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Information Resources on the South American Camelids: Llamas, Alpacas, Guanacos, and Vicunas 2004-2008





Information Resources on the South American Camelids: Llamas, Alpacas, Guanacos, and Vicunas 2004-2008

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About this Document

This publication updates and revises “Information Resources on the South American Camelids: Llamas, Alpacas, Guanacos, and Vicunas 1943-2006” AWIC Resource Series No. 12 - February 2006 (<http://www.nal.usda.gov/awic/pubs/llama.htm>).

There have been a number of decisions made regarding the topics that included in this publication. The topical choices include the following: all four animals are covered; the results of science-based research on the biology, physiology and care of these animals in both their native environments, and as transplants to other countries; the management of these animals by the native people as both herd and natural resources; some information on the important products such as fiber and meat; the role and economic value of the animals and animal products in rural communities; disease and disease organisms; veterinary care of diseases, injuries, surgery, genetic conditions, etc. The information sources are books, conference papers, and journal articles. Some credible web site resources are also listed. Abstracts are included when available.

The information in this resource has been extracted primarily from a variety of resources, and the collection of the National Agricultural Library. It is probably not a comprehensive listing of the Worlds literature on the topic as there may be literature in from the South American countries that has never been listed in commercially available databases.

The bibliographic citations are arranged by genus and species, publication year and alphabetically by author within each year. Since this is an electronic version, it does not include an index. It is expected that by searching using key words and a “find” request, the user will find what is of interest. Much of the information is in English.

The citations may include several access points: the online (URL) journal address, a digital object identifier (DOI) and/or a National Agricultural Library call number as a source of the original article. Go to NAL document services information at <http://www.nal.usda.gov/services/request.shtml> for lending and document delivery services.

The compiler welcomes additional information from other sources for inclusion or any comments or suggestions. It is desirable to have a comprehensive resource of information about these animals, and collaborators are welcome. If you have or know of science based information that would enhance this publication, please contact me. Note that any information submitted must have the important elements of identification and access i.e author, year, publication information, title, accessibility, etc.

Please send your comments, information, or suggestions to:

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Readers are cautioned as to the dynamic nature of the internet and the fact that web addresses and content are subject to change. All sites are current as of April 2009.

Acknowledgements

Sandra Ball, Webmaster for the AWIC program, spent many hours editing converting the document into HTML. Her careful attention to detail helped greatly to provide a consistent, accurate and more readable document.

Introduction

The Camelidae family consists of a small family of mammalian animals. There are two members of Old World camels living in Africa and Asia--Arabian and the Bactrian, and four members of the New World camels living in South America--the llamas, vicunas, alpacas and guanacos. They are all very well adapted to their respective environments: the camels in harsh deserts of Africa and Asia; and their South American cousins inhabit the high altiplano and bush area of South America. Most of these species have been integrated into, and play very important roles in lives of the indigenous people. They have been traditionally used for transport of people and things, hides and fibers for clothing and other textile articles, and in many cases they supply meat and milk products, etc. The South American species are being raised in non-native countries for a variety of reasons: as pack animals, pets, guard animals for sheep ranges, and for fiber. Their biology, reproduction, disease susceptibility, behavior, and nutrition have not been studied to any great extent until fairly recently. Because there are now fairly high populations of these animals in the United States and some other temperate countries, there has been more interest and need to understand their needs, in order to provide adequate housing, feed and veterinary care as they are moved from their native environments to new climates, etc. It is with these needs in mind, that this information resource has been compiled.

Camelidae Family (see Mason, I.L. 1979 for more taxonomic information and characteristics of these animals.)

Oddly enough, the Camelidae evolved in North America. The early ancestors migrated from North America by a crossing the Alaskan land bridge to Asia and the Panama land connection to South America. They eventually became extinct in North America, but began to thrive in their new lands. At one time camels ranged from Asia to Eastern Europe. After crossing into Africa, they were found across the entire northern region and as far south as northern Tanzania. The South American members of the family found their niche in the cool, dry mountain areas of that continent.

Taxonomy

Camelids are in the taxonomic order Artiodactyla (even toed ungulates), sub order Tylopoda (pad-footed), and Family Camelidae. They are ruminants along with the giraffes, deer, cattle, sheep, goats and antelopes. They have several unique features: they walk on pads not hoofs, do have long necks, but no horns, antlers or humps. Their red blood cells are oval in shape. The New World camelids have the ability to survive in harsh dry climates due to their ability to conserve their body water. The group includes two wild species in the high Andes of South America-- the vicuna (*Vicugna vicugna*) and the guanaco (*Lama guanaco*). The native peoples of the Andes domesticated these animals and through selective breeding developed the llama (*Lama glama*) and the alpaca (*Lama pacos* or according to Marin (2007) *Vicugna pacos*). The long standing controversy over the taxonomic relationships between these species may finally have been settled Marin et al (2007) who states "variations in chromosome G banding patterns and two mitochondrial gene sequences were used to study the origin and classification of the llama and alpaca. Differences were found in the short arms of chromosome 1, separating camels, guanacos and llamas from vicunas and alpacas. Phylogenetic analyses showed *V. vicugna* and *L. guanaco* as monophyletic groups." "Marin says that "our results strongly support the hypothesis that the llama would have derived from the *L. guanaco* and the alpaca from the *V. vicugna* supporting a reclassification as *V. pacos*." This genetic analysis is also supported by Kadwell's (2001) 1. does not support the previously accepted thought that both llamas and alpacas were derived from the guanaco. However, since Marin's 2007 reclassification has not become common nomenclature, the old genus and species name of *Lama pacos* will appear in most of the literature that is included in this document.

Introduction to the South American Camelidae

As mentioned above, there are probably just basically two species. All four types have been found to breed in captivity, so genetic relationships are uncertain. Llamoid or camelid is a common name for this group.

Each of the South American camelids has unique qualities, value and can be used as a source

of a wide range of services and products useful to humans. Therefore, a short description and use of each of these interesting, intelligent, and useful animals follows.

The animals are medium sized land mammals. Males are somewhat larger than the females. Their heads have a straight profile. They have no horns or antlers. They have large eyes and thick lashes. The ears are long and pointed. One obvious feature that is different from old world camels is the lack of a hump as their backs are straight. Their foot pads are proportionately smaller than a camel's because they need to move securely on rocky trails and gravel mountain slopes. Since they live in cold, dry places in South America, they have very dense, wooly coats. They may kick or spit if threatened.

Llamas* (*Lama glama*)

Llamas are the largest of the four South American camelids. They can weigh up to 300 pounds. Males are somewhat larger than the females. They are mainly used for fiber and as unusual pack animals in many countries around the world. Currently, they are being used for hauling carts and driving, pet therapy with elderly and disabled persons and as guard animals in large free-range sheep operations. They are environmentally sensitive and intelligent. They are also extremely gentle and used as pet therapy because of their calming effect. They seldom bite or butt and they have no horns, hooves, or claws to do injury. They are alert, curious, adaptable, and predictable with docile, disarming temperaments. They are adapted to high altitudes because their hemoglobin, a constituent of red blood cells, can absorb more oxygen than that of other mammals. Their red blood cells also have a longer life span than other mammals, an average of 235 days versus 100 days for humans.

In their native habitats, llamas played an important role in the ancient Inca civilization in South America. Archeological evidence indicates that they have been domesticated by the indigenous folk from the wild guanaco approximately 5,000 years ago. In the Incan culture, many llamas and alpacas were sacrificed to the gods every year. The meat would then be distributed to the crowds. Llamas were also an integral part of the Inca's workforce. As pack animals they contributed vastly to the building of their irrigation systems, roads, and temples. They were also used to carry loads in the Inca's mines.

Llamas are still used today by the indigenous peoples of South America for packing and transporting goods, fibers, and for meat. Mostly the males are used as pack animal. They usually carry up to fifty pound loads. Stallions can carry up to 110-176 pounds for about 19 miles (a day's march for a llama). Male pack animals are not sheared for their wool as the heavy thick coat acts as a saddle blanket by cushioning their loads. It has been suggested that the llamas were selectively bred as pack animals leading to a larger stronger animals than their wild parent. The females are sheared, but llama wool is inferior to the alpacas and is often used to make rope. (The alpaca has probably been selected and bred for wool and not as a pack animal.) It is interesting to note that llamas only allow themselves to be loaded when they are part of a group. South American herders use most parts of a culled llama's carcasses. They are important sources of meat, wool, hides for various uses including sandals, and fat for candles. Even their dung can be dried and used for fuel.

Alpacas+ (*Llama pacos/ proposed Vicugna pacos*)

Indications are that alpacas were domesticated 6-7,000 years ago. Alpaca's roots also go back to the Incan civilization, where alpacas were considered a "prize." Kadwell et al 1 used mitochondrial and microsatellite DNA analysis that indicates that the vicuna was the ancestor of the alpaca, which would explain why their coats make the finer quality wool than the llamas. Alpaca fiber was woven into robes used by Inca royalty. They also provided food, fuel, clothing, and transportation for this culture in an otherwise extremely hostile environment. Alpacas still thrive in the harsh climates of the Peruvian, Bolivian, and Chilean highlands where scorching temperatures in the day plummet to sub-freezing at night. They prefer low humidity and altitudes between 13,000 and 16,000 feet. At low altitudes, their wool is often of poorer quality. Nevertheless, they are well suited for conditions in the US and are being bred in at least 44 states (1997 estimates). They also are increasing in numbers in many other parts of the world.

Alpacas are small compared to llamas, approximately 36" at the withers. Piebald color patterns are much rarer than in llamas, and alpacas usually have a tuft of hair on their forehead. Their life span is 15 to 25 years. Their weight can range between 100 to 175 pounds (approximately one-half to one-third the size of a llama). Their gestation period is approximately 11.5 months. Their birth weight is between 15 and 19 pounds and the babies

(crias) can stand and nurse within 30 minutes to one hour after birth. They also have a very low infant mortality rate.

The males produce approximately eight pounds and the females about five pounds of easily marketable wool fiber from their coats per year. The fiber comes in approximately 22 basic colors with many variations and blends. It has a cellular structure similar to hair and is more resilient and much stronger than Merino sheep wool. It is highly sought after in Britain, Europe, and Japan. The cria fiber is extra fine and lustrous and commands a higher selling price. Their wool quality is only slightly lower than the vicuna. The black coats are usually the heaviest. The Suri breed has finer, thicker, and longer hair and provides up to eleven pounds of wool per year, but the breed has a greater susceptibility to parasites.

In South America, shearing is usually done every two years before the rainy season in November and December. After seven years of age, alpacas are used primarily for meat. In 1972, there were about two million living in Peru and 50,000 in Bolivia.

Alpacas are inexpensive to feed (about \$1 per day per alpaca). This is about the same cost as a large dog. They have three stomachs which enable them to be very efficient at digesting what they eat. They are more fastidious feeders than llamas, being very Earth-friendly by grazing meticulously throughout the pasture. They prefer free range pasture to confinement in a stall or barn. They have sensitive feet and prefer soft, moist ground with tender grasses. They also enjoy pools and puddles for wallowing. A lack of adequate ground moisture is thought to lead to a fatal foot disease and rainless years often lead to higher mortality rates. No special food is required for them except in winter or in late pregnancy when all they need is good quality hay and low protein pellets. Alpacas will spit on one another if sufficiently angered, but will rarely spit on people.

One acre will provide ample room for five to ten alpacas, much more economical than most other types of livestock. Any fencing that may be required is usually to keep predators out of the pasture versus keeping the alpacas in. Simple shelters will suffice, usually only requiring a three-sided enclosure or a lean-to. Alpacas usually defecate in fixed areas and avoid grazing there, keeping parasitic infestations low. Their manure also makes an excellent fertilizer.

They have a high world market value-- \$8,500 and \$25,000 per animal; a breeding age female goes for \$15,000 to 25,000 (1997 estimates). Some female alpacas are bred as young as 6-12 months of age because breeders are in a hurry to produce young, but it is recommended that the first breeding be at 18-24 months of age to allow full physical and social maturity. In the United States, they can be insured and depreciated from the owner's taxes. Other tax advantages include expense deductions and deferred recognition of accumulating wealth.

They were first imported to the US in 1984 and spread quickly to Canada. There have been limited numbers allowed for export from South America for reasons such as restricting their export and animal health problems. There were relatively few of these animals in North America (less than 8,000 in 1996), but the numbers are increasing rapidly as they are an economically rewarding fiber producing animal both in the US and in many other countries.

Guanacos* (*Lama guanicoe*)

Guanacos are the larger of the two wild camelid species. They stand about four feet tall at the shoulder and about five feet to the top of the head. They have a body length of up to six feet with an approximately ten-inch long tail. They can weigh up to 210 pounds. Their woolly coat is tawny to brown and their head is usually grey.

Wild guanacos thrive in the plains of northern Peru to southern Patagonia. They often live in the mountains and altiplano areas above 12,000 feet. Usually herds of several females travel with one male; however, leaderless herds of males of up to 200 have been found. The guanaco can run at speeds up to 40 miles per hour and they are also strong swimmers. Their mating season is during August and September. They have a ten to eleven month gestation period. The babies can run soon after birth and are weaned at six to twelve weeks.

Vicunas* (*Vicugna vicugna*)

Vicunas are smaller than guanacos and weigh only about 100 pounds. Vicunas thrive in the mountainous regions of Northern Peru and Chile at altitudes above 14,000 feet. They are up to three feet at the shoulder and usually have a light brown coat with a yellow-red bib.

They are very social animals. There are male dominated family groups. Non-territorial males form groups of both young and desposed older males. Vicunas are less easy to tame than the guanaco because they are extremely shy, but some South American Jesuits have shown they can be domesticated. These animals are less adaptable to different environments. The native people do harvest the wool of these animals. They drive them into an enclosure, shear them, and release them.

References (*, +- denotes a large portion of this reference was used to create the text below):

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* Burton, Maurice; Burton, Robert. Marshall Cavendish Corp. **The International Wildlife Encyclopedia.** B.P.C. Publishing Limited, New York. 1969; 10: 1329-1331.
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NAL call no.: QL9.B8

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Mason, I.L. **Origins, evolution and distribution of domestic camels.** In: W. Ross Cockrill (Editor). *The Camelid. An All-Purpose Animal.* Volume 1. Scandinavian Institute of African Studies, Uppsala. Proceedings of the Khartoum Workshop on Camels, December 1979. p. 16-35.
NAL call no.: SF401.C2K48 1979 v. 1

Rae, M. **Alpacas: wooly & wonderful.** *Small Farm Today*. Feb/Mar 1997; 14(1): 27. ISSN: 1079-9729.

NAL call no.: S1.M57

+Sands, J.D. **Alpacas: attractive investment attractive lifestyle.** *AgVentures*. June/July 1997; [1(1)?]: 28-32.

NAL call no.: S441.A475

1. Kadwell, Miranda; Fernandez, Matilde; Stanley, Helen F.; Baldi, Ricardo; Wheeler, Jane C.; Rosadio, Raul; Bruford, Michael W. **Genetic analysis reveals the wild ancestors of the llama and the alpaca.** *Proceedings of the Royal Society Biological Sciences. Series B*. 2001 Dec; 268(1485): 2575-2584. ISSN: 0962-8452.

NAL call no.: 501 L84B

2. Marin, Juan C.; Zapata, Beatriz; Gonzalez, Benito A.; Bonacic, Cristian; Wheeler, Jane C.; Casey, Ciara; Bruford, Michael W.; Palma, R. Eduardo; Poulin, Elie; Alliende, M. Angelica; Spotorno, Angel E. **Sistematica taxonomia y domesticacion de alpacas y llamas: nueva evidencia cromosomica y molecular.** [Systematics, taxonomy and domestication of alpaca and llama: new chromosomal and molecular evidence.] *Revista Chilena de Historia Natural*. 2007; 80(2): 121-140. ISSN: 0716-078X.

Llamas

2008

Albini, S.; Brodard, I.; Jaussi, A.; Wollschlaeger, N.; Frey, J.; Miserez, R.; Abril, C. **Real-time multiplex PCR assays for reliable detection of *Clostridium perfringens* toxin genes in animal isolates.** *Veterinary Microbiology*. 2008; 127(1/2): 179-185. ISSN: 0378-1135

URL:<http://www.sciencedirect.com/science/journal/03781135>

NAL call no.: SF601.V44

Abstract: Typing of *Clostridium perfringens* strains by PCR-based determination of toxin genes proved to be a reliable method for diagnosis of enterotoxaemia in various animal species. We report the establishment and validation of three real-time fluorogenic (Taq-ManReg.) multiplex PCRs for the detection of *C. perfringens* alpha -, beta -, beta 2-, epsilon -, entero-, and iota -toxin genes. The composition of the PCRs was chosen with regard to robustness of the assays and in order to increase sensitivity compared to the conventional simplex PCRs. The combination of probe dyes selected for the real-time assays (FAM/TAMRA, Cy-5/BHQ-2 and VIC/TAMRA) as well as the designation of the chromosome-borne alpha -toxin as internal positive control allowed the creation of highly specific and sensitive, as well as time and cost effective PCRs. One hundred and three strains of *C. perfringens* isolated in Switzerland derived from clinical or suspected cases of enterotoxaemia in 10 different animal species were tested. The toxin genotypes were in agreement in both the conventional PCRs and the newly designed multiplex PCRs. Furthermore, the real-time PCR carried out as simplex allows to quantitate the copy numbers of plasmid-borne toxin genes in relation to the chromosomally located alpha -toxin gene. Reproduced with permission from CAB Abstracts.

Descriptors: cattle, chamois, red deer, sheep, horses, hares, llamas, pigs, calves, detection, diagnosis, diagnostic techniques, enterotoxaemia, enterotoxins, genes, genotypes, PCR, Switzerland.

Cebra, C.K.; Tornquist, S.J.; Reed, S.K. **Collection and analysis of peritoneal fluid from healthy llamas and alpacas.** *Journal of the American Veterinary Medical Association*. 2008 May 1; 232(9): 1357-1361. ISSN: 0003-1488

URL: <http://www.avma.org>

NAL call no.: 41.8 AM3

Abstract: Objective - To compare relative sensitivity and overall yields of various methods of fecal examination for gastrointestinal parasites in llamas and alpacas. Design - Prospective study. Sample Population - Fecal samples from 42 alpacas and 62 llamas. Procedures - Fecal samples were analyzed via direct smear, a modified McMaster technique with sucrose solution or saturated saline (approx 36% NaCl) solution, and a centrifugation-flotation procedure. McMaster flotation chambers were examined 15 and 60 minutes after loading. Centrifugation-flotation samples were examined after 10 and 60 minutes of flotation. The

proportions of samples with positive results and concentrations of parasites were compared among methods. Results - The centrifugation-flotation technique yielded more positive results than other methods for all parasites except small coccidia. Longer flotation time increased the proportion of positive results and parasite concentrations for all parasites except *Nematodirus* spp. Longer time in the McMaster chamber made little difference. By use of the modified McMaster technique, sucrose solution yielded more positive results for *Trichuris* spp., *Eimeria macusaniensis*, and strongyles, whereas saline solution yielded more positive results for *Nematodirus* spp. and small coccidia. The saline solution McMaster test yielded more positive results for small coccidia than did most other methods, and the sucrose McMaster technique yielded more positive results for *Trichuris* spp. Conclusions and Clinical Relevance - The centrifugation-flotation technique appeared to offer clear advantages in detecting infection with *E. macusaniensis*, *Trichuris* spp., *Nematodirus* spp., and capillarids. The saline McMaster technique appeared to offer an advantage in detecting small coccidia. **Descriptors:** healthy animals, 17 llamas, 5 alpacas, abdominocentesis, peritoneal fluid biochemical and cytologic findings, collected safely, compared with blood, peritoneal fluid had a low cell count, low protein concentration, some individual differences, electrolyte concentrations resembled blood, high values of some animals may complicate interpretation of peritoneal fluid values.

Cebra, C.K.; Stang, B.V. **Comparison of methods to detect gastrointestinal parasites in llamas and alpacas.** *Journal of the American Veterinary Medical Association.* 2008 Mar 1; 232(5): 733-741. ISSN: 0003-1488

URL: <http://www.avma.org/>

NAL call no. : 41.8 AM3

Descriptors: 62 llamas; 42 alpacas; gastrointestinal parasites; detection methods; comparison study; direct smear; McMaster technique with sucrose solution or saturated saline; centrifugation-flotation procedure; centrifugation-flotation detected: *E macusaniensis*, *Trichuris* spp, *Nematodirus* spp, and capillarids; saline McMaster technique detected small coccidian, strongyles.

Dinev, T.G. **Comparison of the pharmacokinetics of five aminoglycoside and aminocyclitol antibiotics using allometric analysis in mammal and bird species.** *Research in Veterinary Science.* 2008; 84(1): 107-118. ISSN: 0034-5288.

URL: <http://www.sciencedirect.com/science/journal/00345288>

Descriptors: dromedaries, llamas, cattle, sheep, goats, cats, guinea pigs, horses, hawks, eagles, chickens, turkeys, rabbits, parakeets, owls, pigs, humans, gentamicin, amikacin, tobramycin, kanamycin and apramycin, allometric equations, drug half-life, volume of drug distribution, total body clearance, estimating dose intervals, difference drugs responses between birds, and mammals.

Giuliano, S.; Director, A.; Gambarotta, M.; Trasorras, V.; Miragaya, M. **Collection method, season and individual variation on seminal characteristics in the llama (*Lama glama*).** *Animal Reproduction Science.* 2008 Mar 3; 104(2-4): 359-369. ISSN: 0378-4320

URL: <http://www.sciencedirect.com/science/journal/03784320>

DOI:<http://dx.doi.org/10.1016/j.anireprosci.2007.02.016>

NAL call no.: QP251.A5

Abstract: The objective of the present study was to evaluate the effect of semen collection method (electroejaculation EE as compared with the artificial vagina AV), the season (summer versus winter) and the male used on macroscopic and microscopic characteristics of ejaculates in llamas. A total of 110 ejaculates were collected from six males and 92 of them were analyzed. Ejaculate volume, concentration, total sperm and the following sperm characteristics were studied: motility, membrane function (HOS test), membrane integrity (CFDA/PI fluorochromes) and morphology. A mixed linear model, that considered season and collection method as the fixed variables and the male as the random variable, was used for the statistical analysis. Variability was found between males ($p \leq 0.05$) when comparing the seminal characteristics. When considering the number of collections performed and the number of ejaculates discarded with each method, significant differences ($p < 0.01$) were found between collection methods (EE and AV), with EE having a greater proportion of successful semen collections. There were significant differences ($p \leq 0.05$) between collection methods for volume, sperm motility and membrane function. Ejaculates obtained by EE have a greater volume, sperm motility, live spermatozoa and sperm with functional membranes. Comparison of semen variables between the two seasons indicated that sperm concentration and sperm abnormalities were different ($p < 0.01$). Ejaculates obtained during winter have greater sperm concentration and less sperm tail abnormalities than in summer. We conclude that semen variables have individual variation in llamas and are affected both by method of collection and season. The most desirable semen quality was obtained during winter using EE as the semen collection method.

Descriptors: llamas, semen collection, electroejaculation, artificial vagina, seasonal differences in semen, macroscopic and microscopic examination, semen volume, semen concentration, sperm motility, membrane function and integrity, variability between males, sperm concentration, sperm tail abnormalities.

Harwood, D.; Nuttall, J.; Bidewell, C. **Fasciolosis in camelids.** *Veterinary Record*— London. 2008; 162(13): 424. ISSN. 0042-4900

URL:<http://veterinaryrecord.bvpublications.com/archive/>

NAL call no.: 41.8 V641

Abstract: This correspondence reports a recent incidence of fascioliasis in a 30-month-old llama from a smallholding farm in southeast England [date not given]. The llama was kept with 15 sheep, of which 2 died of chronic fascioliasis. Postmortem examination revealed severe hepatic damage with fibrosis. Histopathological examination revealed extensive hepatic fibrosis, biliary hyperplasia and enlarged bile ducts filled with caseous material. The morphological diagnosis of severe chronic fibrosing cholangiohepatitis was consistent with fluke infection.

Descriptors: llama, case study, case report, clinical aspects, diagnosis, postmortem organ sampling, liver, liver fluke infection, fascioliasis, histopathology, Britain, UK.

Herrera, Emilio A.; Reyes, Roberto V.; Giussani, Dino A.; Riquelme, Raquel A.; Sanhueza, Emilia M.; Ebensperger, German; Casanello, Paola; Mendez, Natalia; Ebensperger, Renato; Sepulveda Kattan, Esteban; Pulgar, Victor M.; Cabello, Gertrudis; Blanco, Carlos E.; Hanson, Mark A.; Parer, Julian T.; Llanos, Anibal J. **Carbon monoxide: a novel pulmonary artery vasodilator in neonatal llamas of the Andean altiplano.** *Cardiovascular Research*. 2008; 77(1): 197-201. ISSN: 0008-6363

URL: <http://www.sciencedirect.com/science/journal/00086363>

Descriptors: lambs, crias, neonates, highlands of 3600 Meters and lowlands of 580 Meters, comparison study, pulmonary regulation, nitric oxide (NO) and carbon monoxide roles, NO synthase (NOS) blockade and production of carbon monoxide by lung, soluble guanylate cyclase (sGC) expression, NOS activity, and hemoxygenase (HO) expression, pulmonary arterial pressure, pulmonary hypertension.

Marques, F.J. **Fluid therapy: general practical recommendations for camelids.** *Large Animal Veterinary Rounds*. 2008; 8(1): 6 pp.

URL: <http://www.larounds.ca>

Abstract: The camelid industry is relatively new and ever-evolving, as is our knowledge about these animals. Camelids differ from ruminants in several ways and in many situations they must be treated differently. Llama and alpaca caseloads tend to rise from year to year, both in the Western College of Veterinary Medicine hospital and in other referral practices, and it is essential that veterinarians keep up with the latest information available in this developing medical field. Further, since recommendations given today may not be valid in the near future, veterinarians must remain open to considering new ideas. This issue of *Large Animal Veterinary Rounds* reviews general fluid therapy principles and indicates some practical recommendations for camelids. The concepts discussed are based on current literature, research, the available reference material and the personal experience of well-respected camelid veterinarians around the world. Reproduced with permission from CAB Abstracts.

Descriptors: alpacas, llamas, dehydration, rehydration, fluid therapy for camelids, clinical aspects, complications, intravenous injection, oral administration, literature review.

Mongoh, M.N.; Dyer, N.W.; Stoltenow, C. L.; Khaitza, M.L. **Risk factors associated with anthrax outbreak in animals in North Dakota, 2005: a retrospective case-control study.** *Public Health Reports*. 2008; 123(3): 352-359. ISSN: 0033-3549

URL: <http://www.publichealthreports.org>

Abstract: Objective. We identified the risk factors associated with the anthrax outbreak of 2005 in animals in North Dakota. Methods. Medical records of the 2005 anthrax outbreak were obtained from the Veterinary Diagnostic Laboratory at North Dakota State University. Additional data were obtained from the North Dakota state veterinarian's office, and supplemental questionnaires were administered to producers. The data obtained included ecological and environmental factors, animal health factors, and management factors. Results. Anthrax occurred from July 1 to October 12, 2005. The cases were located in eastern North Dakota around the Red River Basin. Ransom, LaMoure, and Barnes counties reported most cases (71%). Species affected included cattle, bison, horses, sheep, elk, deer, pigs, and llamas. The predominant symptom was sudden death (38%) followed by bleeding

from orifices (17%). Chi-square analysis indicated significant differences between case and control premises on the following variables: death reported on neighboring pasture, vaccination period, dry conditions, wet conditions, antibiotic use, multiple vaccination, and type of predator (coyote). Factors that significantly ($p < 0.05$) predicted anthrax occurrences on the final logistic regression model were vaccination, use of antibiotics during an outbreak, and period of vaccine administration (before or during the outbreak). Conclusions. The characteristics of the anthrax outbreak regarding time and place of occurrence, animals affected, clinical signs reported, and mortality rate were consistent with previous reports of natural anthrax outbreaks in animals. A number of factors that significantly predicted anthrax occurrence in animals in the 2005 outbreak in North Dakota were identified. This information is important in planning appropriate control and prevention measures for anthrax, including recommending the right vaccination and treatment regimens in managing future anthrax outbreaks.

Descriptors: bison, cattle, elk, deer, horses, llamas, pigs, anthrax, *Bacillus anthracis*, disease transmission, epidemiology, immunization, immune sensitization, outbreaks, risk factors, vaccination, veterinary surgeons, zoonoses, North Dakota, US.

Pirie, Chris G.; Pizzirani, Stefano; Parry, Nicola M. **Corneal epithelial inclusion cyst in a Llama.**

Veterinary Ophthalmology. 2008 Mar; 11(2): 111-113. ISSN: 1463-5216

URL:<http://www3.interscience.wiley.com/journal/118507707/home>

DOI:<http://dx.doi.org/10.1111/j.1463-5224.2008.00608>

NAL call no.: SF891.V47

Abstract: A 13-year-old, female llama presented for evaluation of a limbal based corneal mass involving the OD of 4 months duration. The mass was excised en bloc by a nonpenetrating keratectomy, followed by placement of a conjunctival advancement flap covering the keratectomy site. The mass was submitted for histological evaluation. Histopathology identified the mass to be a corneal epithelial inclusion cyst filled with necrotic squamous and neutrophilic debris. Surgical excision was complete and considered curative with no signs of recurrence 3 months postoperatively. There was no known prior ocular trauma; however, a previously performed corneal biopsy for evaluation of recurrent epithelial erosions may have been an initiating cause.

Descriptors: female llama, corneal mass, excision of mass by keratectomy, conjunctival flap, histopathology, epithelial inclusion cyst filled with debris.

Prado, T.M.; Doherty, T.J.; Boggan, E.B.; Airasmaa, H.M.; Martin-Jimenez, T.; Rohrbach, B.W.

Effects acepromazine and butorphanol on tiletamine-zolazepam anesthesia in llamas.

American Journal of Veterinary Research. 2008 Feb; 69(2): 182-188. ISSN: 0002-9645

URL:<http://www.avma.org/journals/default.asp>

NAL call no.: 41.8 AM3A

Abstract: Objective - To evaluate sedative, antinociceptive, and physiologic effects of acepromazine and butorphanol during tiletamine-zolazepam (TZ) anesthesia in llamas. Animals - 5 young adult llamas. Procedures - Llamas received each of 5 treatments IM (1-week intervals): A (acepromazine, 0.05 mg/kg), B1 (butorphanol, 0.1 mg/kg), AB (acepromazine, 0.05 mg/kg, and butorphanol, 0.1 mg/kg), B2 (butorphanol, 0.2 mg/kg), or C (saline [0.9% NaCl] solution). Sedation was evaluated during a 30-minute period prior to anesthesia with TZ (2

mg/kg, IM). Anesthesia and recovery characteristics and selected cardiorespiratory variables were recorded at intervals. Antinociception was assessed via a toe-clamp technique. Results - Sedation was not evident following any treatment. Times to sternal and lateral recumbency did not differ among treatments. Duration of lateral recumbency was significantly longer for treatment AB than for treatment C. Duration of antinociception was significantly longer for treatments A and AB, compared with treatment C, and longer for treatment AB, compared with treatment B2. Treatment B1 resulted in a significant decrease in respiratory rate, compared with treatment C. Compared with treatment C, diastolic and mean blood pressures were lower after treatment A. Heart rate was increased with treatment A, compared with treatment B1 or treatment C. Although severe hypoxemia developed in llamas anesthetized with TZ alone and with each treatment-TZ combination, hemoglobin saturation remained high and the hypoxemia was not considered clinically important. Conclusions and Clinical Relevance - Sedation or changes in heart and respiratory rates were not detected with any treatment before administration of TZ. Acepromazine alone and acepromazine with butorphanol (0.1 mg/kg) prolonged the duration of antinociception in TZ-treated llamas.

Descriptors: llamas, young adults, anesthesia, evaluate sedation, antinociceptive effect, physiologic effect, recovery characteristics, selected cardiorespiratory variables, toe clamp technique for pain, times to sternal and lateral recumbency did not differ between treatments, lateral recumbency varied, heart rates, hypoxemia, hemoglobin saturation; acepromazine alone and acepromazine with butorphanol (0.1 mg/kg) prolonged duration of antinociception in TZ

Semevolos, Stacy A.; Huber, Michael J.; Parker, Jill E.; Reed, Shannon K. **Complications after orthopedic surgery in alpacas and llamas: 24 cases (2000-2006).** *Veterinary Surgery*. 2008 Jan; 37(1): 22-26. ISSN: 0161-3499

URL:<http://www3.interscience.wiley.com/journal/118532623/home>

DOI: <http://dx.doi.org/10.1111/j.1532-950X.2007.00342>

NAL call no.: SF911.V43

Abstract: To report complications associated with orthopedic surgery in alpacas and llamas. Retrospective study. Alpacas (n=18) and llamas (n=6) that orthopedic surgery using internal or external fixation. Medical records (January 2000-December 2006) and radiographs were reviewed and owners contacted for follow-up information for alpacas and llamas that had orthopedic surgery involving internal or external fixation. Fourteen camelids had internal fixation, 7 had external fixation, and 3 had a combination of internal and external fixation. Twenty-two animals (92%) were discharged after surgery (mean hospitalization, 15 days). Of 20 animals with ≥ 1 year follow-up information, 18 were alive (82%). Postoperative complications related to fracture healing, infection, soft tissue structures, or joints occurred in 21 camelids (87%). Thirteen animals returned to their intended use, 4 animals returned to breeding but not their intended use, 4 were euthanized, and 3 were only able to be used as pets. Fixation type (internal, external) did not have any significant effect on complications involving fracture healing, infection, soft tissue structures, or chronic lameness. Camelids with open fractures were more likely to have complications associated with fracture healing, repair, and infection than closed fractures. Complications after orthopedic surgery in alpacas and llamas are more common than previously reported and may result in chronic lameness or prevent return to their intended use.

Descriptors: alpacas, llamas, musculoskeletal diseases, bone fractures, surgery, veterinary

equipment, disease course, postoperative complications, morbidity, lameness, inflammation, data analysis, image analysis, radiography.

Smith, S.H.; Reel, D.R. **Cerebral and renal candidosis in a llama (*Lama glama*)**. *Veterinary Record*--London. 2008 Apr 12; 162(15): 485-486. ISSN: 0042-4900

URL:<http://veterinaryrecord.bvapublications.com/>

NAL call no.: 41.8 V641

Abstract: A six-year-old neutered male llama in lateral recumbency and with open-mouthed breathing was referred to the University of Tennessee College of Veterinary Medicine (date not given). Physical examination revealed that the animal was depressed and dehydrated (10%). Mentation was abnormal and the menace response in the right eye was decreased. Blood chemical analysis revealed markedly elevated aspartate aminotransferase and creatinine kinase activities, while total bilirubin, gamma-glutamyl transferase and glucose were moderately elevated. Due to poor response to supportive therapy, the llama was euthanized and submitted to postmortem examination. Smooth, raised, firm, pale yellow nodules were disseminated throughout the cortical parenchyma of both kidneys. Dural blood vessels were markedly dilated, especially the dorsal cerebral vein on the right side. Representative samples of multiple organs were processed and fixed for histopathological examination. Several colonies of *Candida albicans* were isolated from fresh brain samples. The histopathological lesions were conclusive of fungal infection.

Descriptors: llamas, brain and kidney infection, *Candidaalbicans*, yeast infection, case study, clinical picture, diagnosis.

Sura, R.; Creden, A.; Van Kruiningen, H.J. ***Pseudomonas*-associated discospondylitis in a two-month-old llama**. *Journal of Veterinary Diagnostic Investigation*. 2008 May; 20(3): 349-352. ISSN: 1040-6387

URL:<http://jvdi.org/>

NAL call no.: SF774.J68

Descriptors: young llama, discospondylitis, case history, clinical picture, bacterial infection, *Pseudomonas*.

Waite, L.H.; Cebra, C.K. **Characterization of hypertriglyceridemia and response to treatment with insulin in llamas and alpacas: 31 cases (1995-2005)**. *Journal of the American Veterinary Medical Association*. 2008 May 1; 232(9): 1362-1367. ISSN: 0003-1488

URL:<http://avmajournals.avma.org/doi/abs/10.2460/javma.232.9.1362>

NAL call no.: 41.8 AM3

Descriptors : 23 alpacas, 8 llamas, 7 pregnant alpacas, 1 lactating alpaca, hypertriglyceridemic, multiple triglycerides concentration, treated and non-treated with insulin, insulin seems to reduce serum and plasma triglycerides, can affect all ages and both sexes.

Yang, FuLin; Wang, HuCheng; Guo, XuSheng; Long, RuiJun. **Review of purine derivatives in urine to estimate rumen microbial protein production**. *Acta Prataculturae Sinica*. (*Ts'oa yeh hsu eh pao* = *Acta prataculturae Sinica* = *Caoye xuebao*) . 2008; 17(1): 121-129. ISSN: 1004-5759. Note: In Chinese with an English summary.

NAL call no .: SB202.C6T73

Abstract: Urinary excretion of purine derivatives (PD), like allantoin, uric acid, xanthine and hypoxanthine, have been studied in ruminants with the objective of using the excretion of these purine metabolites as a parameter to estimate rumen microbial protein. The PD in the urine is a good marker for estimating rumen microbial synthesis. This paper covers endogenous excretion in ruminants, modelling the response of PD excretion to purine absorption, calculation of microbial nitrogen supply from PD excretion using all-urine and spot urine measurement, and the current understanding of PD excretion in different animal species, including sheep, cattle, goats, buffaloes, yaks, camels and llamas. Reproduced with permission from CAB Abstracts.

Descriptors: buffalo, cattle, goats, llamas, ruminants, sheep, yaks, camels, urine testing, purine derivatives, protein biosyntheses, purine bases, allantoin, excretion, hypoxanthine, nitrogen, purines, reviews, rumen, rumen microorganisms, uric acid, urine, xanthine.

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Abd El Aty, A.M.; Goudah, A.; Shah, S.S.; Shin, H.C.; Shimoda, M.; Shim, J.H. **Pharmacokinetic variables of moxifloxacin in healthy male camels following intravenous and intramuscular administration.** *Journal of Veterinary Pharmacology and Therapeutics*. 2007; 30(6): 586-591. ISSN: 0140-7783

URL:<http://www3.interscience.wiley.com/journal/117986825/home>

Descriptors: llamas, alpacas, camels, males, *Chlamydia* infection, *Mycoplasma* infection, drug therapy, moxifloxacin, fluoroquinolone, moxidectin, mocifloxacin, antibiotics, intravenous administration, intramuscular administration, pharmacokinetics.

Adams, G.P. **Theriogenology in llamas and alpacas.** *Large Animal Veterinary Rounds*. 2007; 7(10): 6 PP

URL:<http://www.larounds.ca>

Abstracts: The reproductive characteristics of llamas and alpacas are similar, and clinical management need not distinguish between the two. Camelids are the only large domestic species that are induced ovulators. Sexual behaviour and copulation time is strikingly different from any other domestic species. In addition, gestation is unusually long and uterine anatomy, placentation, and birthing distinctly differ from any other species. This issue of Large Animal Rounds discusses the reproductive management of South American camelids. The paper covers sexual and mating behaviour, ultrasonography of the ovaries and uterus, follicular dynamics, luteal dynamics, ovarian irregularities, breeding schemes, puberty and postpartum period, synchronization and fixed-time breeding and pregnancy diagnosis. Reproduced with permission from CAB Abstracts.

Descriptors: alpacas, llamas, breeding camelids, reproduction, mating behavior, sexual behavior, corpus luteum, ovarian follicles, ovaries, ovulation, uterus, pregnancy gestation period, sexual maturity, synchronization, pregnancy diagnosis, ultrasonography, postpartum period.

Altenbrunner-Martinek, B.; Klein, D.; Kofler, J.; Baumgartner, W. **Kongenitale Extremitätenmissbildungen bei einem Lama (*Lama glama*): Polydactylie kombiniert mit Arthrogryposis.** [Congenital malformation of the front limbs in a llama (*Lama glama*): polydactyly in combination with arthrogryposis.] *Berliner und Münchener Tierärztliche Wochenschrift*. 2007; 120(11/12): 508-512. ISSN: 0005-9366. Note: In German with an English summary. URL:<http://www.vetline.de/bmtw/>

NAL call no.: 41.8 B45

Abstract: A 10-month-old male llama with malformation of both front limbs was presented [Austria, date not given]. Both front limbs had one more digit located medially. The distal phalanx of this additional digit at the left front limb reached the ground by the tip of the keratinized pad and toenail. The accessory digit at the right front limb was bent in a 90 degrees angle caudolaterally. Beside the digital bones of the accessory digits, the second metacarpal bone and the first carpal bone could be detected in both front limbs by radiological examination. A bilateral slight carpal valgus deformity could be seen.

Descriptors: llamas, birth defects, clinical picture, congenital malformations, arthrogryposis, carpus, case report, clinical aspects, congenital abnormalities, diagnosis, digits, limbs, metacarpus, polydactylia, radiography, Austria.

Azwai, S.M.; Abdousslam, O.E.; Al Bassam, L.S.; Al Dawek, A.M.; Al Izzi, S.A.L. **Morphological characteristics of blood cells in clinically normal adult llamas (*Lama glama*).** *Veterinarski Arhiv*. 2007; 77(1): 69-79. ISSN: 0372-5480. Note: In English with a Croatian summary. URL : <http://www.vcf.hr/vetarhiv>

NAL call no.: 41.8 V6416

Abstract: Morphological characteristics, including the number, differentiation and features of blood cells were determined in 10 male and 10 female clinically normal adult llamas. Haematological parameters included erythrocyte count, haemoglobin concentration, packed cell volume, erythrocyte indices, reticulocyte count, platelet count, total leukocyte count and differential leukocyte count. It appeared that the llama haemogram was characterized by the presence of numerous but small erythrocytes, high total leukocyte count and a high number of mainly immature eosinophils. Unique cellular morphological characteristics commonly observed in May-Grunwald-Giemsa stained blood smears were folded erythrocytes, Cabot's rings, hypersegmented neutrophil nuclei, granular lymphocytes and immature eosinophils.

Descriptors: llamas, blood cells, normal values, eosinophils, erythrocyte count, erythrocytes, hematocrit, hematology, hemoglobin, hematocrit, leukocyte count, leukocytes, lymphocytes, morphology, neutrophils, platelets.

Bangari, D.S.; Stevenson, G.W. **Carcinoma in a mixed mammary tumor in a llama (*Lama glama*).** *Journal of Veterinary Diagnostic Investigation*. 2007 July; 19(4): 450-453. ISSN: 1040-6387 URL:<http://jvdi.org/>

NAL call no.: SF774.J68

Abstract: A 13-year-old female llama was presented to the referring veterinarian for swelling and firmness of the right rear mammary gland, for a duration of 2 months, which had been unresponsive to antibiotics. A formalin-fixed wedge biopsy specimen from the affected quarter was submitted to Purdue University Animal Disease Diagnostic Laboratory for histopathology. Histopathologic examination revealed tubulopapillary acinar or solid nest-like

clusters of neoplastic epithelial cells surrounded by whorls and sheets of proliferative myoepithelial cells. Histologic criteria for malignancy observed in neoplastic epithelial cells included marked cellular and nuclear atypia, high mitotic index, and numerous bizarre mitoses. The presence of osseous metaplasia in the proliferative mesenchymal component justified classification as a mixed tumor. Positive immunohistochemical staining of neoplastic epithelial cells with anticytokeratin antibody, and proliferative spindle cells with antivimentin and anti-smooth muscle actin antibodies supported the histopathologic diagnosis. The llama was in good health after about 1 year of initial presentation, and metastasis to regional lymph nodes was not reported. Mammary neoplasia is rare in camelids. To the authors' knowledge, this is the first report of a carcinoma in a mixed mammary tumor in a llama. Reproduced with permission from CAB Abstracts.

Descriptors: llamas, mammary neoplasms, carcinoma, disease diagnosis, case studies, veterinarians, antibiotics, biopsy, epithelial cells, cell proliferation, histopathology, mitosis, metastasis.

Bianchi, C.P.; Meikle, A.; Sartore, I.; GonczLlez, F.; Aba, M.A. **Uterine estrogen receptor alpha and progesterone receptor during the follicular and luteal phase in llamas.** *Animal Reproduction Science*. 2007 May; 99(1-2): 117-126. ISSN: 0378-4320

URL:<http://www.sciencedirect.com/science/journal/03784320>

DOI:<http://dx.doi.org/10.1016/j.anireprosci.2006.04.042>

NAL call no.: QP251.A5

Abstract: Estrogen receptor- alpha (ER alpha) and progesterone receptor (PR) were characterized in different endometrial cell types as luminal and glandular epithelium and stroma during the follicular (FP) and the luteal phase (LP) in llamas. Animals were examined daily by transrectal ultrasonography for the determination of the presence of an ovulatory follicle and ovulation was immediately induced by a GnRH injection (Day 0). Endometrial samples were obtained by transcervical biopsies from the left uterine horn on Day 0 (FP) and 9 days after the GnRH injection (Day 9, LP). Blood samples were collected on these days for estradiol 17 beta and progesterone determination by RIA. An immunohistochemical technique was used to visualize ER alpha and PR immunostaining which was then analyzed by two independent observers. Total positive area and average staining for ER alpha were affected by the phase of the ovarian activity: in the three cell types there was more positive area and intense staining during the FP than during the LP. Similar findings were observed for PR, more positive stained areas were found during the FP than during the LP in the epithelia. In addition, the three cell types had more intense staining during the FP than during the LP. An effect of the cell type for ER alpha and PR was observed; epithelia (luminal and glandular) had more positive stained areas and greater intensity than stromal cells. In conclusion, the results of the present study suggest that in llamas, like in other ruminants, estradiol has a stimulatory effect while progesterone downregulates the ER alpha and PR and that the receptor is cell type specific.

Descriptors: llamas, ovulation, estrous cycle, hormonal regulation, hormone receptors, estrogens, estradiol, progesterone, tissue distribution, uterine tissue, endometrium, epithelial cells, ovarian follicles, follicular development, corpus luteum, luteolysis, stromal cells, immunohistochemistry, differential staining.

Birgel Junior, E.H.; Santos, M.C. dos; Ramos, J. de A.C.; Pogliani, F.C.; Birgel, D.B.; Della-Libera, A.M.M.P.; Gregory, L.; Araujo, W.P. de; Benesi, F.J. **Secondary hepatogenous photosensitization in a llama (*Lama glama*) bred in the state of Sao Paulo, Brazil.** *Canadian Veterinary Journal = La-Revue Veterinaire Canadienne*. 2007 Mar; 48(3): 323-324. ISSN: 0008-5286

URL: <http://www.pubmedcentral.nih.gov/tocrender.fcgi?action=archive&journal=202>

NAL call no.: 41.8 R3224

Descriptors: llamas, photosensitivity disorders, skin lesions, animal diseases, disease outbreaks, case studies, liver, ultrasonography, disease diagnosis, poisonous plants, toxicity, liver function, *Urochloa decumbens*, Brazil.

Bolton, M. **Counting llamas and accounting for people: livestock, land and citizens in southern Bolivia.** *Sociological Review*. 2007; 55(1): 5-21. ISSN: 0038-0261

URL:<http://www.blackwell-synergy.com/doi/pdf/10.1111/j.1467-954X.2007.00680.x>

DOI:<http://dx.doi.org/10.1111/j.1467-954X.2007.00680.x>

Abstract: This paper examines the struggles that surround livestock enumeration in high-land Bolivia. Based on historical and ethnographic data, colonial officials counted llamas for purposes of taxation, while present-day government agencies and NGOs enumerate animals to attract money from aid agencies and promote entrepreneurial activity. In both instances, livestock enumeration serves not just to count animals but to render accountable their owners. It is argued that such enumerative procedures carried out by experts do not simply record a reality, but by rendering herders accountable, seek to produce particular kinds of people within particular economic realities. Far from being a culturally neutral practice, the enumeration of llamas can constitute an act of symbolic violence that seeks to erase specific relationships between herders and animals and to prioritise the individual over the communal. In conclusion, in both colonial and contemporary cases, Andean people seek to produce themselves in ways that contest those in which others would produce them.

Descriptors: llamas, humans, pastoral ethnic groups, cultural values, ethnography, high-lands, development aid, commercialization, livestock pastoral systems, livestock numbers, common lands, accountability, accounting, development aid, entrepreneurship, history, taxes, Bolivia.

Borkowski, R.; Moore, P.A.; Mumford, S.; Carastro, S. **Adaptations of subpalpebral lavage systems used for llamas (*Lama glama*) and a harbor seal (*Phoca vitulina*).** *Journal of Zoo and Wildlife Medicine*. 2007; 38(3): 453-459. ISSN: 1042-7260

URL:<http://www.bioone.org/perlserv/?request=get-archive&issn=1042-7260>

DOI:<http://dx.doi.org/10.1638/2006-0065.1>

Abstract: Subpalpebral lavage systems (SPLSs) were adapted for use in zoo llamas (*Lama glama*) and a wild harbor seal (*Phoca vitulina*) during therapy for severe ulcerative keratitis or corneal perforation. One llama presented with a melting corneal ulcer caused by *Pseudomonas aeruginosa*, which necessitated frequent application of a topical ophthalmic antibiotic. The lavage system was used routinely during the day and was connected to a balloon infusion system at night to allow for continuous medication administration. The ulcer healed soon after therapy was extended to include overnight treatment with the infusion system. A SPLS system was also combined with a balloon infusor during postoperative treatment of a second

llama that had sustained a corneal perforation. Both llamas tolerated the infusor/lavage systems well and regained vision. One llama had minor conjunctival irritation from the SPLS that resolved quickly without treatment. Bilateral SPLS were placed in a wild harbor seal for treatment of severe ulcerative keratitis associated with *Candida albicans* infection. The seal tolerated the lavage systems well throughout 14 wk of their use in an aquatic environment with other seals. Partial detachment of the lavage systems from the skin of the seal occurred a few times during treatment and was easily corrected. Severe keratitis resolved with administration of antimicrobials through the lavage systems, and the seal was returned to the wild. The use of SPLSs alone or in combination with balloon infusion systems warrants consideration for exotic, wild, and aquatic animals that cannot tolerate repetitive manual applications of topical ophthalmic medication.

Descriptors: llamas, harbor seals (*Phoca vitulina*), *Pseudomonas aeruginosa*, zoo animals, eyes, cornea, eye diseases, ulcers, *Candida albicans*, drug therapy, ulcers.

Byers, S.R.; Parish, S.M.; Holmes, S.P.; Donahoe, S.L.; Barrington, G.M. **A fungal granuloma of the frontal sinus in a llama.** *Canadian Veterinary Journal--La Revue Veterinaire Canadienne*. 2007 Sept; 48(9): 939-941. ISSN: 0008-5286. Note: In English with a French summary.

URL: <http://www.pubmedcentral.nih.gov/tocrender.fcgi?action=archive&journal=202>

NAL call no.: 41.8 R3224

Descriptors: llamas, males, *Lama*, granuloma, case studies, mycoses, disease diagnosis, brain, sinuses, computed tomography, diagnostic techniques, microscopy, necropsy.

Cebra, C. **Diarrhea in llama and alpaca crias.** In: R.A. Smith [Editor]. *Proceedings of the Fortieth Annual Conference, American Association of Bovine Practitioners, Vancouver, British Columbia, Canada, 20-22-September 2007*. 2007; 170-173. **Note:** In English with a French summary. **Abstract:** Neonatal and juvenile diarrhea are common complaints among owners of cattle, sheep, pigs, horses, and goats. Microbial causes are usually blamed, although in some cases nutritional or other considerations come in to play. The most commonly identified pathogens are viruses and protozoa. These are relatively self-limiting, and clinical signs are more related to fluid and electrolyte loss than anything else. For ruminants and pigs especially, various products have been developed which specifically address water, base and salt loss. Various antibody and vaccine preparations are available to directly combat the causative organisms, but with the exception of *Eimeria*, antimicrobial treatment is usually not considered necessary. Reproduced with permission from CAB Abstracts.

Descriptors: alpacas, llamas, protozoal agents of disease, etiology, clinical aspects, diagnosis, diarrhea, disease control, disease prevention, drug therapy, fluid therapy, therapy, clinical picture, rehydration, therapeutics.

Cebra, C. **Uterine torsion in llamas and alpacas.** In: R.A. Smith [Editor]. *Proceedings of the Fortieth Annual Conference, American Association of Bovine Practitioners, Vancouver, British Columbia, Canada, 20-22 September, 2007*. 2007; 174-175. Note: In English with a French summary.

Abstract: Uterine torsion is a recognized cause of dystocia in large animals. Relative frequency and severity vary between species, but both dam and offspring can be saved and torsion corrected if the condition is diagnosed in a timely fashion. Uterine torsion is recognized as a cause of colic and dystocia in llamas and alpacas, but is usually regarded as less

common than malpresentations involving the long neck and limbs of crias. In fact, uterine torsion may be responsible for some of those malpresentations.

Descriptors: alpacas, llamas, etiology, clinical aspects, colic, diagnosis, dystocia, malpositions, prognosis, surgery, therapy, torsion, uterine diseases, uterine torsion.

Cebra, C.K.; Valentine, B.A.; Schlipf, J.W.; Bildfell, R.J.; McKenzie, E.; Waitt, L.H.; Heidel, J.R.; Cooper, B.J.; Lohr, C.V.; Bird, K.E. ***Eimeria macusaniensis* infection in 15 llamas and 34 alpacas.** *Journal of the American Veterinary Medical Association*. 2007 Jan 1; 230(1): 94-100. ISSN: 0003-1488

URL:<http://www.avma.org/>

NAL call no.: 41.8 AM3

Descriptors: animal diseases, llamas, alpacas, coccidiosis, *Eimeria macusaniensis*, digestive system diseases, gastrointestinal system, case studies, animal disease outbreaks, signs and symptoms, disease detection, disease diagnosis, fecal egg count, disease course, alternative livestock, Oregon, US.

Cebra, C. **Internal parasites in llamas and alpacas: importance and detection methods.** *Large Animal Proceedings of the North American Veterinary Conference, Volume 21, Orlando, Florida, USA, 2007*. 2007; 251-252.

URL:<http://www.tnnavc.org>

Descriptors: alpacas, llamas, internal parasites, importance, economic impact, detection methods, *Capillaria*, *Cryptosporidium*, *Eimeria*, *Fasciola*, *Fasciola hepatica*, *Giardia*, Strongylidae, *Trichuris*, *Adenophorea*, *Enoplida*.

Cecchi, T.; Valbonesi, A.; Passamonti, P.; Frank, E.; Renieri, C. **Quantitative variation of melanins in llama (*Lama glama* L.).** *Small Ruminant Research*. 2007 Aug; 71(1-3): 52-58. ISSN: 0921-4488

URL:<http://www.sciencedirect.com/science/journal/09214488>

DOI:<http://dx.doi.org/10.1016/j.smallrumres.2006.04.011>

NAL call no.: SF380.I52

Abstract: The amount of melanin pigments was investigated in 80 Argentinean llama, representative of seven phenotypes and four different fleece colours, by means of spectrophotometric assays: SpEM (spectrophotometric eumelanin), SpPM (spectrophotometric pheomelanin), SpASM (spectrophotometric alkali soluble melanin), and SpTM (spectrophotometric total melanin). It was found that, although to a different extent, the quantitative variation of these pigments was affected both by phenotypes and fleece colours and, hence, it was possible to identify and to distinguish homogeneous groups on the basis of these two factors. In particular, SpEM revealed the most reliable parameter for a discrimination among these groups. Low concentrations of this pigment characterize red, wild, and red black phenotypes and distinguish them from black and tan and non-agouti black ones, both showing high concentrations; low concentrations also distinguish reddish brown fleece colour from very dark red and black ones.

Descriptors: llamas, melanization, phenotype, fleece, eumelanin, fleece colors, spectroscopy, spectrophotometers, melanin, reference standards, Argentina

Chigerwe, M.; Middleton, J.R.; Williams, F., III; Tyler, J.W.; Kreeger, J.M. **Atypical coccidiosis in South American camelids.** *Journal of Veterinary Diagnostic Investigation*. 2007; 19(1): 122-125. ISSN: 1040-6387

URL:<http://jvdi.org/>

NAL call no.: SF774.J68

Abstract: Reported clinical signs of coccidiosis in South American camelids include anorexia of a few days duration, sudden death, and diarrhoea. Antemortem diagnosis of clinical coccidiosis is usually based on clinical signs and supported by detection of coccidial oocysts in faeces. This report describes 2 atypical cases of coccidiosis in South American camelids that had no coccidial oocysts detected on antemortem faecal flotation, prolonged weight loss, and normal faecal consistency.

Descriptors: llamas, alpacas, *Eimeria macusaniensis* anorexia, case report, clinical picture, coccidiosis, diagnosis, diarrhea, differential diagnosis, histopathology, oocysts, sudden death.

Conde, P.A.; Herrera, C.; Chaves, M.G.; Giuliano, S M.; Director, A.; Trasorras, V.L.; Pinto, M.; Sarchi, M. I.; Stivale, D.; Rutter, B.; Aguero, A.; Miragaya, M.H.; Pasqualini, R.S. **In vitro production of llama embryos by IVF or ICSI.** *Reproduction Fertility and Development*. 2007; 19(1): 237-238. ISSN: 1031-3613. Note: "33rd Annual Conference of the International Embryo Transfer Society, Kyoto, Japan; January 06, 2004 January 10, 2007."

URL:<http://www.publish.csiro.au/?nid=45&aid=35>

NAL call no: QP251.R47

Descriptors: llamas, in vitro fertilization, in vitro embryos, intracytoplasmic sperm injection, flank laparotomy, clinical techniques, fertility drugs.

Davies, H.L.; Robinson, T.F.; Roeder, B.L.; Sharp, M.E.; Johnston, N.P.; Christensen, A.C. **Plasma metabolites and nitrogen balance in *Lama glama* associated with forage quality at altitude.** *Small Ruminant Research*. 2007 May; 69(1-3): 1-9. ISSN: 0921-4488

URL:<http://www.sciencedirect.com/science/journal/09214488>

DOI : <http://dx.doi.org/10.1016/j.smallrumres.2005.11.016>

NAL call no.: SF380.I52

Abstract: This study evaluated the effects of forage quality on blood metabolites and nitrogen balance in mature, intact male llamas (n = 4, 36 pl 4.4 months, 87 pl 17 kg) at high altitude (4267 m Letanias, Bolivia). Llamas were randomly fed barley hay (B), 80% barley/20% alfalfa hay (BA) and fresh cut grass pasture (P). Animals were housed in metabolism crates and diets were fed for a 7-day adjustment period followed by a 5-day collection period. Feed, feed refusal, feces and urine were collected, dried and N content determined by combustion analysis. Venous blood samples were collected on day 12 at 30 min intervals over a 6 h period. Plasma was harvested and analyzed for electrolytes (Na, K, Cl, Ca, Ca²⁺, P, Mg) and metabolites (glucose, NEFA, urea N, creatinine, albumin, total protein (TPP), osmolality (Osm)). Plasma electrolytes (Na, K, Mg, P, Cl) and metabolites (glucose, Osm, albumin, creatinine, TPP) were unaffected by forage treatment. Dry matter digestibility was greater for the B and BA than P forage, and N digestibility was significantly higher for BA than either the B or P forages. Nitrogen balance varied significantly between diets. N intake was significantly different between each diet (P < 0.0001), with B having the least N (7.1 g/day), followed by P (14.4 g/day) and BA (19.0 g/day), which provided the most N. Urine N excre-

tion was similar between P (7.7 g/day) and BA (10.6 g/day), similar between P (7.7 g/day) and B (6.2 g/day), but was different ($P < 0.04$) between B (6.2 g/day) and BA (10.6 g/day). Fecal N excretion was similar between BA (7.4 g/day) and P (8.9 g/day). Both of these treatments produced significantly higher quantities of fecal N than B (4.1 g/day; $P < 0.0004$). Nitrogen excretion followed the same trend as N intake. Total N excretion was highest in BA followed by P and B forages. Llamas were in negative N balance on the B and P diets. Llamas had an estimated daily maintenance requirement value of 0.58 g crude N/W^{0.75} and a daily maintenance requirement of 106.2 g CP/day. Mineral intake varied significantly between diets. Overall, pasture provided higher amounts of minerals than the barley forages, except for copper, phosphorus and zinc. These data demonstrate the effects of feeding forages of varying quality on whole-body N utilization, and trends in blood metabolite and electrolyte patterns in llamas at altitude.

Descriptors: llamas, *Lama*, ruminant nutrition, forage, feed barley, hay, alfalfa, forage grasses, forage quality, digestibility, energy metabolism, nitrogen metabolism, altitude, biomarkers, excretion, blood plasma, metabolites, electrolytes, mineral content, nutritive value, Bolivia.

Davies, H.L.; Robinson, T.F.; Roeder, B.L.; Sharp, M.E.; Johnston, N.P.; Christensen, A.C.; Schaalje, G.B. **Digestibility, nitrogen balance, and blood metabolites in llama (*Lama glama*) and alpaca (*Lama pacos*) fed barley or barley alfalfa diets.** *Small Ruminant Research*. 2007 Nov; 73(1-3): 1-7. ISSN: 0921-4488

URL:<http://www.sciencedirect.com/science/journal/09214488>

DOI:<http://dx.doi.org/10.1016/j.smallrumres.2006.10.006>

NAL call no.: SF380.I52

Abstract: To determine the effect of barley diets on digestibility, nitrogen balance, and blood metabolites, mature gelded llamas and alpacas ($n = 8$; 4 llamas, 36 pl 4 months, 90 pl 10.7 kg; 4 alpacas, 24-36 months, 50 pl 4 kg) were randomly fed 100% barley (B) and 20% alfalfa/80% barley (BA) hay. Animals were housed in metabolism crates and diets were fed for a 7 days adjustment period followed by a 5 days collection period. Feed, feed refusal, feces and urine were collected, dried and N content determined by combustion analysis. Blood samples were collected on day 12 at 30 min intervals over a 6 h period. Plasma was harvested and analyzed for electrolytes (Na, K, Cl, Ca, Capo, P, Mg), metabolites glucose, non-esterified fatty acids (NEFAs), urea N, creatinine, albumin, total protein (TPP), osmolality (Osm). Plasma glucose, urea N, albumin, osmolality, electrolyte and metabolite levels were similar between species, and were unaffected by diet. On a metabolic weight basis, only diet was significant for N intake, urinary and fecal N, and total N excreted. Dry matter intake was not significantly different; however, BA consumption was greater than B, (B) 1272 g N/day and (BA) 1636 g N/day for llamas, and for alpacas (B) 835 g N/day and (BA) 1034 g N/day, respectively. Nitrogen intake followed the same pattern, (B) 21.4 g N/day and (BA) 33.9 g N/day, respectively for llamas, and (B) 13.6 g N/day and (BA) 20.6 g N/day, respectively for alpacas (diet, $P < 0.002$). Diet affects were significant for urine N excretion ($P < 0.02$), (B) 11.2 g/day and (BA) 18.2 g/day for llamas, and (B) 6.8 and (BA) 10.8 g N/day for alpacas. Fecal N excretion was different for diet ($P < 0.03$), with fecal excreted N of 9.0 g N/day and 11.9 g N/day for B and BA in llamas, and 5.9 g N/day and 9.1 g N/day for B and BA respectively in for alpacas, respectively. Nitrogen retention, DM digestibility and N digestibility

were unaffected by diet or species. However, the llamas in this study displayed an increase in nitrogen intake of 64.6% between the B and BA diets with a 381% increase in N retention. Alpacas increased their N intake by 57.4% when they consumed the BA forage, which only increased N retention by 22.2%. These species differences indicate that alpacas have a lower N requirement to meet metabolic needs than llamas, which are likely related to the smaller body size of the alpaca. When examining the biological value of N from the respective diets, alpacas and llamas had a value of 56.2% when consuming barley. The BA diet had a higher biological value of 65.0% in llamas compared to 57.4% in alpacas. Therefore, on the basis of this study, extrapolations between llamas and alpacas with respect to nitrogen requirement and balance are not valid.

Descriptors: llamas, alpacas, ruminant nutrition, dietary protein, forage, barley, alfalfa, nutritive value, nutrient utilization, digestibility, digestible protein, energy requirements, protein requirement, nitrogen balance, nitrogen metabolism, biomarkers, blood chemistry, electrolytes, species differences.

Davis, W.C.; Drbal, K.; Mosaad, A.E.A.A.E.; Elbagory, A.R.M.; Tibary, A.; Barrington, G.M.; Park, Y.H.; Hamilton, M.J. **Use of flow cytometry to identify monoclonal antibodies that recognize conserved epitopes on orthologous leukocyte differentiation antigens in goats, llamas, and rabbits.** *Veterinary Immunology and Immunopathology*. 2007 Sept 15; 119(1-2): 123-130. ISSN: 0165-2427. Note: In the special issue. A. Saalmuller and B. Aasted [Editors]. "HLDA8 Animal Homologues."

URL:<http://www.sciencedirect.com/science/journal/01652427>

DOI:<http://dx.doi.org/10.1016/j.vetimm.2007.06.024>

NAL call no.: SF757.2.V38

Abstract: Flow cytometry was used to screen a panel of 320 mAbs, submitted to the Animal Homologues Section of the HLDA8, for mAbs that recognize epitopes conserved on orthologous leukocyte differentiation antigens (LDA) in goats, llamas, and rabbits. Nineteen mAbs specific for CD11a (1), CD14 (3), CD18 (1), CD21 (1), CD29 (2), CD44 (2), CD47 (3), CD49d (1), CD172a (1), CD45RB (1), CD61 (1), RACT48A, and GBSP71A reacted with goat LDA. Twenty three mAbs specific for CD7 (1), CD9 (2), CD11a (1), CD14 (3), CD18 (4), CD29 (1), CD32 (1), CD44 (1), CD47 (4), CD49d (2), CD50 (1), CD80 (1), CD172a (1), and GBSP71A reacted with llama LDA. Eighteen mAbs specific for CD9 (2), CD11a (1), CD14 (2), CD18 (4), CD21 (1), CD44 (2), CD45RB (1), CD49d (1), CD209 (1), RACT48A, and GBSP71A reacted with rabbit LDA. The specificities of two cross reactive mAbs that recognize different conserved epitopes on all leukocytes in two species (RACT48A) and all three species (GBSP71A) have not been determined. The patterns of reactivity of most of the mAbs were consistent with patterns of reactivity noted on human leukocytes. The specificity of some cross reactive mAbs generated in non-human species were validated on human leukocytes. Further studies are needed to verify that CD7, CD32, CD45RB, CD50, and CD209 recognize orthologous molecules in the indicated species.

Descriptors: goats, llamas, *Lama*, rabbits, flow cytometry, monoclonal antibodies, epitopes, species differences, sequence homology, leukocytes, cell differentiation, antigens, cross reaction, cell lines, human cell lines, antibody detection, human CD antigens, orthologous antigens.

Dukti, S.A.; Southwood, L.L.; Metre, D.C. van. **Survival and factors affecting survival in small ruminants and camelids attacked by dogs: 62 cases (1994-2004).** *Journal of Veterinary Emergency and Critical Care.* 2007; 17(3): 257-261. ISSN: 1479-3261

URL:<http://www.blackwell-synergy.com/loi/vec>

DOI:<http://dx.doi.org/10.1111/j.1476-4431.2007.00229.x>

Abstract: Objective: To determine the survival rates and factors affecting survival in small ruminants and camelids attacked by dogs. Design: Retrospective study. Setting: Two university teaching hospitals. Animals: Thirty goats, 28 sheep, 3 alpacas, and 1 llama. Measurements and main results: Medical records were reviewed to obtain signalment, time between injury and admission, hospitalization length, lesion site, treatment, complications, survival rate, and cost. Follow-up information was obtained by telephone conversation with the owner. Sixty-two patients met the inclusion criteria. Six animals were euthanized at admission and thus excluded. Of the 56 animals that were treated, 43 (77%) were discharged, 5 (9%) died, and 8 (14%) were euthanized. Animals that had thoracic or abdominal injuries, required surgery, or received more potent analgesic therapy were less likely to survive to discharge from hospital compared with animals that did not. Complications developed in 50 (82%) animals. Animals with respiratory complications were also less likely to survive to discharge from hospital than animals that did not. Long-term follow up was available on 38/43 (88%) animals that were discharged. Thirty-five of 38 (92%) animals were discharged and recovered from their injuries and 5 animals had long-term complications. Conclusions: Small ruminants and camelids that are attacked by dogs have a good prognosis for short-term survival. Short-term survival is affected by lesion location and complications. Reproduced with permission from CAB abstracts.

Descriptors: alpacas, goats, llamas, sheep, dog bites, dog attacks, chemotherapy, traumas, complications, therapeutics, drug therapy, lesions, prognosis, risk factors; surgery, long term survival, Colorado, US.

Emmanuel, F.X.; Seagar, A.L.; Doig, C.; Rayner, A.; Claxton, P.; Laurenson, I. **Human and animal infections with *Mycobacterium microti*, Scotland.** *Emerging Infectious Diseases.* 2007; 13(12): 1924-1927. ISSN: 1080-6040

URL:<http://www.cdc.gov/eid>

Abstract: During 1994-2005, we isolated *Mycobacterium microti* from 5 animals and 4 humans. Only 1 person was immunocompromised. Spoligotyping showed 3 patterns: vole type, llama type, and a new variant llama type.

Descriptors: badgers, cats, ferrets, llamas, humans, immunocompromised hosts, *Mycobacterium microti* clinical aspects, etiology, bacterial pathogen, case reports, disease course/progression, spoligotyping, genotypes molecular, genetics techniques, zoonoses, UK.

Ferrari, A.; Rodriguez, M.M.; Power, P.; Weill, F.S.; Simone, E.A. de; Gutkind, G.; Leoni, J. **Immunobiological role of llama heavy-chain antibodies against a bacterial α -lactamase.** *Veterinary Immunology and Immunopathology.* 2007 June 15; 117(3-4): 173-182. ISSN: 0165-2427

URL:<http://www.sciencedirect.com/science/journal/01652427>

DOI: <http://dx.doi.org/10.1016/j.vetimm.2007.03.003>

NAL call no.: SF757.2.V38

Abstract: In 1993, a fraction of antibodies (Abs) devoid of L chain was found naturally occurring in the Camelidae. They were found to lack L chains, as well as the first constant heavy-chain domain (CH1) and therefore they were named heavy-chain Abs (HCAs). Subsequent studies focused on the functional, structural and biochemical properties of recombinant variable fragments (rVHHs) of HCAs. It was stated that rVHHs have an augmented capacity to interact with partially hidden epitopes, like enzymes active sites, and have an increased stability to thermal and chemical aggression. It has been suggested that these unconventional Abs could represent an evolutionary advantage, being more efficient than conventional Abs to inhibit microbial enzymes, and thus exerting a more protective immune response against pathogens. The present work focuses on the immunobiological role of HCAs, in their capacity to inhibit microbial enzymes. Two animal models were selected, comprising a model for common vertebrates without HCAs (rabbits), and a model for vertebrates with both conventional and unconventional Abs (*Lama glama*). A recombinant bacterial o-lactamase (CTX-M-2) was selected as the microbial enzymatic antigen. After conventional immunization schedules, neither serum titers nor serum inhibitory capacity showed significant differences when rabbits and llamas were compared. These results indicate that the a priori assumption that the adaptive immune system of camelids could be better prepared to respond to bacterial enzymes because of the presence of HCAs, is not always accurate. Furthermore, when the different llama antibody isotypes and subclasses were purified, it was demonstrated that the inhibitory capacity of total serum was due exclusively to IgG1. HCAs not only failed to inhibit CTX-M-2, but instead they activated its enzymatic activity. Altogether, these results indicate that the hypotheses extrapolated from the rVHHs properties need to be revised; the real role of HCAs in vivo remains unknown, as well as their evolutionary cause.

Descriptors: llamas, *Lama*, animal physiology, immune system, antibodies, immune response, antigen-antibody reactions, enzyme inhibitors, enzyme inhibition; bacterial enzyme, disease resistance, animal models, in vivo studies, immunization, enzyme activity, immunoglobulins, beta lactamas, heavy chain antibodies.

Frank, E.N.; Hick, M.V.H.; Ahumada, M.R. **Clasificación de vellones de llamas argentinas en base a regiones corporales identificadas objetiva y subjetivamente. [Argentine llama fleece grading by subjective and objective assessment by identified body regions.]** *Revista Argentina de Produccion Animal*. 2007; 27(Suppl.1): 358-359. ISSN: 0326-0550. Note: 30 Congreso Argentino de Produccion Animal "La produccion animal, un pilar del desarrollo nacional", Santiago del Estero, Argentina, 3-5 October 2007. In Spanish.

URL: <http://www.aapa.org.ar/congresos/2007/TppPDF/TPP09.pdf>

Descriptors: llamas, fleece, grading, body differences in fleece quality, animal fiber quality assessment, wool, wool production.

Graziotti, G.H.; Rodriguez-Menendez, J.M.; Rios, C.M.; Victorica, C.L. **Distribution of the internal pudendal artery in male and female llama (*Lama glama*).** *Annals of Anatomy*. 2007; 189(3): 295-298. ISSN: 0940-9602

URL: <http://www.sciencedirect.com/science/journal/0940-9602>

DOI: <http://dx.doi.org/10.1016/j.aanat.2006.10.004>

Abstract: The aim of this research has been to describe the internal pudendal artery dis-

tribution in male and female llama and to compare it with that of other domestic animals including the one-humped camel (*Camelus dromedarius*). The arterial system was perfused with a solution of 14% coloured plaster and preserved in a solution of a 10% formalin, 3% carbolic acid and 3% glycerine. The systematic dissection was made using traditional working techniques and standard instruments. The internal pudendal artery is the ventral terminal branch of the internal iliac artery at the level of the third sacral vertebra. The main supply of the pelvic organs comes from the prostatic or vaginal arteries; notwithstanding these arteries arise from the internal pudendal artery, showing an important difference between ruminants and pig (long iliac type). Similarities between the distribution of the internal pudendal artery of the llama and those obtained in the camel provide strong evidence of a common phylogenetic origin.

Descriptors: llamas, dromedary camels, animal anatomy, males and females, arteries, blood vessels, cardiovascular system, phylogentic origins, prostate, vagina, circulatory system, pudendal arteries.

Grimes, M.; Kutzler, M.; Tyson, R.; Timm, K. **Determination of testicular blood flow in llamas using vascular casting and Doppler color flow ultrasonography.** *Theriogenology*. 2007 Aug; 68(3): 493-494. ISSN: 0093-691X. Note: "Proceedings of the 2007 Annual Conference of the Society for Theriogenology held in Monterey, California." Edited by P. Hearn. Includes references.

URL: <http://www.sciencedirect.com/science/journal/0093691X>

DOI:<http://dx.doi.org/10.1016/j.theriogenology.2007.05.007>

NAL call no.: QP251.A1T5

Descriptors: llamas, testicles, testicular blood flow, vascular casting, techniques, ultrasound, Doppler color flow.

Hagihara, Yoshihisa; Mine, Shouhei; Uegaki, Koichi. **Stabilization of an immunoglobulin fold domain by an engineered disulfide bond at the buried hydrophobic region.** *Journal of Biological Chemistry*. 2007 Dec 14; 282(50): 36489-36495. ISSN: 0021-9258

URL:<http://www.jbc.org/>

NAL call no.: 381 J824

Abstract: We report for the first time the stabilization of an immunoglobulin fold domain by an engineered disulfide bond. In the llama single-domain antibody, which has human chorionic gonadotropin as its specific antigen, "Alat# and Ile" are buried in the structure. A mutant with an artificial disulfide bond at this position showed a 10 pC higher midpoint temperature of thermal unfolding than that without the extra disulfide bond. The modified domains exhibited an antigen binding affinity comparable with that of the wild-type domain. "Alat# and Ile" are conserved in camel and llama single-domain antibody frameworks. Therefore, domains against different antigens are expected to be stabilized by the engineered disulfide bond examined here. In addition to the effect of the loop constraints in the unfolded state, thermodynamic analysis indicated that internal interaction and hydration also control the stability of domains with disulfide bonds. The change in physical properties resulting from mutation often causes unpredictable and destabilizing effects on these interactions. The introduction of a hydrophobic cystine into the hydrophobic region maintains the hydrophobicity of the protein and is expected to minimize the unfavorable mutational effects.

Descriptors: llamas, camels, single domain antibody, fold domains, thermodynamic analysis, internal interaction, hydration, stability of domains.

Harmsen, M.M.; Solt, C.B. van; Fijten, H.P.D.; Keulen, L.van; Rosalia, R.A.; Weerdmeester, K.; Cornelissen, A.H.M.; Bruin, M.G.M. de; Eble, P.L.; Dekker, A. **Passive immunization of guinea pigs with llama single-domain antibody fragments against foot-and-mouth disease.** *Veterinary Microbiology*. 2007 Mar 10; 120(3-4): 193-206. ISSN: 0378-1135

URL:<http://www.sciencedirect.com/science/journal/03781135>

DOI:<http://dx.doi.org/10.1016/j.vetmic.2006.08.019>

NAL call no.: SF601.V44

Abstract: Foot-and-mouth disease (FMD) is a highly contagious disease that occasionally causes outbreaks in Europe. There is a need for therapies that provide rapid protection against FMD in outbreak situations. We aim to provide such rapid protection by passive immunization with llama single-domain antibody fragments (VHHs). Twenty-four VHHs binding serotype O FMDV in vitro were isolated from immunized llamas by phage display and expressed in baker's yeast for further characterization. They recognized four functionally independent antigenic sites. Six strongly FMDV neutralizing VHHs bound to a peptide representing the GH-loop of viral protein 1 known to be involved in binding to the cellular receptor of FMDV. Clone M8, recognizing this antigenic site, and clone M23, recognizing another antigenic site, showed synergistic in vitro virus neutralization. Three FMDV specific VHHs were PEGylated in order to decrease their rapid blood clearance and thus enable in vivo guinea pig protection experiments. Passive immunization with individual VHHs showed no protection, but a mixture of M8 and M23 showed partial transient protection. The protection afforded by these VHHs was however low as compared to the complete protection afforded by convalescent guinea pig serum. In contrast, these VHHs showed far more efficient in vitro FMDV neutralization than convalescent guinea pig serum. This lack of correlation between in vitro neutralization and in vivo protection lends further credence to the notion that opsonophagocytosis of FMDV is important for protection in vivo.

Descriptors: immunization, guinea pigs, llamas, antibodies, vaccines, foot and mouth disease virus, amino acid sequences, animal models, in vivo studies, epitopes, serotypes, immunotherapy, neutralization tests, molecular sequence data.

Hearn, F.P.D. [Editor]. **Proceedings of the Annual Conference of the Society for Theriogenology, Monterey, California, USA, 7-11 August 2007.** *Theriogenology*. 2007; 68(3): 295-520. ISSN: 0093-691X. Note: A special issue on reproduction—technologies and diseases.

URL:<http://www.sciencedirect.co./science/journal/0093691x>

DOI : <http://dx.doi.org/10.1016/j.theriogenology.2007.05.051>

Descriptors: alpacas, buffalo, cats, cattle, dogs, pigs, horses, llamas, reproduction, reproductive technologies, reproductive diseases, etiology, animal breeding, semen handling, artificial insemination, AI, cryopreservation, diagnosis, diagnostic techniques, domestic animals, drug therapy, embryo transfer, embryos, fertility, in vitro fertilization, livestock, pharmacodynamics, pregnancy, reproductive disorders, reproductive performance, gestation, drugs.

Horacio-Graziotti, Guillermo; Manuel-Rodriguez Menendez, Jose; Maria-Rios, Clara; Lisandro-Victorica, Carlos. **Distribution of the internal pudendal artery in male and female llama (*Lama glama*)**. *Annals of Anatomy*. 2007; 189(3): 295-298. ISSN: 0940-9602

URL: <http://www.sciencedirect.com/science/journal/09409602>

Abstract: The aim of this research has been to describe the internal pudendal artery distribution in male and female llama and to compare it with that of other domestic animals including the one-humped camel (*Camelus dromedarius*). The arterial system was perfused with a solution of 14% coloured plaster and preserved in a solution of a 10% formalin, 3% carbolic acid and 3% glycerine. The systematic dissection was made using traditional working techniques and standard instruments. The internal pudendal artery is the ventral terminal branch of the internal iliac artery at the level of the third sacral vertebra. The main supply of the pelvic organs comes from the prostatic or vaginal arteries; notwithstanding these arteries arise from the internal pudendal artery, showing an important difference between ruminants and pig (long iliac type). Similarities between the distribution of the internal pudendal artery of the Llama and those obtained in the camel provide strong evidence of a common phylogenetic origin. (c) 2006 Elsevier GmbH. All rights reserved.

Descriptors: dromedaries, llamas, males, females, iliac artery, pudendal artery, dissection, perfused arteries, comparative anatomy.

Iturrizaga, D.M.; Verechia, F.T.; Santos, T.C.; Bombonato, P.P.; Teixeira, D.G.; Miglino, M.A. **The materno-fetal interface in llama (*Lama guanicoe glama*)**. *Pesquisa Veterinaria Brasileira*. 2007; 27(6): 221-228. ISSN: 0100-736X. Note: In English with a Portuguese summary.

URL: <http://www.scielo.br>

DOI: <http://dx.doi.org/10.1590/S0100-736X2007000600001>

Abstract: Samples from 9 llamas (28 through 36 weeks of gestation) were collected and fixed in 4% buffered paraformaldehyde (light microscopy) and in 2.5% buffered glutaraldehyde (transmission and scanning electron microscopy). The material was processed in paraplast and slides (5µm) were stained with HE, PAS, Masson-Trichrome, acid phosphatase and Perl's. The uteroferrin was immunolocalized. The results show that llama placenta is chorioallantoic, diffuse, folded and epitheliochorial, and the fetus is covered with an epidermal membrane. The trophoblast cells have variable morphology: cubic, rounded and triangular cells, with cytoplasm containing PAS-positive granules. Binucleated cells with large cytoplasm and rounded nuclei, as well as giant trophoblastic cells with multiple nuclei were also observed. Numerous blood vessels were observed beneath the cells of the uterine epithelium and around the chorionic subdivided branches. Glandular activity was shown by PAS, Perl's, and acid phosphatase positive reactions in the cytoplasm and glandular lumen, and by immunolocalization of the uteroferrin in the glandular epithelium. The uterine glands open in spaces formed by the areoles, which are filled by PAS-positive material. The llama fetus was covered by the epidermal membrane, composed of stratified epithelium, with up to seven layers of mono-, bi- or trinucleated cells. The high level of maternal and fetal vascularization surfaces indicates an intense exchange of substances across both surfaces. The metabolic activity shown in the uterine glands suggests an adaptation of the gestation to the high altitudes of the natural habitat of this species. Reproduced with permission from CAB Abstracts.

Descriptors: llamas, pregnancy, uterus, placenta, fetuses, gestation, epithelium, histology, morphology, pregnancy.

Jones, M.L.; Gilmour, M.A.; Streeter, R.N. **Use of grid keratotomy for the treatment of indolent corneal ulcer in a llama.** *Canadian Veterinary Journal = La Revue Veterinaire Canadienne*. 2007 Apr; 48(4): 416-419. ISSN: 0008-5286. Note: In English with a French summary.
URL: <http://www.pubmedcentral.nih.gov/tocrender.fcgi?action=archive&journal=202>
NAL call no.: 41.8 R3224

Descriptors: llamas, tissue degeneration, cornea, corneal diseases, case studies, disease diagnosis, cell biology, histopathology, surgery, combination drug therapy, neomycin, veterinary drugs, atropine, indolent corneal ulcer, grid keratotomy, polymixin.

Keen, James E.; Durso, Lisa M.; Meehan, Thomas P. **Isolation of *Salmonella enterica* and Shiga-toxigenic *Escherichia coli* O157 from feces of animals in public contact areas of United States zoological parks.** *Applied and Environmental Microbiology*. 2007; 73(1): 362-365. ISSN: 0099-2240

URL: <http://www.pubmedcentral.nih.gov/tocrender.fcgi?action=archive&journal=83>
NAL call no.: 448.3 AP5

Descriptors: cattle, sheep, goats, yaks, antelopes, camels, llamas, vicunas, deer, reindeer, pigeons, horses, donkey, giraffes, okapis, rabbits, parrots, swine, fecal sampling, *Salmonella enterica*, serovar *Typhimurium*, serovar *Enteritidis*, *Escherichia coli*, strain O157, zoological park, pathogens in zoos, public health risks, risk assessment, US.

Klein, D.; Hassan, J.; Fuchs-Baumgartinger, A.; Baumgartner, W. **Osophagusdilatation bei einem Lama. [Esophageal dilatation in a llama - a case report.]** *Wiener Tierärztliche Monatsschrift*. 2007; 94(11/12): 304-308. ISSN: 0043-535X. Note: In German with an English summary.

URL: <http://www.wtm.at/>

Abstract: A 6 year old male llama was admitted to the Clinic for Ruminants at the University of Veterinary Medicine in Vienna with a history of 'vomiting' and loss of body mass despite eating well. Physical examination did not allow a diagnosis but the history presumed a defect of the oesophagus. Ultrasonography showed signs of a dilatation of the caudal part of the pars cervicalis of the oesophagus. These changes of the oesophagus could be approved by radiography especially contrast radiography and oesophagoscopy. Subsequent pathological and pathohistological examinations confirmed the diagnosis of a dilatation of the caudal part of the pars cervicalis and the pars thoracica of the esophagus.

Descriptors: llamas, vomiting, clinical picture, esophageal diseases, esophagus, diagnosis, dilation of caudal part, pars cervicalis and pars thoracica, radiography, ultrasonography, case reports, diagnosis, histopathology, Austria.

Koch-Nolte, Friedrich; Reyelt, Jan; Schceoow, Britta; Schwarz, Nicole; Scheuplein, Felix; Rothenburg, Stefan; Haag, Friedrich; Alzogaray, Vanina; Cauerhff, Ana; Goldbaum, Fernando A. **Single domain antibodies from llama effectively and specifically block T cell ecto-ADP-ribosyltransferase ART2.2 in vivo.** *FASEB Journal*. 2007 Nov; 21(13): 3490-3498. ISSN: 0892-6638

URL: <http://www.fasebj.org/>

NAL call no.: QH301.F3

Abstract: The purpose of our study was to develop a tool for blocking the function of a

specific leukocyte ecto-enzyme in vivo. ART2.2 is a toxin-related ecto-enzyme that transfers the ADP-ribose moiety from NAD onto other cell surface proteins. T cell death by activating the cytolytic P2x7 purinoceptor via ADP-ribosylation. Here, we report the generation of ART2.2-blocking single domain antibodies from an immunized llama. The variable domain of heavy-chain antibodies (VHH domain) represents the smallest known antigen-binding unit generated by adaptive immune responses. Their long CDR3 endows VHH domains with the extraordinary capacity to extend into and block molecular clefts. Following intravenous injection, the ART2.2-specific VHH domains effectively shut off the enzymatic and cytotoxic activities of ART2.2 in lymphatic organs. This blockade was highly specific (blocking ART2.2 but not the related enzymes ART1 or ART2.1), rapid (within 15 min after injection), and reversible (24 h after injection). Our findings constitute a proof of principle that opens up a new avenue for targeting leukocyte ecto-enzymes in vivo and that can serve as a model also for developing new antidotes against ADP-ribosylating toxins.--Koch-Nolte, F., Reyelt, J., Schceow, B., Schwarz, N., Scheuplein, F., Rothenburg, S., Haag, F., Alzogaray, V., Cauerhff, A., and Goldbaum, F. A. Single domain antibodies from llama effectively and specifically block T cell ecto-ADP-ribosyltransferase ART2.2 in vivo.

Descriptors: llamas, blocking the function of specific leukocyte ecto-enzyme in vivo, ART2.2 induces T cell death, possible antidotes against ADP ribosylating toxins.

Lascola, K.M.; Hoffman, A.M.; Mazan, M.R.; Bedenice, D. **Respiratory mechanics in sedated and nonsedated adult llamas.** *American Journal of Veterinary Research*. 2007 June; 68(6): 676-684. ISSN: 0002-9645

URL: <http://avmajournals.avma.org/loi/ajvr/>

NAL call no.: 41.8 AM3A

Descriptors: llamas, sedation, breathing, diagnostic techniques, reference standards, respiratory system, xylazine, calibration, noninvasive methods, pulmonary function, plethysmography, flow limitations, pneumotachography.

Macciotta, N.P.P.; Battacone, G.; Enne, G.; Marongiu, L.; Pais, A.; Pulina, G.; Rassu, P. [Editors].

Proceedings of the ASPA 17th Congress, Alghero, 29 May-1 June 2007. *Italian Journal of Animal Science*. 2007; 6(Supplement 1): 911 pp. ISSN: 1594-4077

URL: <http://www.aspajournal.it>

Abstract: This proceeding contains articles on genetics and breeding, nutrition and feeding, aquaculture, buffalo production, cattle production, goat production, horse production, poultry production, pig production, rabbit production, sheep production, and other species production such as wild ungulates and llamas. There are 331 scientific papers wherein 204 are theatre presentations and 127 are poster presentations. The papers highlight Italian scientific research and some works from European and non-European countries. Reproduced with permission from CAB Abstracts.

Descriptors: domesticated birds, buffalo, cattle, fishes, goats, horses, llamas, pigs, rabbits, sheep, animal breeding, animal feeding, animal nutrition, animal production, aquaculture, genetics, livestock, poultry, ungulates.

Marai, I.F.M.; Zeidan, A.E.B. **Artificial insemination in Camelidae.** *Tropical and Subtropical Agroecosystems*. 2007; 7(1): 1-13. Note: In English with a Spanish summary. Literature review.

URL:<http://www.veterinaria.uady.mx/publicaciones/journal/2007-1/128-camels2.pdf>

Abstract: The most important problems of Artificial Insemination (AI) in Camelidae is its timing in relation to ovulation in the she-camel. The present article reviewed collection of semen, processing of semen, manipulation of the female and semen deposition technique in Camelidae species. Commonly, semen is collected by electroejaculation, artificial vagina (AV), flushing of the epididymus with saline solution, while the more accepted methods are the former two methods. Semen is usually used in raw condition or after extension, depending on the method of semen processing. In the fresh raw method, whole semen is used within minutes or after few hours. Extension of the semen ejaculate is carried out by adding extenders and it is required in more efficient use of AI, in short-term preservation or liquid semen (within a few hours or days) and long-term preservation or frozen semen (months or years). In short-term preservation, semen is used extended under different temperatures (30, 25 or 4 degrees C). Long-term preservation is carried out by cryopreservation. Packaging methods such as pellets, ampoules or in plastic straws with different volumes (0.25, 0.5 or 4 ml) represent different freezing procedures. The quality and survival of spermatozoa of post-thaw semen are highly variable from one male to the other, even after using the same freezing technique. To ensure that the inseminated females ovulate, hormonal manipulation of ovarian activity is used such as the induction of follicular activity and ovulation, as well as, synchronization of these phases in a group of females. The best time for insemination can only be determined by ultrasonography and/or rectal palpation of the ovaries. The other alternative is to inseminate at known intervals following induction of ovulation by hormonal treatment with human-chorionic gonadotropin (hCG) or gonadotropin-releasing hormone (Gn-RH).

Descriptors: alpacas, llamas, dromedaries, Bactrian camels, guanacos, vicunas, artificial insemination, cryopreservation of semen, deposition site, freezing, frozen semen, GnRH, HCG, estrus, ovulation, reproduction, semen, semen diluent additives, semen preservation, spermatozoa, synchronization, synchronized females, gonadoliberin, gonadotropin releasing hormone, techniques.

Marin, Juan C.; Zapata, Beatriz.; Gonzalez, Benito A.; Bonacic, Cristian; Wheeler, Jane C. ; Casey, Ciara; Bruford, Michael W.; Palma, R. Eduardo; Poulin, Elie; Alliende, M. Angelica; Sportorno, Angel E. **Sistematica, taxonomia y domesticacion de alpacas y llamas: nueva evidencia cromosomica y molecular.** [**Systematics, taxonomy and domestication of alpaca and llama: new chromosomal and molecular evidence.**] *Revista Chilena de Historia Natural*. 2007; 80(2): 121-140. ISSN: 0716-078X. Note: In Spanish with an English summary.

URL:<http://www.scielo.cl>

Abstract: Four camelid species exist in South America: two wild, the guanaco (*Lama guanicoe*) and the vicuna (*Vicugna vicugna*), and two domestic, the alpaca (*Lama pacos*) and the llama (*Lama glama*). However, the origin of the domestic species has been a matter of debate. In the present study, variations in chromosome G banding patterns and in two mitochondrial gene sequences have been used to study the origin and classification of the llama and alpaca. Similar patterns in chromosome G band structure were observed in all four Lamini

species, and these in turn were similar to the bands described for camels, *Camelus bactrianus*. However, fine and consistent differences were found in the short arms of chromosome 1, separating camels, guanacos and llamas from vicunas and alpacas. This pattern was consistent even in a hybrid guanaco x alpaca. Equivalent relationship showed the complete cytochrome b gene sequences, and the minimum expansion tree of the partial control region sequence, grouping guanaco with llama and vicuna with alpaca. Phylogenetic analyses showed *V. vicugna* and *L. guanicoe* as monophyletic groups. Analysis of both gene sequences revealed two clades within vicuna, concordant with the two described subspecies, but the results for guanaco did not confirm existence of the four previously proposed subspecies. The combined analysis of chromosomal and molecular variation showed close genetic similarity between alpacas and vicunas, as well as between llamas and guanacos. Although directional hybridization was revealed, our results strongly support the hypothesis that the llama would have derived from *L. guanicoe* and the alpaca from *V. vicugna*, supporting reclassification as *V. pacos*. Reproduced with permission from CAB Abstracts.

Descriptors: camelids, Bactrian camels, 2 wild species, guanacos (*Lama guanicoe*) and vicunas (*Vicugna vicugna*), 2 domesticated species, alpacas (*Lama pacos*) and llamas (*Lama glama*), classification of species, chromosome G banding pattern variations, 2 mitochondrial gene sequences variations, analysis showed close genetic similarity of alpacas and vicunas and of llamas and guanacos, hypothesize llama derived from *L. guanicoe*, alpaca derived from *V. vicugna*, supporting reclassification as *V. pacos*, genetic variability, South American camelids.

Mastromonaco, Gabriela F; King, W. Allan. **Cloning in companion animal, non-domestic and endangered species: can the technology become a practical reality?** *Reproduction Fertility and Development*. 2007; 19(6): 748-761. ISSN: 1031-3613. Note: Is a review article.

URL:<http://www.publish.csiro.au/?nid=45&aid=35>

NAL call no: QP251.R47

Descriptors: companion and exotic animals, engendered species, sheep, water buffalo, saola, *Ovis ammon*, argali sheep, *Ovis canadensis*, desert bighorn sheep, *Budorcas taxicolor*, takin, *Bos gaurus*, *Ovis orientalis musimon*, mouflon, *Taurotragus derbianuas*, giant eland, *Tragelaphus eurycerus isaaci*, bonga, llamas, macaque, cats, tigers, *Prionailurus bengalensis* leopard cats, rabbits, *Ailurupoda-melanoleuca*, giant pandas, black bears, cloning of animals, current and future of Somatic cell nuclear transfer (SCNT), problems, pre and post implantation embryo survival, assisted reproduction, invitro fertilization.

Mate, M.L.; Di Rocco, F; Zambelli, A.; Vidal-Rioja, L. **Mitochondrial heteroplasmy in Control Region DNA of Small Ruminant Research.** *South American camelids*. 2007 Aug; 71(1-3): 123-129. ISSN: 0921-4488

URL:<http://www.sciencedirect.com/science/journal/09214488>

DOI:<http://dx.doi.org/10.1016/j.smallrumres.2006.04.016>

NAL call No.: SF380.I52

Abstract: In the present work, polymerase chain reaction-single strand conformation polymorphism and sequencing were used to investigate the length and nucleotide variability in the Control Region mitochondrial DNA of the four South American camelid species from Argentina. To asses these the complete Control Region of 20 animals, 5 each of guanaco, llama, alpaca and vicuna species were cloned. Seventy-three clones corresponding to the 20

animals were screened and 7 different SSCP patterns were identified. Sequencing of all clones showed 9 different haplotypes contained in the 350 bp hypervariable segment of the Control Region. Interestingly, 3 guanacos, 3 vicunas, 3 alpacas and 1 llama were heteroplasmic for different nucleotide positions. The screening of the Control Region mitochondrial DNA in blood samples from about 200 wild guanacos from Argentine Patagonia supported the above results. After comparison with other vertebrate species, we concluded that nucleotide substitutions are the main cause of heteroplasmy found in Control Region mitochondrial DNA of these taxa.

Descriptors: *Lama*; llamas, alpacas, vicunas, *Lama guanicoe*, phylogeny, genetic variation, genetic markers, mitochondrial DNA, molecular cloning, clones, nucleotide sequences, polymerase chain reaction, PCR, single stranded conformational polymorphism, mutation, single nucleotide polymorphism, genome, genomics, heteroplasmy, molecular sequence data, Argentina.

Merriwether, D.A. **Domestication of alpacas: Genetics of the North American herd.** *American Journal of Physical Anthropology*. 2007; (Suppl. 44): 171. ISSN: 0002-9483. Note: 76th Annual Meeting of the American Association of Physical Anthropologists, Philadelphia, PA, USA; March 28 -31, 2007.

Descriptors: vicunas, llamas, alpacas, guanacos, domesticated animals, breeding, genetics, North America.

Navarre , C.B. **Fluid therapy in small ruminants.** In R.A. Smith [Editor]. *Proceedings of the Fortieth Annual Conference, American Association of Bovine Practitioners, Vancouver, British Columbia, Canada, 20-22 September, 2007*. 2007; 176-178. Note: In English with a French summary.

Abstract: Methods for fluid therapy in adult and neonatal sheep, goats and camelids are presented, as well as catheters and key formulas. Fluid therapy regimes for common clinical situations, such as diarrhea and sepsis, are provided. Reproduced with permission from CAB Abstracts.

Descriptors: alpacas, goat kids, llamas, sheep, lambs, catheters, dehydration physiological, diarrhea, scouring, dehydration, rehydration, fluid therapy, methodology, sepsis.

Nielsen, K.; Smith, P.; Yu, W.L. **Detection of anti-Brucella antibodies in Llama (*Lama glama*).** *Journal of Immunoassay and Immunochemistry*. 2007; 28(1): 61-66. ISSN: 1532-1819.

Descriptors: 7 llamas, killed vaccine of *Brucella abortus* S1119.3, 299 other llamas and 2075 apaca sera tested, buffered antigen plate agglutination test, complement fixation test, indirect enzyme immunoassays using smooth and rough lipopolysaccharides, competitive enzyme immunoassay, fluorescence polarization assays, results compared, specificity values, false positives.

Nes, E. van; Pieterse, M.C. **Voortplanting bij lama en alpaca. [Reproduction in the llama and alpaca.]** *Veehouder en Dierenarts*. 2007; 21(2): 20-22. ISSN: 1381-8007. Note: In Dutch.

Descriptors: alpacas, llamas, reproduction, anatomy, pregnancy, gestation, semen, reproductive organs, birth.

Newman, Kenneth D.; Anderson, David E. **Humerus fractures in llamas and alpacas: Seven Cases(1998-2004).** *Veterinary Surgery*. 2007 Jan; 36(1): 68-73. ISSN:
URL:<http://www3.interscience.wiley.com/journal/118532623/home>
DOI: <http://dx.doi.org/10.1111/j.1532-950X.2007.00237>

Abstract: To describe treatment and outcome of humerus fractures in llamas and alpacas. Retrospective study. Llamas (n=4) and alpacas (3) with humerus fracture. Medical records (January 1, 1998-August 1, 2004) were reviewed for small camelids with a humeral fracture. Retrieved data were signalment, history, physical examination and radiographic findings, surgical and medical treatment, and outcome. Humeral fracture occurred in 7 of 38 (18%) camelids admitted with fractures. Affected animals were aged from 1 month to 3 years old. Fracture configuration included long-oblique (n=4), short-oblique (2), and Salter-Harris Type II fracture of the proximal physis (1). One adult llama was managed by stall confinement and surgical repair was attempted in the other camelids: fixation by screws inserted in lag fashion (n=3), intramedullary pinning and fixation by screws inserted in lag fashion (1), rush pinning (1), and bone plating (1). A Velpeau sling was used for additional support in 3 animals. All fractures healed but temporary radial nerve paresis occurred in 3 animals. Limb shortening and permanent lameness occurred in the llama managed conservatively. Humerus fractures in small camelids are amenable to surgical repair which may offer better long-term outcome than medical treatment alone. Surgical treatment of humerus fractures should have a good prognosis in llamas and alpacas. In select cases, minimally invasive techniques, such as rush pinning or fixation by screws inserted in lag fashion are sufficient for fracture healing.
Descriptors: llamas, alpacas, bone fractures, humerus, fracture fixation, screws, nails (equipment), disease course, postoperative complications, lameness, paralysis, case studies, recommendations.

Nichols, S.; Anderson, D.E.; Schober, K. **Subtotal pericardiectomy for treatment of constrictive effusive pericarditis in a llama cria.** *Journal of Camel Practice and Research*. 2007; 14(1): 33-37. ISSN: 0971-6777

URL:<http://www.camelsandcamelids.com>

Abstract: A 2-month-old llama cria in Ohio, USA, was evaluated for lethargy and intermittent fever [date not given]. A physical examination revealed a holosystolic murmur (3/6) over the tricuspid valve area and an enlarged umbilicus suggestive of an abscess. Echocardiography revealed severe enlargement of the atria, ventricular hyperkinesia and mild increase of the pericardial fluid mainly organized as fibrin. A diagnosis of constrictive effusive pericarditis was made. To increase the ventricular segmental fraction, a subtotal pericardiectomy was suggested. After resection of the 5th rib, a left thoracotomy was performed to expose the heart. 60% of the pericardium was then removed. The cria recovered uneventfully from the surgery. Seven days after the surgery, a control echocardiography was performed. No more effusion was surrounding the heart. However, the cria showed signs of cardiac failure (enlarge vessels, abdominal effusion). Two weeks after the pericardiectomy, the cria gained weight and was clinically normal and was discharged from the hospital. A laparotomy was performed to remove umbilical abscess. At follow up, the owner reported that the cria died suddenly without showing any signs of lethargy. Necropsy was not performed. In conclusion, this case demonstrates that a pericardiectomy can be performed in llama cria from a left thoracotomy.

Descriptors: llama, cria, case report, clinical aspects, diagnosis, echocardiography, pericarditis, pericardiectomy, surgery, surgical operations, surgical techniques, Ohio, US.

Niehaus, A.J.; Anderson, D.E. **Tooth root abscesses in llamas and alpacas: 123 cases (1994-2005).** *Journal of the American Veterinary Medical Association.* 2007 July 15; 231(2): 284-289. ISSN: 0003-1488

URL:<http://www.avma.org/>

DOI:<http://dx.doi.org/10.2460/javma.231.2.284>

NAL call no.: 41.8 AM3

Abstract: Objective - To determine features, outcome, and complications of surgical treatment of camelid tooth root abscesses. Design - Retrospective case series. Animals - 123 camelids with tooth root abscesses. Procedures - Signalment, history, teeth involved, surgery performed, ancillary diagnostic tests, and short-term complications were recorded from each medical record. An owner questionnaire was used to obtain long-term (>1 year) follow-up information. Results - The most common surgical treatments included tooth extraction (n=106) and apicoectomy (13). Owners provided follow-up information on 84 animals. Postoperative complications were reported in 42 of 84 animals. The most common complications included reinfection (n=15), chronic draining tract (14), and osteomyelitis (14). Significantly more camelids that were in good or obese body condition at the time of surgery were alive at the time of follow-up, compared with those with thin body condition at the time of surgery. Camelids with 2 teeth extracted had significantly more complications than those with 1 tooth extracted. Thirty-four of 47 owners reported that they were completely satisfied with the outcome. Conclusions and Clinical Relevance - Owners of camelids in poor body condition should be forewarned that such animals are at greater risk for complications following dental surgery. Clinicians should recognize that the number of teeth affected was not associated with a poorer outcome. Reproduced with permission from CAB Abstracts.

Descriptors: alpacas, llamas, teeth, dental caries, dental abscess, surgery, postoperative complications, disease diagnosis, risk factors, body condition, tooth extraction, apicoectomy, prognosis.

Nolen-Walston, R.; Bedenice, D.; Rodriguez, C.; Rushton, S.; Bright, A.; Fecteau, M.E.; Short, D.; Majdalany, R.; Tewari, D.; Pedersen, D.; Kiupel, M.; Maes, R.; Piero, F. **del Eastern equine encephalitis in 9 South American camelids.** *Journal of Veterinary Internal-Medicine.* 2007; 21(4): 846-852. ISSN: 0891-6640

URL:<http://www.blackwell-synergy.com/doi/ref/10.1111/j.1939-1676.2008.0072.x>

DOI:[http://dx.doi.org/10.1892/0891-6640\(2007\)21\[846:EEEISA\]2.0.CO;2](http://dx.doi.org/10.1892/0891-6640(2007)21[846:EEEISA]2.0.CO;2)

NAL call no.: SF601.J65

Abstract: Background: Eastern equine encephalitis (EEE) virus is a mosquito-borne togavirus (alphavirus) that causes severe (often fatal) encephalitis in many mammalian species, but it has not been reported previously in South American camelids. Hypothesis: South American camelids can become naturally infected with EEE virus and show encephalitic signs similar to those observed in other affected species. Animals: Nine cases (8 alpacas and 1 llama, aged 3.5 weeks to 12 years) were identified; 4 of 9 were ≤10 weeks old. All cases were from the East Coast of the United States and presented in late summer and fall. Methods: A retrospective study was performed to include confirmed cases of EEE in camelids in North America before

2006. Results: Eight of nine (89%) camelids died or were euthanized in extremis, with the mean time to death of 2 days. Clinical signs were consistent with encephalitis and included fever, lethargy, ataxia, seizures, recumbency, torticollis, opisthotonus, and vestibular signs. No consistent hematologic abnormalities were identified, and cerebrospinal fluid contained an increased protein concentration in the single camelid analyzed. No successful therapy was identified. EEE was confirmed by alphavirus detection by using immunohistochemistry (IHC) and polymerase chain reaction (PCR) in the central nervous system (CNS) and by serology. Findings included polioencephalitis with lymphocytic perivascular cuffing; neutrophil infiltration; gliosis; neuron satellitosis; necrosis; and edema, with intracytoplasmic alphavirus within neurons and glial cells. No virus was detected in extraneural tissues. Conclusions and Clinical Importance: In endemic areas, EEE should be considered a differential diagnosis for young and adult camelids with CNS disease. Brain histopathology with indirect IHC or PCR is diagnostic. Reproduced with permission of CAB Abstracts.

Descriptors: alpacas, llamas, animal pathology, clinical aspects, diagnosis, encephalitis, histopathology, immunohistochemistry, postmortem examinations, autopsy, clinical picture, encephalomyelitis, PCR, postmortem inspections, viral diseases, Eastern equine encephalitis virus, Massachusetts, New Hampshire, New Jersey, New York, North Carolina, US.

Plant, Jon D.; Kutzler, Michelle A.; Cebra, Christopher K. **Efficacy of topical eprinomectin in the treatment of *Chorioptes* sp. infestation in alpacas and llamas.** *Veterinary Dermatology*.

2007 Feb; 18(1): 59-62. ISSN: 0959-4493

URL:<http://dx.doi.org/10.1111/j.1365-3164.2007.00558>

NAL call no.: SF901.V47

Abstract: *Chorioptes* sp. mite infestation is increasingly recognized as a cause of skin disease in New World camelids and there is a need for an effective treatment protocol to eliminate herd infestation. In this field trial, eprinomectin applied topically at the rate of 0.5 mg/kg weekly for 10 weeks was found to be ineffective in a herd of 12 llamas and 16 alpacas.

Descriptors: alpacas, llamas, alternative livestock herds, animal parasitic diseases, mange, mites, *Chorioptes*, chorioptic mange, eprinomectin, topical application, drug evaluation, in vivo studies, dosage, dose response, acaricidal properties, drug resistance.

Polidori, P.; Renieri, C.; Antonini, M.; Lebboroni, G. **Llama meat nutritional properties.** *Italian Journal of Animal Science*. 2007; 6(Supplement 1): 857-858. ISSN: 1594-4077. Note: "Proceedings of the ASPA 17th Congress, Alghero, 29 May-1 June 2007." Special issue editors: N.P.P. Macciotta; G. Battacone; G. Enne; L. Marongiu; A. Pais; G. Pulina; P. Rassa.

URL:<http://www.aspajournal.it>

Abstract: The aim of this study was to determine the chemical composition of the muscle Longissimus thoracis taken from 20 llama males, reared in the Andean region, slaughtered at an age of 25 months and at a mean final body weight of 74 kg. Llama meat showed a low fat (3.51%) and cholesterol content (58.16 mg/100 g), a good protein content (22.42%) and an ash content of 3.06%. The Warner-Bratzler shear force values determined in llama meat was 6.56 kg/cm². This study confirmed that llama meat is healthy and nutritious, and represents a good source of proteins for Andean population.

Descriptors: llamas, llama meat, nutritional value, chemical composition, cholesterol, fat, nutritive value, protein content.

Polidori, P.; Antonini, M.; Torres, D.; Beghelli, D.; Renieri, C. **Tenderness evaluation and mineral levels of llama (*Lama glama*) and alpaca (*Lama pacos*) meat.** *Meat Science*. 2007. Dec; 77(4): 599-601. ISSN: 0309-1740

URL: <http://www.sciencedirect.com/science/journal/03091740>

DOI: <http://dx.doi.org/10.1016/j.meatsci.2007.05.011>

NAL call no.: TX373.M4

Abstract: Tenderness and mineral levels were determined in the Longissimus thoracis taken from 20 llama and 30 alpaca males reared in Peru and slaughtered at 25 months of age. Mineral contents were determined using an inductively coupled plasma emission spectrometer. Tenderness evaluation was determined two and seven days post slaughter using a Warner-Bratzler shear force device. Potassium is the mineral with the highest content, with a significant difference ($P < 0.05$) between the two species of camelids. The other mineral contents were, in decreasing order, phosphorus, sodium, magnesium and calcium, in addition to smaller percentages of zinc and iron. Shear force values determined seven days post slaughter were significantly ($P < 0.01$) lower in both the species compared with the results obtained two days post slaughter.

Descriptors: llamas, alpacas, males, meat quality, slaughter animals, mineral content, tenderness, Peru.

Polidori, P.; Renieri, C.; Antonini, M.; Passamonti, P.; Pucciarelli, F. **Meat fatty acid composition of llama (*Lama glama*) reared in the Andean highlands.** *Meat Science*. 2007; 75(2): 356-358. ISSN: 0309-1740

URL: <http://www.sciencedirect.com/science/journal/03091740>

DOI: <http://dx.doi.org/10.1016/j.meatsci.2006.07.010>

Abstract: This study reports the results of the chemical analysis of the Longissimus thoracis and lumborum taken from 20 llama males, reared in the Andean highlands. The animals were slaughtered at 25 months and had a mean final body weight of 63 kg. Llama meat shows a low fat (3.51%) and cholesterol content (56.29 mg/100 g). The fatty acid composition in llama meat contains 50.34% saturated fatty acids, 42.48% monounsaturated fatty acids and 7.18% polyunsaturated fatty acids. Llama meat appears to be a healthy alternative red meat choice.

Descriptors: llamas, chemical composition, cholesterol, fat, meat, meat quality, monoenoic fatty acids, polyenoic fatty acids, saturated fatty acids, monounsaturated fatty acids, polyunsaturated fatty acids

Powell, S.A.; Smith, B.B.; Timm, K.I.; Menino, A.R. Jr. **Expression of estrogen receptors alpha and beta in the corpus luteum and uterus from non-pregnant and pregnant llamas.**

Molecular Reproduction and Development. 2007; 74(8): 1043-1052. ISSN: 1040-452X

URL: <http://www3.interscience.wiley.com/cgi-bin/abstract/114037313/ABSTRACT>

DOI: <http://dx.doi.org/10.1002/mrd.20684>

Abstract: Because estrogen may be involved in maternal recognition of pregnancy and embryonic migration in llamas, expression of estrogen receptor subtypes alpha (ER alpha) and beta (ER beta) was evaluated in corpus luteum (CL), endometrium, and uterus using relative RT-PCR. Tissues were recovered from sterile-mated (SM) and pregnant (PG) females during Days 7-11 and 7-13 (Day 0=day of mating), respectively, and follicular phase and

juvenile females. Luteal expression of ER alpha and beta was similar ($P>0.10$) in SM and PG females and within Days 7-11, however, expression of ER alpha in ovarian tissue from follicular phase females was greater ($P<0.05$) than Days 7 and 9 CL. Uterus expressed less ER alpha and beta compared to endometrium ($P=0.07$ and $P<0.01$, respectively). Expression of ER alpha was greater ($P<0.05$) in Day 7 and follicular phase uteri than Days 9 and 11, Day 13 PG and juvenile uteri. Uterine ER beta expression was greater ($P=0.09$) in PG versus SM females and in mated compared to follicular phase females ($P<0.05$). Endometrial expression of ER alpha and beta did not differ ($P>0.10$) between SM and PG females or by day. The presence of luteal ER during this period may mean a role for estradiol in maternal recognition of pregnancy. Observed increases in uterine ER expression with no changes in endometrium suggest expression increased in myometrium and/or perimetrium. Upregulation of myometrial ER beta in PG females may be involved in supporting uterine migration of the embryo. Reproduced with permission from CAB Abstracts.

Descriptors: llamas, uterus, corpus luteum, endometrium, estradiol, maternal recognition, myometrium, estrogen receptors, estrogens, estradiol, gestation, pregnancy.

Powell, S.A.; Smith, B.B.; Timm, K.I.; Menino, A.R. Jr. **Estradiol production by preimplantation blastocysts and increased serum progesterone following estradiol treatment in llamas.**

Animal Reproduction Science. 2007 Nov; 102(1-2): 66-75. ISSN: 0378-4320

URL: <http://www.sciencedirect.com/science/journal/03784320>

DOI: <http://dx.doi.org/10.1016/j.anireprosci.2006.10.002>

NAL call no.: QP251.A5

Abstract: Estradiol is a potential candidate for the blastocyst signal responsible for maternal recognition of pregnancy in the llama (*Lama glama*). Two experiments were conducted to determine if the llama blastocyst produces estradiol during the presumed period of maternal recognition of pregnancy and if exogenous estradiol can extend the luteal phase. In Experiment 1, llamas were superovulated with eCG and mated 7 days later (Day 0=day of mating). Blastocysts were collected nonsurgically on Days 7, 9, or 11 or at necropsy on Days 13 and 15 post-mating and cultured for 48 h. Conditioned medium was recovered, replaced with fresh medium at 24-h intervals, and assayed for estradiol-17 beta. Estradiol production (pg/blastocyst) over the 48-h culture increased ($P<0.05$) by day of gestation where more estradiol ($P<0.05$) was produced by Day 11 compared to Day 7 blastocysts, Day 13 compared to Days 7-11 blastocysts, and Day 15 compared to Days 7-13 blastocysts. A dramatic increase was observed between Days 11 and 13 when estradiol production by Day 13 blastocysts increased ($P<0.05$) more than 50-fold. In Experiment 2, 30 females were induced to ovulate with hCG (Day 0=day of hCG injection). Starting on Day 7 and continuing through Day 15, animals received daily injections i.m. of 0 (n=11), 5 (n=7), or 10 mg (n=12) estradiol benzoate (EB) dissolved in isopropylmyristate. Sera were collected immediately prior to each injection and on Days 16, 17, 18, 20, and 22 and analyzed for progesterone. Progesterone concentrations were greater ($P<0.05$) on Days 14, 15, 16, and 17 in llamas treated with 10 mg EB compared to llamas treated with 0 mg EB. These results demonstrate that llama blastocysts produce estradiol and exogenous estradiol can enhance and transiently extend luteal progesterone production. Estradiol produced by the preimplantation llama blastocyst may play a role in maternal recognition of pregnancy and early luteal support. Reproduced with permission from CAB Abstracts.

Descriptors: llamas, *Lama*, females, female reproductive system, pregnancy, estradiol, progesterone, hormone secretion, blastocyst, hormonal regulation, corpus luteum, luteinization, blood chemistry, signal transduction, hormones, embryogenesis, biomarkers, blood serum.

Ratto, M.; Gomez, C.; Berland, M.; Adams, G.P. **Effect of ovarian superstimulation on COC collection and maturation in alpacas.** *Animal Reproduction Science*. 2007 Feb; 97(3-4): 246-256. ISSN: 0378-4320

URL:<http://www.sciencedirect.com/science/journal/03784320>

DOI:<http://dx.doi.org/10.1016/j.anireprosci.2006.02.002>

NAL call no.: QP251.A5

Abstract: The objective of the present study was to compare the ovarian follicular response, cumulus-oocyte complex (COC) collection rate, and maturational status of COC collected from alpacas subsequent to treatment with two different superstimulatory protocols. Alpacas (n=7 per group) were treated with: (1) 200 mg of FSH im divided bid for 3 d, plus a single i.v. dose of 1000 IU hCG 24 h after the last FSH treatment, or (2) 1200 IU of eCG as a single i.m. dose, plus a single i.v. dose of 1000 IU of hCG on day 3 after eCG treatment (day 0=start of superstimulatory treatment). At 20-24 h post-hCG treatment, the ovaries were surgically exposed and COC were collected by needle aspiration of all follicles ≥ 6 mm. The FSH and eCG treatment groups did not differ with respect to the number of follicles ≥ 6 mm at the time of COC collection (20.0 \pm 7.5 versus 27.0 \pm 3.3; P=0.5), the number of COC collected (26.2 \pm 8.4 versus 23.3 \pm 3.7; P=0.7), or the collection rate per follicle aspirated (89% versus 87%; P=0.7). No differences were detected between FSH- and eCG-treated alpacas in the number of expanded COC collected per alpaca (11.5 \pm 2.9 versus 8.8 \pm 2.8; P=0.54), the number of expanded COC in metaphase II (8.5 \pm 1.9 versus 6.0 \pm 2.1; P=0.1), or the number of compact COC with ≥ 3 layers of cumulus cells (12.5 \pm 4.3 versus 14.3 \pm 2.6; P=0.72). A greater proportion (P<0.05) of compact COC collected after FSH treatment matured in vitro to the metaphase II stage than after eCG treatment. Eight expanded alpaca COC were fertilized in vitro with llama sperm, three of which were fixed and stained 18 h after exposure to sperm and five were cultured in vitro. Two of the three stained oocytes were in the pronuclear stage, and all five of the cultured oocytes developed to the two-cell and morula stages at 2 and 7 days, respectively, after in vitro fertilization. In summary, FSH and eCG treatments were equally effective for ovarian superstimulation and oocyte collection. Cumulus-oocyte complexes were collected from more than 80% of follicles aspirated during laparotomy. Nearly one third of the COC collected after superstimulation were in metaphase II, and more than 70% of the remaining COC progressed to metaphase II after in vitro maturation for 26 h, bringing the mean number of oocytes available for in vitro fertilization to 16 per alpaca. Preliminary results support the hypothesis that alpaca oocytes obtained after superstimulation in the absence of progesterone are developmentally competent since morulae developed from all five COC fertilized and cultured in vitro.

Descriptors: alpacas, llamas, ovarian development, ovaries, superovulation, cumulus oophorus, ovarian follicles, oocytes, follicle stimulating hormone, equine chorionic gonadotropin, in vitro culture, in vitro fertilization, spermatoocytes, embryogenesis, morula, metaphase, in vitro maturation.

Reed, S.K.; Semevolos, S.A.; Rist, P.K.; Valentine, B.A. **Morphologic and biochemical characterization of hyperextension of the metacarpophalangeal and metatarsophalangeal joints in llamas.** *American Journal of Veterinary Research*. 2007 Aug; 68(8): 879-885. ISSN: 0002-9645
URL: <http://avmajournals.avma.org/loi/ajvr/>
DOI: <http://dx.doi.org/10.2460/ajvr.68.8.879>
NAL call no.: 41.8 AM3A

Abstract: To determine the morphologic and biochemical characteristics of hyperextension of the metacarpophalangeal and metatarsophalangeal joints in llamas. Animals - 12 adult llamas (6 with bilateral hyperextension of the metacarpophalangeal or metatarsophalangeal joints and 6 age- and sex-matched control llamas). Procedures - Llamas were evaluated by use of lameness examination, ultrasonography, and radiography. A CBC, serum biochemical analysis, and determination of concentrations of trace minerals in serum and liver samples were performed. Llamas were euthanized, and samples of the superficial digital flexor tendon, deep digital flexor tendon, and suspensory ligament were obtained from 4 areas and snap-frozen in liquid nitrogen or suspended in neutral-buffered 10% formalin. Immunohistochemical evaluation of collagen types I and III and assays for measurement of lysyl oxidase activity were performed. Results - 2 affected llamas had a visible gait deficit associated with metacarpophalangeal joint hyperextension. Radiographic evidence of osteoarthritis was detected in 1 severely affected llama, and ultrasonographic changes of soft tissue mineralization and suspensory desmitis were observed in 2 llamas. Liver concentrations of copper were lower and serum concentrations of zinc higher in affected llamas, compared with values in control llamas. Lysyl oxidase activity and collagen distribution did not differ significantly between groups. Conclusions and Clinical Relevance - Hyperextension of the metacarpophalangeal or metatarsophalangeal joints in llamas does not appear to be the result of injury or degeneration of the suspensory ligament or flexor tendons. Lower copper concentrations coupled with higher zinc concentrations in affected llamas may be indicative of secondary copper deficiency.

Descriptors: llamas, lameness, joint diseases, metacarpus, phalanges, metatarsus, animal injuries, animal morphology, biomarkers, ultrasonography, radiology, blood chemistry, blood cell counts, tendons, ligaments, immunohistochemistry, gait, copper, zinc, nutrient deficiencies, dietary minerals, digital flexor tendons, suspensory ligament.

Riek, A.; Gerken, M.; Moors, E. **Measurement of milk intake in suckling llamas (*Lama glama*) using deuterium oxide dilution.** *Journal of Dairy Science*. 2007 Feb; 90(2): 867-875. ISSN: 0022-0302

URL: <http://jds.fass.org/>

NAL call no.: 44.8 J822

Abstract: The objective of the study was to estimate daily milk intake in llama crias and relate nutrient intakes at peak lactation to growth data. Milk intake in 11 suckling llamas was estimated from water kinetics using deuterium oxide (D subscript 2(BO) at d 17, 66, and 128 postpartum. Daily milk intakes averaged 2.6, 2.3, and 2.0 kg at 17, 66, and 128 d postpartum, respectively. Milk intake decreased with age when expressed as daily amount, percentage of body weight (BW), or per kilogram of metabolic size, but the influence of age was eliminated when expressed per gram of daily gain. Because llamas only have one young per parturition, milk intake was equivalent to the daily milk output of the dam,

which ranged from 27.6 to 96.9 g/kg of maternal BW⁰(B. ⁷⁵(B. Compared with different ruminant species, milk production in llamas appears to lie between wild and domestic ruminants used for meat production. Nutrients (dry matter, fat, protein, and lactose) and energy intakes from the milk calculated by combining milk intake and milk composition data decreased with age when expressed as daily amount or per 100 g of BW, but when expressed per gram of daily gain, no clear trend was observed. Maintenance requirement for suckling llamas at peak lactation (17 d postpartum) was 312 kJ of ME/kg of BW⁰(B. ⁸³(B. Combined with milk composition data, the present milk intake estimations at different stages of the lactation can be used to establish recommendations for nutrient and energy requirements of suckling llamas.

Descriptors: llama crias, daily milk intake, nutrient intakes at peak lactation, growth data, milk composition, estimates of milk update, recommendations and energy requirements for suckling crias.

Riek, A.; Gerken, M. **Measurements of the bodyweight and other physical characteristics of 11 llamas (*Lama glama*) from birth to weaning.** *Veterinary Record*— London. 2007 Oct 13; 161(15): 520-524. ISSN: 0042-4900

URL:<http://veterinaryrecord.bvapublications.com/>

NAL call no.: 41.8 V641

Abstract: The bodyweight (BW), thoracic circumference, length and height of 11 llamas were recorded weekly from birth for 27 weeks. Their mean (sd) birth weight was 11.60 (2.35) kg and their weight increased in curvilinear fashion reaching 61.05 (13.75) kg after 27 weeks. Their average daily gains reached the highest value three weeks after birth and then decreased, reaching the lowest value of 262 g per day at 27 weeks. On a metabolic BW^{0.83} basis, the growth of the llamas when their dams were at peak lactation was comparable with that of calves, fawns and lambs. All the measurements were significantly affected by the age, but not by the sex of the young or the parity of the dam. The regression models chosen to predict the bodyweight and weight gain of the llamas yielded R² ranging from 0.97 to 0.99. Correlations between bodyweight and other single body measurements were between r=0.68 and 0.77. Single or combined body measurements were good predictors of bodyweight, but additional body measurements added little to the already good fit provided by a single measurement (R² ranging from 0.93 to 0.98). The thoracic circumference (R²=0.98) and length (R²=0.96) were good predictors of the bodyweight of the llamas between birth and 27 weeks old.

Descriptors: llamas, parturition, weaning, body weight, body measurements.

Rodriguez, C.T.; Quispe, J.L. **Domesticated camelids, the main animal, genetic resource of pastoral systems in the region of Turco, Bolivia.** In: K.A. Tempelman; R.A. Cardellino. *People and Animals, Traditional Livestock Keepers: Guardians of Domestic Animal Diversity.* 2007; 33-45. ISBN: 9789251056844

NAL call no.: SF105.3 P46 2007

Abstract: The Turco region has a harsh, microthermal, semi-arid climate, but people make a living there from llamas and alpacas which have advantages over exotic species and are managed in a transhumant system. These camelids are the main source of food and income for herders. The inhabitants have a holistic world view and see themselves, the land and

their animals as an integrated unit. Group selection is being done by herders assisted by the Camelid Research and Improvement Centre. There is little conservation activity by government agencies or NGOs. A programme, compatible with the maintenance of genetic diversity and the producers' interests and economic needs, is needed to focus primarily on in situ conservation, inventorying, characterization and utilization. Reproduced with permission of CAB Abstracts.

Descriptors: alpacas, llamas, agropastoral systems, livestock farming systems, animal genetic resources, conservation, ecology, ecosystems, food security, genetic diversity, livestock farming, policy, selection, selection criteria, traditional farming, Bolivia.

Roth, C.; Ganter, M. **Urolithiasis bei einem Lamawallach. [Urolithiasis in a gelded llama.]** Tierärztliche Praxis Ausgabe G., Grosstiere/Nutztiere. 2007; 35(6): 446-452. ISSN: 1434-1220. Note: In German with an English summary.

URL:<http://www.schattauer.de/index.php?id=947&L=1>

Abstract: Objective: In recent years, the number of South American camelids kept in Germany has increased, and brings the surgeon into contact with a new kind of patient. Similar to the ruminants, obstructions of the urinary tract can occur in male South American camelids. Here, the case of an eight-year-old gelded llama with urolithiasis will be presented. Material and methods: This account describes the clinical symptoms and findings, as well as the results of laboratory diagnosis and pathological examinations performed on a gelded llama. The results of urolithic analysis as well as the ensuing calculation of the silicate content of the hay and pasture grass will be presented. Results: The llama displayed a severe disturbance of its general condition. Clinical tests and creatinine and urea values in the blood and abdominal fluid led to the presumptive diagnosis of urolithiasis with rupture of the bladder. After surgical opening of the abdominal cavity and removal of more than 20 litres of a yellowish-bloody fluid, a ruptured bladder was seen. Due to the poor prognosis the patient was euthanized intra-operatively. The urinary apparatus was subjected to a pathological-anatomical examination. Bladder and kidneys also underwent a histopathological examination. Cause for the bladder rupture were silicate uroliths: one of 4 mm and two of 3 mm in size, which led to an obstruction of the urethra at the transition from the pelvic to the penis section. The livestock was fed hay which was shown to have a silicate content of 0.64% (based on dry substance). The silicate concentration in the available pasture grass totalled 1.82%. Conclusion and clinical relevance: In examining male South American camelids which present diffuse symptoms and high grade disturbance of the general condition urolithiasis should be considered as a differential diagnosis. Despite low concentrations of silicate in native grasses, uroliths on the basis of silicic acid can develop.

Descriptors: llamas, clinical picture, ruptured urinary bladder, abdomen, body fluids, case reports, clinical aspects, creatinine, diagnosis, histopathology, kidneys, obstruction, prognosis, rupture, surgery, urolithiasis, Germany.

Sansinena, M.J.; Taylor, S.A.; Taylor, P.J.; Schmidt, E.E.; Denniston, R.S.; Godke, R.A. **In vitro production of llama (*Lama glama*) embryos by intracytoplasmic sperm injection: Effect of chemical activation treatments and culture conditions.** *Animal Reproduction Science*. 2007 June; 99(3-4): 342-353. ISSN: 0378-4320

URL: <http://www.sciencedirect.com/science/journal/03784320>

DOI:<http://dx.doi.org/10.1016/j.anireprosci.2006.05.020>

NAL call no.: QP251.A5

Abstract: Assisted reproductive technologies in the llama (*Lama glama*) are needed to provide alternative methods for the propagation, selection and genetic improvement; however, recovery of adequate quantity and quality of spermatozoa for conventional IVF is problematic. Therefore, an effort was made to adapt the intracytoplasmic sperm injection (ICSI) procedure for the in vitro production of llama embryos. The specific objectives of this study were: (1) to determine in vitro maturation rates of oocytes recovered by transvaginal ultrasound-guided oocyte aspiration (TUGA) or flank laparotomy; (2) to evaluate the effects of activation treatments following ICSI; (3) to evaluate the development of llama ICSI embryos in CR1aa medium or in an oviduct cell co-culture system. Llamas were superstimulated by double dominant follicle reduction followed by oFSH administered in daily descending doses over a 3-day interval. Oocytes were harvested by flank laparotomy or TUGA and matured in vitro for 30 h. Mature oocytes were subjected to ICSI followed by no chemical activation (Treatment A), ionomycin only (Treatment B) or ionomycin/DMAP activation (Treatment C). More oocytes were recovered by flank laparotomy procedure compared with TUGA (94% versus 61%, $P < 0.05$) and a greater number of oocytes harvested by flank laparotomy reached the metaphase-II stage (77% versus 44%, $P < 0.05$). After ICSI, the proportion of cleaved and 4-8-cell stages embryos was significantly greater when injected oocytes were activated with ionomycin/DMAP combination (63% and 38%, respectively, $P < 0.05$). The co-culture of ICSI embryos with llama oviduct epithelial cells resulted in progression to morula (25%) and blastocyst (12%) stages; whereas, all embryos cultured in CR1aa medium arrested at the 8-16-cell developmental stage.

Descriptors: llamas, *Lama*, females, animal breeding, in vitro fertilization, methodology, oocytes, extraction, laparoscopy, ultrasonography, spermatozoa, injection, in vitro culture, cell culture, culture media, chemical treatment, epithelial cells, oviducts, embryogenesis, meiosis, intracytoplasmic sperm injection, ionomycin.

Schwalm, A.; Gauly, M.; Erhardt, G.; Bergmann, M. **Changes in testicular histology and sperm quality in llamas (*Lama glama*), following exposure to high ambient temperature.** *Theriogenology*. 2007 May; 67(8): 1316-1323. ISSN: 0093-691X

URL: <http://www.sciencedirect.com/science/journal/0093691X>

DOI: <http://dx.doi.org/10.1016/j.theriogenology.2007.02.005>

NAL call no.: QP251.A1T5

Abstract: The aim of the study was to investigate whether a moderately elevated ambient temperature (29 °C, 4 weeks, 24 h per day) has an effect on the spermatogenesis in male llamas (*Lama glama*) and to monitor the recrudescence of spermatogenesis. Thirteen llamas were used. Semen parameters were monitored in four of the llamas and six animals were castrated at different times after the heat treatment. An additional three llamas were used as control animals and were castrated without any treatment. Spermatogenesis was found to be severely impaired due to the high environmental temperature. Sperm concentration declined from 97.5 million to 10 million spermatozoa/ml. Sperm motility declined from 63.1% to 15.0% and the percentage of morphologically abnormal sperm cells increased from 26.3% up to 50.5%. The changes in sperm parameters corresponded to the histological analysis of the testes. We found an increase in destroyed tubules, where no stage of the spermatogenesis

cycle could be established from 1.8% up to 38.2%, and a reduction of the spermatogonial proliferation rate (Ki-67 histochemistry) represented by tubules with proliferating spermatogonia from 79.5% to 45.7% directly after the heat treatment. Apoptosis (TUNEL assay) showed no significant changes during the experiment. The recrudescence of spermatogenesis within 6 weeks after the heat treatment was found to be due to an increase of mitotic proliferation of spermatogonia and not due to a decrease in the apoptotic rate. Our data indicate that in llamas the thermoregulatory ability is not sufficient enough to prevent heat caused damage to the testis at longer acting ambient temperature of 29 pC.

Descriptors: llamas, testes, histology, seminiferous tubules, spermatogenesis, spermatogonia, spermatozoa, sperm motility, heat stress, ambient temperature, sperm parameters, sperm concentration, abnormal sperm, heat damage, spermatogenic recrudescence.

Semevolos, Stacy A.; Reed, Shannon K.; Gamble, Kari. **In Vitro bursting pressures of jejunal enterotomy closures in llamas.** *Veterinary Surgery*. 2007 Jan; 36(1): 64-67. ISSN: 0161-3499

URL:<http://www3.interscience.wiley.com/journal/118532623/home>

DOI : <http://dx.doi.org/10.1111/j.1532-950X.2007.00236>

NAL call no.: SF911.V43

Abstract: To evaluate closure strength (in vitro bursting pressure) of jejunal enterotomies in llamas. In vitro experimental study. Jejunal specimens (n=72) from 6 llamas. Differences in bursting pressures and luminal diameters were compared between 2 layer enterotomy closures with an initial full thickness simple continuous pattern oversewn with either a continuous Lembert or Cushing suture pattern using 3 sizes (2-0, 3-0, 4-0) of polyglactin 910 and polydioxanone. Bursting pressures were significantly higher for enterotomies closed with polydioxanone than polyglactin 910, independent of suture size, but there was no difference between Lembert and Cushing oversew patterns. Use of a Lembert pattern reduced intestinal diameter more than a Cushing pattern regardless of suture material or size. Although polydioxanone resisted higher bursting pressures than polyglactin 910, both suture materials should be considered satisfactory for jejunal enterotomy closure in llamas based on typical intraluminal pressures expected in clinical patients. The optimal oversew pattern may be continuous Cushing to maximize the luminal diameter in small intestinal enterotomy closures. In vitro bursting pressures may help to predict which enterotomy sites would leak post-operatively, although further studies are necessary to determine the outcome in clinical patients.

Descriptors: llamas, surgery, jejunum, suture techniques, in vitro studies, materials testing, fatigue strength, forces, pressure, protective effect, postoperative complications, enterotomy, polydioxanone, polyglactin.

Serrano-Martinez, E.; Collantes-Fernandez, E.; Chavez-Velasquez, A.; Rodriguez-Bertos, A; Casas-Astos, E.; Risco-Castillo, V.; Rosadio-Alcantara, R.; Ortega-Mora, L.M. **Evaluation of *Neospora caninum* and *Toxoplasma gondii* infections in alpaca (*Vicugna pacos*) and llama (*Lama glama*) aborted foetuses from Peru.** *Veterinary parasitology*. 2007 Nov 30; 150(1-2): 39-45. ISSN: 0304-4017

URL: <http://www.sciencedirect.com/science/journal/03044017>

DOI:<http://dx.doi.org/10.1016/j.vetpar.2007.08.048>

NAL call no.: SF810.V4

Abstract: The aim of this study was to investigate the participation of *Neospora caninum* and *Toxoplasma gondii* in abortion cases of Peruvian llamas and alpacas. Fifteen aborted foetuses were recovered from two main rearing areas of camelids in Peru (Central or South Andean region). Foetal histopathology was used to detect the presence of protozoal-associated lesions in target organs. *N. caninum* and *T. gondii* infections were confirmed by immunohistochemistry (IHC) combined with PCR and by PCR alone, respectively. The influence of the species (llama and alpaca), foetal age (first, second and third gestational periods) and geographical location (Central or South Andean region) of the foetuses was also studied. Thirteen of the samples (26%, 13/50) showed lesions suggestive of protozoal infection. *N. caninum* infection was detected by either IHC or specific PCR in 14 out of 50 foetuses (28%), of which 8 also showed protozoal-associated lesions. *T. gondii* DNA was not detected in any of the foetuses analysed. Protozoal infection was more frequent in the foetuses from the second gestational period ($P < 0.05$, Fisher F-test). No significant association was observed between protozoal infection and species or geographical location ($P > 0.05$, chi 2 test). The results of the present study indicate that neosporosis should be included during the differential diagnosis of abortion in llamas and alpacas.

Descriptors: alpacas, llamas, vicuna, *Vicugna*, *Lama*, *Neospora caninum*, *Toxoplasma gondii*, neosporosis, toxoplasmosis, animal abortion, fetus, disease prevalence, disease detection, histopathology, immunohistochemistry, polymerase chain reaction, PCR, gestational age, Peru, Andes region.

Shoemaker, R.W.; Wilson, D.G. **Surgical repair of femoral fractures in New World camelids: five cases (1996-2003)**. *Australian Veterinary Journal*. 2007 Apr; 85(4): 148-152. ISSN: 0005-0423

URL:<http://www.ava.com.au/avjpast.php?journalid=9&plink=avj03.htm>

DOI:<http://dx.doi.org/10.1111/j.1751-0813.2006.00099.x>

NAL call no.: 41.8 AU72

Abstract: Five New World camelids were admitted to the Western College of Veterinary Medicine between 1996 and 2003 for evaluation of femoral fractures. There were three alpacas and two llamas. Four of the animals were female and three were less than 3 months of age. Fracture configurations consisted of distal physeal fractures (three), a comminuted diaphyseal/metaphyseal fracture, and a transverse diaphyseal fracture. Fractures were diagnosed with a combination of physical examination and radiographs in all cases. All five fractures were repaired with internal fixation and three animals were discharged from the hospital with fractures that healed. One cria underwent successful internal fixation but died from pulmonary oedema during recovery from anaesthesia. Postoperative complications were rare and limited to inadequate fracture stability in one alpaca and prolonged recovery to weight bearing in another. One llama with a comminuted metaphyseal fracture, repaired with a 4.5 mm dynamic compression plate, subsequently had catastrophic failure of the bone 17 days after surgery. Overall the clients were pleased with the outcome of discharged animals. Although femoral fractures are considered rare, they pose a unique opportunity for the large animal veterinarian to successfully achieve fracture union with the aid of internal fixation. Reproduced with permission from CAB Abstracts.

Descriptors: alpacas, llamas, females, males, age differences, case studies, bone fractures, surgical repairs, fracture fixation, femur.

Shubitz, Lisa E. **Comparative aspects of coccidioidomycosis in animals and humans.** *6th International Symposium on Coccidioidomycosis, Palo Alto, CA, USA; August 23-26, 2006.* ISSN: 0077-8923 (print). ISBN: 9781573316880

URL: <http://www3.interscience.wiley.com>

NAL call no.: RC136.3.I58 2006

Descriptors: llamas, dogs, humans, cats, azole antifungal agents, therapy for *Coccidioides* spp., clinical picture, symptoms comparison, oral administration of drugs.

Snyder, J.H. **Small ruminant tips for small animal practitioners.** *Small Animal and Exotics Proceedings of the North American Veterinary Conference, Volume 21, Orlando, Florida, USA, 2007.* 2007; 664-667

URL:<http://www.tnavc.org>

Descriptors: alpacas, llamas, deer, goats, sheep, adverse effects, anesthesia, anesthetics, analgesics, anthelmintics, disease prevention, drug therapy, drug toxicity, adverse drug reactions, euthanasia, foot rot, grooming, lidocaine, non steroidal anti-inflammatory agents, NSAIDS, opioids, pain control, parasitoses, quarantine, rumen, surgery, vaccination, *Clostridium perfringens*, *Dichelobacter nodosus*, parasitic infections.

Spire, Mark F. **Update on the USDA National Animal Identification System (NAIS) program.**

Bovine Practitioner. 2007; 41(1): 66-69. ISSN: 0524-1685

NAL Call no. SF779.5.A1B5

Abstract: The National Animal Identification System proposed and under development by the USDA-APHIS is a comprehensive program designed to provide rapid response following the introduction of a foreign animal disease (accidental or intentional), the discovery of an emerging pathogen or within the framework of existing regulatory programs for currently known domestic animal diseases. It is being planned as a three-part voluntary program: premises registration, individual or group/lot animal identification and animal movement tracking. The premises and animal identification components of the program fit well with other USDA programs, particularly the Agricultural Marketing Service source and age verification program, for use by producers for value discovery in animals entering marketing channels.

Descriptors: sheep, cattle, goats, llamas alpacas, cervids, equines, tuberculosis, brucellosis, USDA, National Animal Identification System program, identification program, tracking to deal with introduced diseases. US.

Tibary, A.; Semrad, Susan, University of Wisconsin, Madison. School of Veterinary Medicine.

Reproduction and Diseases of the Alpaca and Llama. Published by the Veterinary School. Madison, WI. 2007. Note: Cover title. "March 2007". Contents: Overview of physiology and infertility in the male and female camelid / by Ahmed Tibary -- Diagnostic imaging in camelid theriogenology / by Ahmed Tibary -- Reproductive surgery in the male and female / by Ahmed Tibary -- Pregnancy complications and obstetrical management / by Ahmed Tibary -- Postpartum care of the dam and neonate / by Ahmed Tibary -- Update on selected medical conditions / by Susan Semrad -- Supplemental notes.

NAL call no.: SF745.5 .M64 2006

Descriptors: see contents in the note above.

Twomey, D.F.; Aktan, I.; Boon, J.D.; Higgins, R.J.; La Ragione, R.M.; Preston, G.D. ***Streptococcus bovis* biotype I meningoencephalitis in an alpaca (*Lama pacos*) cria.** *Veterinary Record*—London. 2007 Mar 10; 160(10): 337-339. ISSN: 0042-4900

URL:<http://veterinaryrecord.bvapublications.com/>

NAL call no.: 41.8 V641

Abstract: A 10-day-old, 8.5 kg, male homebred alpaca was found dead without premonitory clinical signs (UK, date not given). Postmortem examination was performed the day after death and the carcass was found to be autolysed. The stomach compartments contained a mixture of fibrous material and semi-clotted milk. The large intestinal contents were liquid but the rectum was empty. Samples from the brain, heart, lung, liver, kidney and small intestine were fixed and processed for histopathological examination. Aerobic culture on sheep blood agar of a meningeal swab yielded a pure growth of a Group D streptococcus and further testing identified the isolate as *Streptococcus bovis* biotype I. Histopathological examination of the brain revealed diffuse meningeal infiltration with predominantly neutrophils and macrophages, intermixed with fibrinous exudate. This is the first recorded case of fatal fibrinopurulent meningoencephalitis associated with *S. bovis* infection in an alpaca cria in UK. Reproduced with permission from CAB Abstracts.

Descriptors: alpacas, *Streptococcus bovis*, meningoencephalitis, case study, UK.

Twomey, D.F.; Crawshaw, T.R.; Anscombe, J.E.; Farrant, L.; Evans, L.J.; McElligott, W.S.; Higgins, R.J.; Dean, G.; Vordermeier, M.; Jahans, K.; Rua-Domenech, R. de la. **TB in llamas caused by *Mycobacterium bovis*.** *Veterinary Record*—London. 2007; 160(5): 170. ISSN: 0042-4900

URL : <http://veterinaryrecord.bvapublications.com/archive/>

NAL call no.: 41.8 V641

Abstract: The diagnosis of tuberculosis in llamas in a herd in Devon, UK, in 2006 and the use of intradermal tuberculin and antibody tests to determine the seroprevalence of *M. bovis* infection are reported.

Descriptors: llamas, antibody testing, diagnosis, disease prevalence, epidemiology, mycobacterial diseases, antibody detection, intradermal tests, mycobacterial infections, seroprevalence, skin tests, tuberculin, tuberculosis, *Mycobacterium bovis*, UK.

Uhrig, S.R.; Papich, M.G.; KuKanich, B.; Mama, K.R.; Wagner, A.E.; Chapman, P.L.; Hellyer, P.W. **Pharmacokinetics and pharmacodynamics of morphine in llamas.** *American Journal of Veterinary Research*. 2007 Jan; 68(1): 25-34. ISSN: 0002-9645

URL:<http://www.electronicpc.com/JournalEZ/toc.cfm?code=0429001>

DOI : <http://dx.doi.org/10.2460/ajvr.68.1.25>

NAL call no.: 41.8 AM3A

Abstract: To assess the pharmacokinetics and pharmacodynamics of morphine in llamas. Animals - 6 healthy adult llamas. Procedures - Llamas received morphine sulfate in a randomized crossover design. In phase 1, they received IV or IM administration of morphine at 0.05 or 0.5 mg/kg, respectively; in phase 2, they received IV administration of morphine at 0.05, 0.25, or 0.5 mg/kg. Plasma morphine and morphine-6-glucuronide concentrations were determined by validated methods. Body temperature, heart rate, respiratory rate, sedation, and analgesia were assessed and compared with plasma concentrations by regression

analysis. Results - Total body clearance was similar between IV administration of morphine sulfate at 0.25 and 0.5 mg/kg (mean+or-SD, 25.3+or-6.9 mL/min/kg and 27.3+or-5.9 mL/min/kg, respectively), and linearity was demonstrated between these doses. Bioavailability of morphine following IM administration at 0.5 mg/kg was 120+or-30%. Body temperature and sedation increased as the dose of morphine administered increased. Heart rate was unaffected by varying doses. Respiratory rate decreased as dose increased. Analgesia was difficult to assess as a result of high individual variability. Intravenous administration of morphine at 0.25 mg/kg provided the most consistent increase in tolerance to electric stimulation. Pharmacodynamic modelling revealed a sigmoidal relationship between plasma concentration and sedation score. Conclusions and Clinical Relevance - Morphine was characterized by a large apparent volume of distribution and high systemic clearance in llamas. A prolonged half-life was observed with IM injection. Intravenous administration of morphine sulfate at 0.25 mg/kg every 4 hours is suggested for further study. Reproduced with permission from CAB Abstracts.

Descriptors: llamas, morphine, pharmacokinetics, intravenous injection, intramuscular injection, dosage, blood chemistry of metabolites, glucuronides, body temperature, heart rate, breathing, sedation, analgesia, regression analysis, mathematical models.

Valentine, B.A.; Martin, J.M. **Prevalence of neoplasia in llamas and alpacas (Oregon State University, 2001-2006).** *Journal of Veterinary Diagnostic Investigation.* 2007 Mar; 19(2): 202-204. ISSN: 1040-6387

URL:<http://jvdi.org/>

NAL call no.: SF774.J68

Abstract: Prevalence and type of neoplastic disease were determined in 551 camelid submissions (368 alpacas [*Lama pacos*], 180 llamas [*Lama glama*], and 3 cases in which species was not identified) over a 5-year period. Forty neoplasms were identified in 38 animals (6.9%). Prevalence of neoplasia in llamas was higher (11%) than in alpacas (4.9%). Mean age of camelids with neoplasia was 9.42+or-4.9 years. Mean age of alpacas with neoplasia (5.48+or-3.7 years) was significantly less than of llamas with neoplasia (12.53+or-3.2 years; P<0.001). Cutaneous and mucocutaneous fibroma/fibropapilloma was most common (10 animals), followed by cutaneous and mucocutaneous squamous cell carcinoma (6 animals), disseminated lymphoma (5 animals), and fibrosarcoma (4 animals). Four of 5 animals with lymphoma were alpacas, aged 0.21 to 4 years. Lymphoma occurred in 1 aged llama (15 years). Disseminated carcinoma and adenocarcinoma occurred in 4 llamas and 2 alpacas, and included biliary (2), gastrointestinal (2), mammary gland (1), and unknown (1) origin. Mean age of camelids with any type of carcinoma or adenocarcinoma (12.36+or-2.8 years) was significantly greater than that of camelids with lymphoma (4.24+or-6.2 years; P=0.02). Results indicate that neoplasia is relatively common in camelids and that there are differences between llamas and alpacas as regards prevalence of neoplasia, tumor types, and age at diagnosis. Reproduced with permission of CAB Abstracts.

Descriptors: llamas, alpacas, neoplasms, disease prevalence, animal age, species differences, fibroma, squamous cell carcinoma, lymphoma, fibrosarcoma, Oregon, US.

Wolff, P.L. **The geriatric small ruminant - dental care, body condition scoring, and nutrition.** *Large Animal Proceedings of the North American Veterinary Conference, Volume 21, Orlando, Florida, USA, 2007.* 2007; 290-292.

URL:<http://www.tnavc.org>

Descriptors: alpacas, deer, goats, llamas, sheep, physical exam, animal nutrition, arthritis, body condition, body weight, dental health, feeding, geriatrics, lameness, lifespan, teeth, teeth diseases, periodontal diseases.

Woodford, N.; D' Alterio, G.L.; Owen, M. **Bilateral metatarsophalangeal valgus and subluxation in two adult llamas treated by medial bone plate arthrodesis.** *Veterinary Record*— London. 2007 Feb 24; 160(8): 262-266. ISSN: 0042-4900

URL:<http://veterinaryrecord.bvapublications.com/>

NAL call no.: 41.8 V641

Abstract: The clinical signs and diagnostic imaging of two adult llamas with severe metatarsophalangeal valgus angular limb deformity causing metatarsophalangeal instability, severe osteoarthritis and marked bilateral hindlimb lameness are described [UK, date not given]. The metatarsophalangeal axis was corrected and arthrodesis of the metatarsophalangeal joint was achieved by distal medial metatarsal condylectomy and the medial application of a custom-made angled 4.5 mm dynamic compression plate. A secure construct with normal limb angulation and a good biomechanical outcome was achieved in each of the hindlimbs of both llamas. The development and final dimensions of the implants are described to assist decision making during the evaluation of the surgical management of such cases. Reproduced with permission from CAB Abstracts.

Descriptors: llamas, legs, abnormal development, lameness, surgery, case studies, deformities.

Weber, Roy E. **High-altitude adaptations in vertebrate hemoglobins.** *Respiratory Physiology and Neurobiology.* 2007; 158(2-3): 132-142. ISSN: 1569-9048

URL:<http://www.sciencedirect.com/science/journal/15699048>

Abstract: Vertebrates at high altitude are subjected to hypoxic conditions that challenge aerobic metabolism. O₂ transport from the respiratory surfaces to tissues requires matching between the O₂ loading and unloading tensions and the O₂-affinity of blood, which is an integrated function of hemoglobin's intrinsic O₂-affinity and its allosteric interaction with cellular effectors (organic phosphates, protons and chloride). Whereas short-term altitudinal adaptations predominantly involve adjustments in allosteric interactions, long-term, genetically-coded adaptations typically involve changes in the structure of the haemoglobin molecules. The latter commonly comprise substitutions of amino acid residues at the effector binding sites, the heme-protein contacts, or at intersubunit contacts that stabilize either the low-affinity ('Tense') or the high-affinity ('Relaxed') structures of the molecules. Molecular heterogeneity (multiple isoHbs with differentiated oxygenation properties) can further broaden the range of physico-chemical conditions where Hb functions under altitudinal hypoxia. This treatise reviews the molecular and cellular mechanisms that adapt haemoglobin-oxygen affinities in mammals, birds and ectothermic vertebrates at high altitude. (c) 2007 Elsevier B.V. All rights reserved.

Descriptors: llamas, elephants, chickens, ostriches, bar headed geese, greylag geese, humans,

blood, erythrocytes, hemoglobin, heme protein, oxygen transport, adaptations for high altitude living.

Youngquist, Robert S.; Threlfall, Walter R. ***Current Therapy in Large Animal Theriogenology***. Saunders Elsevier. St. Louis, Mo. c2007. ISBN: 0721693237; 9780721693231. Note: Large animal theriogenology. Includes bibliographical references and index. Partial Contents: Section I. Equine theriogenology; Section II. Bovine theriogenology; Section III. Caprine theriogenology; Section IV. Ovine theriogenology; Section V. Porcine theriogenology; Section VI. Llama theriogenology; Section VII. Specialized livestock theriogenology.
NAL call no.: SF871 .C87 2007
Descriptors: theriogenology, equines, bovines, caprines, ovines, porcines, llamas, specialized livestock.

Zielinska, P.; Jurka, P. **Charakterystyka rozrodu lam i alpak. [Characteristics of llamas and alpacas reproduction.]** *Zycie Weterynaryjne*. 2007; 82(3): 202-207. ISSN: 0137-6810. Note: In Polish with and English summary.
URL:<http://www.vetpol.org.pl/zycie.htm>
Descriptors: alpacas, llamas, reproductive physiology, production performance, reproductive disorders, common conditions.

2006

Alternative Farming Systems Information Center (U.S.). ***Web Selections: Llama and Alpaca Production***. 2006
URL:http://www.nal.usda.gov/afsic/AFSIC_pubs/wsllama.htm
NAL call no.: aSF401.L6
Descriptors: llama, alpaca, production.

Alvarez, R.; Villca, S.; Liden, G. **Biogas production from llama and cow manure at high altitude.** *Biomass and Bioenergy*. 2006; 30(1): 66-75. ISSN: 0961-9534
URL: <http://www.sciencedirect.com/science/journal/09619534>
DOI:<http://dx.doi.org/10.1016/j.biombioe.2005.10.001>
Abstract: Methane production from llama and cow manures from the Bolivian high plateau (The "Altiplano") was studied using a parallel reactor set-up consisting of 10 lab-scale biogasifiers. The effects of pressure (495 and 760 mmHg), temperature (11 and 35 degrees C), hydraulic retention time (20 and 50 days), and manure content in the slurry (10%, 20% and 50%) were evaluated with respect to productivity and methane yields based on two 24-1 fractional factorial designs with 8 treatments for each kind of manure. The reactors were operated semi-continuously with daily manure feeding for periods between 50 and 100 days. Temperature was the main factor effect found, and the hydraulic retention time and the manure content in feed were also found significant whereas the effect of pressure was not significant in the range studied. The methane yield obtained with cow manure at 11 degrees C

was between 6.4 and 33.61 CH₄ kg⁻¹ VS (volatile solids added) whereas at 35 degrees C the methane yield was between 49.6 and 131.31 CH₄ kg⁻¹ VS. The methane yield from llama manure was somewhat lower than for cow manure (between 3.3 and 19.31 CH₄ kg⁻¹ VS at 11 degrees C and between 35.6 and 84.11 CH₄ kg⁻¹ VS at 35 degrees C, respectively). However, overall llama manure was found to be the best raw material of the two for biogas production, due to its high content of volatile solid - higher than has been previously reported for most manures - and also its high nitrogen and phosphorous content.

Descriptors: cattle, llamas, animal manures, biofuels, biogas, cattle manure, dairy cattle, feedstocks, methane production, pressure, temperature, waste utilization, Bolivia.

Anderson , D.E. **Periapical tooth root infections in llamas and alpacas.** *Small Ruminant Research: The Journal of the International Goat Association*. 2006 Feb; 61(2-3): 235-240. ISSN: 0921-4488. Note: In the special issue: "South American Camelids" edited by A. Tibary and S.M. Parish. Includes references.

URL:<http://www.sciencedirect.com/science/journal/09214488>

NAL call no.: SF380.I52

Abstract: Head and neck abscesses are a common complaint in llamas and alpacas in North America representing 3% of clinical cases presented at the Veterinary Teaching Hospital at Ohio State University (OSU-VTH). Approximately 20% of infected teeth have infection of the pulp cavity most often associated with a patent infundibulum, approximately 60% have evidence of periodontal disease and compromised periodontal ligament, and 20% are of unknown cause. Differential diagnosis includes tooth root abscess, osteomyelitis, soft tissue abscess (*Corynebacterium pseudotuberculosis*), foreign body, parotid duct lesion, facial bone fracture, retained food bolus, and malocclusion. The aim of this paper is to review available information and provide clinical observation on etiology, diagnosis, and treatment option for tooth root infection in llamas and alpacas.

Descriptors: llamas, alpacas, tooth pulp, tooth diseases, tooth abscesses, disease diagnosis, etiology, medical treatment, surgery, literature reviews, veterinary teaching hospital, Ohio State University, US.

Animal Welfare Information Center (U.S.). **Information Resources on Farm Animals.** The Center, U.S. Dept. of Agriculture, Agricultural Research Service, National Agricultural Library, Beltsville, MD [2006]. Note: Farm animals. Title from disc label. "June 2006." "Induced molting, dairy cattle, beef cattle, swine, disposal of dead animals, swine housing, proceedings livestock and poultry handling and transport, Emus and ostriches, llamas, alpacas, guanacos and vicunas." System requirements: CD-ROM drive and Adobe Acrobat.

Anonymous. **Innere Parasiten der Kleinwiederkauer. Internal parasites in small ruminants.** *Forum Kleinwiederkauer/Petits Ruminants*. 2006; (3): 6-11. Note: In German and French.

URL:<http://www.caprovis.ch>

Descriptors: sheep, goats, deer, llamas, parasites, coccidia, liver fluke, *Fasciola hepatica*, lung worm incidence, transmission, detection, symptoms, clinical picture, treatments

Anonymous **Annual Conference of the Society for Theriogenology, St Paul, MN, USA, August 22 -26, 2006.** *Theriogenology*. 2006; 66(3): 663-687. ISSN: 0093-691X. Note: Conference proceedings containing 37 abstracts, use of hormone drugs, fertility analysis, ejaculate sperm concentration in dogs, reproductive disease diagnosis, early pregnancy in cattle, castration of llamas.

URL: <http://www.sciencedirect.com/science/journal/0093691X>

NAL acall no.: QP251.A1T5

Descriptors: mares, dogs, dairy cows, llamas, reproductive technologies, hormones, ovulation, fertility analysis, pregnancy diagnosis, castration of llamas, etc.

Ansalconi, F.; Pyszny, F.; Claros, A.L.; Marquina, R.; Zapana-Pineda, J.; Claros, A.J.; Quispe-Huanca, J.L. **DECAMA-project: Analysis of farm income from South American camelids meat production in Latin American countries: Preliminary results of a comparison between case studies.** *4th European Symposium on South American Camelids/DECAMA European Seminar, Göttingen, Germany; October 07-09, 2004.* 2006. ISBN: 9076998981

Nal Call no.: SF401.L35 E97 2004

Descriptors: camelid meat production, economic development, hygiene status and quality of animal based products, income and production costs of camelid meat production, homogeneous questionnaire, visits and direct interviews with agricultural entrepreneurs, Andean rural areas, Peru, Bolivia, South America.

Balter, Vincent; Simon, Laurent; Fouillet, Helene; Lecuyer, Christophe **Box-modeling of N-15/N-14 in mammals.** *Oecologia* (Berlin). 2006; 147(2): 212-222. ISSN: 0029-8549

URL:<http://www.springerlink.com/content/100458/>

Abstract: The N-15/N-14 signature of animal proteins is now commonly used to understand their physiology and quantify the flows of nutrient in trophic webs. These studies assume that animals are predictably N-15-enriched relative to their food, but the isotopic mechanism which accounts for this enrichment remains unknown. We developed a box model of the nitrogen isotope cycle in mammals in order to predict the N-15/N-14 ratios of body reservoirs as a function of time, N intake and body mass. Results of modeling show that a combination of kinetic isotope fractionation during the N transfer between amines and equilibrium fractionation related to the reversible conversion of N-amine into ammonia is required to account for the well-established approximate to 4 parts per thousand N-15-enrichment of body proteins relative to the diet. This isotopic enrichment observed in proteins is due to the partial recycling of N-15-enriched urea and the urinary excretion of a fraction of the strongly N-15-depleted ammonia reservoir. For a given body mass and diet delta N-15, the isotopic compositions are mainly controlled by the N intake. Increase of the urea turnover combined with a decrease of the N intake lead to calculate a delta N-15 increase of the proteins, in agreement with the observed increase of collagen delta N-15 of herbivorous animals with aridity. We further show that the low delta N-15 collagen values of cave bears cannot be attributed to the dormancy periods as it is commonly thought, but inversely to the hyperphagia behavior. This model highlights the need for experimental investigations performed with large mammals in order to improve our understanding of natural variations of delta N-15 collagen.

Descriptors: llamas, foxes, horses, rats, seals, cave bears, urine, ammonia, nitrogen 15, nitrogen 14, hyperphagia, box modeling, computer technique.

Becerra, Jorge Alberto Bustamante. **Grazing intensity, plant diversity, and rangeland conditions in the Southeastern Andes of Peru (Palccoyo, Cusco).** In: Spehn E.M.; Liberman M.; Korner C [Editors]. *Land Use Change and Mountain Biodiversity*. CRC Press Taylor & Francis Group. Boca Raton, FL. 2006. 376p. ISBN: 084933523X. Note: Global Mountain Biodiversity Assessment Workshop, Bolivia, Colombia; August 20 -23, 2003.

NAL call no.: QH541.5 M65 L36 2006

Descriptors: sheep, goats, llamas, alpacas, *Opuntia floccosa*, *Polylypis*, primary production, grazing intensity, plant diversity, rangeland conditions, Peru.

Bromage, Gina. **Llamas and Alpacas: A Guide to Management.** Crowood in Ramsbury. 2006. 208 p. ISBN: 186126884X; 9781861268846

NAL call no.: SF401.L6.B76 2006

Abstract: This book serves as a guide to those who own llamas and alpacas or considering to own these animals. It is comprised of 13 chapters. The housing, fencing, routine husbandry procedures, welfare, behaviour and training of these animals are covered. The assessment of the animal, shearing, fleece evaluation and marketing are examined. The breeding, birth, care of newborn animals and common diseases are discussed. Reproduced with permission of CAB Abstracts.

Descriptors: llamas, alpacas, care, handling, breeding, housing, behavior, reproduction, etc.

Brown, R.A.li. **Unusual findings in a Llama.** *Veterinary Record*-- London. 2006; 159(22): 755-756. ISSN: 0042-4900

URL:<http://veterinaryrecord.bvpublications.com/archive/>

NAL call no.: 41.8 V641

Abstract: A llama in the UK which had shown previous clinical signs of teeth grinding, pneumonia and a parotid lymph node abscess died on 24 March 2006 despite treatment. Postmortem examination showed old, necrotic and black herbage in the nasal cavity above the soft and hard palate. The herbage caused inflammation to the pharyngeal area. The cause of death may have been due to bacteraemia and septicaemia as a result of chronic long-standing infection.

Descriptors: llamas, etiology, case report, causes of death, clinical aspects, diagnosis, foreign bodies, herbage, postmortem examinations, autopsy, causal agents, clinical picture, long standing chronic infection, Britain, UK.

Burkhalter, B.; Feldmann, H. **Sichere Zaune.[Safe fencing.]** *Forum Kleinwiederkauer/Petits Ruminants*. 2006; (3): 12-19. Note: In German and French.

URL:<http://www.caprovis.ch>

Descriptors: alpacas, goats, llamas, sheep, mobile and permanent fences, economic factors, illustrations, Switzerland.

Bustamante, Ana V.; Mate, Maria L.; Lamas, Hugo E.; Giovambattista, Guillermo; Zambelli, Andres; Vidal-Rioja, Lidia. **Analisis de diversidad genetica en tres poblaciones de llamas (*Lama glama*) del noroeste Argentino.** [Analysis of genetic diversity in three llama (*Lama glama*) populations from north-western Argentina.] *Revista Chilena de Historia Natural*. 2006; 79(2): 175-184. ISSN: 0716-078X. Note: In Spanish.

URL: <http://www.scielo.cl>

Descriptors: 3 llama management units, 77 animals tested, DNA sampling, PCR amplification of 12 loci using microsatellite primers, specific to *Lama glama*, 142 alleles, Hardy Weinberg Equilibrium test/locus, significant deviation ($P < 0.05$) due to heterozygotes deficiency, 9-16 allele number/locus, heterozygosities/locus, obey to the natural polygynic behavior of the species, forcing male parents policy, Argentina.

Cebra, C.K.; Bildfell, R.J.; Fischer, K.A. **Microanatomic features of pancreatic islets and immunolocalization of glucose transporters in tissues of llamas and alpacas.** *American Journal of Veterinary Research*. 2006 Mar; 67(3): 524-528. ISSN: 0002-9645

URL: <http://avmajournals.avma.org/loi/ajvr/>

DOI:<http://dx.doi.org/10.2460/ajvr.67.3.524>

NAL call no.: 41.8 AM3A

Abstract: Objective - To describe the microanatomic features of pancreatic islets and the immunohistochemical distribution of glucose transporter (GLUT) molecules in the pancreas and other tissues of New World camelids. Animals - 7 healthy adult New World camelids, 2 neonatal camelids with developmental skeletal abnormalities, and 2 BALB/c mice. Procedure - Samples of pancreas, liver, skeletal muscle, mammary gland, brain, and adipose tissue were collected postmortem from camelids and mice. Pancreatic tissue sections from camelids were assessed microscopically. Sections of all tissues from camelids and mice (positive control specimens) were examined after staining with antibodies against GLUT-1, -2, -3, and -4 molecules. Results - In camelids, pancreatic islets were prominent and lacked connective tissue capsules. Numerous individual endocrine-type cells were visible distant from the islets. Findings in neonatal and adult tissues were similar; however, the former appeared to have more non-islet-associated endocrine cells. Via immunostaining, GLUT-2 molecules were detected on pancreatic endocrine cells and hepatocytes in camelids, GLUT-1 molecules were detected on the capillary endothelium of the CNS, GLUT-3 molecules were detected throughout the gray matter, and GLUT-4 molecules were not detected in any camelid tissues. Staining characteristics of neonatal and adult tissues were similar. Conclusions and Clinical Relevance - In New World camelids, microanatomic features of pancreatic islets are similar to those of other mammals. Data suggest that the poor glucose clearance and poor insulin response to hyperglycemia in adult camelids cannot be attributed to a lack of islet cells or lack of GLUT molecules on the outer membrane of those cells. Reproduced with permission of CAB Abstracts.

Descriptors: llamas, alpacas, Islets of Langerhans, microstructure, glucose transporters, immunohistochemistry, adult animals, neonates, mice, animal models, abnormal development, skeletal development, hepatocytes, central nervous system, brain, adipose tissue, liver, skeletal muscle, mammary glands.

Cebra, C.K.; Bildfell, R.J.; Lohr, C.V. **Determination of internal organ weights in llamas and alpacas.** *4th European Symposium on South American Camelids/DECAMA European Seminar, Göttingen, Germany; October 07-09, 2004.* 2006. ISBN: 9076998981
NAL call no.: SF401.L35 E97 2004

Descriptors: camelids, llamas, alpacas, organ weights, gender differences, species differences, first and second gastric compartments, third stomach, liver, pancreas, post mortem sampling, no gender differences found, species differences observed.

Cebra, C.K.; Tornquist, S.J. **Meta-analysis of glucose tolerance in llamas and alpacas.** *4th European Symposium on South American Camelids/DECAMA European Seminar, Göttingen, Germany; October 07-09, 2004.* 2006. ISBN: 9076998981
NAL call no.: SF401.L35 E97 2004

Descriptors: glucose tolerance, 5 adult female llamas, 9 adult llama geldings, 22 adult alpacas geldings, 0.5g/kg glucose in bolus after overnight fast, blood draws at various intervals, no difference for llama genders, alpacas had greater volume of distribution than llamas, potentially require different dosing regimens for medications that distribute throughout the extracellular fluid, lower insulin response to hyperglycemia in alpacas result of lower peak glucose concentrations, not pancreatic insufficiency.

Celedon, M.O.; Osorio, J.; Pizarro, J. **Aislamiento e identificación de pestivirus obtenidos de alpacas (*Lama pacos*) y llamas (*Lama glama*) de la Region Metropolitana, Chile. [Isolation and identification of pestiviruses in alpacas (*Lama pacos*) and llamas (*Lama glama*) introduced to the Region Metropolitana, Chile.]** *Archivos de Medicina Veterinaria.* 2006; 38(3): 247-252. ISSN: 0301-732X. Note: In Spanish with an English summary.
URL:<http://www.uach.cl/>

Abstract: The natural habitat for more than 90% of the domestic South American camelids (SAC) in Chile, alpaca (*Lama pacos*) and llama (*Lama glama*), is located between 11 degrees and 21 degrees South latitude at 3800 and 5000 ms of altitude. Lately, alpacas and llamas have been introduced to other geographic parts of the country where they are in contact with domestic ruminants, making likely infection with BVDV, present in cattle, goats and sheep. The BVDV includes two species, BVDV genotype I (BVDV I) and BVDV genotype II (BVDV II), which along with the border disease virus (BDV) and classical swine fever virus (CSFV) conforms the Pestivirus genus of the Flaviviridae family. This study evaluates the hypothesis that SAC introduced to the Metropolitan Region (MR) of Chile are infected with pestiviruses. In order to perform viral isolation, samples were taken from 80 SAC (42 live alpacas, 35 live llamas, 2 dead llamas and 1 aborted fetus of llama), coming from 4 flocks suspected to be infected with pestivirus. The samples were inoculated in primary culture of bovine fetus lung cells (free of BVDV), passing each sample 5 times, and were then analysed by direct immunofluorescence and indirect immunoperoxidase techniques to detect the presence of pestivirus antigens. For molecular characterization, a fragment of the 5'-untranslated region (5'-UTR) of RNA of the isolates was amplified by reverse transcription-polymerase chain reaction (RT-PCR) and treated with restriction enzymes Pst I, Bgl I and Xho I in order to identify species of viruses. The results show that 18 SAC (10 alpacas and 8 llamas from the 4 studied flocks), were infected with pestivirus. All isolates were non cytopathogenic. BVDV I was isolated from 6 alpacas while BVDV II was isolated from 4 alpacas and 8 llamas. The

viral samples were obtained from 8 healthy alpacas, 2 alpacas with abortion, 5 healthy llamas, 2 llamas with abortion and 1 dead llama without clinical history. It is concluded that alpacas and llamas from the MR of Chile are infected with BVDV I and BVDV II.

Descriptors: alpacas, llamas, amplification, disease prevalence, identification, isolation, molecular genetics, RNA, bovine diarrhea virus, Pestivirus, biochemical genetics, BVD, mucosal disease, mucosal disease virus, ribonucleic-acid, Chile.

D'Alterio, G.L. **Skin lesions in UK alpacas (*Lama pacos*): Prevalence, aetiology and treatment.** *4th European Symposium on South American Camelids/DECAMA European Seminar, Göttingen, Germany; October 07-09, 2004.* 2006. ISBN: 9076998981

NAL call no.: [SF401.L35 E97 2004](#)

Descriptors: camelid breeders, llamas, alpacas, 3,520 animals counted, zinc deficiency, ectoparasitism, *Chorioptes* mite, mail survey, characterize the camelid population, features of skin disease, efficacy of eprinomectin vs ivermectin, anti-miticide, Britain.

De Simone, Emilio; Saccodossi, Natalia; Ferrari, Alejandro; Leoni,-Lucrecia; Leoni, Juliana. **Immunochemical analysis of IgG subclasses and IgM in south American camelids.** *Small Ruminant Research.* 2006; 64(1-2): 2-9. ISSN: 0921-4488

URL:<http://www.sciencedirect.com/science/journal/09214488>

Abstract: Antibodies are glycoproteins comprising two heavy and two light chains. Surprisingly, all members of the family Camelidae possess a fraction of antibodies devoid of both light chains and the first constant domain (CH1). These kinds of antibodies are known as heavy chain antibodies (HCAs). There are three subclasses of IgG in dromedaries, namely IgG(1), IgG(2) and IgG(3) Of which, IgG(2) and IgG(3) are of the HCAs type. In the present work, the different IgG isotypes from guanaco (*Lama guanicoe*), llama (*Lama glama*) and vicuna (*Vicugna vicugna*) were purified and characterized. Interestingly, it was found that IgM was capable of binding to protein A. The different subclasses of immunoglobulins were also assayed for their ability to fix complement. Both IgG(1) and the total serum were able to fix complement, whereas IgG(2) and IgG(3) fixed complement even in the absence of antigen. (c) 2005 Elsevier B.V. All rights reserved.

Descriptors: vicuna; guanaco; llama; IgM immunoglobulin M G1, G2, and G3; immunologic techniques.

Di Rocco, Florencia; Parisi, Gustavo; Zambelli, Andres; Vida-Rioja, Lidia. **Rapid evolution of cytochrome c oxidase subunit II in camelids (Tylopoda, Camelidae)** *Journal of Bioenergetics and Biomembranes.* 2006; 38(5-6): 293-297. ISSN: 0145-479X

URL:<http://www.springerlink.com/content/102584/>

Descriptors: new and old camelids, mitochondrial aerobic energy production, mitochondrial DNA, cytochrome c oxidase subunits I, II, III, replacement of amino acids inferred, transmembrane helices of proteins, hot dry adaption for camels, high altitude cold hypoxic environment of the Andean region.

Doerfler, R.L.; Peters, K.J. **The relativity of ethical issues in animal agriculture related to different cultures and production conditions.** *Livestock Science.* 2006 Sept; 103(3): 257-262. Note: In the special issue--M. Marie [Editor]. *Ethics in Animal Agriculture.* Literature review.

URL:<http://www.sciencedirect.com/science/journal/18711413>

DOI:<http://dx.doi.org/10.1016/j.livsci.2006.05.013>

NAL call no.: SF1.L5

Abstract: Initiatives to incorporate European animal welfare standards in international trade agreements raise issues of ethical relativism: (1) in the Fulani pastoral system the harsh environmental conditions result in a strong mutual dependency of pastoralists and their animals. Thus, animal ethics is vital to ensure the survival of the pastoral family, framed as ethic of securing survival; (2) the magnitude of human intervention, investigated in the Indian small-holder crop-livestock production system keeping oxen for work, determines the farmer's responsibility for adequate handling of animals. The apt anticruelty ethic prohibits deliberate cruelty to animals and neglect; (3) in intensive animal agriculture, such as intensive poultry and pig production in Thailand, the traditional ethical concept is no longer applicable and a new ethic encoded in law that respects the animals' natures is needed; (4) local moralities, as illustrated with the case of the llama system in the Andean highlands, deserve adequate attention independent of the production system. Therefore, the issue of animal welfare should be regarded relative in the global context and a dialogue between the cultures is encouraged to advance ethical concerns in animal agriculture.

Descriptors: bioethics, farmed animal species, llamas, animal welfare, livestock and meat industry, livestock production, animal husbandry, tropical agriculture, agroecology, hunger, Fulani, nationalities and ethnic groups, cultural differences, pastoralism, human animal relations, animal breeding, Nigeria, Thailand, Andes region.

Dykgraaf, S.; Pusterla, N.; Van Hoogmoed, L.M. **Rattlesnake envenomation in 12 New World camelids.** *Journal of Veterinary Internal Medicine.* 2006 July-Aug; 20(4): 998-1002. ISSN: 0891-6640

URL:<http://www.blackwell-synergy.com/doi/ref/10.1111/j.1939-1676.2008.0072.x>

NAL call no.: SF601.J65 .

Descriptors: llamas, alpacas, snake bites, snake venoms, *Crotalus atrox*, antivenoms, antibiotics, fluid therapy, mortality, California.

Evermann, J.F **Pestiviral infection of llamas and alpacas.** *Small Ruminant Research: The Journal of The International Goat Association.* 2006 Feb; 61(2-3): 201-206. ISSN: 0921-4488. Note: In the special issue: South American Camelids / edited by A. Tibary and S.M. Parish. Includes references.

URL:<http://www.sciencedirect.com/science/journal/09214488>

NAL call no.: SF380.I52

Abstract: This review summarizes the literature pertaining to pestiviral infections of members of the camelid family. The exact nature of pestiviral infections, in particular bovine viral diarrhoea virus (BVDV), is the subject of active investigation especially in llamas and alpacas. Earlier reports based on serology-detected pestiviral (BVDV) antibodies in members of the camelid group ranging from a low 4% to a high of 53%. These studies indicate that members of the camelid group are susceptible to infection and do seroconvert. Over the past decade, clinical reports have documented disease conditions in llamas, alpacas and more recently, camels. These conditions range from respiratory and enteric diseases to chronic wasting and in utero infections resulting in stillbirths, and abortion. The review brings together some

thoughts on whether infections of the camelid group are due to interspecies transmission and/or the potential that members of this group have their own unique pestiviral infections.

Descriptors: llamas, alpacas, Bovine viral diarrhea virus; viral diseases of animals and humans, literature reviews, seroprevalence, pestivirus, respiratory tract diseases, digestive system diseases, wasting syndrome, disease transmission, disease vectors.

Finucane, Brian; Agurto, Patricia Maita; Isbell, William H. **Human and animal diet at Conchopata, Peru: stable isotope evidence for maize agriculture and animal management practices during the Middle Horizon.** *Journal of Archaeological Science*. 2006; 33(12): 1766-1776. ISSN: 0305-4403

URL:<http://www.sciencedirect.com/science/journal/03054403>

Descriptors: prehistoric agricultural systems, humans, plant species, alpacas, llamas, guanacos, vicuna, *Avaia porcellus*, maize, various grasses, nitrogen 15, delta C 13, analysis of skeletal remains, Middle Horizon period (AD550-1000) Conchopata, Peruvian highlands, animal management strategies, no sex differences in diet, Peru.

Frank, E.N.; Hick, M.V.H.; Lamas, H.E.; Gauna, C.D.; Molina, M.G. **Effects of age-class, shearing interval, fleece and color types on fiber quality and production in Argentine llamas.** *Small Ruminant Research: The Journal of the International Goat Association*. 2006 Feb; 61(2-3): 141-152. ISSN: 0921-4488. Note: In the special issue: "South American Camelids" edited by A. Tibary and S.M. Parish. Includes references.

URL:<http://www.sciencedirect.com/science/journal/09214488>

NAL call no.: SF380.I52

Abstract: Influence of animal age, shearing intervals and fleece and color types on the productivity and quality of the fiber were investigated in fleeces and skin samples of a Llama flock of the high altitude plateau in the province of Jujuy, Argentina. In this fiber and skin samples of Llama the following variables were evaluated (mean +/- S.D.): (i) fleece variables-greasy fleece weight (GFW), 1614.97 +/- 376.16 g; fiber weight per skin surface unit (FWSSU, mg/mm²), 122 +/- 28.7 mg; staple length (SL), 19.07 cm; mean fiber diameter (MFD), 22.91 +/- 1.55 micrometer; fiber diameter coefficient of variation (FDCV), 26.39 +/- 4.34%; weighted fiber diameter (WFD), 23.11 +/- 2.28 micrometer; total medullation degree (TMD), 28.3 +/- 4.7%; continuous medullation degree (CMD), 19.95 +/- 4.5%; non-continuous medullation degree (NCMD), 30.7% +/- 5.5; lattice medullae (La), 0.4 +/- 0.32%; continuous medullae (C), 15.8 +/- 4.01%; interrupted medullae (I), 11.0 +/- 4.3%, fragmented medullae (F), 22.8 +/- 5.8%, and non-medullated (NM), 51.9 +/- 3.77%. (ii) Horizontal sections variables-total follicular density (TFD), 20.69 +/- 4.38 No/mm²; secondary follicle density (SFD), 16.92 +/- 3.82 Nr/mm²; primary follicle density (PFD), 3.77 +/- 0.83 No/mm²; secondary/primary ratio (SPR), 4.52 +/- 0.82; fiber diameter within primary follicles (FDPF), 35.5 +/- 4.27 micrometer; fiber diameter within secondary follicles (FDSF), 19.92 +/- 3.82 micrometer; primary on secondary diameter ratio (PSDR), 1.77 +/- 0.82. (iii) Vertical sections variables-follicular length (FL), 2624.68 +/- 299.77 micrometer; follicular depth (FD), 1515.55 +/- 229.23 micrometer; grade of follicular curvature (GFC), 4.33%; follicular angle (FA), 35.9 +/- 6.86 degrees; bulbar papillae area (BPA), 962.90 +/- 230.47 micrometer². The analysis showed that age is the external effect that displays greater modifications (GFW, FWSSU, fundamentally MFD and WFD). The GFW increases sig-

nificantly ($p < 0.05$) between ages, with a slight but constant tendency to 4 years old, and at the same time the SL and MFD also significantly ($p < 0.05$) increases. The shearing interval affects only the fiber productivity (GFW and SL), and significant ($p < 0.05$) differences are only between annual shearing and the rest. The fleece types show variations in SL between straight curled types or hemi lustre (HL) and straight or non-crimped or lustre (L) types and double coated (DC) fleece type. In this way, the HL and L have significance ($p < 0.05$) longer SL though do not show significant ($p < 0.05$) weight (GFW, FWSSU) differences in relation to the DC fleece type. The overall MFD does not show any variation between fleece types ($p < 0.05$), but the FDPF show significant ($p < 0.05$) differences. These results also are wider PSDR in DC, and narrower PSDR in HL and L fleece types. This has no relation with TFD and SFD, which is less ($p < 0.05$) in L and with FL, which is shorter in DC fleece type. We concluded that the increase of the GFW with age is mainly due to the increase of the MFD (diminution of the quality). This could be explained by the decrease of TFD that takes place as animal grows, since the points of inflection of the increases of MFD, diminution of SL and diminution of TFD agree into the same class of ages.

Descriptors: llamas, animal's age, fleece, color, fiber quality, shearing interval, fiber staple luster, fiber diameter, wool production, productivity, sensory properties, altitude, Argentina.

Frank, E.N.; Hick, M.V.H.; Gauna, C.D.; Lamas, H.E.; Renieri, C.; Antonini, M. **Phenotypic and genetic description of fibre traits in South American domestic camelids (llamas and alpacas)**. *Small Ruminant Research: The Journal of the International Goat Association*. 2006 Feb; 61(2-3): 113-129. ISSN: 0921-4488. Note: In the special issue: South American Camelids / edited by A. Tibary and S.M. Parish. Includes references.

URL:<http://www.sciencedirect.com/science/journal/09214488>

NAL call no.: SF380.I52

Abstract: Even though llamas and alpacas are multipurpose animals, fibre production remains the main trait from an international market point of view. The objectives of this review are to describe the phenotypic traits that determine fibre quality, and to identify the genetic mechanisms governing them. The finer and lesser prickling effect the fibre has, the higher its value is. All these characteristics are related to fibre diameter and evenness, and to other traits such as color, type of fleece, fibre length and yield. Studies on genetic mechanisms for llama and alpaca fleece traits show that the white phenotype is dominant to the pigmented phenotype and to the spotted phenotype. Black face and extremities phenotypes are dominant to black and wild phenotypes. Lustre is dominant to non-lustre type and double coated is governed by an additive genetic mechanism. Heritabilities of fleece weight, staple length and fibre diameter are low to moderate in the high plateau environment and very high outside Altiplano conditions.

Descriptors: llamas, alpacas, fiber quality, phenotype, animal genetics, wool production, fiber color, fiber staple, fleece, yields, dominance (genetics), heritability, diameter, genotype, literature reviews.

Gall, David A.; Zekas, Lisa J.; Van Metre, David; Holt, Timothy. **Imaging diagnosis--pulmonary metastases in new world camelids**. *Veterinary Radiology and Ultrasound*. 2006 Oct-Nov; 47(6): 571-573. ISSN: 1058-8183

URL:<http://www3.interscience.wiley.com>

DOI:<http://dx.doi.org/10.1111/j.1740-8261.2006.00187>

NAL call no.: SF757.8.A4

Abstract: The radiographic appearance of pulmonary metastatic disease from carcinoma is described in a llama and an alpaca. In one, a diffuse miliary pattern was seen. In the other, a more atypical unstructured interstitial pattern was recognized. Metastatic pulmonary neoplasia in camelids may assume a generalized miliary or unstructured pattern.

Descriptors: Doberman Pinscher dogs, llamas, alpacas, lymphoma, prostate-gland, ultrasonography, case studies, carcinoma, radiography, respiratory tract diseases.

Garcia-Pereira, F.L.; Greene, S.A.; McEwen, M.M.; Keegan, R. **Analgesia and anesthesia in camelids.** *Small Ruminant Research The Journal of the International Goat Association*. 2006 Feb; 61(2-3): 227-233. ISSN: 0921-4488. Note: In the special issue: South American Camelids / edited by A. Tibary and S.M. Parish. Includes references. A literature review.

URL:<http://www.sciencedirect.com/science/journal/09214488>

NAL call no.: SF380.I52

Abstract: South American camelids, alpacas and llamas, are increasing in popularity. As a result, veterinarians in North American and European countries are treating increasing numbers of these species in their practices. This article reviews some of the common anesthetic and analgesic practices used in camelids.

Descriptors: alpacas, llamas, analgesia, anesthesia, veterinary medicine, tranquilizers.

Genin, D.; Alzerreca, H. Le Houerou, H.N. [Editors]. **Campos nativos de pastoreo y produccion animal en la puna semiarida y arida andina. Entre fragilidad, saberes tradicionales y marginalidad, inverted-¿cual desarrollo duradero? [Native pastures and animal production in the semi-arid puna and arid Andes. What type of sustainable development between fragility, traditional knowledge and marginalization?]** *Secheresse*. 2006; 17(1/2): 265-274. ISSN: 1147-7806. Note: In Spanish with a French summary.

URL:<http://www.secheresse.info>

Abstract: Natural pasture types in the altiplano and altoandino regions of the Andes are described and precipitation and temperature data are presented. The advantages and disadvantages of sheep, llamas, and alpacas are discussed and linked to vegetation type and altitude. Reproduced with permission from CAB Abstracts.

Descriptors: alpacas, sheep, llamas, livestock farming at high altitudes, altiplano, indigenous knowledge, high pastures, dry zones, grazing lands, rural development, sustainability, Andes, South America.

Genin, D.; Tichit, M. **Mixed camelids-sheep herds, management practices and viability analysis: some considerations for a sustainability framework of Andean pastoral systems.** *4th European Symposium on South American Camelids/DECAMA European Seminar, Göttingen, Germany; October 07-09, 2004*. 2006. ISBN: 9076998981

NAL call no.: [SF401.L35 E97 2004](#)

Descriptors: llama, sheep, mixed management strategies, herd composition, breeding, removal of individuals practices, rural household need, sustainability of mixed pastoral systems, balance between species, survey study, computer model developed, climatic uncertainty and

long-term household survival, proposal of a conceptual framework, links of family wealth and range of strategies, Bolivia.

Gerken, M.; Renieri, C. [Editors]. *South American Camelids Research, Volume 1. Proceedings of the 4th European Symposium on South American Camelids and DECAMA European seminar*. Wageningen Academic Publishers. Wageningen, Netherlands: 2006; 308p. ISBN: 9076998981

NAL call no.: SF402.L35 E97 2004

Abstract: A series of papers on the current trends in reproduction, animal breeding, genetics, nutrition, health (including bacterial and parasitic infections) and fibre morphology of South American camelids, viz. llamas, alpacas, vicunas and guanaco (*Lama guanicoe*) is presented, including discussions on the potential of these camelids for meat production and commercialization in South America. The particular advantages of South American camelids for the sustainable use of fragile ecosystems with native pastures are outlined, and discussions on the interaction between wild and domestic species, management of alpaca populations outside South America and aspects of camelid health under European conditions are presented as well.

Descriptors: llamas, guanacos, vicunas, breeding, genetics, nutrition, bacterial diseases, bacterial infections, helminthoses, protozoal diseases, meat production, nature conservation, protozoal infections, reproduction, wildlife management, wool producing animals, South America.

Goitia, A. Claros; Quispe, J.L.; Liendo, A. Claros; Flores, J. **DECAMA-Project: Women of mountain in business of charque of llama**. *4th European Symposium on South American Camelids/DECAMA European Seminar, Göttingen, Germany; October 07 -09, 2004*. 2006. ISBN: 9076998981

NAL call no.: SF401.L35 E97 2004

Descriptors: llamas, women, production of llama jerky, ethnic food production, Chile.

Grubb, Tamara L.; Schlipf, John W.; Riebold, Thomas W.; Cebra, Christopher K.; Poland, Lisa; Zawadzka, Xenia; Mailhot, Nicole. **Minimum alveolar concentration of desflurane in llamas and alpacas**. *Veterinary Anaesthesia and Analgesia*. 2006 Nov; 33(6): 351-355. ISSN: 1467-2987

URL: <http://www3.interscience.wiley.com/journal/118516519/home>

DOI:<http://dx.doi.org/10.1111/j.1467-2995.2005.00278.x>

NAL call no.: SF914 .V47

Abstract: To determine the minimum alveolar concentration (MAC) of desflurane in llamas and alpacas. Prospective study. Six healthy adult llamas and six healthy adult alpacas. Anesthesia was induced with desflurane delivered with oxygen through a mask. An endotracheal tube was inserted, and a port for continuous measurement of end-tidal and inspired desflurane concentrations was placed between the endotracheal tube and the breathing circuit. After equilibration at an end-tidal-to-inspired desflurane concentration ratio >0.90 for 15 minutes, a 50-Hz, 80-mA electrical stimulus was applied to the antebrachium until a response was obtained (i.e. gross purposeful movement) or for up to 1 minute. The vaporizer setting was increased or decreased to effect a 10-20% change in end-tidal desflurane concen-

tration, and equilibration and stimulus were repeated. The MAC was defined as the average of the lowest end-tidal desflurane concentration that prevented a positive response and the highest concentration that allowed a positive response. Mean \pm SD MAC of desflurane was 7.99 \pm 0.58% in llamas and 7.83 \pm 0.51% in alpacas. The MAC of desflurane in llamas and alpacas was in the range of that reported for other species.

Descriptors: alpaca, llamas, desflurane, inhalant anesthesia.

Grubb, Tamara L.; Schlipf, John W.; Riebold, Thomas- W.; Cebra, Christopher K.; Poland, Lisa; Zawadzka, Xenia; Mailhot, Nicole. **Minimum alveolar concentration of desflurane in llamas and alpacas.** *Veterinary Anaesthesia and Analgesia*. 2006 Nov; 33(6): 351-355. ISSN: 1467-2987

URL: <http://www3.interscience.wiley.com/journal/118516519/home>

DOI: <http://dx.doi.org/10.1111/j.1467-2995.2005.00278>

NAL call no.: SF914 .V47

Abstract: To determine the minimum alveolar concentration (MAC) of desflurane in llamas and alpacas. Prospective study. Six healthy adult llamas and six healthy adult alpacas. Anesthesia was induced with desflurane delivered with oxygen through a mask. An endotracheal tube was inserted, and a port for continuous measurement of end-tidal and inspired desflurane concentrations was placed between the endotracheal tube and the breathing circuit. After equilibration at an end-tidal-to-inspired desflurane concentration ratio >0.90 for 15 minutes, a 50-Hz, 80-mA electrical stimulus was applied to the antebrachium until a response was obtained (i.e. gross purposeful movement) or for up to 1 minute. The vaporizer setting was increased or decreased to effect a 10-20% change in end-tidal desflurane concentration, and equilibration and stimulus were repeated. The MAC was defined as the average of the lowest end-tidal desflurane concentration that prevented a positive response and the highest concentration that allowed a positive response. Mean \pm SD MAC of desflurane was 7.99 \pm 0.58% in llamas and 7.83 \pm 0.51% in alpacas. The MAC of desflurane in llamas and alpacas was in the range of that reported for other species.

Descriptors: alpacas, llamas, veterinary drugs, anesthetics, pulmonary alveoli, chemical concentration, drug evaluation, anesthesia, desflurane, inhalant anesthesia, minimum alveolar concentration, Internet resource

Le Houerou, H.N. [Editor]. **Pastizales y produccion animal en las zonas aridas de Argentina.** [Pasture and animal production in the dry zones of Argentina.] *Secheresse*. 2006; 17(1/2): 242-256. ISSN: 1147-7806. Note: In Spanish with a French summary.

URL: <http://www.secheresse.info>

Abstract: Dry zones cover approximately 108 million ha (39% of land area). Drinking water is the main limiting factor for livestock farming. Sheep (59% of total sheep), goats (52% of total) and llamas, alpacas and vicunas (96% of total) are kept in the dry zones. The stocking density of livestock is 2.4 animal units/km². The main production systems are rearing of cattle and sheep for meat, and sheep for wool.

Descriptors: cattle, goats, sheep, llamas, livestock farming dry zone pastures, availability of water, stocking density, Argentina.

Gunsser, I.; Haenichen, T.; Kiesling, C. **Breeding and/or handling problems? Causes of death in camelids.** In: M. Gerken and C. Renueri [Editors]. *The 4th European Symposium on South American Camelids/DECAMA European Seminar, Gottingen, Germany; October 07-09, 2004.* 2006. ISBN: 9076998981

NAL call no.: SF401.L35 E97 2004

Descriptors: 179 camelids; 63 alpacas; 5 guanacos; 1 guanaco-llama mix; 5 dromedary camels; 3 Bactrian camels; 1 vicuna; post mortem sampling; causes of death; most common problems: pulmonary edema; next most common: liver, digestive system, abdomen, endoparasites, chronic feeding mistakes; pathology of other organs: urinary tract, head, spleen, skin; degeneration of parenchymas, teeth problems, spleen reactions, mites or other infections; less frequent pathology: genitals, neck, bones, limbs; general causes of death: infectious diseases (22.5%), euthanasia (17.1%), emaciation (9.5%), fatty degeneration of parenchyma (9.0%), diagnosis inconclusive (14.4%).

Gunsser, I.; Aigner, A.; Kiesling, C. **Evaluation of laboratory results of camelids, made for import, export or participation in shows.** *4th European Symposium on South American Camelids/DECAMA European Seminar, Gottingen, Germany; October 07-09, 2004.* 2006. ISBN: 9076998981

NAL call no.: [SF401.L35 E97 2004](#)

Descriptors: 2,546 llamas and alpacas, importing, exporting, show animals, 9, 391 tests for ruminant diseases, brucellosis, leucosis, tuberculosis, leptospirosis, bovine herpes virus 1, and other diseases, testing products evaluated, negative for most ruminant diseases, false positives found, laboratories in Switzerland, Germany, France, Italy, Sweden, and Finland, United States, Chile, Peru.

Harrison, R.A.; Hasson, S.S.; Harmsen, M.; Laing, G.D.; Conrath, K.; Theakston, R.D.G. **Neutralisation of venom-induced haemorrhage by IgG from camels and llamas immunised with viper venom and also by endogenous, non-IgG components in camelid sera.** *Toxicon* 2006; 47(3): 364-368. ISSN: 0041-0101

URL: <http://www.sciencedirect.com/science/journal/00410101>

Abstract: Envenoming by snakes results in severe systemic and local pathology. Intravenous administration of antivenom, prepared from IgG of venom immunised horses or sheep, is the only effective treatment of systemic envenoming. Conventional antivenoms, formulated as intact IgG, papain-cleaved (Fab) or pepsin-cleaved F(ab)(2) fragments, are however ineffective against the local venom effects because of their inability to penetrate the blood/tissue barrier. We have embarked on a new research program to examine (i) whether the unusually small (15 kDa) antigen-binding fragment of camelid heavy chain IgG (VHH) can be exploited to neutralise the local effects of envenoming and (ii) whether a novel antivenom to treat both the systemic and local effects of envenoming can be formulated by combining anti-snake venom VHH and conventional F(ab)(2). In this preliminary study, we demonstrate that camels and llamas respond to immunisation with *Echis ocellatus* venom with high antibody titres and broad antigen specificity. These encouraging immunological results were matched by the successful elimination of venom-induced haemorrhage by IgG from the venom-immunised camels and llamas. Unexpectedly, we report for the first time that camelid serum contains a non-IgG, highly potent inhibitor of venom-induced haemorrhage. (c) 2005

Published by Elsevier Ltd.

Descriptors: camels, llamas, immunized with viper venom, immunoglobulin G, IgG, camelid serum, potent inhibitor of venom induced hemorrhage.

Hashimoto, K. **Commodification of farm products in Andes highlands, production of llama meat of Bolivia.** *Japanese Journal of Tropical Agriculture*. 2006; 50(5): 288-292. ISSN: 0021-5260. Note: In Japanese.

URL:<http://sciencelinks.jp/j-east/journal/J/F0874A/2005.php>

Descriptors: llamas, livestock products, raising llamas for meat, Bolivia.

Hertzberg, H.; Kohler, L.: **Prevalence and significance of gastrointestinal helminths and protozoa in South American Camelids in Switzerland.** *Berliner und Munchener Tierarztliche Wochenschrift*. 2006; 119(7/8): 291-294. ISSN: 0005-9366. Note: In English with a German summary.

URL:<http://www.vetline.de/bmtw/>

NAL call no.: 41.8 B45

Abstract: A cross-sectional study was conducted to determine the prevalence and significance of endoparasitic infections in South American Camelids (SAC) in Switzerland. Qualitative and quantitative coproscopic examinations were performed in 38 farms during the grazing period. Management practices with possible interference with parasitic infections were analysed. On the farm level, prevalences of endoparasitic infections were: trichostrongyles, 87%; *Trichuris* sp., 74%; *Capillaria* sp., 68%; *Nematodirus battus*, 63%; *Nematodirus* sp., 53%; *Dicrocoelium dendriticum*, 34%; *Moniezia* sp., 8%; *Fasciola hepatica*, 5%; protostrongylids, 5%; *Eimeria macusaniensis*, 68%. The level of helminth egg excretion was generally low. The highest values were recorded for trichostrongyles with an average for all investigated farms of 53 eggs per gram of faeces. The mean trichostrongyle egg output was approximately three-fold in SAC on farms that also kept sheep and/or goats, although this difference was not significant ($P=0.11$). Clinical trichostrongylosis was not reported from any of the farms. The low infection level with gastrointestinal nematodes is attributed to the defaecation behaviour of SAC, depositing their faeces focally on small spots on pasture. As a consequence, pasture infectivity is largely restricted to the area adjacent to the dung piles. Dicrocoeliosis is regarded as the most relevant parasitic infection of llamas and alpacas in Switzerland causing severe clinical symptoms and death in untreated animals. 16% of the owners regularly treated their herds against dicrocoeliosis using praziquantel at a dose of 50 mg/kg body weight orally. Reproduced with permission from CAB Abstracts.

Descriptors: alpacas, llamas, animal parasitic nematodes, anthelmintics, disease control, disease prevalence, disease surveys, epidemiology, fecal testing, disease surveillance, helminthoses, praziquantel, protozoal infections, *Capillaria*, *Dicrocoelium dendriticum*, *Eimeria macusaniensis*, *Fasciola hepatica*, *Moniezia*, *Nematodirus*, *Nematodirus battus*, Protostrongylidae, *Trichostrongylus*, *Trichuris*, *Enoplida*, protozoal diseases, Switzerland.

Huanca, W.; Ratto, M.; Santiani, A.; Cordero, A.; Huanca, T. **Embryo transfer in camelids: Study of a reliable superovulatory treatment in llamas.** *4th European Symposium on South American Camelids/DECAMA European Seminar, Göttingen, Germany; October 07-09, 2004*. 2006. ISBN: 9076998981

NAL call no.: SF401.L35 E97 2004

Descriptors: llamas, females, embryos, embryo transfer, superovulatory treatment, clinical techniques, therapeutic and prophylactic techniques, embryo recovery rate, pregnancy, genetic improvement.

Huanca, W.; Palomino, J.; Huanca, T. **Effect of oestradiol on embryo mortality in llamas.** *4th European Symposium on South American Camelids/DECAMA European Seminar, Gottingen, Germany; October 07 -09, 2004.* 2006. ISBN: 9076998981

NAL call no.: SF401.L35 E97 2004

Descriptors: llamas, females, embryo mortality, corpus luteum, endocrine system, reproductive hormones, estradiol, progestogen, progesterone, pregnancy, ovulation, conception rates.

Jensen, J M. **Camelid Drug Formulary.** Published by Game Ranch Health. San Antonio, USA: 2006, 405 p. ISBN: 9781424312177

NAL call no.: SF916.5.J46 2006

Abstract: The book is divided into two main sections, the first dealing with South American Camelids (SAC), llama (*Lama glama*), alpaca (*Lama pacos*), guanaco (*Lama guanicoe*), and vicuna (*Vicugna vicugna*), and the second with dromedaries (*Camelus dromedaries*) and Bactrian camels (*C. bactrianus*). The drugs are grouped in the book according to clinical application (for example, Analgesia, Anaesthesia, Gastrointestinal, Immunization, Reproductive, Vitamins-Minerals). The information consists of a table with five columns entitled Drug, Species, Dosage, Comments, and Reference. For example the information for penicillin in the Reproduction - SAC section is: Drug: penicillin, Species: SAC, Dosage: 22,000 mg/kg, SC, q24h for 3 treatments, Comments: prevention of uterine infection, References: Johnson, L. 1989 [the full references are listed at the end of each of the SAC and Camel sections]. This book will be extremely useful to all veterinarians who come across camelids in their work.

Descriptors: llamas, alpacas, dromedaries, Bactrian camels, vicunas, guanacos, drug formulary, pharmaceuticals, antibiotics, anti-infective agents, anti-inflammatory agents, anti-parasitic agents, drug therapy, gastrointestinal agents, pharmacology.

Lakritz, J.; Middleton, J.R.; Anderson, D.E.; Linden, D.R.; Sams, R.A.; Tessman, R.K.; Tyler, J.W. **Pharmacokinetics of intravenously administered caffeine in healthy alpacas (*Lama pacos*) and llamas (*Lama glama*).** *American Journal of Veterinary Research.* 2006 June; 67(6): 1063-1069. ISSN: 0002-9645

URL: <http://avmajournals.avma.org/loi/ajvr/>

NAL call no.: 41.8 AM3A

Abstract: Objective-To determine the pharmacokinetic disposition of IV administered caffeine in healthy *Lama* spp camelids. Animals-4 adult male alpacas and 4 adult female llamas. Procedures-Caffeine (3 mg/kg) was administered as an IV bolus. Plasma caffeine concentrations were determined by use of high-performance liquid chromatography in 6 animals and by use of liquid chromatography-mass spectrometry in 2 llamas. Results-Median elimination half-life was 11 hours (range, 9.3 to 29.8 hours) in alpacas and 16 hours (range, 5.4 to 17 hours) in llamas. The volume of distribution at steady state was 0.60 L/kg (range, 0.45 to 0.93 L/kg) in alpacas and 0.75 L/kg (range, 0.68 to 1.15 L/kg) in llamas. Total plasma

clearance was 44 mL/h/kg (range, 24 to 56 mL/h/kg) in alpacas and 42 mL/h/kg (range, 30 to 109 mL/h/kg) in llamas. Conclusions and Clinical Relevance-High-performance liquid chromatography and liquid chromatography-mass spectrometry were suitable methods for determination of plasma caffeine concentrations in alpacas and llamas. Plasma caffeine concentration-time curves were best described by a 2-compartment model. Elimination half-lives, plasma clearance, volume of distribution at steady state, and mean residence time were not significantly different between alpacas and llamas. Intravenous administration of caffeine at a dose of 3 mg/kg did not induce clinical signs of excitement.

Descriptors: llamas, alpacas, males, females, pharmacokinetics, intravenous injection, caffeine, behavioral effects, half life, drug evaluation.

Leotta, Gerardo A.; Deza, Natalia; Origlia, Javier; Toma, Claudia; Chinen, Isabel; Miliwebsky, Elizabeth; Iyoda, Sunao; Sosa-Estani, Sergio; Rivas, Marta. **Detection and characterization of Shiga toxin-producing *Escherichia coli* in captive non-domestic mammals.** *Veterinary Microbiology*. 2006; 118(1-2): 151-157. ISSN: 0378-1135

URL:<http://www.sciencedirect.com/science/journal/03781135>

DOI:<http://dx.doi.org/10.1016/j.vetmic.2006.08.019>

NAL call no.: SF601.V44

Descriptors: ruminants, goat, giraffes, *Taurotragus oryx*, elands, *Antilope cervicapra*, blackbuck antelopes, *Ovis musimon*, mouflon sheep, *Ovis aries somalicus*, Somali sheep, *Bos grunniensis*, yaks, *Lama pacos*, alpacas, *Lama guanicoe*, guanacos, *Lama guanico glama*, llamas, *Hydrochoerus hydrochaeris*, capybaras, *Dolichotis patagonus*, Patagonian cavy, *Cervus elaphus*, red deer, *Ozotoceros bezoarticus*, pampas deer, *Axis axis*, axis deer, *Mazama gouazoubira*, fallow deer, *Dama dama*, paint deer, *Elaphrus davidianus* (Coleoptera-), pere david deer, *Escherichia coli*, serovar-O12:H25, serovar-O13:H6, strain 25 strains, strain 27 strains, strain O146:H28; Shiga toxin producing-*Escherichia coli*, 7 different sero-types, testing fecal samples, PCR, Shiga toxin gene sequences, natural reservoir, frequency in non-domestic animals, zoo habitat, living in a pit, Zoo and Botanical Garden, La Plata City, Argentina.

Li, PengFei; Dong, ChangSheng; Fan, RuiWen; Bai, Rui; Zhu, ZhiWei; Du HaiYan. **Study on the relation of ribosomal protein S5 (RPS5) gene and alpaca fleece growth** *Journal of Economic Animal*. 2006; 10(4): 215-218. ISSN: 1007-7448. Note: In Chinese with an English summary.

URL:<http://jjdwxb.periodicals.net.cn>

Abstract: The ribosomal protein S5 gene from the alpaca DNA library was studied using southern blotting. The gene was sequenced and the deduced nucleotide and amino acid sequences were compared with that of other mammals. The gene sequence was also analysed using bioinformatics to determine its special functional structure. The results will be used as basis for future research.

Descriptors: alpacas, amino acid sequences, fleece, genes, growth, nucleotide sequences, proteins, protein sequences.

Linden , D.R.; Anderson, D.E.; Ramsey, P.M. **Seasonal variation in water intake in llama (*Lama glama*) and alpaca (*Lama pacos*) species.** *Journal of Camel Practice and Research*. 2006; 13(2): 201-205. ISSN: 0971-6777

URL: <http://www.camelsandcamelids.com>

NAL call no.: SF997.5.C3

Abstract: Water consumption was recorded during selected periods throughout the year to determine the variation that occurs with climactic changes and between species for llamas (*L. glama*) and alpacas (*L. pacos*) housed in North America (Ohio, USA). Llamas had mean water consumption of 46.1 ml/kg during summer, 34.1 ml/kg during autumn, 25.0 ml/kg during winter and 33.2 ml/kg during spring. Alpacas had mean water consumption of 69.0 ml/kg during summer, 50.2 ml/kg during autumn, 40.6 ml/kg during winter and 46.1 ml/kg during spring. On a metabolic body weight basis, llamas and alpacas had mean water consumptions of 117.2 and 101.1 ml kg (0.75)⁻¹, respectively, during spring, 157.1 ml kg (0.75)⁻¹ and 194.8 ml kg (0.75)⁻¹, respectively during summer, 116.2 ml kg (0.75)⁻¹ and 141.6 ml kg (0.75)⁻¹, respectively, during autumn and 86.7 ml kg (0.75)⁻¹ and 114.9 ml kg (0.75)⁻¹, respectively, during winter. Mean daily ambient temperature during summer, autumn, winter and spring sample periods were 25.4, 24.6, 4.4 and 21.0 degrees C, respectively. Mean relative humidity during the summer, autumn, winter and spring sample periods were 69.6, 64.2, 82.5 and 87.2%, respectively. This study showed that seasonal environmental variations correlated with variations in water consumption in llamas and alpacas (P<0.05). This study determined that alpacas consume greater amounts of water per kg body weight than llamas in any given season under the same temperature and humidity (P<0.05). Reproduced with permission from CAB Abstracts.

Descriptors: llamas, alpacas, body weight, environmental temperatures, relative humidity, seasonal variation, seasonality, species differences, spring, summer, autumn, winter, water intake, seasonal changes, seasonal fluctuations, Ohio, USA.

Lusky, T.; Valbonesi, A.; Rodriguez, T.; Ayala, C.; Luan Weimin; Antonini, M. **Skin follicular structure in Bolivian llamas.** *4th European Symposium on South American Camelids/DECAMA European Seminar, Gottingen, Germany; October 07-09, 2004.* 2006. ISBN: 9076998981

NAL call no.: SF401.L35 E97 2004

Descriptors: llamas, young animals, males, females, type "Q'aras" (or carguera), "T'amphullis", born in January and April 1998, Patacamaya Experimental Station, hair follicles, skin follicular structure and activity among types, age of follicle maturity, skin biopsies, biopsies fixed in Bouin solution, stained by SACPIC procedure modified by Nixon, Bolivia.

Machaca, N. Cochi **Yield and quality of the dehaired llama fibre of the community of Phujrata.** *4th European Symposium on South American Camelids/DECAMA European Seminar, Gottingen, Germany; October 07-09, 2004.* 2006. ISBN: 9076998981

NAL call no.: [SF401.L35 E97 2004](#)

Descriptors: llama fleeces, 52, Phujrata, partial and complete manual de-hairing, tactile and visual method based on fiber fineness and length, de-haired fleeces, classified into 5 categories, medullation percentage and fiber length analyzed, white fleeces vs colored fleeces, economic benefits, Department of La Paz, Bolivia.

Madaleno, I.M. **Raising camelids up the Andes: Aymara indians animal and vegetable farming complementarities in Chile.** *4th European Symposium on South American Camelids/DECAMA European Seminar, Gottingen, Germany; October 07-09, 2004.* 2006. ISBN:

9076998981

NAL call no.: [SF401.L35 E97 2004](#)

Descriptors: llamas, alpacas, Indian camelid herders, Aymara Indian communities, 3,800 meter above sea level, lack of crops, quinoa, social structure, villages, ethnic pastoralism, bofedal, animals for meat, milk and wool fibers, traditional camelid husbandry, current status, Chile.

McKenna, P.B. **Register of new host-parasite records.** *Surveillance Wellington*. 2006; 33(4): 6-7. ISSN: 0112-4927

URL: www.biosecurity.govt.nz

Abstract: This article presents some new host-parasite records in domestic, zoo and wild animals in New Zealand, including *Eimeria macusaniensis* in an alpaca; *Lamanema chavezii* in llamas and alpacas; *Nematodirus spathiger*, *Camelostrongylus mentulatus*, *Cooperia oncophora* and *Trichostrongylus colubriformis* in llamas; *T. vitrinus* in an alpaca; *Oxyuris karamoja* in a white rhinoceros (*Ceratotherium simum*); *Syngamus trachea* in a stitchbird (*Notiomystis cincta*) and *Heterakis gallinarum* in a guineafowl. Reproduced with permission from CAB Abstracts.

Descriptors: domestic animals, wild animals, zoo animals, wild birds, poultry, guinea fowl, hosts, new host records, parasitoses, alpacas, llamas, birds, parasitic organisms, *Camelostrongylus mentulatus*, *Ceratotherium simum*, *Cooperia oncophora*, *Eimeria macusaniensis*, *Heterakis gallinarum*, *Nematodirus spathiger*, *Syngamus trachea*, *Trichostrongylus colubriformis*, *Trichostrongylus vitrinus*, *Lamanema chavezii*, *Notiomystis cincta*, *Oxyuris karamoja*, New Zealand.

Middleton, J.R.; Johnson, G.C.; Pardo, I.; Chigerwe, M.; O'Brien, D.P. **Dysautonomia and salmonellosis in an 11-year-old female llama (*Lama glama*).** *Journal of Veterinary-Internal Medicine*. 2006 Jan-Feb; 20(1): 213-216. ISSN: 0891-6640

URL: <http://www.blackwell-synergy.com/doi/ref/10.1111/j.1939-1676.2008.0072.x>

NAL call no.: SF601.J65

Descriptors: case studies, histopathology, *Salmonella enterica* subsp. *enterica* serovar *Agona*, gastrointestinal motility.

Middleton, J.R.; Johnson, G.C.; Pardo, I.; Chigerwe, M.; O'Brien, D.P. **Dysautonomia and salmonellosis in an 11-year-old female llama (*Lama glama*).** *Journal of Veterinary Internal Medicine*. 2006; 20(1): 213-216. ISSN: 0891-6640

URL: <http://www.blackwell-synergy.com/doi/ref/10.1111/j.1939-1676.2008.0072.x>

DOI : [http://dx.doi.org/10.1892/0891-6640\(2006\)20\[213:DASIAY\]2.0.CO;2](http://dx.doi.org/10.1892/0891-6640(2006)20[213:DASIAY]2.0.CO;2)

NAL Call no.: SF601.J65

Descriptors: llamas, *Salmonella agona*, salmonellosis, *Clostridium perfringens*, multiple infections, animal pathology, case reports, clinical aspects, diagnosis, dysautonomia, therapy, therapeutics, histopathology, mixed infections, postmortem examinations, therapy, Missouri, US.

Middleton, J.R.; Chigerwe, M.; Fine, D.M.; Turk, J.R.; Lattimer, J.C. **Pulmonary hypertension and right-sided heart failure in an adult llama with hepatic disease.** *Journal of the American Veterinary Medical Association*. 2006 Mar 1; 228(5): 756-759. ISSN: 0003-1488

URL: <http://www.avma.org/>

NAL call no.: 41.8 AM3

Abstract: Case Description-A 13-year-old llama was examined because of lethargy, inappetence, and syncope. Clinical Findings-Physical examination revealed muffled heart and lung sounds and peripheral edema. Clinicopathologic abnormalities included lymphopenia, hyperglycemia, prerenal azotemia, mild hyponatremia, mild hypoalbuminemia, and high gamma-glutamyltransferase and creatine kinase activities. On ultrasonography, the liver appeared hyperechoic and ascites and pleural effusion were seen. Echocardiography revealed severe dilatation of the right atrium, right ventricle, and pulmonary artery; severe tricuspid regurgitation; and high right ventricular systolic pressure consistent with right-sided heart failure secondary to pulmonary hypertension. Treatment and Outcome-Treatment with furosemide was attempted, but because of failing health, the llama was euthanized 4 weeks later. Macronodular cirrhosis of the liver, glomerulonephritis, and intimal fibrosis and medial hypertrophy of muscular pulmonary arteries were seen on histologic examination of post-mortem specimens. Clinical Relevance-Findings in this case were similar to those reported for human patients with portopulmonary hypertension secondary to hepatic cirrhosis. Pulmonary hypertension secondary to hepatic disease should be considered in the differential diagnosis of right-sided heart failure.

Descriptors: llama, female, case study, hypertension, animal diseases, liver cirrhosis, congestive heart failure, level of physical activity, anorexia, edema, heart sounds, uremia, hyperglycemia, gamma glutamyltransferase, creatine kinase, enzyme activity, ascites, systolic blood pressure, drug therapy, glomerulonephritis, hypertrophy, pulmonary artery, furosemide.

Miglino, M.A.; Iturrizaga, D.; Morini, A.C.; Verechia, F.T.; o Kfoury, J.R. Jr; Monteiro, J.M.; Bazer, F.W. **Iron transfer across the llama placenta (*Lama guanicoe glama*)**. *Reproduction Fertility and Development*. 2006; 18(1-2): 177. ISSN: 1031-3613. Note: 32nd Annual Conference of the International Embryo Transfer Society, Orlando, FL, USA; January 07-11, 2006.

URL:<http://www.publish.csiro.au/nid/45.htm>

DOI:<http://dx.doi.org/10.1071/RD07049>

NAL Call no.: QP251.R47

Descriptors: llamas, fetuses, placentas, iron transfer.

Miragaya, M.H.; Chaves, M.G.; Aguero, A. **Reproductive biotechnology in South American camelids**. *Small Ruminant Research: The Journal of The International Goat Association*. 2006 Feb; 61(2-3): 299-310. ISSN: 0921-4488. Note: In the special issue: "South American Camelids" edited by A. Tibary and S.M. Parish. Includes references.

URL:<http://www.sciencedirect.com/science/journal/09214488>

NAL call no.: SF380.I52

Abstract: Basic and applied research on physiology of reproduction in alpacas and llamas has gained much importance in the last decades because of their increasing economic value. Reproductive biotechnology would allow propagation of genetically superior individuals, especially those with excellent quality fiber. The objective of this review is to provide an update on the most relevant subjects related to reproductive biotechnology in female and the male. In the female, follicular synchronization, ovarian superstimulation, embryo recovery and transfer, oocyte maturation, assisted reproduction techniques (in vitro fertilization,

ICSI), nuclear transfer and embryo cryopreservation are reviewed. In the male, this review concerns artificial insemination.

Descriptors: llamas, alpacas, males, females, animal reproduction, biotechnology, genetic improvement, estrus synchronization, fiber quality, literature reviews, embryo transfer, oocytes, in vitro fertilization, cryopreservation, germplasm conservation, artificial insemination.

Mosaad, A.A.; Elbagory, A.R.; Khalid, A.M.; Waters, W.R.; Tibary, A.; Hamilton, M.J.; Davis, W.C.

Identification of monoclonal antibody reagents for use in the study of the immune response to infectious agents in camel and water buffalo. *Journal of Camel Practice and Research*. 2006; 13(2): 91-101. ISSN: 0971-6777

URL:www.camelsandcamelids.com

Abstract: Progress in elucidating the mechanisms regulating the immune response to infectious agents and derived vaccines in domestic species, especially in camels and water buffaloes, has been impeded by the lack of monoclonal antibody (mAb) reagents needed to study the immune response in the species of interest. As a first step to address this problem, we conducted a study to determine how many existing mAbs developed against leukocyte differentiation molecules (LDM) in various species recognize conserved epitopes on orthologous (identical) molecules in two or more species of Artiodactyla. Analysis of 490 monoclonal antibodies raised against LDM in cattle, goat, sheep, llama, pig, dog and human revealed that many epitopes have been conserved on orthologous molecules in the course of evolution in closely related species in the suborder Ruminantia such as in cattle, bison and water buffalo, and fewer on more distantly related species such as goat and sheep. Only a few of the epitopes conserved in Ruminantia were conserved in the suborders Suiformes (pigs) and Tylopoda (llamas and camels). The highest level of conservation in all suborders was found with major histocompatibility complex (MHC) class I (MHC I) and class II (MHC II) molecules. These findings show the potential as well as the limitations of screening existing mAbs for research in less studied species. Importantly, the findings also provide further insight into the composition of the immune system in Artiodactyla and factors to be considered when studying the immune response to infectious agents and vaccines in the different suborders of Artiodactyla.

Descriptors: alpacas, llamas, *Bison bison*, buffalo, Bactrian camels, *Camelus bactrianus*, cattle, dogs, dromedaries, goats, human, pigs, rabbits, sheep, epitopes, evolution, immune response, immune system, immunity, major histocompatibility complex, monoclonal antibodies, antigenic determinants, histocompatibility complex, hogs, immunity reactions, immunological reactions.

Newman, K.D.; Anderson, D.E. **Fracture management in llamas and alpacas.** *Small Ruminant Research: The Journal of the International Goat Association*. 2006 Feb; 61(2-3): 241-258. ISSN: 0921-4488. Note: In the special issue: South American Camelids / edited by A. Tibary and S.M. Parish. Includes references.

URL:<http://www.sciencedirect.com/science/journal/09214488>

NAL call no.: SF380.I52

Abstract: Fracture management in llamas and alpacas present a unique and interesting challenge to the veterinary surgeon compared to other species. Camelids are considered to be

excellent patients for the treatment of orthopedic injuries because they have a relative low body weight, tolerate external coaptation devices, are able to ambulate on three legs post-operatively, and can tolerate prolonged periods of recumbency for recuperation after surgery. Reports in the literature on camelid fractures (28 cases) and the authors' experiences with an additional 38 fractures are reviewed. There are a number of repair techniques that can be employed, depending primarily on fracture configuration and the surgeon's experience. Complications to fracture repair include mal-union, delayed union, non-union, osteomyelitis, sequestrum formation, and implant failure. Complications are associated with damage to the neurovascular bundle, damage to adjacent soft tissue at the fracture site, and compound fractures. Complications may be managed through the use antibiotics, surgical debridement, and staged destabilization of the fixation device. When irreversible damage to the neurovascular bundle has occurred, limb amputation with or without a prosthetic device may be alternatives to euthanizing the patient.

Descriptors: llamas, alpacas, bone fractures, fracture fixation, literature reviews, postoperative complications, osteomyelitis, risk factors, amputation.

Nolen-Walston, R.; Rushton, S.; Rodriguez, C.; Bedenice, D.; Del-Piero, F. **Eastern equine encephalitis (EEE) in South American Camelids: 9 cases.** *Journal of Veterinary Internal Medicine.* 2006; 20(3): 723-724. ISSN: 0891-6640. Note: "24th Annual Forum of the American College of Veterinary Internal Medicine, Louisville, KY, USA; May 31-June 03, 2006."
URL:<http://www.blackwell-synergy.com/doi/ref/10.1111/j.1939-1676.2008.0072.x>
NAL call no.: SF601.J65

Descriptors: llamas, alpacas, infection with Eastern equine encephalitis virus (Togaviridae), clinical picture, blood sampling, neurological symptoms, cerebrospinal fluid, epidemiology, immunology, laboratory techniques.

Odbileg, R.; Purevtseren, B.; Batsukh, Z.; Konnai, S.; Ohashi, K.; Onuma, M. **Complete cDNA sequences and phylogenetic analyses of the Th1 and Th2 cytokines of the bactrian camel (*Camelus bactrianus*).** *Journal of Veterinary Medical Science.* 2006; 68(9): 941-946. ISSN: 0916-7250

URL:<http://www.soc.nii.ac.jp/jsvs>

DOI:<http://dx.doi.org/10.1292/jvms.68.941>

Abstract: The complementary DNAs of the Th1 (IL-2, IL-12p35, and IFN- gamma) and Th2 (IL-4, IL-10 and IL-13) cytokine genes of the bactrian camel (*Camelus bactrianus*) were cloned, sequenced, and analyzed. IL-2, IL-4, IL-10, IL-12p35, IL-13, and IFN- gamma were found to have 465, 402, 537, 669, 411, and 501 bp length open reading frames with 154, 133, 178, 222, 136, and 166 amino acid encodings, respectively. The homology ranged from 58.8% to 100% between the nucleotide sequences of the camel cytokine genes and the published sequences of other mammalian genes, including the llama, pig, cow, horse, human, and mouse. The cDNA had highest homology with orders Artiodactyla (pigs and cattle) and Perissodactyla (horses), especially to the recently cloned llama sequences.

Descriptors: *Camelus bactrianus* , cattle, horses, llamas, pigs, complementary DNA, cytokines, DNA cloning, genes, interferon, linkage, nucleotide sequences, open reading frames, phylogeny.

- Pachao, N. **DECAMA-Project: Characteristics of the supply and demand of charqui.** *4th European Symposium on South American Camelids/DECAMA European Seminar, Gottingen, Germany; October 07 -09, 2004.* 2006. ISBN: 9076998981
NAL call no.: SF401.L35 E97 2004
Descriptors: llamas, alpacas, charqui, meat product, jerky, Arequipa markets, volumes of production, characteristics of demand, commercialization of systems, financial margins, 443.4 MT/year, Peruvian markets.
- Pacheco, C.; Soza, A. **DECAMA-project: determination of the lactation curve and evaluation of the main chemical components of the milk of llamas (*Lama glama*).** *4th European Symposium on South American Camelids/DECAMA European Seminar, Gottingen, Germany; October 07-09, 2004.* 2006. ISBN: 9076998981
NAL call no.: SF401.L35 E97 2004
Descriptors: llamas, lactating mature females, 2 nd lactation, lactation curve, milk composition, growth rate of crias, milk volume, levels of total solids, protein, fat, ash, whey protein, sampling at various days post partum, manual milking, volume (207.33 ml) peaked at 60 days, Andean pasture management system, changes in composition noted, crias with from 10.75 kg to 35kg at 120 days.
- Panuska, C.; Rickard, L.G.; Rudolph, D.D. **Isotype-specific serum IgG responses of llamas (*Lama glama*) to experimental liver fluke infection.** *Small Ruminant Research: The Journal of the International Goat Association.* 2006 Feb; 61(2-3): 195-199. ISSN: 0921-4488. Note: In the special issue: South American Camelids / edited by A. Tibary and S.M. Parish. Includes references.
URL:<http://www.sciencedirect.com/science/journal/09214488>
NAL call no.: SF380.I52
Abstract: The humoral immune system of South American camelids is unusual in that a large component of the IgG comprises heavy chains only. The objective of this study was to assess the contribution of these and conventional four chain IgG antibodies to the immune response of llamas in the course of primary infections with the liver fluke *Fasciola hepatica*. Isotypes of IgG were isolated by affinity chromatography and the production of various isotypes determined by ELISA. Both conventional and heavy-chain only isotypes of *F. hepatica*-specific IgG were detected in the course of the infection. The conventional four-chain antibody, IgG1, predominated but a marked increase was also detected in the heavy-chain only isotype IgG3. IgG2, another heavy-chain only isotype, was a minor component of the fluke specific response.
Descriptors: llamas, liver flukes, trematode infections, immune response, immunoglobulin G, humoral immunity, *Fasciola hepatica*, isotypes.
- Patitucci, A.N.; Perez, M.J.; Barril, G.; Carcamo, C.M.; Munoz, A. **Deteccion de anticuerpos sericos contra *Toxoplasma gondii* (Nicolle y Manceaux, 1909) en llamas (*Lama glama* Linneaus, 1758) y alpacas (*Lama pacos* Linneaus, 1758) de Chile. [Serum antibodies to *Toxoplasma gondii* in llamas and alpacas from Chile.] *Archivos de Medicina Veterinaria.* 2006; 38(2): 179-182. ISSN: 0301-732X. Note: In Spanish with an English summary.
URL:<http://www.uach.cl>**

Abstract: Serum samples from 113 llamas (*Lama glama*) and 127 alpacas (*Lama pacos*) from the IX and V Regions, respectively, of Chile were tested for *Toxoplasma gondii* antibodies. The modified agglutination test (MAT) was used in both species and titres of 1:25 were considered diagnostically significant. Sera from 49 llamas (43.3%) and 15 alpacas (11.8%) were positive for *T. gondii*. Percentage seropositivity in serum dilutions of 1:25, 1:50, 1:500 and 1:5000 was 17.6, 7.9, 14.1 and 3.5% in llamas and 0, 2.3, 0.7 and 8.6% in alpacas. The rather low prevalence in alpacas may be associated with geographical conditions, management practices or contact with cats rather than different species susceptibility. As expected, older animals showed higher *T. gondii* reactivity than young animals. Reproduced with permission from CAB Abstracts. **Descriptors:** llamas, alpacas, *Toxoplasma gondii*, antibodies, agglutination tests, blood serum, immune response, seroprevalence, susceptibility, immunity reactions, immunological reactions.

Ponce, R.; Farias, S.; Mitre, G.B.; Velez, D.; Montoro, R. **Determinacion de arsenico total e inorganico en carne y visceras de camelidos (*Lama glama*) autoctonos de la provincia de Jujuy, Argentina. [Determination of total and inorganic arsenic in muscular and visceral tissues of autochthonous camel (*Lama glama*) from Jujuy-Argentina.]** *Revista de la Facultad de Agronomia Universidad de Buenos Aires*. 2006; 26(1): 105-109. ISSN: 0325-9250. Note: In Spanish with an English summary.

NAL call no.: SB87.A7R48

Abstract: A study was carried out to determine the total arsenic and inorganic arsenic in muscle and liver of *Lama glama*. Samples were digested using "dry ash" technique to determine total arsenic. Arsenic was quantified through hydride generation-inductively coupled plasma-optical emission spectrometry. Inorganic arsenic was determined using acid digestion, subsequent extraction with chloroform and re-extraction with diluted acid. Inorganic arsenic was quantified by flow injection hydride generation atomic absorption spectrometry. Total arsenic content in the liver ranged from 0.19-0.45 Fg/g and was higher than those found in muscle (0.06-0.26 Fg/g). However, none exceeded the maximum allowed limits based on the legislation in Argentina. Inorganic arsenic in muscle was low (0.002-0.006 ng/g). This is thought to be the first report of inorganic arsenic content in this llamas' meat. Reproduced with permission from CAB Abstracts.

Descriptors: llamas, arsenic, meat contamination, liver, meat quality, quantitative analysis, food contaminants, Argentina.

Popowics, T.E.; Herring, S.W. **Teeth, jaws and muscles in mammalian mastication.** In: V. Bels [Editor]. *Feeding in Domestic Vertebrates: from Structure to Behaviour*. 2006; 61-83. ISBN: 1845930630; 9781845930639

NAL call no.: SF95.F423 2006

Abstract: This chapter presents the structural features of the masticatory system in mammals (minks, sheep, llamas, rabbits and pigs). The contributions of these structures to are dealt with. The following topics are discussed in detail: anatomical components of the masticatory system; morphology of teeth and arrangement in jaws; modification of tooth morphology by wear; temporo-mandibular joint and masticatory movements; and muscles of mastication and jaw mechanics.

Descriptors: llamas, mink, pigs, rabbits, sheep, comparative animal anatomy, dentine, enamel, grazing, jaws, mastication, morphology, muscles, teeth

Ratto, Marcelo H.; Singh, Jaswant; Roesler, William; Adams, Gregg P. **Partial chemical characterization of an ovulation-inducing factor present in the seminal plasma of llamas.** *Biology of Reproduction*. 2006; (Sp. Iss. SI): 174-175. ISSN: 0006-3363. Note. 39th Annual Meeting of the Society for the Study of Reproduction, Omaha, NE, USA; July 29 -August 01, 2006.

URL:<http://www.biolreprod.org/>

Descriptors: llamas, males, females, reproduction, seminal plasma, follicle development, ovulation producing factor in seminal plasma.

Ratto, M.; Huanca, W.; Singh, J.; Adams, G.P. **Comparison of the effect of natural mating, LH, and GnRH on interval to ovulation and luteal function in llamas.** *Animal Reproduction Science*. 2006 Feb; 91(3-4): 299-306. ISSN: 0378-4320

URL:<http://www.sciencedirect.com/science/journal/03784320>

NAL call no.: QP251.A5

Abstract: Gonadotropins and GnRH have been used to electively induce ovulation in llamas and alpacas, but critical evaluation of the natural interval to ovulation after mating has not been performed nor has a direct comparison of the effects of natural mating versus hormone treatments on this interval and subsequent luteal development. The objectives of this study were to compare the effects of hormonal treatments and natural mating on ovulation induction, interval to ovulation, and luteal development in llamas. The ovaries of llamas were examined by transrectal ultrasonography once daily. Llamas with a large follicle were assigned randomly to be: (1) mated with an intact male (mated; n=10); (2) given 5 mg of LH im (LH; n=11); or (3) 50 micro g of GnRH im (GnRH; n=10). Ultrasound examinations were performed every 4 h from treatment (day 0) to ovulation and thereafter once daily for 15 consecutive days to monitor CL growth and regression (n=5 per group). Plasma progesterone concentrations were measured at days 0, 3, 6, 9, and 12 after treatment to evaluate CL function. The size of the largest preovulatory follicle at the time of treatment did not differ among groups (11+or-0.6, 10.5+or-0.8, 11.8+or-0.9 mm, for mated, LH, and GnRH groups, respectively; P=0.6). No differences were detected among groups (mated, LH, and GnRH) in ovulation rate (80%, 91%, 80%, respectively; P=0.6), or interval from treatment to ovulation (30.0+or-0.5, 29.3+or-0.6, 29.3+or-0.7 h, respectively; P=0.9). Similarly, no differences were detected among groups (mated, LH, and GnRH) in maximum CL diameter (14.2+or-0.3, 13.2+or-0.5, and 13.0+or-0.7 mm, respectively; P=0.5), the day of maximum CL diameter (7.6+or-0.2, 7.6+or-0.2, and 7.4+or-0.4 mm, respectively; P=0.6), or the day on which the CL began to regress (12.3+or-0.3 [non-pregnant, n=3], 11.8+or-0.6, 12.2+or-0.4, respectively; P=0.4). The diameter of the CL and plasma progesterone concentrations changed over days (P<0.0001) but the profiles did not differ among groups. In summary, ovulation rate, interval to ovulation, and luteal development were similar among llamas that were mated naturally or treated with LH or GnRH. We conclude that both hormonal preparations are equally reliable for inducing ovulation and suitable for synchronization for artificial insemination or embryo transfer program. Reproduced with permission from CAB Abstracts.

Descriptors: llamas, females, ovulation, corpus luteum, luteinizing hormone, gonadotropin releasing hormone, insemination, progesterone, blood plasma, follicular development.

Ratto, M.H.; Huanca, W.; Singh, J.; Adams, G.P. **Comparison of the effect of ovulation-inducing factor (OIF) in the seminal plasma of llamas, alpacas, and bulls.** *Theriogenology*. 2006 Sept 15; 66(5): 1102-1106. ISSN: 0093-691X
URL:<http://www.sciencedirect.com/science/journal/0093691X>
DOI:<http://dx.doi.org/10.1016/j.theriogenology.2006.02.050>
NAL call no.: QP251.A1T5

Abstract: We have recently reported the presence of an ovulation-inducing factor (OIF) in the seminal plasma of llamas and alpacas--species characterized as induced ovulators. The study was designed to test the hypothesis that the seminal plasma of bulls will induce ovulation in llamas, and to compare the ovulation-inducing effect of seminal plasma of conspecific versus hetero-specific males. The seminal plasma of alpacas, a closely related induced ovulator (*Lama pacos*), and cattle, a distantly related ruminant species (*Bos taurus*) considered to be spontaneous ovulators, were compared with that of the llama (*Lama glama*). Ovulation and maximum corpus luteum diameter were compared by ultrasonography among female llamas (n = 19 per group) treated intramuscularly with 2 mL of phosphate buffered saline (PBS, negative control) and those treated with 2 mL of seminal plasma of bulls, alpacas, or llamas (conspecific control). The diameter of the preovulatory follicle did not differ among groups at the time of treatment. Bull seminal plasma induced ovulations in 26% (5/19) of llamas compared to 0% (0/19) in PBS group (P < 0.001). The proportion of females that ovulated was lower (P < 0.01) in bull seminal plasma group compared to the groups treated with alpaca or llama seminal plasma (100%). A corpus luteum was detected on Day 8 (Day 0 = treatment) in all llamas in which ovulation was detected earlier (Day 2) by ultrasonography. The diameter of the CL did not differ among groups. Results document the presence of an ovulation-inducing factor in the seminal plasma of *B. taurus*. The interspecies effects of seminal plasma on ovulation and luteal development provide rationale for the hypothesis that OIF is conserved among both spontaneous and induced ovulating species.

Descriptors: llamas, alpacas, females, ovulation, seminal plasma, intramuscular injection, corpus luteum, Hereford beef bulls.

Riek, A.; Gerken, M. **Changes in llama (*Lama glama*) milk composition during lactation.** *Journal of Dairy science*. 2006 Sept; 89(9): 3484-3493. ISSN: 0022-0302

URL:<http://jds.fass.org/>

NAL call no.: 44.8 J822

Abstract: Milk samples were collected weekly from 10 llamas during the first 27 wk after parturition under controlled stable conditions. Mean values for the concentrations of the major milk components across the lactation period were 4.70% fat, 4.23% protein, 5.93% lactose, 15.61% dry matter, and 22.62 mg/dL of milk urea N. All constituents were affected by the stage of lactation. There was an increase in fat to protein ratio as protein concentration declined and fat concentration increased. Fat, protein, and lactose concentrations changed during the transition from colostrum to milk. In the first month postpartum, fat concentration remained constant, protein decreased, and lactose increased. Starting with wk 5 postpartum, fat and protein increased and lactose decreased until the end of lactation. Among the major constituents fat had the highest variation. The mean gross energy concentration of milk was 3.88 kJ/g and showed a similar course as protein. Fat contributed 48.0%, protein 26.3%, and lactose 25.7% to the gross energy in the milk. Milk urea N values were

higher than those found in ruminants and increased with stage of lactation, whereas the pH decreased. The analyzed milk components were not affected by the lactation number of the animal, except milk urea N. Somatic cell counts indicated the absence of mastitis and revealed that the average somatic cell count of uninfected llamas is lower than in animals usually used for milk production. The 2 algebraic models fitted by a nonlinear regression procedure to the data resulted in suitable prediction curves for the constituents ($R_{po} = 0.76$ to 0.94). The courses of major milk constituents in llamas during lactation are similar to those in domesticated ruminants, although different in their values. The established curves facilitate the composition of milk replacers at different stages of lactation for nursing llamas whose dams died or are agalactic.

Descriptors: llamas, maternal milk, milk composition, lactation stage, colostrum, milk fat percentage, milk protein percentage, lactose, energy content, mathematical models.

Rodriguez, J.; Dodd, C.; Rosadio, R.; Wheeler, J.C.; Bruford, M.W. **Paternity testing using microsatellite DNA in alpacas (*Vicugna pacos*)**. *4th European Symposium on South American Camelids/DECAMA European Seminar, Gottingen, Germany; October 07 -09, 2004*. 2006. ISBN: 9076998981

NAL call no.: [SF401.L35 E97 2004](#)

Descriptors: alpacas, llamas, microsatellites, amplified in 3 multiplex reactions, polymorphic, allele numbers, Cervus 2.0, paternity testing, parentage accuracy in records, IVTA Research Station, Marangani, Canchis Province, Cusco, Peru.

Rohbeck, Simone; Gauly, M.; Bauer, C. **Course of gastro-intestinal parasite and lungworm infections in South American camelids on a farm in central Germany**. *4th European Symposium on South American Camelids/DECAMA European Seminar, Gottingen, Germany; October 07-09, 2004*. 2006. ISBN: 9076998981

NAL call no.: [SF401.L35 E97 2004](#)

Descriptors: llamas, alpacas, parasites, *Eimeria* fauna, *Moniezia*, *Haemonchus contortus*, *Trichostrongylus*, *Trichostrongylus*, *Ostertagia*, *Dictyocaulus viviparus*, oocysts, coccidiosis, gastrointestinal parasitic infections, lungworm infections, epidemiology, Germany.

Rohbeck, S.; Bauer, C.; Gauly, M. **Biology of *Eimeria macusaniensis* in llamas**. *4th European Symposium on South American Camelids/DECAMA European Seminar, Gottingen, Germany; October 07-09, 2004*. 2006. ISBN: 9076998981

NAL call no.: [SF401.L35 E97 2004](#)

Descriptors: llamas, small intestinal parasite, *Eimeria macusaniensis*, epidemiology, symptoms, clinical picture, parasite levels.

Schoeniger, S.; Donner, L.R.; Van Alstine, W.G. **Malignant nonteratoid ocular medulloepithelioma in a llama (*Llama glama*)**. *Journal of Veterinary Diagnostic Investigation*. 2006 Sept; 18(5): 499-503. ISSN: 1040-6387

URL: <http://jvdi.org/>

NAL call no.: SF774.J68

Abstract: A 6-year-old female llama presented with buphthalmos of its right eye owing to the presence of an intraocular mass. The affected globe was enucleated and submitted for micro-

scopic examination. The intraocular mass was diagnosed as malignant medulloepithelioma. Within the following months, the llama developed soft tissue masses, which completely filled the right orbital cavity and expanded the cranial portion of the right mandibular bone, and enlarged mandibular lymph nodes. Euthanasia was elected 30 months after the initial diagnosis. The carcass was submitted for postmortem examination, which revealed the presence of medulloepithelioma metastases within the right orbit, mandible, mandibular lymph nodes, lungs, liver, and mesenteric and sublumbar lymph nodes. The primary intraocular tumor and its metastases were composed of neoplastic undifferentiated neuroepithelial cells, which formed tubules, Flexner-Wintersteiner and Homer Wright rosettes, and rare solid sheets. Electron microscopy showed that tumor cells were connected by desmosome-like junctions and contained rare intracytoplasmic basal bodies. Neoplastic cells were positive for vimentin, nestin, microtubule-associated protein 1B, S-100 protein, and glial fibrillary acidic protein (GFAP). To the best of the authors' knowledge, this is the first report of a malignant nonteratoid ocular medulloepithelioma with distant metastases in a llama and of the ultrastructural and extended immunohistochemical characterization of a nonteratoid medulloepithelioma in this species. Reproduced with permission from CAB Abstracts.

Descriptors: llamas, eyes, eye diseases, neoplasms, animal diseases, disease diagnosis, metastasis, histopathology, epithelium, immunohistochemistry, nonteratoid ocular, medulloepithelioma.

Schwalm, A.; Erhardt, G.; Guly, M.; Gerken, M.; Bergmann, M. **Changes in testicular histology and sperm quality in llamas (*Lama glama*) following exposure to high ambient temperature.** *4th European Symposium on South American Camelids/DECAMA European Seminar, Göttingen, Germany; October 07-09, 2004.* 2006. ISBN: 9076998981
NAL call no.: SF401.L35 E97 2004

Descriptors: llamas, males, heat stress, high ambient temperatures, heat effects on testicles and sperm, sperm quality, testicular histology, infertility.

Schwalm, A.; Erhardt, G.; Gerken, M.; Gauly, M. **The influence of high ambient temperature on thermoregulation, thyroid hormone and testosterone levels in male llamas (*Lama glama*) depending on their fibre length.** *4th European Symposium on South American Camelids/DECAMA European Seminar, Göttingen, Germany; October 07-09, 2004.* 2006. ISBN: 9076998981

NAL call no.: [SF401.L35 E97 2004](#)

Descriptors: llamas; intact males; influence of heat stress on physiological parameters: body temperatures, body surface temperature, thyroid hormones, testosterone levels, respiration, body fibers; heated stables, 5 animals shorn, 5 unshorn, 2 barrel cut; 30degrees C. for 7 weeks, heat loss through ventral body sections, reduced thyroid, reduced testosterone, shorn animals tolerated the heat better.

Simone, E. de; Saccodossi, N.; Ferrari, A.; Leoni, L.; Leoni, J. **Immunochemical analysis of IgG subclasses and IgM in South American camelids.** *Small Ruminant Research.* 2006 July; 64(1-2): 2-9. ISSN: 0921-4488

URL: <http://www.sciencedirect.com/science/journal/09214488>

DOI: <http://dx.doi.org/10.1016/j.smallrumres.2005.03.009>

NAL call no.: SF380.I52

Abstract: Antibodies are glycoproteins comprising two heavy and two light chains. Surprisingly, all members of the family Camelidae possess a fraction of antibodies devoid of both light chains and the first constant domain (CH1). These kinds of antibodies are known as heavy chain antibodies (HCAbs). There are three subclasses of IgG in dromedaries, namely IgG1, IgG2 and IgG3 of which, IgG2 and IgG3 are of the HCAbs type. In the present work, the different IgG isotypes from guanaco (*Lama guanicoe*), llama (*Lama glama*) and vicuna (*Vicugna vicugna*) were purified and characterized. Interestingly, it was found that IgM was capable of binding to protein A. The different subclasses of immunoglobulins were also assayed for their ability to fix complement. Both IgG1 and the total serum were able to fix complement, whereas IgG2 and IgG3 fixed complement even in the absence of antigen.

Descriptors: llamas, *Lama guanicoe*, vicunas, immunoglobulin G, immunoglobulin M, antibodies, chemical structure, complement, complement fixation tests, antigens, heavy chain antibodies, light chain antibodies.

Southey, B.R.; Rodriguez, T.; Thomas, D.L. **An evaluation of the growth and change in body dimensions from birth to maturity of the llama (*Lama glama*) and the huarizo (cross-bred camelid) in the Bolivian Andes.** *4th European Symposium on South American Camelids/ DECAMA European Seminar, Göttingen, GERMANY; October 07-09, 2004.* 2006. ISBN: 9076998981

NAL call no.: SF401.L35 E97 2004

Descriptors: llamas, cross bred, huarizo, growth, structural differences, growth, birth, maturity, Andean region, Bolivia.

Taylor, P.; Taylor, S.; Sansinena, M.; Godke, R. **Llama llama glama pregnancies from vitrified/warmed blastocysts using a novel coaxial cryoprotectant microinjection system.** *Reproduction Fertility and Development.* 2006; 18(1-2): 164. ISSN: 1031-3613. 32nd Annual Conference of the International Embryo Transfer Society, Orlando, FL, USA; January 07 -11, 2006.

URL:<http://www.publish.csiro.au/nid/45.htm>

DOI: <http://dx.doi.org/10.1071/RD07049>

NAL Call no: QP251.R47

Descriptors: llamas, embryo, blastula, glycerol, sucrose, cryoprotectant, fetal bovine serum, butanedial, ultraconography, coaxial cryoprotectant microinjection device, lab techniques.

Tibary, A.; Parish, S.M. [Editors] **South American camelids.** *Small Ruminant Research. The Journal of The International Goat Association.* 2006; 61(2/3): 221 pp.

URL:<http://www.sciencedirect.com/science/journal/09214488>

NAL call no.: SF380.I52

Descriptors: alpacas, guanacos, *Lama guanicoe*, llamas, vicunas, etiology, anesthesia, anesthetics, analgesics, breeding, reproduction, diseases, feeding, nutrition, fibers, fleeces, wool production, genetics, disease diagnosis, immunity, immunology, pharmacodynamics, pharmacokinetics, surgery, therapy.

Tibary, A.; Vaughan, J. **Reproductive physiology and infertility in male South American camelids: a review and clinical observations.** *Small Ruminant Research: The Journal of The International Goat Association*. 2006 Feb; 61(2-3): 283-298. ISSN: 0921-4488. Note: In the special issue: "South American Camelids" / edited by A. Tibary and S.M. Parish. Includes references.

URL:<http://www.sciencedirect.com/science/journal/09214488>

NAL call no.: SF380.I52

Abstract: Male South American camelids exhibit several distinctive behavioral and physiological reproductive characteristics. This paper describes the anatomical features of the male reproductive tract and a detailed review of puberty, spermatogenesis and factors affecting semen production. Methods of semen collection and parameters of sperm morphology and semen biochemistry are also described. The most common abnormalities and diseases associated with reduced fertility and infertility are presented based on the authors clinical experience.

Descriptors: llamas, alpacas, males, animal reproduction, male fertility, literature reviews, reproductive behavior, male reproductive system, puberty, spermatogenesis, semen, reproductive disorders, artificial insemination, breeding soundness.

Tibary, A.; Fite, C.; Anouassi, A.; Sghiri, A. **Infectious causes of reproductive loss in camelids.** *The-riogenology*. 2006 Aug; 66(3): 633-647. ISSN: 0093-691X

URL:<http://www.sciencedirect.com/science/journal/0093691X>

DOI:<http://dx.doi.org/10.1016/j.theriogenology.2006.04.008>

NAL call no.: QP251.A1T5

Abstract: Reproductive losses in camelids are due to infertility, pregnancy loss, udder diseases and neonatal mortality caused by a variety of infectious diseases. Uterine infection and abortion represent the major complaint in camelid veterinary practice. The major infectious organisms in endometritis and metritis are *E. coli* and *Streptococcus equi* subspecies *zoepidemicus*. Abortion rates due to infectious diseases vary from 10% to more than 70% in some areas. Leptospirosis, toxoplasmosis and chlamydiosis have been diagnosed as the major causes of abortion in llamas and alpacas. In camels, brucellosis and trypanosomiasis represent the major causes of infectious abortion in the Middle East and Africa. Mastitis is rare in South American camelids. The prevalence of subclinical udder infection in camels can reach very high proportions in dairy camels. Udder infections are primarily due to *Streptococcus agalactiae* and *Staphylococcus aureus*. Neonatal mortality is primarily due to diarrhea following failure of passive transfer and exposure to *E. coli*, rotavirus, coronavirus, *Coccidia* and *Salmonella*. This paper reviews the etio-pathogenesis of these causes of reproductive losses, as well as the major risk factors and strategies to prevent their occurrence.

Descriptors: large animal practice, llamas, animal reproduction, alpacas, dromedaries, dairy animals, abortion, female fertility, mastitis, neonatal mortality, colostral immunity, endometritis, *Escherichia coli*, *Streptococcus equi* subsp. *zoepidemicus*, toxoplasmosis, *Chlamydia*, etiology, pathogenesis, risk factors, disease control, disease diagnosis.

Troiano, J.C.; Gould, E.G.; Gould, I. **Hemolytic action of *Naja naja atra* cardiotoxin on erythrocytes from different animals.** *Journal of Venomous Animals and Toxins including Tropical Diseases*. 2006; 12(1): 44-58. ISSN: 0104-7930

URL:<http://www.scielo.br/pdf/jvlatid/v12n1/28300.pdf>

DOI:<http://dx.doi.org/10.1590/S1678-91992006000100004>

Abstract: A comparative study on the sensitivity of erythrocytes from different vertebrate species (avian, mammalian and reptilian) to the haemolytic action caused by cardiotoxin isolated from *Naja naja atra* venom was carried out. Cardiotoxin was able to induce direct haemolysis in washed erythrocytes from several animals, except for llama. The EC₅₀ values from haemolysis of the most sensitive (cat) and the most resistant (snake) animal varied approximately tenfold. According to the cell behaviour, it was possible to characterize four types of behaviour: The first was observed in cat, horse and human cells; the second in rat, rabbit and dog erythrocytes; and the third only in llama erythrocytes, which were resistant to cardiotoxin concentrations up to 300 micro g/ml. Finally, avian and reptilian erythrocytes were more resistant to cardiotoxin III-induced haemolysis than those of the mammalian species. Reproduced with permission of CAB Abstracts.

Descriptors: llamas, humans, reptiles, rats, poisonous snake venom, *Naja atra*, effects on red blood cells, hemolysis, comparisons, cardio-toxins.

Tyler, J.W.; Middleton, J.R.; Tessman, R.K.; Nagy, D.W. **Risk of after-hours visits to an in-hospital food animal service by species.** *Journal of Veterinary Internal Medicine.* 2006 Mar-Apr; 20(2): 407-409. ISSN: 0891-6640

URL:<http://www.blackwell-synergy.com/doi/ref/10.1111/j.1939-1676.2008.0072.x>

NAL call no.: SF601.J65

Descriptors: large animal veterinary practice, veterinary clinics, cattle, swine, Vietnamese potbellied pigs, llamas, alpacas, goats, sheep, risk groups, risk factors, veterinary education, Missouri, US.

Valentine, B.A.; Saulez, M.N.; Cebra, C.K.; Fischer, K.A. **Compressive myelopathy due to intervertebral disk extrusion in a llama (*Lama glama*).** *Journal of Veterinary Diagnostic Investigation.* 2006 Jan; 18(1): 126-129. ISSN: 1040-6387

URL:<http://jvdi.org/>

NAL call no.: SF774.J68

Abstract: A 12-year-old intact female llama was euthanized following acute onset of spastic tetraparesis and recumbency with inability to rise. Postmortem examination revealed caudal cervical spinal cord compression due to a mass within the ventral spinal canal arising from the C6-C7 intervertebral disk space and attached to an irregularly thickened annulus fibrosis. On histopathologic examination, the mass was composed of amorphous acellular basophilic to amphophilic material admixed with irregularly arranged collagen bundles. The amorphous material was metachromatic and contained multiple small foci of markedly vacuolated round cells, characteristic of origin from the nucleus pulposus. Severe necrosis of all white matter tracts with astrocytic reaction was present in the overlying spinal cord segment. Ascending and descending Wallerian degeneration and dissecting interstitial astrogliosis were present within white matter tracts above and below the lesion, respectively. The diagnosis was compressive myelopathy due to chronic extrusion of the nucleus pulposus of the C6-C7 intervertebral disk. To the authors' knowledge, this is the first report of intervertebral disk disease in a camelid.

Descriptors: llamas, intact female, symptoms, spastic tetraparesis and recumbency, spinal

diseases, intervertebral disks, case study, disease diagnosis, animal pathology, histopathology, euthanasia, myelopathy.

Van Saun, R.J. **Nutrient requirements of South American camelids: a factorial approach.** *Small Ruminant Research: The Journal of The International Goat Association*. 2006 Feb; 61(2-3): 165-186. ISSN: 0921-4488. Note: In the special issue: "South American Camelids" edited by A. Tibary and S.M. Parish. Includes references.

URL:<http://www.sciencedirect.com/science/journal/09214488>

NAL call no.: SF380.I52

Abstract: Literature describing digestive physiology and defining specific nutrient requirements for llamas and alpacas was reviewed. Using data from studies defining maintenance energy and protein requirements, llamas and alpacas have lower energy and protein requirements compared to other ruminants; however, they have a greater protein requirement per unit of energy. This is consistent with observed differences in urea and glucose metabolism between camelids and other ruminants suggesting a reliance on protein catabolism to maintain blood glucose concentrations. Evidence suggests llamas and alpacas may have a greater requirement for Vitamin D, but no other evidence of significant differences in requirements between camelids and other ruminants. There are limited data defining other nutrient requirements or differences in requirements based on physiologic state for llamas and alpacas. In spite of limited data, a factorial approach to estimate nutritional requirements of llamas and alpacas was described. Defined maintenance energy and protein requirements were extrapolated to other physiologic states using beef cattle, sheep and goat data as templates. Models were developed to predict energy, protein, mineral and vitamin requirements for growth, pregnancy and lactation. Model development was based on determining beef cattle and sheep nutrient requirements on an amount per kg of body weight and assuming no inherent metabolic differences among species. An averaged value was calculated and used as a basis for defining requirements for llamas and alpacas. Amount per kg body weight requirements were converted to a recommended dietary nutrient density basis using an observed lower dry matter intake per unit body weight. Factorially derived models were in better agreement with North American feeding recommendations compared to predicted requirements using current North American-based requirement models. North American-based requirement equations over predicted energy and protein, resulting in required dietary nutrient densities in excess of practical feeding practices. The proposed factorial models need to be critically validated, but provides a starting point for discussion in advancing the study and application of llama and alpaca nutrient requirements. There are tremendous gaps in our knowledge of llama and alpaca requirements, requiring further basic research especially in the areas of neonatal and fetal growth and composition, lactational performance and mineral bioavailability.

Descriptors: llamas, alpacas, nutrient requirements, ruminant nutrition, literature reviews, dietary protein, urea, glucose, energy metabolism, vitamin D, dietary minerals, animal growth, pregnancy, lactation, animal models, beef cattle, sheep.

Van Saun, R.J. **Nutritional diseases of South American camelids.** *Small Ruminant Research: The Journal of The International Goat Association*. 2006 Feb; 61(2-3): 153-164. ISSN: 0921-4488. Note: In the special issue: "South American Camelids" edited by A. Tibary and S.M. Parish.

Includes references.

URL:<http://www.sciencedirect.com/science/journal/09214488>

NAL call no.: SF380.I52

Abstract: Literature describing nutritional or nutrition-related diseases of llamas and alpacas was reviewed. Case reports of copper toxicity, polioencephalomalacia, plant poisonings and urolithiasis accounted for the greatest number of literature citations relative to llamas and alpaca nutritional diseases. However, the overall number of published studies detailing nutritional disease of llamas and alpacas is very limited. Metabolic bone disease, associated with Vitamin D deficiency, and hepatic lipidosis were metabolic diseases for which controlled research studies were completed to address underlying mechanisms. Circumstantial evidence would suggest llamas and alpacas are similar to other ruminants relative to most nutrient deficiency or toxicity disease problems. Llamas and alpacas are unique compared to other ruminant animals in their susceptibility to zinc and Vitamin D deficiency diseases. A zinc-responsive dermatosis has been described, but the true role of zinc deficiency is debated. Llamas and alpacas show a seasonal deficiency in Vitamin D resulting in a hypophosphatemic rickets syndrome. Camelids may have a lower capacity to endogenously synthesize Vitamin D or higher requirement compared to other species. Although mechanisms are not fully understood, llamas and alpacas are somewhat different in metabolic responses to negative energy balance and subsequent hepatic lipidosis. Further research is necessary to better define llama and alpaca nutrient requirements and metabolism as they directly impact potential for nutritional disease.

Descriptors: llamas, alpacas, animal diseases, diet related diseases, literature reviews, copper, ruminant nutrition, encephalomalacia, poisonous plants, poisoning, developmental orthopedic disease, vitamin deficiencies, vitamin D, fatty liver, zinc, nutrient deficiencies, skin diseases, rickets, seasonal variation, energy balance.

Vaughan , J.L.; Tibary, A. **Reproduction in female South American camelids: a review and clinical observations.** *Small Ruminant Research: The Journal of The International Goat Association.* 2006 Feb; 61(2-3): 259-281. ISSN: 0921-4488. Note: In the special issue: "South American Camelids" edited by A. Tibary and S.M. Parish. Includes references.

URL:<http://www.sciencedirect.com/science/journal/09214488>

NAL call no.: SF380.I52

Abstract: Female South American camelids present striking reproductive peculiarities compared to other domestic livestock. Characteristics such as induced ovulation, pregnancy recognition and maintenance make reproductive management relatively challenging for practitioners with limited exposure to these species. The aim of this paper is to review the current state of knowledge in reproductive physiology and infertility in these species. Following a brief review of the distinctive anatomical features, we describe the follicular wave patterns in non-mated and mated females, mechanisms of ovulation and corpus luteum development as well as fertilisation and pregnancy. Endocrinology of follicle growth, pregnancy, parturition and the post-partum period are described. The paper concludes with a review of the main causes of infertility, early embryonic death and abortion based on clinical observations by the authors.

Descriptors: llamas, alpacas, females, literature reviews, ovulation, pregnancy diagnosis, pregnancy outcome, female fertility, ovarian follicles, follicular development, corpus luteum,

fertilization, parturition, endocrinology, embryonic mortality, abortion, reproductive disorders.

Webb, A.A.; Cullen, C.L.; Lamont, L.A. **Brainstem auditory evoked responses and ophthalmic findings in llamas and alpacas in eastern Canada.** *Canadian Veterinary Journal = La Revue Veterinaire Canadienne*. 2006 Jan; 47(1): 74-77. ISSN: 0008-5286. Note: In English with a summary in French.

URL: <http://www.pubmedcentral.nih.gov/tocrender.fcgi?action=archive&journal=202>

NAL call no.: 41.8 R3224

Abstract: Seventeen llamas and 23 alpacas of various coat and iris colors were evaluated for: 1) deafness by using brainstem auditory evoked response testing; and 2) for ocular abnormalities via complete ophthalmic examination. No animals were deaf. The most common ocular abnormalities noted were iris-to-iris persistent pupillary membranes and incipient cataracts.

Descriptors: llamas, alpacas, brain stem, evoked potentials, hearing, eyes, vision disorders, eye diseases, Canada.

Whitehead, C.E.; Anderson, D.E. **Neonatal diarrhea in llamas and alpacas.** *Small Ruminant Research: The Journal of the International Goat Association*. 2006 Feb; 61(2-3): 207-215. ISSN: 0921-4488. Note: In the special issue: "South American Camelids" edited by A. Tibary and S.M. Parish. Includes references.

URL: <http://www.sciencedirect.com/science/journal/09214488>

NAL call no.: SF380.I52

Abstract: Diarrhea is an important cause of morbidity in neonatal llamas and alpacas. Diarrhea may be multifactorial in etiology including management and nutritional factors as well as a variety of pathogens. Most of the pathogens involved affect other livestock species and some have host-adapted strains. However, the clinical signs, their expected severity and age of onset of disease varies between species in some cases. The most common pathogens causing diarrhea in neonatal camelids are coronavirus, *Escherichia coli* (*E. coli*), *Cryptosporidium* spp., *Giardia* spp. and coccidia. The purpose of this paper is to review the available literature on neonatal diarrhea in camelids and to present clinical data from 55 cases seen at The Ohio State University.

Descriptors: llamas, alpacas, neonates, diarrhea, etiology, symptoms, disease severity, animal age, Coronavirus, viral diseases of animals and humans, *Escherichia coli*, *Escherichia* infections, *Cryptosporidium*, cryptosporidiosis, coccidiosis, salmonellosis, *Giardia*, giardiasis, literature reviews, disease diagnosis, *Coccidia*.

Wolt, D.; Gauly, M.; Huanca, W.; Cardenas, O.; Bauer, C.; Schares, G. **Seroprevalence of *Neospora caninum* und *Toxoplasma gondii* in South American camelids.** *4th European Symposium on South American Camelids/DECAMA European Seminar, Gottingen, Germany; October 07-09, 2004* 2006. ISBN: 9076998981

NAL call no.: SF401.L35 E97 2004

Descriptors: llamas, alpacas, vicunas, *Neospora caninum*, *Toxiplasma gondii*, post-natal infection routes, clinical significance, South America.

Wurzinger, M.; Delgado, J.; Nurnberg, M.; Valle-Zarate, A.; Stemmer, A.; Ugarte, G.; Solkner, J.

Genetic and non-genetic factors influencing fibre quality of Bolivian llamas. *Small Ruminant Research: The Journal of The International Goat Association*. 2006 Feb; 61(2-3): 131-139. ISSN: 0921-4488. Note: In the special issue: "South American Camelids" edited by A.

Tibary and S.M. Parish. Includes references.

URL:<http://www.sciencedirect.com/science/journal/09214488>

NAL call no.: SF380.I52

Abstract: Fibre samples of 2378 llamas were analysed with the optical fibre diameter analyser (OFDA). The following traits were considered: mean fibre diameter (MFD), standard deviation (S.D.), diameter of fibre <30 micrometer (DF < 30), proportion fibre <30 micrometer (%F < 30), proportion of kemp (PK) and proportion of medullated fibre (PMF). The effects of type of llama, age, sex and coat colour were studied. The type of llama influenced all traits showing that Th'ampulli (fibre type) is better than Kh'ara (meat type). With increasing age of the animal MFD, S.D., DF < 30 and PK increased whereas %F < 30 decreased. Comparing the two sexes, females showed better fibre quality. Heritabilities and genetic correlations for fibre traits were estimated using animal model procedures where all information came from mother-offspring relationships. Heritability estimates were 0.33, 0.28, 0.36, 0.32 and 0.25 for MFD, S.D., DF < 30, %F < 30 and PK, indicating potential for genetic selection. Genetic correlations between fibre traits and some body measurements were also calculated. In conclusion, the llama population studied shows a high genetic potential for high quality fibre production. The information available allows further steps towards the design of a breeding program.

Descriptors: llamas, Th'ampulli llama breed, Kh'ara llama breed, animal genetics, fiber quality, fleece, diameter, animal age, gender differences, color, heritability, genetic correlation, traits, environmental factors, animal growth, selection criteria, animal breeding, Bolivia.

Zama, M.M.S.; Bhardwaj, H.R.; Tarunbir Singh; Gupta, A.K.; Chaudhary, R.N. **Dorsal patellar fixation in large animals - a review.** *Indian Journal of Field Veterinarians*. 2006; 1(4): 71-80. ISSN: 0973-3175

URL:<http://www.ivri.nic.in>

Abstract: alpacas, equines, camels, llamas, etiological factors, diagnosis, treatment, patellar fixation, tibio-femoral patellar articulation stifle joint, bone fractures, diagnosis, ultrasonography.

Zanolari, P. **Neuweltkameliden - von der Geburtsvorbereitung bis zur Versorgung der Neugeborenen.** [**New World camelidae: from birth preparations to care for newborn animals.**] *Forum Kleinwiederkauer/Petits Ruminants*. 2006; (12): 6-12. Note: In German and French. A literature review.

URL:<http://www.caprovis.ch>

Abstract: This review deals with the gestation period and parturition of alpacas and llamas, and details are given of placental function, the role of colostrum in protecting young animals from infections, failure of passive immunoglobulin transfer and colostrum administration. A checklist of measures required before and after parturition includes the provision of a stress-free environment for dams, neonatal checks of the respiration and navel, ensuring that young animals stand up within 60 minutes of birth and that they suck within 4 h, regular checks of

daily gain, the avoidance of extreme temperatures and the provision of selenium. Reproduced with permission from CAB Abstract.

Descriptors: alpacas, llamas, colostrum, gestation, newborn immunity, vitelline immunity, maternal immunity, newborn animals, parturition, pregnancy, reviews.

Zogbi, A.P.; Frank, E.N.; Gauna, C.D. **DECAMA-Project: Technological and nutritional parameters of fresh meat of Argentinean llamas (*Lama glama*)**. *4th European Symposium on South American Camelids/DECAMA European Seminar, Göttingen, Germany; October 07-09, 2004* 2006.

NAL call no.: SF401.L35 E97 2004

Descriptors : DECAMA Project, evaluation of llama meat, Argentina.

2005

Adams, G.P.; Ratto, M.H.; Huanca, W.; Jaswant Singh. **Ovulation-inducing factor in the seminal plasma of alpacas and llamas**. *Biology of Reproduction*. 2005; 73(3): 452-457. ISSN: 0006-3363

URL:<http://www.bioreprod.org/>

DOI:<http://dx.doi.org/10.1095/biolreprod.105.040097>

Abstract: Studies were conducted to document the existence of an ovulation-inducing factor in the seminal plasma of alpacas (experiment 1) and llamas (experiment 2) and to determine if the effect is mediated via the pituitary (experiment 3). In experiment 1, female alpacas (n=14 per group) were given alpaca seminal plasma or saline intramuscularly or by intrauterine infusion. Only alpacas that were given seminal plasma i.m. ovulated (13/14, 93%; P<0.01). In experiment 2, ovulation was detected in 9/10 (90%) llamas at a mean of 29.3±0.7 h after seminal plasma treatment. Plasma progesterone concentrations were maximal by Day 9 and were at nadir by Day 12 post-treatment. In experiment 3, female llamas were given llama seminal plasma, GnRH, or saline i.m., and ovulation was detected in 6/6, 5/6, and 0/6 llamas, respectively (P<0.001). Treatment was followed by a surge (P<0.01) in plasma LH concentration beginning 15 min and 75 min after treatment with GnRH and seminal plasma, respectively. Plasma LH remained elevated longer in the seminal plasma group (P<0.05) and had not yet declined to pre-treatment levels after 8 h. Compared with the GnRH group, corpus luteum tended to grow longer and to a greater diameter (P=0.1) and plasma progesterone concentration was twice as high in the seminal plasma group (P<0.01). Results document the existence of a potent factor in the seminal plasma of alpacas and llamas that elicited a surge in circulating concentrations of LH and induced an ovulatory and luteotropic response. Reproduced with permission from CAB Abstracts.

Descriptors: alpacas, llamas, blood chemistry, blood plasma, corpus luteum, GnRH, LH, ovaries, ovulation, ovulation rate, pituitary, progesterone, semen, seminal plasma, gonadoliberein, gonadotropin releasing hormone, hypophysis, pituitary gland.

Alexander, K.; Drost, W.T.; Mattoon, J.S.; Anderson, D.E. **99mTc-ciprofloxacin in imaging of clinical infections in camelids and a goat.** *Veterinary Radiology and Ultrasound*. 2005; 46(4): 340-347. ISSN: 1058-8183

URL: <http://www3.interscience.wiley.com/journal/117990755/home>

DOI: <http://dx.doi.org/10.1111/j.1740-8261.2005.00064.x>

Abstract: 99mTc-ciprofloxacin was used to image five adult camelids and a juvenile goat with clinical and/or radiographic signs of infection. 99mTc-ciprofloxacin (range 10-33 MBq/kg) was injected intravenously and a series of 2-min static images were acquired at 1- and 4-h postinjection. At 24-h postinjection, 5-min static images were acquired. Only the skull or abdomen was imaged in the adults; the whole body was imaged in the goat. The quality of the 1-, 4-, and 24-h studies was evaluated subjectively. Normal and abnormal areas of 99mTc-ciprofloxacin uptake were recorded and subjectively graded as mild, moderate or intense. Image quality was best 4-h postinjection. Twenty-four-hour images were poor because of insufficient radioactivity. 99mTc-ciprofloxacin imaging resulted in true positive or true negative scans in four of six animals. Two false-negative studies occurred. Intense 99mTc-ciprofloxacin activity was seen in the lungs and urinary bladder, moderate/intense activity in the kidneys, and mild activity in the physes/epiphyses, liver and intermittently in the gastrointestinal tract. The normal distribution of 99mTc-ciprofloxacin in camelids/small ruminants differed from people. Further studies to determine the sensitivity and specificity of infection detection using 99mTc-ciprofloxacin in animals are warranted.

Descriptors: alpacas, goats, goat kids, llamas, glue ear infections, *Arcanobacterium pyogenes*, *Streptococcus*, abscesses, clinical aspects, etiology, antibiotics, ciprofloxacin, diagnosis, diagnostic techniques, drug therapy, osteomyelitis, otitis media, radiography, scintigraphy, tissue distribution, Ohio, US.

Anna, M.V.; Aurelia, R.R. **Characteristics of selected parameters of hair from llamas (*Lama glama*) kept at Warsaw Zoo.** *Annals of Warsaw Agricultural University, Animal Science*. 2005; (43): 35-39. ISSN: 0208-5739. Note: In English with a Polish summary.

NAL call no.: SF15.B7 A62

Abstract: The main characteristics of hair fibre from llamas kept in Warsaw Zoo were analysed. Two fractions were observed: thin inner (down) and thicker outer (medullated). Thin hair from the down fraction accounted for 93.96% of the samples examined. The thickness of the hair from the down fraction and thick medullated fraction was 23.35 and 70.70 microm, respectively. The difference in diameter allowed easy hair separation. The length of both fractions was 13.40 cm for down and 19.50 cm for medullated.

Descriptors: llamas, zoo animals, wool producing animals, animal fibers, hair characteristics, length, thickness, wool, Poland.

Bruford, M.W. **Molecular approaches to understanding animal domestication: what have we learned so far?** *World Poultry Science Association, 4th European Poultry Genetics Symposium, Dubrovnik, Croatia, 6-8-October, 2005*. 2005; No.10.

URL: <http://www.animalscience.com/uploads/additionalFiles/wpsa2.htm>

Descriptors: livestock, llamas, vicunas, buffalo, cattle, sheep, donkeys, asses, goats, guinea

pigs, dogs, ancestors, animal genetic resources, domestic animals, domestication, genetic analysis, genetic diversity, history, molecular genetics, biochemical genetics.

Burri, I.H.; Martig, J.; Sager, H.; Liesegang, A.; Meylan, M. **Neuweltkameliden in der Schweiz. I. Population, Haltung und Gesundheitsprobleme.** [South American camelids in Switzerland. I. Population, management and health problems.] *SAT-Schweizer Archiv für Tierheilkunde*. 2005; 147(8): 325-334. ISSN: 0036-7281. Note: In German with English, French, and Italian summaries.

URL:<http://verlag.hanshuber.com/ezm/index.php?ezm=SAT>

NAL call no.: 41.8 SCH9

Abstract: At the beginning of 2000, a population of 1622 South American camelids in 257 herds was living in Switzerland. The origin of the animals, their age, the management systems, their feeding habits, their use as well as the observed medical conditions and the indications for treatment were assessed with a questionnaire. It was shown that 60% of the South American camelid population in Switzerland consisted of llamas (999 animals) and 40% of alpacas (623), and that females younger than 4 years of age made up the majority of the animals. South American camelids were predominantly kept as a hobby, for breeding or trekking. The most frequent health problems were related to the digestive tract, the skin, the eyes and metabolism. Veterinarians were consulted for deworming, vaccinations, castrations or obstetric interventions. The parasitological examination of 204 faecal samples showed that llamas and alpacas were infested with the same endoparasites as ruminants (i.e. nematodes, trematodes and protozoa). Reproduced with permission from CAB Abstracts.

Descriptors: alpacas, llamas, herd size, animal diseases, animal feeding, animal health, livestock numbers, parasitoses, parasitic diseases, parasitic infestations, population dynamics, Nematoda, Protozoa, Trematoda, Switzerland.

Burri, I.H.; Tschudi, P.; Martig, J.; Liesegang, A.; Meylan, M. **Neuweltkameliden in der Schweiz. II. Referenzwerte für hamatologische und blutchemische Parameter.** [South American camelids in Switzerland. II. Reference values for blood parameters.] *SAT-Schweizer Archiv für Tierheilkunde*. 2005; 147(8): 335-343. ISSN: 0036-7281. Note: In German with English, French, and Italian summaries.

URL:<http://verlag.hanshuber.com/ezm/index.php?ezm=SAT>

NAL call no.: 41.8 SCH9

Abstract: In order to establish reference values for blood parameters of South American camelids in Switzerland, 273 blood samples were collected from 141 llamas and 132 alpacas. These animals were classified in three categories (young animals <six months, adult females and males). Forty-one parameters were measured (red blood cell count, white blood cell count, electrolytes, metabolites and enzymes). Significant differences between llamas and alpacas were evident for 26 parameters. This study also showed that differences between young animals, females and males must be taken into consideration. A comparison of blood values with the results of faecal analysis for parasite eggs showed that an infestation with *Dicrocoelium dendriticum* was associated with elevated activity of two liver enzymes, glutamate dehydrogenase (GLDH) and gamma-glutamyltransferase (gamma-GT), in the serum. In contrast, no differences were found in the results of blood analyses between animals

shedding eggs of gastrointestinal strongyles or not. Reproduced with permission from CAB Abstracts.

Descriptors: alpacas, llamas, age differences, sex differences, species differences, animal parasitic nematodes, *Dicrocoelium dendriticum*, blood chemistry, electrolytes, enzymes, erythrocyte count, gamma glutamyltransferase, glutamate dehydrogenase, hematology, helminth ova, helminthoses, leukocyte count, liver, metabolites, normal values, Strongylidae, Switzerland.

Camenzind, D. **Gehauftes Auftreten von Aktinomykose in einem Lamabestand in der Schweiz.** [Accumulation of actinomycosis in a llama herd in Switzerland.] *SAT-Schweizer Archiv fur Tierheilkunde*. 2005; 147(8): 351-356. ISSN: 0036-7281. Note: In German with an English summary.

URL:<http://verlag.hanshuber.com/ezm/index.php?ezm=SAT>

NAL call no.: 41.8 SCH9

Abstract: The symptoms of actinomycosis (caused by *Actinomyces bovis*) in several llamas in a herd raised in Switzerland and its management are presented. Haematological and chemical blood examinations were conducted in 5 llamas, which showed low calcium and partially low iron and copper levels. Various reasons which influence bone metabolism and lead to a higher susceptibility of bone infection are also discussed.

Descriptors: llamas, actinomycosis diagnosis, *Actinomyces bovis*, blood chemistry, bone diseases, clinical aspects, calcium, copper, iron, disease prevalence, epidemiology, hematology, susceptibility, therapy, Switzerland.

Cebra, C.K.; Tornquist, S.J. **Evaluation of glucose tolerance and insulin sensitivity in llama crias.** *American Journal of Veterinary Research*. 2005; 66(6): 1013-1017. ISSN: 0002-9645

URL: <http://avmajournals.avma.org/loi/ajvr/>

NAL call no.: 41.8 AM3A

Abstract: Objective - To investigate glucose tolerance and insulin sensitivity in llama crias. Animals - 7 llamas (age range, 14 to 30 days). Procedure - On each of 2 sequential days, crias were administered glucose (0.5 g/kg) via rapid IV injection. On 1 day (randomly determined for each cria), regular insulin (0.2 U/kg) or 0.9% NaCl solution (0.002 mL/kg) was administered IV 15 minutes after glucose administration. Blood samples were collected before (baseline) and at 5, 15, 30, 45, 60, 90, 120, 180, and 240 minutes after glucose administration for determination of plasma glucose and insulin concentrations; fractional turnover rates and plasma half-life of glucose were calculated. The data were compared over time and between days (ie, between glucose treatments with and without insulin administration). Results - A peak plasma glucose concentration of 342±47 mg/dL was detected at 5 minutes after glucose administration and llamas cleared glucose from plasma within 60 minutes; at 15 minutes, plasma insulin concentration attained a peak value of 33±13 micro U/mL (ie, triple the baseline value). During the 15- to 45-minute interval, fractional turnover rate of glucose was 1.10±0.24%/min and plasma half-life was 65.7±13.4 minutes. Insulin significantly increased glucose turnover and resulted in hypoglycemia within 75 minutes of administration. Conclusions and Clinical Relevance - Healthy immature llamas have glucose tolerance and insulin sensitivity superior to that of adults. However,

whether sick crias retain the pancreatic sufficiency and tissue responsiveness that are likely responsible for the rapid glucose clearance in healthy individuals is not known.

Descriptors: llamas, young animals, blood plasma, blood sugar, blood glucose, glucose tolerance, dextrose, hypoglycemia, low blood sugar, insulin, metabolism.

Cristofanelli, S.; Antonini, M.; Torres, D.; Polidori, P.; Renieri, C. **Carcass characteristics of Peruvian llama (*Lama glama*) and alpaca (*Lama pacos*) reared in the Andean highlands.** *Small Ruminant Research: The journal of The International Goat Association*. 2005 June; 58(3): 219-222. ISSN: 0921-4488

URL:<http://www.sciencedirect.com/science/journal/09214488>

NAL call no.: SF380.I52

Abstract: An experiment based on males from 20 llama and 40 alpaca reared in Peru evaluated the carcass characteristics from animals slaughtered at 25 months of age, at a final body weight of 46.1 kg for alpaca and 63.2 kg for llama. Warm carcass weight was significantly higher in llama carcasses compared with alpaca, while dressing percentage was higher in alpacas. In the llama carcasses, leg, thorax and chops were heavier compared with the same cuts taken from the alpaca carcasses ($P < 0.05$). In contrast, the shoulder and neck were proportionately heavier in the alpaca compared with the llama carcasses. Full digestive tract was the heaviest component found in the carcasses. In the llama carcasses, both full digestive tract and digestive content were significantly heavier than in the alpaca carcasses. Significant differences were observed in the proportion of muscle and bone in the shoulder and in the leg of the llama and alpaca carcasses. Llama and alpaca slaughtered at similar age showed different carcass characteristics; considering the results of this study, llama can be more easily bred as animal for meat production.

Descriptors: llamas, alpacas, males, carcass quality, legs, thorax, shoulders, neck, bones, gastrointestinal system, carcass characteristics, livestock production, carcass composition, carcass evaluation, Peru.

Daley, L.P.; Gagliardo, L.F.; Duffy, M.S.; Smith, M.C.; Appleton, J.A. **Application of monoclonal antibodies in functional and comparative investigations of heavy-chain immunoglobulins in New World camelids.** *Clinical and Diagnostic Laboratory Immunology*. 2005; 12(3): 380-386. ISSN: 1071-412X

URL:<http://cvi.asm.org/cgi/content/abstract/12/3/380>

DOI:<http://dx.doi.org/10.1128/CDLI.12.3.380-386.2005>

Abstract: Of the three immunoglobulin G (IgG) isotypes described to occur in camelids, IgG2 and IgG3 are distinct in that they do not incorporate light chains. These heavy-chain antibodies (HCAbs) constitute approximately 50% of the IgG in llama serum and as much as 75% of the IgG in camel serum. We have produced isotype-specific mouse monoclonal antibodies (MAbs) in order to investigate the roles of HCAbs in camelid immunity. Seventeen stable hybridomas were cloned, and three MAbs that were specific for epitopes on the gamma chains of llama IgG1, IgG2, or IgG3 were characterized in detail. Affinity chromatography revealed that each MAb bound its isotype in solution in llama serum. The antibodies bound to the corresponding alpaca IgGs, to guanaco IgG1 and IgG2, and to camel IgG1. Interestingly, anti-IgG2 MAbs bound three heavy-chain species in llama serum, confirming the presence of three IgG2 subisotypes. Two IgG2 subisotypes were detected in

alpaca and guanaco sera. The MAbs detected llama serum IgGs when they were bound to antigen in enzyme-linked immunosorbent assays and were used to discern among isotypes induced during infection with a parasitic nematode. Diseased animals, infected with *Parelaphostrongylus tenuis*, did not produce antigen-specific HCABs; rather, they produced the conventional isotype, IgG1, exclusively. Our data document the utility of these MAbs in functional and physiologic investigations of the immune systems of New World camelids.

Descriptors: alpacas, llamas, guanacos, camels, Bactrian camels, antigens, epitopes, hybridomas, IgG, immune response, immune system, immunity, immunoglobulins, isotypes, monoclonal antibodies, *Parelaphostrongylus tenuis*, antigenic determinants, antigenicity, gamma globulins, immune globulins, immunity reactions, immunogens, immunological reactions, Secernentea.

Eastern States Veterinary Association. *Proceedings of the North American Veterinary Conference. Large Animal. Volume 19, Orlando, Florida, USA, 8-12 January, 2005.* Published by the Association. 2005; 530 pp

Abstract: This proceedings is comprised of the papers presented in the North American Veterinary Conference on Large Animals. 38 papers generally deal with bovines, with emphasis given on viral and bacterial diseases and their diagnosis and control, metabolism and lameness disorders, fluid therapy, peripartum disorders, surgical procedures and serological testing. 91 papers on horses are included with following topics: dermatology; incisor reduction; wound healing; managing wounds; skin grafting; diagnostic and surgical arthroscopy of the coffin, pastern and temporomandibular joints; limb deformities; urinary problems; anaesthesia; myositis; colitis; dental care; sinus disease; guttural pouch disease; castration complications; reproductive emergencies; emergency procedures in equine critical care; alternative medicine in equine practice; strangles; reproductive disorders; acupuncture; behaviour; foot problems; viral diseases; zoonotic diseases; pain management; heart failure and corneal diseases. 16 papers on small ruminants are presented, dealing with lameness and foot care, dermatological problems; pregnancy diagnosis; neonatology, infertility, mineral nutrition, artificial rearing, endophytes in forages, chronic wasting disease, techniques for removal of brainstem for TSE testing, myopathy in cervids and small ruminants and diseases of free ranging and captive North American cervids. Diagnosis and control of bacterial and viral diseases in pigs are discussed in 10 papers. 78 papers on practice management and legal issues are also included.

Descriptors: alpacas, cattle, goats, horses, llamas, sheep, pigs, *Mycobacterium avium* subsp *paratuberculosis*, *Streptococcus equi*, porcine reproductive and respiratory syndrome virus, acupuncture, anesthesia, anesthetics, animal behavior, animal nutrition, bacterial diseases, prognosis, colic, colitis, customer relations, dermatology, diagnosis, diagnostic techniques, disease control, disease prevention, drug therapy, eye diseases, fluid therapy, foot-diseases, heart diseases, joint diseases, lameness, law, management, marketing, metabolic disorders, myositis, Arterivirus, personnel management, porcine reproductive and respiratory syndrome, pregnancy diagnosis, reproductive disorders, skin diseases, surgery, tooth diseases, urinary tract diseases, vaccination, veterinary practice, viral diseases, wounds, zoonoses, prognosis, anesthesia, anesthetics, arthropathy, bacterial infections, bacterioses, chemotherapy, coronary diseases, legal aspects, legal principles, humane euthanasia, metabolic diseases, rehydration therapy; surgical techniques, zoonotic infections, emergencies, healing.

Ebensperger, G.; Ebensperger, R.; Herrera, E.A.; Riquelme, R.A.; Sanhueza, E.M.; Lesage, F.; Marengo, J.J.; Tejo, R.I.; Llanos, A.J.; Reyes, R.V. **Fetal brain hypometabolism during prolonged hypoxaemia in the llama.** *Journal of Physiology*. 2005; 567(3): 963-975. ISSN: 0022-3751

URL:<http://www.blackwellsynergy.com/servlet/useragent?func=showIssues&code=tjp>

DOI : <http://dx.doi.org/10.1113/jphysiol.2005.094524>

Abstract: In this study we looked for additional evidence to support the hypothesis that fetal llama reacts to hypoxaemia with adaptive brain hypometabolism. We determined fetal llama brain temperature, Na⁺ and K⁺ channel density and Na⁺-K⁺-ATPase activity. Additionally, we looked to see whether there were signs of cell death in the brain cortex of llama fetuses submitted to prolonged hypoxaemia. Ten fetal llamas were instrumented under general anaesthesia to measure pH, arterial blood gases, mean arterial pressure, heart rate, and brain and core temperatures. Measurements were made 1 h before and every hour during 24 h of hypoxaemia (n=5), which was imposed by reducing maternal inspired oxygen fraction to reach a fetal arterial partial pressure of oxygen (P_{a,O₂}) of about 12 mmHg. A normoxaemic group was the control (n=5). After 24 h of hypoxaemia, we determined brain cortex Na⁺-K⁺-ATPase activity, ouabain binding, and the expression of NaV1.1, NaV1.2, NaV1.3, NaV1.6, TREK1, TRAAK and K⁺ channels. The lack of brain cortex damage was assessed as poly ADP-ribose polymerase (PARP) proteolysis. We found a mean decrease of 0.56 degrees C in brain cortex temperature during prolonged hypoxaemia, which was accompanied by a 51% decrease in brain cortex Na⁺-K⁺-ATPase activity, and by a 44% decrease in protein content of NaV1.1, a voltage-gated Na⁺ channel. These changes occurred in absence of changes in PARP protein degradation, suggesting that the cell death of the brain was not enhanced in the fetal llama during hypoxaemia. Taken together, these results provide further evidence to support the hypothesis that the fetal llama responds to prolonged hypoxaemia with adaptive brain hypometabolism, partly mediated by decreases in Na⁺-K⁺-ATPase activity and expression of NaV channels. Reproduced with permission from CAB Abstracts.

Descriptors: llamas, pregnancy, fetuses, fetal development, gestation, cerebrum, hypoxemia, brain diseases, adenosinetriphosphatase, blood gases, blood pressure, brain diseases, heart rate, ions, metabolism, neurophysiology, oxygen, pH, potassium, sodium, ATPase, hydrogen ion concentration, potential of hydrogen.

Frank, E.N.; Hick, M.V.H.; Gauna, C.D.; Molina, M.G. **Determinacion de parametros geneticos en variables de produccion de fibra en Llamas Argentinas.** [Genetic parameters estimation for fiber production traits of Argentine Llamas.] *Revista Argentina de Produccion Animal*. 2005; 25(Supl. 1): GM7. ISSN: 0326-0550. Note: 28 Congreso Argentino de Produccion Animal "Hacia un Incremento en la Demanda Global de Productos de Origen Animal", Bahia Blanca, Argentina, 19-21 October 2005. Note: In Spanish.

Descriptors: llamas, fiber animals, animal fibers, fleece, estimation, genetic correlation, genetic parameters, heritability, phenotypic correlation, heritable fiber characteristics, wool production, Argentina.

Fugaro, M.N.; Kiupel, M.; Montiani-Ferreira, F.; Hawkins, J.F.; Janovitz, E.B. **Retinoblastoma in the eye of a llama (*Llama glama*)**. *Veterinary Ophthalmology*. 2005; 8(4): 287-290. ISSN: 1463-5216

URL: <http://www3.interscience.wiley.com/journal/118507707/home>

DOI:<http://dx.doi.org/10.1111/j.1463-5224.2005.00407.x>

NAL call no.: SF891.V47

Abstract: Animal studied: A 6-year-old, pregnant female llama experienced a 6-month history of epiphora, buphthalmos, and acute loss of vision in the left eye. The condition was unresponsive to topical antimicrobial and anti-inflammatory therapy and progressed to corneal rupture. Procedures: Transpalpebral enucleation was performed and an intraorbital silicone prosthesis was implanted. The eye was fixed in formalin and processed according to routine paraffin technique. Sections of a mass were immunohistochemically prepared routinely and stained for glial fibrillary acidic protein (GFAP), S-antigen, and rhodopsin. Results: Gross, histopathologic, and immunohistochemical analysis revealed a retinal tumor consistent with a retinoblastoma. The neoplastic tissue formed Flexner-Wintersteiner and Homer-Wright rosettes, originated from the retina, and demonstrated photoreceptor differentiation with S-antigen and rhodopsin expression. Neoplastic cells were negative for GFAP. Four years after enucleation, the llama showed no signs of recurrent neoplasia. Conclusions: This report describes the diagnosis and successful treatment of the first known retinoblastoma in a llama.

Descriptors: llamas, cancer of the eye, retinoblastoma, case report, clinical picture, clinical aspects, diagnosis, enucleation surgery, histopathology, immunology, histochemistry, neoplasms, therapy, Indiana, US.

Gauna-Anasco, L.; Oliva, G.; Affricano, O.; Montesano, A.; Graziotti, G. **Morfología del linfocentro cervical superficial de la llama (*Lama glama*)**. [Morphology of the superficial cervical lymph center of the llama (*Lama glama*).] *In Vet Investigacion Veterinaria*. 2005; 7(1): 25-30. ISSN: 1514-6634. Note: In Spanish with an English summary.

Abstract: The superficial cervical lymph centre of the llama was studied through macroscopic dissections and light microscopy, offering scientific bases about lymph drainage from the anatomical regions of the forelimb, which has implications for meat inspection. The thoracic limbs were injected with modified Gerota's mass and fixed using a 10% buffered formalin solution. For light microscopy, traditional methods were used. The afferent lymph vessels come from the forefoot, antebrachial and brachial regions. The lymph nodes have a flat surface and are smaller than those of other species. They do not have a characteristic pattern of cortex, paracortex and medulla. Lymph nodules, dense anodular lymphatic and diffuse lymphatic tissues are distributed through the primary and secondary lymph nodules. The capsule does not present smooth muscle fibres and the peritrabecular sinuses are surrounded by diffuse lymphatic tissue. Reproduced with permission from CAB Abstracts.

Descriptors: llamas, animal anatomy, lymph nodes, lymphatic system, morphology.

Gauly, M.; Vaughan, J; Hogreve, S.K.; Erhardt, G. **Brainstem auditory-evoked potential assessment of auditory function and congenital deafness in llamas (*Lama glama*) and alpacas (*L. pacos*)**. *Journal of Veterinary Internal Medicine*. 2005; 19(5): 756-760. ISSN: 0891-6640

URL:<http://www.blackwell-synergy.com/doi/ref/10.1111/j.1939-1676.2008.0072.x>

DOI:[http://dx.doi.org/10.1892/0891-6640\(2005\)19\[756:BAPAOA\]2.0.CO;2](http://dx.doi.org/10.1892/0891-6640(2005)19[756:BAPAOA]2.0.CO;2)

NAL Call no.: SF601.J65

Abstract: Auditory function of llamas and alpacas was assessed objectively by means of brain-stem auditory-evoked response audiometry (BAER) to establish the normal hearing range and to test the hypothesis of a correlation between blue eyes, white coat, and deafness. Sixty-three camelids were available for the study. Thirteen animals had blue irides; 1 animal had 1 blue and 1 pigmented iris. Wave latencies, amplitudes, and interpeak latencies were measured under general anesthetic. Click stimuli (dB [HL]) were delivered by an insert earphone.

Four to five positive peaks could be detected; waves I, II, and V were reproducible; wave II appeared infrequently; and wave IV generally merged with wave V to form a complex. Peak latencies decreased and peak amplitudes increased as stimulus intensity increased. A hearing threshold level of 10-20 dB (HL) was proposed as the normal range in llamas and alpacas. None of the animals with pigmentation of coat and iris showed any degree of hearing impairment. Seven of the 10 blue-eyed, pure-white animals were bilaterally deaf and one of them was unilaterally deaf. However, 2 blue-eyed, white animals exhibited normal hearing ability. Three blue-eyed animals with pigmented coat did not show any hearing impairment. All white animals with normal iris pigmentation had normal auditory function; so did the 1 animal with 1 normal and 1 blue iris. The high frequency (78%) of bilaterally deaf animals with pure white coat and blue iris pigmentation supports the hypothesis of a correlation between pigmentation anomalies and congenital deafness in llamas and alpacas.

Descriptors: alpacas, llamas, auditory threshold, brain stem, coat, congenital abnormalities, deafness, diagnosis, diagnostic techniques, eyes, hearing, pigmentation, techniques, birth defects, congenital malformations, threshold of hearing.

Geurden, T.; Hemelrijk, K. van. **Ivermectin treatment against gastrointestinal nematodes in New World camelids in Belgium.** *Small Ruminant Research*. 2005; 58(1): 71-73. ISSN: 0921-4488

URL:<http://www.sciencedirect.com/science/journal/09214488>

DOI:<http://dx.doi.org/10.1016/j.smallrumres.2004.09.002>

Abstract: Gastrointestinal parasites are a major clinical and economical threat to New World camelids (NWC) throughout the world. Since there are no anthelmintics approved for use in NWC, there is only limited information about the efficacy and safety of these products. In this study, the reduction of the faecal egg output following treatment with an injectable formulation of ivermectin in NWC was evaluated. Therefore, a group of 10 llamas and a group of eight alpacas, naturally infested with *Trichostrongylus* spp. and *Oesophagostomum* spp., were randomly divided into a treated and a control group, and injected with ivermectin subcutaneously at a dose rate of 0.2 mg/kg bodyweight. Faecal samples were collected per rectum immediately prior to treatment from each individual animal in the study, and every week thereafter for the next 5 weeks. Both for the llamas and the alpacas, there was a 100% reduction in faecal egg output during at least 3 weeks. None of the animals showed adverse reactions to the ivermectin treatment.

Descriptors: alpacas, llamas, fecal sampling, *Trichostrongylus* spp., *Oesophagostomum* spp., *Trichostrongylus* spp., *Oesophagostomum* spp., nematode infestation, fecal egg count, digestive tract, ivermectin, nematode control.

- Geurden, T. ; Claerebout, E.; Vercruyse, J. **Parasitaire infecties bij lama's in gematigde streken.** [Parasite infections in llamas in temperate zones.] *Vlaams Diergeneeskundig Tijdschrift*. 2005; 74(5): 347-354. ISSN: 0303-9021. Note: In Dutch.
URL:<http://vdt.ugent.be>
Descriptors: llamas, occurrence of scabies, *Sarcoptes scabiei*, *Psoroptes*, clinical picture, liver flukes, *Fasciola hepatica*, *Helminths* and *Moniezia* spp. treatment and prevention are described, protozoal infections and ectoparasites are minimal, risks for Belgian llama keepers.
- Grubb, T.L.; Gold, J.R.; Schlipf, J.W.; Craig, A.M.; Walker, K.C.; Riebold, T.W. **Assessment of serum concentrations and sedative effects of fentanyl after transdermal administration at three dosages in healthy llamas.** *American Journal of Veterinary Research*. 2005 May; 66(5): 907-909. ISSN: 0002-9645
URL:http://www.avma.org/journals/ajvr/ajvr_index.asp
NAL call no.: 41.8 AM3A
Descriptors: healthy llamas, sedative effects, serum concentrations, fentanyl transdermal administration, 3 dose levels.
- Izeta, Andres D. **South American camelid bone structural density: what are we measuring? Comments on data sets, values, their interpretation and application.** *Journal of Archaeological Science*. 2005; 32(8): 1159-1168. ISSN: 0305-4403
URL:<http://www.elsevier.com>
Descriptors: llamas, vicunas, guanacos, bone density sets, five archaeofaunal assemblages, Formative Period archaeological sites, southern Calchaquies valleys, Catamarca, Argentina.
- Johnson, L.W. **Neonatology of llamas and alpacas.** *Proceedings of the North American Veterinary Conference Large Animal Volume 19, Orlando, Florida, USA, 8-12 January, 2005*. 2005; 306-308.
URL:<http://www.tnavc.org>
Descriptors: alpacas, llamas, animal health, congenital abnormalities, diarrhea, maternal immunity, newborn animals, parturition, umbilical hernia, birth defects, congenital malformations, diarrhea, newborn immunity, scouring, vitelline immunity.
- Johnson, L.W. **Small ruminant tips for the small animal practitioner.** *Proceedings of the North American Veterinary Conference Large Animal Volume 19, Orlando, Florida, USA, 8-12-January, 2005*. 2005; 301-303.
URL:<http://www.tnavc.org>
Descriptors: alpacas, goats, llamas, sheep, abortion, anesthetics, gestation, polling, anesthetics, animal breeding, animal diseases, animal health, antihelmintics, blood sampling, castration, coccidiosis, dehorning, disease control, mycoses, posthitis, pregnancy, pregnancy complications, pregnancy diagnosis, small animal practice, urolithiasis, vaccination-
- Johnson, L.W. **Dermatologic problems of small ruminants.** *Proceedings of the North American Veterinary Conference Large Animal Volume 19, Orlando, Florida, USA, 8-12 January, 2005*. 2005; 299-300.

URL:<http://www.tnavc.org>

Descriptors: goats, llamas, sheep, skin diseases, etiology, alopecia, scabby mouth, sore mouth, ulcerative dermatosis, dermatomycoses, dermatophytes, drug therapy, hyperkeratosis, mange, mineral deficiencies, copper, pododermatitis, treatment, *Arcanobacterium pyogenes*, contagious ecthyma virus, causal agents, *Corynebacterium renale*, *Dermatophilus congolensis*, *Fusobacterium necrophorum*, *Microsporium*, *Phthiraptera*, *Trichophyton*, chemotherapy, contagious pustular dermatitis, CPD virus, etiology, *Onygenales*.

Johnson, L.W. **Alpaca infertility cases.** *Proceedings of the North American Veterinary Conference Large Animal Volume 19, Orlando, Florida, USA, 8-12 January, 2005.* 2005; 309.

URL:<http://www.narc.org>

Descriptors: alpacas, case reports, diagnosis, dysplasia, infertility, pseudo-hermaphroditism, reproductive disorders, testes, testicles, treatment, Colorado, US.

Krebs, J.W.; Mandel, E.J.; Swerdlow, D.L.; Rupprecht, C.E. **Rabies surveillance in the United States during 2004.** *Journal of the American Veterinary Medical Association.* 2005; 227(12): 1912-1925. ISSN: 0003-1488

URL: <http://www.avma.org/>

DOI:<http://dx.doi.org/10.2460/javma.2005.227.1912>

NAL call no.: 41.8 AM3

Abstract: During 2004, 49 states and Puerto Rico reported 6,836 cases of rabies in non-human animals and 8 cases in human beings to the CDC, representing a 4.6% decrease from the 7,170 cases in nonhuman animals and 3 cases in human beings reported in 2003. Approximately 92% of the cases were in wildlife, and 8% were in domestic animals (compared with 91% and 9%, respectively, in 2003). Relative contributions by the major animal groups were as follows: 2,564 raccoons (37.5%), 1,856 skunks (27.1%), 1,361 bats (19.9%), 389 foxes (5.7%), 281 cats (4.1%), 115 cattle (1.7%), and 94 dogs (1.4%). Compared with the numbers of reported cases in 2003, cases in 2004 decreased among all groups, except bats, cattle, human beings, and "other domestics" (1 llama). Decreases in numbers of rabid raccoons during 2004 were reported by 12 of the 20 eastern states in which raccoon rabies was enzootic. In the East, Massachusetts reported the first cases of raccoon rabies detected beyond the Cape Cod oral rabies vaccine barrier. Along the western edge of the raccoon rabies epizootic (Ohio in the north and Tennessee in the south), cases of rabies were reported from unexpected new foci beyond oral rabies vaccine zones. On a national level, the number of rabies cases in skunks during 2004 decreased by 12.1% from the number reported in 2003. Once again, Texas reported the greatest number (n=534) of rabid skunks and the greatest overall state total of rabies cases (913). Texas reported only 1 case of rabies in a dog that was infected with the dog/coyote rabies virus variant and only 22 cases associated with the Texas gray fox rabies virus variant (compared with 61 cases in 2003). The total number of cases of rabies reported nationally in foxes and raccoons declined 14.7% and 2.7%, respectively, during 2004. The 1,361 cases of rabies reported in bats during 2004 represented a 12.3% increase over the previous year's total of 1,212 cases for this group of mammals. Cases of rabies reported in cats, dogs, horses and mules, and sheep and goats decreased 12.5%, 19.7%, 31.8%, and 16.7%, respectively, whereas cases reported in cattle increased 174%.

In Puerto Rico, reported cases of rabies in mongooses decreased 4.1% and rabies in dogs (9 cases) remained unchanged from those reported in 2003. Among the 8 cases of rabies in human beings, 1 person from Oklahoma and 3 from Texas died following receipt of infected organs and tissues from an Arkansas donor. In California, a person originally from El Salvador and, in Florida, a person originally from Haiti both died of canine rabies infections acquired outside the United States. In Wisconsin, a teenager contracted rabies from a bat bite and became the first known person to survive rabies despite not having received rabies vaccine prior to symptom onset. Reproduced with permission from CAB Abstracts.

Descriptors: llamas, humans, cats, cattle, bats, Chiroptera, dogs, foxes, *Procyon*, rabies virus, skunks, disease prevalence, disease surveys, rabies, zoonoses, zoonotic infections, US.

Kriegel, C.; Klein, D.; Kofler, J.; Fuchs, K.; Baumgartner, W. **Haltungs und Gesundheitsaspekte bei Neuweltkameliden. [South American Camelid husbandry in Austria.]** *Wiener Tierärztliche Monatsschrift*. 2005; 92(5): 119-125. ISSN: 0043-535X. Note: In German with an English summary.

URL:<http://www.wtm.at/>

Abstract: Introduction: South American Camelids have gained popularity over the last few years in Austria. Therefore veterinarians are often asked about their husbandry, breeding or to intervene in clinical management of different problems. The aim of this work is to get an overview of the development of the current state of new world camelidae husbandry in Austria. Material and methods: At the end of 2002 a 12-page questionnaire was sent to all owners of South American camelids in German-speaking countries. It contained general questions on the animals and their husbandry, questions on preventive measures and on diseases. 179 of the 760 questionnaires that had been sent out were returned, which corresponds to a rate of return of 23.6%. At the same time post mortem findings of the last 6 years were collected and analysed. Results and conclusion: In contrast to Switzerland where alpacas account for 47.6%, in Austria llamas are much more dominant with 89.7%. The average herd size in Austria is 9.5 animals, with the majority of animals being held as a hobby. The animals are mainly used for hiking and trekking tours, breeding, pasture farming and/or wool production. Diseases of the digestive tract and endoparasites constitute the most frequent problems of husbandry. Regular preventive medication against endoparasites led to significantly fewer diseases of the digestive tract. The most frequently used supplements are avermectins with 74.4%. In general breeders with no more than 5 animals had significantly ($p < 0.001$) less diseases than those with more animals. 42.6% of the post mortem examinations of tylopods showed that the animals had died below reproduction age. The share of infectious diseases was particularly high with 18.5%. Altogether 30 parasite findings were recorded from 21 animals (38.9%). Nematodes of the digestive tract were found most frequently with 43.3%. Reproduced with permission from CAB Abstracts.

Descriptors: alpacas, llamas, dromedaries, fiber producing animals, camelids, animal husbandry, endoparasites, avermectins, digestive-tract, Austria.

Liesegang, A.; Burri, I.H.; Meylan, M. **Neuweltkameliden in der Schweiz. III. Verdaulichkeit der Futtermittel in verschiedenen Betrieben von Neuweltkameliden in der Schweiz.** [South American camelids in Switzerland. III. Digestibilities of different feedstuff.] *SAT-Schweizer Archiv für Tierheilkunde*. 2005; 147(8): 345-349. ISSN: 0036-7281. Note: In German with English, French and Italian summaries.

URL:<http://verlag.hanshuber.com/ezm/index.php?ezm=SAT>

NAL call no.: 41.8 SCH9

Abstract: Faeces from 15 adult llamas were collected in 4 herds in Switzerland and the exact diet was determined, either of the group or of individual animals, to examine apparent digestibility. A questionnaire was submitted to the animal owners. The questionnaire included questions about the animals in the herd (number, age, gender, origin), management methods, pastures, watering and feeding facilities for the animals, hay supplementation, composition of the ration and fodder additives used. Analysis of the feed revealed an average apparent digestibility for dry matter of 81+or-4%, for organic matter 77+or-7%, for crude protein 69+or-10%, for nitrogen-free extract 83+or-5%, for calcium 60+or-17%, for phosphorus 54+or-11% and 81+or-9% for crude fibre. All feed components seem to be digested similarly to domestic ruminants, whereas the apparent digestibility of crude fibre was high, which indicates that the digestive system seems to be more effective in llamas compared to ruminants.

Descriptors: llamas, animal feeding, feeds, crude fiber, nutritional value, quality for nutrition, calcium, crude fiber, crude protein, digestibility, dry matter, feeds, organic matter, phosphorus, Switzerland.

Macaldowie, C.; Patterson, I.A.P.; Nettleton, P.F.; Low, H.; Buxton, D. **Louping ill in llamas (*Lama glama*) in the Hebrides.** *Veterinary Record*. 2005; 156(13): 420-421. ISSN: 0042-4900

URL : <http://veterinaryrecord.bvapublications.com/archive/>

NAL Call no.: 41.8 V641

Descriptors: llamas, disease vectors, *Ixodes ricinus*, louping ill disease, viral brain disease, cerebrum, clinical aspects; diagnosis, postmortem examinations, tissue sampling, histopathology, Scotland, Britain, UK.

Moses, V.L. **Llamas and sheep and farm tours. Oh my!** *Small Farm Today*. 2006 Mar-Apr; 23(2): 28-29. ISSN: 1079-9729

NAL call no.: S1.M57

Descriptors: llamas, small farms, small scale farming, sheep, *Ovis*, intensive livestock farming, tourism, Washington Georgia, Second Time Around Mini Farm, Babydoll sheep, USA.

Odbileg, R.; Lee, S.I.; Ohashi, K.; Onuma, M. **Cloning and sequence analysis of llama (*Lama glama*) Th2 (IL-4, IL-10 and IL-13) cytokines.** *Veterinary Immunology and Immunopathology*. 2005 Apr 8; 104(3-4): 145-153. ISSN: 0165-2427

URL:<http://www.sciencedirect.com/science/journal/01652427>

NAL call no.: SF757.2.V38

Abstract: This paper describes the cloning and sequence analysis of the cDNAs encoding the T helper (Th) 2 cytokines of llama including interleukin-4 (IL-4), IL-10 and IL-13. The

cDNAs encoding for IL-4, IL-10 and IL-13 were amplified using specific primers designed from reported sequences of bovine cytokine genes. The cDNAs for llama IL-4, IL-10 and IL-13 were found to be 402, 537 and 411 bp in length, with open reading frames encoding 133, 178 or 136 amino acids, respectively. Homology analyses of nucleotide and deduced amino acid sequences of llama IL-4, IL-10 and IL-13 and phylogenetic analysis based on their nucleotide sequences indicated the close relationship in these cytokine genes between llama and eutherian mammalian order Artiodactyla (pig, cattle) and Perissodactyla (horse).
Descriptors: llamas, cytokines, interleukin 4, interleukin 10, complementary DNA, nucleotide sequences sequence, homology, sequence analysis, phylogeny, amino acid sequences, interleukin 13, molecular sequence data.

Odbileg, Raadan; Konnai, Satoru; Ohashi, Kazuhiko; Onuma, Misao. **Molecular cloning and phylogenetic analysis of inflammatory cytokines of Camelidae (llama and camel.)** *Journal of Veterinary Medical Science*. 2005; 67(9): 921-925. ISSN: 0916-7250

URL: <http://www.jstage.jst.go.jp/browse/jvms/-char/en>

Abstract: We cloned, sequenced and analyzed the cDNAs encoding Camelidae inflammatory cytokines, including llama (*Lama glama*) interleukin (IL)-1 alpha, IL-1 beta, IL-6, tumor necrosis factor (TNF)-alpha and camel (*Camelus bactrianus*) IL-6 and TNF-alpha. The similarity levels of the deduced amino acid sequences of IL-1 alpha, IL-1 beta, IL-6 and TNF-alpha from llama (camel) to those from other mammalian species, ranged from 60.7% to 87.7%, 52.8% to 75.3%, 41.4% to 98.6%, and 72.9% to 99.6%, respectively. Phylogenetic analyses based on nucleic acid sequences showed that llama IL-1 alpha, IL-1 beta, IL-6 and TNF-alpha were more closely related to those of camel, pig, cattle, sheep and horse than to those of human, dog, cat, mouse and rat.

Descriptors: llama, camel, pig, cattle, sheep, horse, dog, cat, mouse, rat, humans, inflammatory cytokines, phylogenetic analysis.

Sequences: AB107645: GenBank, EMBL, DDJB, amino acid sequence; AB107644: GenBank, EMBL, DDJB, amino acid sequence; AB107647: GenBank, EMBL, DDJB, amino acid sequence; AB107646: GenBank, EMBL, DDJB, amino acid sequence; M37210: GenBank, EMBL, DDJB, amino acid sequence; M37211: GenBank, EMBL, DDJB, amino acid sequence; X57317: GenBank, EMBL, DDJB, amino acid sequence; AF011926 : GenBank, EMBL, DDJB, amino acid sequence; X60167: GenBank, EMBL, DDJB, amino acid sequence; X56972: GenBank, EMBL, DDJB, amino acid sequence; X68723: GenBank, EMBL, DDJB, amino acid sequence; X56756: GenBank, EMBL, DDJB, amino acid sequence; D42146: GenBank, EMBL, DDJB, amino acid sequence; U92481: GenBank, EMBL, DDJB, amino acid sequence; U12234: GenBank, EMBL, DDJB, amino acid sequence; Z70046: GenBank, EMBL, DDJB, amino acid sequence; BC003727: GenBank, EMBL, DDJB, amino acid sequence; M98820: GenBank, EMBL, DDJB, amino acid sequence; D00403: GenBank, EMBL, DDJB, amino acid sequence; X66539: GenBank, EMBL, DDJB, amino acid sequence.

Odbileg, R.; Konnai, S.; Usui, T.; Ohashi, K.; Onuma, M. **Quantification of llama inflammatory cytokine mRNAs by real-time RT-PCR.** *Journal of Veterinary Medical Science*. 2005; 67(2): 195-198. ISSN: 0916-7250

URL: <http://www.jstage.jst.go.jp/browse/jvms/-char/en>

NAL call no.: SF604.J342

Descriptors: llamas, real time PCR, complementary DNA, messenger RNA, cytokines, gene expression, immune system, interleukin 1, interleukin 6, lipopolysaccharides, tumor necrosis factor.

Pereyra, J.E.; Campero, L.M. **Determinacion de antigenos carnicos de llama (*Lama glama*) y ovino (*Ovis aries*) por el metodo de inmunodifusion.**[Determination of meat antigens in llamas (*Lama glama*) and sheep *Ovis aries*, using the immunodiffusion method.] *Veterinaria Argentina*. 2005; 22(215): 344-351. ISSN: 0326-4629. Note: In Spanish with an English summary.

NAL call no.: SF604.V63

Abstract: A method of obtaining sera reacting against llama and sheep meat is described. Although the sera presented transverse immunity, their identification was attained by comparing different precipitation patterns. Data are presented in 7 graphs.

Descriptors: llamas, sheep, antigens, identification, immunodiffusion, meat, sheep meat, lamb meat, mutton, antigenicity, immunogens.

Poulsen, K.P.; Smith, G.W.; Davis, J.L.; Papich, M.G. **Pharmacokinetics of oral omeprazole in llamas.** *Journal of Veterinary Pharmacology and Therapeutics*. 2005 Dec; 28(6): 539-543. ISSN: 0140-7783

URL:<http://www3.interscience.wiley.com/journal/117986825/home>

NAL call no.: SF915.J63

Descriptors: llamas, pharmacokinetics, oral administration, drug formulations, dosage, half life, gastric acid, bioavailability, dose response, omeprazole.

Poulsen, K.P.; Smith, G.W.; Davis, J.L.; Papich, M.G. **Bioavailability and pharmacokinetics of oral omeprazole in llamas.** *Journal of Veterinary Internal Medicine*. 2005; 19(3): 412. ISSN: 0891-6640. Note: 23rd Annual Forum of the American College of Veterinary Internal Medicine, Baltimore, MD, USA; June 01 -04, 2005.

URL:<http://www.blackwell-synergy.com/doi/ref/10.1111/j.1939-1676.2008.0072.x>

NAL call no.: SF601.J65

Descriptors: llama, oral dosing with omeprazole, pharmacokinetics, bioavailability, third compartment ulcer treatment.

Radi, Z.A.; Miller, D. L.; Liggett, A.D. **Cutaneous melanocytoma in a llama (*Lama glama*).** *Veterinary Research Communications*. 2005; 29(2): 137-140. ISSN: 0165-7380.

URL:<http://www.springerlink.com/content/103009/>

NAL call no.: SF601.V38

Descriptors: male llamas, skin tumor, tumor biology, diagnosis, treatment, case study.

Ratto, Marcelo H.; Huanca, Wilfredo; Singh, Jaswant; Adams, Gregg P. **Local versus systemic effect of ovulation-inducing factor in the seminal plasma of alpacas.** *Reproductive Biology and Endocrinology*. 2005; 3. ISSN: 1477-7827

URL:<http://www.rbej.com/home/>

Descriptors: alpacas, llamas, ovulation factor, seminal plasma, females, seminal plasma or

phosphate buffered saline, intramuscular injection intrauterine infusion, intrauterine infusion after endometrial curettage, transrectal ultrasonography, ovulation detection, follicular and luteal diameters, conclusion was systemic effect of seminal plasma.

Ratto, Marcelo; Berland, Marco; Huanca, Wilfredo; Singh, Jaswant; Adams, Gregg P. **In vitro and in vivo maturation of llama oocytes.** *Theriogenology*. 2005; 63(9): 2445-2457. ISSN: 0093-691X

URL:<http://www.sciencedirect.com/science/journal/0093691X>

NAL call no.: QP251.A1T5

Descriptors: llamas oocytes, postmortem collection of ovaries, in vitro culture for 28, 30, 36 hours, incubation conditions, reproductive technologies, FSH and eCG added, COC in metaphase II, in vitro fertilization.

Sanhueza, E.M.; Riquelme, R.A.; Herrera, E.A.; Giussani, D.A.; Blanco, C.E.; Hanson, M.A.; Llanos, A.J. **Vasodilator tone in the llama fetus: the role of nitric oxide during normoxemia and hypoxemia.** *American Journal of Physiology*. 2005; 289(3(2)): R776-R783. ISSN: 0002-9513

NAL call no.:<http://physiologyonline.physiology.org/>

Abstract: The fetal llama responds to hypoxemia, with a marked peripheral vasoconstriction but, unlike the sheep, with little or no increase in cerebral blood flow. We tested the hypothesis that the role of nitric oxide (NO) may be increased during hypoxemia in this species, to counterbalance a strong vasoconstrictor effect. Ten fetal llamas were operated under general anesthesia. Mean arterial pressure (MAP), heart rate, cardiac output, total vascular resistance, blood flows, and vascular resistances in cerebral, carotid and femoral vascular beds were determined. Two groups were studied, one with nitric oxide synthase (NOS) blocker NG-nitro-L-arginine methyl ester (L-NAME), and the other with 0.9% NaCl (control group), during normoxemia, hypoxemia, and recovery. During normoxemia, L-NAME produced an increase in fetal MAP and a rapid bradycardia. Cerebral, carotid, and femoral vascular resistance increased and blood flow decreased to carotid and femoral beds, while cerebral blood flow did not change significantly. However, during hypoxemia cerebral and carotid vascular resistance fell by 44% from its value in normoxemia after L-NAME, although femoral vascular resistance progressively increased and remained high during recovery. We conclude that in the llama fetus: (1) NO has an important role in maintaining a vasodilator tone during both normoxemia and hypoxemia in cerebral and femoral vascular beds and (2) during hypoxemia, NOS blockade unmasked the action of other vasodilator agents that contribute, with nitric oxide, to preserving blood flow and oxygen delivery to the tissues. Reproduced with permission from CAB Abstracts.

Descriptors: llamas, fetuses, hypoxemia, effects, vasoconstriction, heart rate, cardiac output, vasodilation, arteries, blood, blood flow, blood pressure; brain, nitric oxide synthase, oxygen, oxygen transport.

Semevolos, S.A.; Cope, R.B. **Determination of the anatomic communications among compartments within the carpus, metacarpophalangeal and metatarsophalangeal joints, stifle joint, and tarsus in llamas.** *American Journal of Veterinary Research*. 2005 Aug; 66(8): 1437-1440. ISSN: 0002-9645

URL: <http://avmajournals.avma.org/loi/ajvr/>

NAL call no.: 41.8 AM3A

Abstract: Objective - To determine the anatomic communications among compartments within the carpus, metacarpophalangeal and metatarsophalangeal joints, stifle joint, and tarsus in llamas. Sample Population - 88 limbs from 22 llamas necropsied because of reasons unrelated to disease of the carpus; tarsus; or metacarpophalangeal, metatarsophalangeal, or stifle joints. Procedure - 1 compartment (randomly assigned) of each joint was injected with blue latex solution. Communication between joint compartments was determined by observation of latex in adjacent compartments following frozen sectioning. Results - Of the 44 carpi, 30 (68%) had anatomic separation between the radiocarpal and middle carpal joints, whereas the remaining 14 (32%) had communication between the radiocarpal and middle carpal joints. In the metacarpophalangeal or metatarsophalangeal joints, medial and lateral joint compartments remained separate in 83 of 88 (94%) joints injected. The tibiotarsal and proximal intertarsal joints communicated in all tarsi examined, whereas 14 of 38 (37%) communicated between the proximal intertarsal and distal intertarsal joints. Communication between the distal intertarsal and tarsometatarsal joints was detected in 17 of 25 (68%) specimens; all 4 tarsal joints communicated in 11 of 42 (26%) specimens examined. Examination of 33 stifle joints that were successfully injected revealed communication between the femoropatellar, medial femorotibial, and lateral femorotibial joints. Conclusions and Clinical Relevance - These data suggest that it is important to determine the joint communications specific to each llama prior to treatment of septic arthritis. The metacarpophalangeal or metatarsophalangeal joint compartments may be considered separate, although the lateral and medial compartments infrequently communicate along the proximal palmar or plantar aspect. Reproduced with permission from CAB Abstracts.

Descriptors: llamas, bone joints, carpus, metacarpus, metatarsus, stifle, tarsus bone, latex, injection, animal diseases, sepsis (infection), arthritis, veterinary medicine, necropsy.

Shapiro, J.L.; Watson, P.; McEwen, B.; Carman, S. **Highlights of camelid diagnoses from necropsy submissions to the Animal Health Laboratory, University of Guelph, from 1998 to 2004.** *Canadian Veterinary Journal*. 2005; 46(4): 317-318. ISSN: 0008-5286

URL: <http://www.pubmedcentral.nih.gov/tocrender.fcgi?action=archive&journal=202>

NAL call no.: 41.8 R3224

Descriptors: llamas, alpacas, camelids, age differences, animal diseases, diagnoses, bacterial diseases, causes of death, diseases of gastrointestinal and nervous systems, liver, neoplasms, postmortem examinations, Ontario, Canada.

Smith, M.C. **Diagnosis, treatment, and prevention of common small ruminant parasites.** R.A. Smith, [Editor]. *Proceedings of the Thirty Eighth Annual Convention, American Association of Bovine Practitioners, Salt Lake City, Utah, USA, 24-24 September, 2005.* 2005; 123-127

NAL call no.: SF961.A5

Abstract: External parasites of small ruminants include lice, keds and mange mites. They cause pruritus, fleece damage, and in some instances blood loss anemia. The most important internal parasite of sheep and goats is *Haemonchus*, a blood sucking strongyle that can kill animals on contaminated pasture in a matter of weeks. Overuse of dewormers has caused the development of parasite resistance, and currently recommended programs emphasize

selective treatment and eventual culling of animals that show severe clinical signs. Untreated animals are left in the herd to provide unselected parasites in refugia. Other strongyle species contribute to production loss by causing weight loss and diarrhea. Tapeworms are of minimal clinical importance but, regionally, liver flukes cause ill thrift or death. Fencing off ponds and stream is often more effective than deworming for fluke control. In regions where whitetail deer abound on pastures, the meningeal worm *Parelaphostrongylus tenuis* causes neurologic disease and sporadic losses of small ruminants and guard llamas.

Descriptors: goats, sheep, llamas, parasitic diseases, parasitic infestations, liver flukes, mites, mange, Eucestoda, *Haemonchus*, *Hippobosca*, *Parelaphostrongylus tenuis*, *Phthiraptera*, *Secernentea*, *Strongylid*, clinical picture, clinical care, antihelmintics, diagnosis, culling, losses, disease prevention, treatments, fencing.

Stemmer, A.; Zarate, A.V.; Nuernberg, M.; Delgado, J.; Wurzinger, M.; Soelkner, J. **La llama de Ayopaya: descripcion de un recurso genetico autoctono.** [The llama of Ayopaya: description of an indigenous genetic resource.] *Archivos de Zootecnia*. 2005; 54(206/207): 253-259. ISSN: 0004-0592. Note: special issue. "Recursos Zoogeneticos Iberoamericanos: Conservacion y Uso Sostenible." In Spanish with English summary.

URL : <http://www.uco.es/organiza/servicios/publica/az/az/htm>

Abstract: The genetic resource of the llama of Ayopaya, department of Cochabamba, Bolivia, was evaluated in 6 communities according to trait. Data of 730-2821 llamas were used in this study. Genetic parameters were estimated using 860 dam-progeny pairs. The system of production was agropastoral. The larger part of the products was consumed by the household, and only a small percentage was sold in local markets. As for reproduction and production aspects, fertility was 55.3%, mortality up to one year of age was 35%, birth weight was 8 kg, height at withers at birth was 64 cm, weight of mature animals was 73 kg and height at withers was 101 cm. The Th'ampulli type and uniform colours predominated with 89 and 78%, respectively. The average total fibre diameter, standard deviation of total fibre diameter, proportion of fine fibres and diameter of fine fibres were 22.2 mm, 7.46 mm, 91.3 p.100 and 20.47 mm, respectively. Proportions of medullated fibres and kemps were 21.92 and 0.44%, respectively. The fleece weight was 1.77 kg and the staple length was 14.8 cm. Heritabilities for liveweight, height at withers, circumference of chest, body length and circumference of abdomen were estimated as 0.36, 0.27, 0.15, 0.09 and 0.11, respectively. Estimated heritabilities for total fibre diameter, standard deviation of total fibre diameter, diameter of fine fibres, proportion of fine fibres and proportion of kemps were 0.33, 0.28, 0.36, 0.32 and 0.25, respectively. Genetic correlations ranged from -0.94 to 0.96. It was concluded that the excellent quality of the fibre produced by the llamas of Ayopaya gave rise to many hopes for the future. In order to better utilize this resource, it was necessary to continue the selection programme and strategies for improved marketing. Reproduced with permission of CAB Abstracts.

Descriptors: llamas, agropastoral systems, animal fibers, animal genetic resources, heritable characters, birth weight, coat, fertility, genetic correlation, heritability, mortality, Bolivia.

Sullivan, E.K.; Callan, R.J.; Holt, T.N.; Van Metre, D.C. **Trichophytobezoar duodenal obstruction in New World camelids.** *Veterinary Surgery*. 2005 Sept-Oct; 34(5): 524-529. ISSN: 0161-3499

URL: <http://www3.interscience.wiley.com/journal/118532623/home>

DOI:<http://dx.doi.org/10.1111/j.1532-950X.2005.00079.x>

NAL call no.: SF911.V43

Abstract: Objective-To describe clinical findings, surgical treatment, and outcome associated with trichophytobezoar duodenal obstruction in New World camelids. Study Design-Retrospective study Animals-Alpacas (7) and 1 llama. Methods-Historical and clinical data were obtained from the medical records of New World camelids with a diagnosis of trichophytobezoar duodenal obstruction confirmed by surgical exploration or necropsy. Results-Seven camelids were <1 year old. Abnormal clinical findings included anorexia, reduced fecal output, recumbency, colic, abdominal distension, regurgitation, decreased serum chloride concentration, increased serum bicarbonate concentration, and/or elevated first gastric compartment chloride concentration. Survey abdominal radiographs obtained (4 animals) revealed gastric distension (4) and/or visualization of the obstruction (2). Diagnosis was confirmed at necropsy (1) or surgery (7). Right paracostal celiotomy was performed on all animals and duodenotomy (3) or retropulsion of the trichophytobezoar combined with third compartment gastrotomy (4) was used to remove the obstruction. Six animals survived to discharge and 5 were healthy at follow-up, 8-20 months later. The remaining discharged alpaca was healthy at 12 months but subsequently died of unrelated causes. Conclusions-Diagnosis of trichophytobezoar duodenal obstruction should be considered in juvenile New World camelids with abdominal distension and hypochloremic metabolic alkalosis. Right paracostal celiotomy can be used for access to the descending duodenum and third gastric compartment for surgical relief of obstruction. Clinical Relevance-Duodenal obstruction from bezoars should be considered in New World camelids <1year of age with abdominal distension and hypochloremic metabolic alkalosis. Surgical relief of the obstruction by right paracostal celiotomy has a good prognosis.

Descriptors: alpacas, llamas, juveniles, duodenum, intestinal obstruction, trichobezoars, surgery, clinical examination, animal age, symptoms, anorexia, defecation, colic, chlorides, blood chemistry, bicarbonates, disease diagnosis.

Wolf, D.; Schares, G.; Cardenas, O.; Huanca, W.; Cordero, Aida; Baerwald, Andrea; Conraths, F.J.; Gauly, M.; Zahner, H.; Bauer, C. **Detection of specific antibodies to *Neospora caninum* and *Toxoplasma gondii* in naturally infected alpacas (*Lama pacos*), llamas (*Lama glama*) and vicunas (*Lama vicugna*) from Peru and Germany.** *Veterinary Parasitology*. 2005; 130(1-2): 81-87. ISSN: 0304-4017

URL: <http://www.sciencedirect.com/science/journal/03044017>

NAL call no.: SF810.4.V4

Descriptors: llamas, alpacas, wild vicunas, experimental infection, protozoal parasite, *Neospora caninum*, *Toxoplasma gondii*, sera testing, immunoblot, ELISA, IFAT, antibody detection against *N. caninum* tachyzoites, routes of infection, natural infections in South American camelids, Peru, Germany .

Wurzinger, M.; Delgado, J.; Nurnberg, M.; Zarate, A.V.; Stemmer, A.; Ugarte, G.; Solkner, J.

Growth curves and genetic parameters for growth traits in Bolivian llamas. *Livestock Production Science*. 2005; 95(1/2): 73-81. ISSN: 0301-6226

URL : <http://www.sciencedirect.com/science/journal/03016226>

NAL call no.: SF1.L5

Abstract: The present study was carried out in the High Andes of the Department Cochabamba, Bolivia. Two types of llamas were found in the study area: Th'ampullis with higher fleece yields and fitting a fibre type; Kh'aras used as pack animals and fitting a meat-type. Growth curves for height at withers (HW), body length (BL), chest circumference (CC), abdomen circumference (AC) and body weight (BW) were described with the non-linear Brody function. The differences between sexes or types, except in the case of BW, were small. Equations for predicting body weight from different body measurements that could be easily obtained under field conditions were calculated. Reasonable fits were obtained with the inclusion of chest circumference and body length or chest circumference alone. Heritabilities and genetic correlations were estimated using animal model procedures based on mother-offspring relationships. Heritability estimates were 0.36, 0.27, 0.15, 0.09 and 0.11 for BW, HW, CC, BL and AC, genetic correlations ranged from 0.55 to 0.94.

Descriptors: Th'ampullisllamas, Kh'aras llamas, wool producing animals, body length, body measurements, body weight, genetic correlation, genetic parameters, growth, growth curve, heritability, live weight, mathematical models, prediction, sex differences, thorax, Bolivia.

Wurzinger, M.; Delgado, J.; Nuernberg, M.; Valle-Zarate, A.; Stemmer, A.; Ugarte, G.; Solkner, J.

Genetic parameters for coat characteristics in Bolivian llamas. *4th European Symposium on South American Camelids/DECAMA European Seminar, Gottingen, Germany; October 07-09, 2004*. 2006. ISBN: 9076998981

NAL call no.: [SF401.L35 E97 2004](#)

Descriptors: 1,869 llamas; 2 breeds Th'ampulli (fibre type) and Kh'ara (meat type); fiber characteristics; fleece; variability; mean fibre diameter (MFD); standard deviation (SD); diameter of fine fibre (DFF); proportion of fine fibre (PFF); proportion of kemp (PK); proportion of medullated fibre (PMF); effects of age, sex, and coat color; heritability; genetic correlations observed.

Zacari, M.A.; Pacheco, L.F. **Depredacion vs. problemas sanitarios como causas de mortalidad de ganado camelido en el Parque Nacional Sajama.** [Depredation versus disease problems as causes of mortality in camelid livestock in the Sajama national park.] *Ecologia en Bolivia*. 2005; 40(2): 58-61. ISSN: 1605-2528. Note: In Spanish.

URL: <http://dialnet.unirioja.es>

Abstract: This article discusses the causes of mortality among camelid livestock (llamas and alpacas) in the Sajama National Park in Bolivia. The problems of predation by pumas and foxes are described, including losses recorded, as well as animal diseases as causes of mortality. The incidence, potential mortality percentage and the numbers of animals at risk of death for the following diseases in a sample of 2078 llamas and alpacas in the national park are presented: conjunctivitis, ocular orbit infections, keratitis, pediculosis, diarrhoea, scabies, fractures, fever (in alpacas), pneumonia and malnutrition. Among these diseases, the most significant were malnutrition (30.22%), followed by scabies (3.22%) and pediculosis

(3.22%).

Descriptors: alpacas, llamas, animal diseases, animal nutrition, death rate, causes of death, livestock, malnutrition, mortality, pediculosis, predation, scabies, Bolivia.

Zarebski, Laura M.; Urrutia, Mariela; Goldbaum, Fernando A. **Llama single domain antibodies as a tool for molecular mimicry.** *Journal of Molecular Biology*. 2005; 349(4): 814-824. ISSN: 0022-2836

URL:<http://www.sciencedirect.com/science/journal/00222836>

Descriptors: llamas, antibodies, heavy chain IgGs (hcIgGs), variable region one polypeptide chain suitable for engineering, immunized with anti-DNA mouse mAb develop anti-Ig response, immuno-stimulant, excellent tool for molecular mimicry.

2004

Al Ani, F.K. **Classification and breeds.** In: *Camel: Management and Diseases*. Faculty of Veterinary Medicine, Baghdad University, Baghdad, Iraq. 2004; 61-68.

Descriptors: alpacas, guanacos, llamas, vicunas, dromedaries, Bactrian camels, taxonomy, draft animals, riding animals, dual purpose animals, hybrids, breeds, adaptation, anatomy, physiology, milk and meat production.

Al Ani, F.K. **Domestication, distribution and population.** In: *Camel: Management and Diseases*. 2004; 1-24. Faculty of Veterinary Medicine, Baghdad University, Baghdad, Iraq.

Descriptors: camels, llamas, vicunas, dromedaries, Bactrian camels, domestication, geographical distribution, livestock numbers, population dynamics, Africa, Asia, Australia, Europe, North and South America, Saudi Arabia, United Arab Emirates.

Al Ani, F.K.; Ababneh, M.M. **South American camelids (SAC).** In: *Camel: Management and Diseases*. Faculty of Veterinary Medicine, Baghdad University, Baghdad, Iraq. 2004; 121-136.

Descriptors: alpacas, guanacos, llamas, vicunas, draft animals, riding animals, breeding, crossbreeding, diseases, husbandry, hematology, meat and milk production, reproduction, pregnancy diagnosis, parturition, physiology, surgery, wool producing animals, South America.

Al Izzi, S.A.; Abdousslam, O.E.; Al Bassam, L.S.; Azwai, S.M. **Haematological parameters in clinically normal llamas (*Lama glama*).** *Praxis Veterinaria Zagreb*. 2004; 52(3): 225-232. ISSN: 0350-4441. Note: In English with a summary in Croatian.

Descriptors: llamas, sex and age differences, blood base values, blood composition, proteins, fibrinogen, hemoglobin, prothrombin, thromboplastin, blood cells, basophils, eosinophils, erythrocyte count, leukocyte counts, lymphocytes, monocytes, platelets, reticulocytes.

Alwood, A.J.; Downend, A.B.; Slensky, K.A.; Fox, J.A.; Simpson, S.A.; Donahue, S.M.; Waddell, L.S.; Otto, C.M. **10th international veterinary emergency and critical care symposium, September 8-12, 2004. San Diego, California, USA.** *Journal of Veterinary Emergency and Critical Care* . 2004; 14(Supplement 1): 18 p. ISSN: 1534-6935. Note: Conference proceedings.

NAL call no.: SF778.J68

Descriptors: cats, dogs, donkeys, horses, llamas, *Clostridium tetani*, *Escherichia coli*, emergency and intensive care, acepromazine, albumins, anesthetics, anticoagulants, antioxidants, antibiotic resistance, benzodiazepines, blood chemistries, transfusions, cardiac diseases, catheterization convulsions, diagnostic techniques, disease control, drug resistance, electrocardiography, electroencephalograms, gastric acid, hemolytic anemia, hemorrhage, heparin, hyperkalaemia, ketamine, morphine, ketoacidosis, lithium, naltrexone, neoplasms, neuroleptics, obstructions, oxygen, respiratory diseases, septicaemia, spinal diseases, tetanus, therapy, transport of animals, troponins, urethra, respiratory distress syndrome, ventilation, seizures, thoracotomy, thromboelastography, thromboembolism, tramadol.

Andelt, W.F. **Use of livestock guarding animals to reduce predation on livestock.** *Sheep and Goat Research Journal*. 2004; 19(19): 72-75. ISSN: 1535-2587. Note: In the special issue: "Predation." Includes references.

Descriptors: livestock, predation, working animals, predator control, predators, pest control equipment, dogs, llamas, asses, control methods, literature reviews, wildlife management, livestock production, wildlife livestock relations, sheep, cattle, attachment behavior, goats, loss prevention, guard dogs, US.

Andelt, William F.; Colorado State University. Cooperative Extension Service. **Livestock guard dogs, llamas, and donkeys.** 2004. Note: "no. 1.218."

URL:<http://www.ext.colostate.edu/PUBS/LIVESTK/01218.html>

NAL call no.: SF428.6

Descriptors: livestock, protection from predators, protective animals, comparison study, llamas, guard dogs, donkeys.

Anderson , D.E. **Common surgical procedures in camelids.** In: *Proceedings of the Thirty Seventh Annual Conference, American Association of Bovine Practitioners, Forth Worth, Texas, City, USA, 23-25 September, 2004.* 2004: 118-125. ISSN: 0743-0450

NAL call no.: SF961.A5

Descriptors: alpacas, dromedary camels, llamas, surgical procedures, teeth, tooth diseases, abscesses, bone diseases, castration, digestive tract, limb bones, limbs, postoperative care.

Anderson , D.E. **Comparison of trace mineral concentration in the various lobes of the liver of alpacas and llamas.** *Journal of Animal and Veterinary Advances*. 2004; 3(3): 162-164. ISSN: 1680-5593

Descriptors: alpacas, llamas, postmortem study, site of liver collection, affects on selected trace metals postmortem study, left lobe, right lobe, caudate lobe, analysed via inductively coupled argon plasma emission, spectroscopy, calcium, copper, iron, molybdenum, selenium, zinc, potassium.

Anderson , D.E.; Silveira, F.; Grubb, T. **Effects of venipuncture and correlation of plasma, serum and saliva cortisol concentration with transportation stress in camelids.** In: *Selected Research on Camelid Physiology and Nutrition.* The Camelid Publishers. Bikaner, India. 2004: 160-168. ISBN: 8190114123

NAL call no.: SF401.C2S46 2004

Descriptors: alpacas, dromedary camels, llamas, camels, animal transport related stress effects, blood chemistry, saliva hydrocortisone, effects of venipuncture, intravenous injection, restraint of animals, stress response.

Anderson , D.E. **Liver disease, metabolism and digestion in llamas and alpacas.** In: *Selected Research on Camelid Physiology and Nutrition.* The Camelid Publishers. Bikaner, India. 2004: 545-554. ISBN: 8190114123

NAL call no.: SF401.C2S46 2004

Descriptors: llamas, alpacas, liver disease, hepatitis, lipidosis, diagnosis, etiology, clinical aspects, therapy, digestion, disease prevalence surveys, disease prevention, energy requirements, epidemiology, metabolism, neoplasms, poisoning, therapy, toxicity.

Antonini, M.; Gonzales, M.; Valbonesi, A. **Relationship between age and postnatal skin follicular development in three types of South American domestic camelids.** *Livestock Production Science.* 2004; 90(2-3): 241-246. ISSN: 0301-6226

URL: <http://www.sciencedirect.com/science/journal/03016226>

NAL call no.: SF1.L5

Descriptors: 15 alpaca kids, (10 huacaya and 5 suri types), 10 llama kids (chaku type), age of secondary follicle maturity, skin follicular structure, difference in types, fiber study, shearing recommendation, "Alpaquero" Developing Centre of Toccra, Arequipa Plateau, Caylloma Province, Peru.

Bird, K.E.; Parker, J.E.; Andreasen, C.B.; Watrous, B.J.; Heidel, J.R. **Keratinizing ameloblastoma in a 9-month-old llama (*Lama glama*).** *Journal of Veterinary Diagnostic Investigation.* 2004; 16(1): 89-92. ISSN: 1040-6387

URL: <http://jvdi.org/>

NAL call no.: SF774.J68

Descriptors: 9 month old llama, odontogenic disease, destruction of bony structure, epithelial neoplasms, mass on face, clinical aspects, differential diagnosis, keratinizing ameloblastoma, treatment via surgical excision at early stage, case report, Oregon, United States.

Burkholder, Tanya H.; Jensen, James; Chen, Hong; Junkins, Katherine; Chatfield, Jenifer; Boothe, Dawn. **Plasma evaluation for ivermectin in llamas (*Lama glama*) after standard subcutaneous dosing.** *Journal of Zoo and Wildlife Medicine.* 2004; 35(3): 395-396. ISSN: 1042-7260

URL: <http://www.bioone.org/perlserv/?request=get-archive&issn=1042-7260>

Descriptors: 5 llamas, pesticide levels, ivermectin, *Parelaphostrongylus tenuis*, brainworm nematode, meningeal worm, 200 micrograms/kg s.c. injections pharmacokinetics, plasma levels after 4 weeks post injection, dosage not adequate for therapeutic concentration, pharmacokinetics.

Buttolph, Lita P; Coppock, D. Layne. **Influence of deferred grazing on vegetation dynamics and livestock productivity in an Andean pastoral system.** *Journal of Applied Ecology*. 2004; 41(4): 664-674. ISSN: 0021-8901

URL: <http://www.wiley.com/bw/journal.asp?ref=0021-8901>

NAL call no.: 410 J828

Descriptors: sheep, llamas, alpacas, rangeland management, range degradation, livestock productivity, equilibrium and non-equilibrium theory, key grazing resources, Andean pastoral ecosystem, fencing of bofedal and gramadal (wet and dry meadows) seasonally deferred grazing practices, peak standing crop, plant species, enclosures increased survival of young alpacas and sheep, different finding for meadow systems, negative effects of privatizing communal resources, Bolivia.

Campero, J.R. **Lama (*Lama glama* L.) and guanaco (*Lama guanicoe* M.): general perspective.** In: Cardellino, R.; Rosati, A; Mosconi, C. [Editors] *ICAR Technical Series*. 2004; (11): 11-18. ISSN: 1563-2504. ISBN: 9295014065. Note: conference proceedings: "Current Status of Genetic Resources, Recording and Production Systems in African, Asian and American Camelids, Sousse, Tunisia, 30 May 2004."

URL: http://www.icar.org/DOCS/technical_series_11_sousse.pdf

Abstract: The highlands of South America form a special ecosystem with an important biodiversity. Since 4 000 or 5 000 years ago, two species of domesticated camelids have developed in this region: the llama and the alpaca, as well as two non-domesticated ones, the guanaco and the vicuna. During the Incas period, these genetic resources played an important role in the development of this ancient culture, but the protagonistic role of Camelids ended abruptly with the Spanish conquest of that South American region five centuries ago. The Spaniards initiated their colonization with the systematic elimination of the camelids and replaced them with their own domestic species, principally sheep and cattle. Along with the Spanish conquest, the mines period begins in these highlands as well; the mines' development requested not only an important quantity of camelids' meat, vegetables and natural energy but also large llama caravans, in order to transport the mines products from highlands to the coast. However, the pastoral communities in those high-risk environments have played a major role in conserving the llama, alpaca, guanaco and vicuna species. The mining activity along with human pressure on the fragile ecosystem resulted not only in an important loss of biodiversity but also, and most importantly, in the reproduction of poverty. Consequently, today like five centuries ago, the highlands of South America are characterized by three elements: poverty, soils of low quality and camelids. And it is through these elements that they try to resolve their main problem, that is poverty. The analysis of market trends, the review of the historical context of the use of native breeds, and the efforts of highlands people suggest that the rational use of South American Camelids, both domestic and wild ones, can be an economic alternative in many production systems in the South American highlands, on the condition that the regional governments in co-operation with the producers are able to find new markets with fair prices and improve the quality of camelids' products. Reproduced with permission from CAB Abstracts.

Descriptors: alpacas, llamas, vicunas, guanacos, animal production, biodiversity, ecosystems, socioeconomics, socioeconomic aspects, South America.

Campero, J.R. **Camelids in South America. Lama (*Lama pacos*) production systems in Bolivia.**

In: Cardellino, R.; Rosati, A; Mosconi, C. [Editors] *ICAR Technical Series*. 2004; (11): 145-158. ISSN: 1563-2504. ISBN: 9295014065. Note: conference proceedings: "Current Status of Genetic Resources, Recording and Production Systems in African, Asian and American Camelids, Sousse, Tunisia, 30 May 2004."

URL:http://www.icar.org/DOCS/technical_series_11_sousse.pdf

Abstract: In this paper, a review about the historical and actual context of the lama production systems, with special focus in the Bolivian Altiplano Lama Production Systems (BALPS) is presented. The BALPS are possible to include in two general systems named Pastoral (lama, or/and alpaca and sheep) System and Agropastoral System, and gather near 54 thousands productive units. During the last five centuries, the life of many people in these systems was very hard, and the poverty and social exclusion are the principal results. Lama is the principal livestock component and has historically been used for their high protein meat, transporting merchandise along the Incan, colonial and republican roads, and in religious rituals; it provides the family with economic security, manure, traction and transport and has and specific cultural significance; moreover, in those Agropastoral Systems, the quantity of manure determined the extension of agricultural activities. In Bolivia as in other countries, the llamas' productive systems are, still, traditional and based on the extensive use of the native pastures. The productivity of the grasslands, not only is scarce but too it has low quality as a result of the extreme climatic fluctuations, characterized for periods prolonged of frosts and droughts, and depended of a ecosystem fragile, marginal and inaccessible. However, the Altiplano, also presents opportunities as its biological diversity and the extreme conditions have generated traditional practices and knowledge that joint with modern technologies should be used to improve the actual low productive systems. The planners of Ministry of Rural Affairs and Agricultural of Bolivia consider that the successful developed of the camelid chain with fiber, meat, and leather productions require to develop of special markets as organic or ecological markets, and consider that this can be a one of a few opportunities that have the Altiplano people in order to resolved the secular poverty cycle. Reproduced with permission from CAB Abstracts.

Descriptors: llama, alpacas, agropastoral systems, animal production, ecosystems, pastoralism, poverty, socioeconomic aspects, reviews, Bolivia.

Cardellino, R.; Rosati, A; Mosconi, C. [Editors]. **Current Status of Genetic Resources, Recording and Production Systems in African, Asian and American Camelids, Sousse, Tunisia, 30 May 2004.** *ICAR-Technical-Series*. 2004; (11): 163 pp. ISSN: 1563-2504. ISBN: 9295014065. Note: conference proceedings: "Current Status of Genetic Resources, Recording and Production Systems in African, Asian and American Camelids, Sousse, Tunisia, 30 May 2004."

URL:http://www.icar.org/DOCS/technical_series_11_sousse.pdf

Abstract: This proceedings contains 14 conference papers on the breeding, handling systems and milk, meat and fibre production of Bactrian and dromedary camels, llamas, guanacos, alpacas and vicunas in Asia, Africa, Arab Gulf countries and South America. Reproduced with permission from CAB Abstracts.

Descriptors: alpacas, dromedaries, Bactrian camels, guanacos, llamas, vicunas, fiber pro-

ducing animals, animal breeding, animal fibers, meat production, milk production, wool production, Africa, Arab Countries, Asia, South America.

Castellaro G., G.; Ullrich R., T.; Wackwitz, B.; Raggi S., A. **Composicion botanica de la dieta de alpacas (*Lama pacos* L.) y llamas (*Lamaglama* L.) en dos estaciones del ano, en praderas altiplanicas de un sector de la Provincia de Parinacota, Chile.** [Botanical composition of alpaca (*Lama pacos*) and llama (*Lama glama*) diets in two seasons of the year on highland ranges of Parinacota Province, Chile.] *Agricultura Tecnica*. 2004; 64(4): 353-363. ISSN: 0365-2807. Note: In Spanish with an English summary.

URL: http://www.scielo.cl/scielo.php?script=sci_serial&pid=0365-2807

Descriptors: alpacas, llamas, botanical composition of diets, grazing, winter dry and summer wet seasons, matter, dry matter, grazing, *Deschampsia cespitosa*, *Agrostis tolucensis*, *Festuca nardifolia*, *Festuca orthophylla*, *Oxychloe*, *Oxychloe andina*, *Parastrephia lucida*, *Ranunculus uniflorus*, highland range of Parinacota, Chile.

Cebra, C.K.; Tornquist, S.J. **Assessment of the effects of epinephrine and insulin on plasma and serum biochemical variables in llamas and alpacas.** *American Journal of Veterinary Research*. 2004 Dec; 65(12): 1692-1696. ISSN: 0002-9645

URL: <http://avmajournals.avma.org/loi/ajvr/>

NAL call no.: 41.8 AM3A

Descriptors: llamas, alpacas, blood values, plasma, serum biochemical variables, effects of epinephrine and insulin.

Cebra, C.K.; Tornquist, S.J.; Jester, R.M.; Stelletta, C. **Assessment of the effects of feed restriction and amino acid supplementation on glucose tolerance in llamas.** *American Journal of Veterinary Research*. 2004 Jul; 65(7): 996-1001. ISSN: 0002-9645

URL: <http://avmajournals.avma.org/loi/ajvr/>

NAL call no.: 41.8 AM3A

Descriptors: llamas, glucose tolerance, effects of feed restriction, amino acid supplementation.

Cebra, C.K.; Tornquist, S.J.; Jester, R.M.; Stelletta, C. **Assessment of the metabolic effects of hydrocortisone on llamas before and after feed restriction.** *American Journal of Veterinary Research*. 2004 Jul; 65(7): 1002-1005. ISSN: 0002-9645

URL: <http://avmajournals.avma.org/loi/ajvr/>

NAL call no.: 41.8 AM3A

Descriptors: llamas, comparison study, pre and post feed restriction, metabolic effects of hydrocortisone.

Cecchi, Teresa; Cozzali, Claudia; Passamonti, Paolo; Ceccarelli, Piero; Pucciarelli, Filippo; Gargiulo, Anna Maria; Frank, Eduardo-Nargiso; Renieri, Carlo. **Melanins and melanosomes from llama (*Lamaglama* L.).** *Pigment Cell Research*. 2004; 17(3): 307-311. ISSN: 0893-5785

URL: <http://www.wiley.com/bw/journal.asp?ref=1755-1471>

Descriptors: adult pigmented Argentine llamas, analysis of melanins and melanosomes,

hair and skin samples, eumelanins, pheomelanins, alkali-soluble melanins, eumelanosome shapes, black, reddish brown, dark brown, melanosomes at stages I, II, III, IV described.

Centeno-Condori, Raul; Deutsche Gesellschaft für Technische Zusammenarbeit. **Manual de Capacitación en Sanidad y Crianza de Llamas.** [La Paz?]: GTZ Cooperación Técnica Alemana, [2004]. Note: In Spanish.

NAL call no.: SF401.L6.C46 2004

Descriptors: llamas, health and care.

Chavez-Velasquez, A.; Alvarez-Garcia, G.; Collantes-Fernandez, E.; Casas-Astos, E.; Rosadio-Alcantara, R.; Serrano-Martinez, E.; Ortega-Mora, L.M. **First report of *Neospora caninum* infection in adult alpacas (*Vicugna pacos*) and llamas (*Lama glama*).** *Journal of Parasitology.* 2004 Aug; 90(4): 864-866. ISSN: 0022-3395

URL: <http://www.journalofparasitology.org/perlserv/?request=index-html>

NAL call no.: QH547.I55

Descriptors: *Vicugna*, vicunas, alpacas, llamas, *Neospora caninum*, protozoal disease, neosporosis, new host records, adult animals, seroprevalence, antibody detection, fluorescent antibody technique, immunoblotting, Western blotting, Peru.

Clauss, M.; Lendl, C.; Schramel, P.; Streich, W.J. **Skin lesions in alpacas and llamas with low zinc and copper status - a preliminary report.** *Veterinary Journal.* 2004; 167(3): 302-305. ISSN: 1090-0233

URL: <http://www.sciencedirect.com/science/journal/10900233>

NAL call no.: SF601.V484

Descriptors: alpacas, llamas, species differences, breed differences, sex differences, 13 llamas, 17 huacaya alpacas, 18 suri alpacas predisposition to skin lesions, dry scaly lesions, dietary deficiencies of copper (Cu) and zinc (Zn) deficiencies, fleece color, non-white colors, wool, Germany.

Coates, W.; Ayerza, R. **Comparison of llama fiber obtained from two production regions of Argentina.** *Journal of Arid Environments.* 2004 Sep; 58(4): 513-524. ISSN: 0140-1963

URL: <http://www.elsevier.com>

NAL call no.: QH541.5.D4J6

Descriptors: llamas, alpacas, farmed animal species, arid zones, overgrazing, environmental degradation, animal production, animal breeding, fiber differences, fleece, color, fiber quality, selection criteria, sustainable agriculture, Argentina.

Coates, Wayne; Ayerza, Ricardo. **Fatty acid composition of llama muscle and internal fat in two Argentinian herds.** *Small Ruminant Research.* 2004; 52(3): 231-238. ISSN: 0921-4488

URL: <http://www.sciencedirect.com/science/journal/09214488>

NAL call no.: SF380.I52

Descriptors: castrated llama male, muscle meat composition, internal fats, fatty acids, cholesterol and fats than beef, higher 3 fatty acid content, castration improves meat quality.

Cristofanelli, S.; Antonini, M.; Torres, D.; Polidori, P.; Renieri, C. **Meat and carcass quality from Peruvian llama (*Lama glama*) and alpaca (*Lama pacos*).** *Meat Science*. 2004 Mar; 66(3): 589-593. ISSN: 0309-1740

URL:<http://www.elsevier.com>

NAL call no.: TX373.M4

Abstract: An experiment based on 20 llama males and 40 alpaca males reared in Peru has been carried out with the aim to evaluate the live growth performances, carcass quality, the nutritional characteristics of meat from animals slaughtered at 25 months of age, and to determine the physical and chemical parameters of meat obtained from these animals. The live body weights registered during the 25 months of the experiment were significantly lower in alpaca compared with llama. In llama carcasses were significantly higher both warm and cold carcass weight ($P < 0.001$) but dressing percentage was higher in alpacas ($P < 0.01$). The glycolytic fine-course was very similar both in llama and in alpaca muscle Longissimus Thoracis et Lumborum. Chemical composition of muscle Longissimus Thoracis et Lumborum taken from llama and alpaca carcasses was significantly different ($P < 0.01$) in ash content; cholesterol content was significantly higher ($P < 0.001$) in llama meat compared with alpaca.

Descriptors: llamas, alpacas, male animals, alternative livestock, growth, body weight, 25 months old at slaughter, longissimus dorsi, physical and chemical parameters of meat, postmortem changes, pH, nutritional value of meat, carcass quality and weight, dressing percentage, meat quality, moisture content, lipid content, protein content, ash content, cholesterol, water holding capacity, species comparison, Peru.

Deforges, L.; Boulouis, H.J.; Thibaud, J.L.; Boulouha, L.; Sougakoff, W.; Blot, S.; Hewinson, G.; Truffot-Pernot, C.; Haddad, N. **First isolation of *Mycobacterium microti* (Llama-type) from a dog.** *Veterinary Microbiology*. 2004 Nov 15; 103(3-4): 249-253. ISSN: 0378-1135

URL:<http://www.sciencedirect.com/science/journal/03781135>

DOI:<http://dx.doi.org/10.1016/j.vetmic.2006.08.019>

NAL call no.: SF601.V44

Abstract: We report the first isolation of *Mycobacterium microti* from a dog with lesions of acute peritonitis. The isolate was demonstrated to be *M. microti* of Llama-Type by spoligotyping. Epidemiological implications of the isolation of this possibly zoonotic agent from a dog are discussed.

Descriptors: dogs, *Mycobacterium microti*, dog diseases, mycobacterial diseases, case studies, lesions, peritonitis, llamas, zoonoses, epidemiology, host-range.

Dixon, Amy. **Animal management at Auckland Zoo. 1. Clicker training llamas.** *IZN International Zoo News*. 2004 Jan-Feb; 51(1): 14-17; no. 330. ISSN: 0020-9155

URL: <http://www.zoonews.ws/IZN/>

Descriptors: llamas, zoo animals, animal training techniques, care in captivity, clicker conditioning, Auckland Zoo, New Zealand.

Drew, M.L.; Johnson, L.; Pugh, D.; Navarre, C.B.; Taylor, I.T.; Craigmill, A.L. **Pharmacokinetics of ceftiofur in llamas and alpacas.** *Journal of Veterinary Pharmacology and Therapeutics*. 2004; 27(1): 13-20. ISSN: 0140-7783

URL: <http://www3.interscience.wiley.com>

NAL call no.: SF915.J63

Descriptors: llamas, alpacas, ceftiofur sodium, pharmacokinetics, antibiotics, dosages based on other domestic species, disposition studies, intramuscular administration in llamas, intravenous and intramuscular administration in alpacas, serial timed blood sampling, similar to values in sheep and goats.

DuBois, W.R.; Prado, T.M.; Ko, J.C.H.; Mandsager, R.E.; Morgan, G.L. **A comparison of two intramuscular doses of xylazine-ketamine combination and tolazoline reversal in llamas.**

Veterinary Anaesthesia and Analgesia. 2004; 31(2): 90-96. ISSN: 1467-2987

URL: <http://www.wiley.com/bw/journal.asp?ref=1467-2987&site=1>

NAL call no.: SF914.V47

Descriptors: llamas, animal restraint, surgery, analgesia, anesthetics, xylazine, tolazoline, ketamine, blood gases, blood pressure, arterial pressure, heart rate, conduction anesthesia, dosage effects, electrocardiograms, animal restraint, hemoglobin, intramuscular injection, respiration, pharmacodynamics, pharmacology.

Graziotti, Guillermo H.; Palencia, Pablo; Delhon, Gustavo; Rivero, Jose Luis L. **Neuromuscular partitioning, architectural design, and myosin fiber types of the M. vastus lateralis of the llama (*Lama glama*).**

Journal of Morphology. 2004; 262(2): 667-681. ISSN: 0362-2525

URL: <http://www3.interscience.wiley.com/cgi-bin/fulltext/109627426/PDFSTART>

Descriptors: adult llamas, locomotory muscles, three fast myosin heavy chain isoforms (i.e., IIA, IIX, IIB), morphological and functional skeletal musculature, neuromuscular partitioning, architectural design, myosin fiber types, M. vastus lateralis, description of the muscle, Sihler's technique, femoral nerve, deep partitions, functional adaptations.

Graziotti, G.H.; Rodriguez-Menendez, J.; Montesano, A.; Jalley, S.; Affricano, N.O.; Victorica, C.L.

Tipos fibrilares en diversos musculos de llama (*Lama glama*) de interes zootecnico.

[**Fibre types in different llama (*Lama glama*) muscles used as meat source.**] *In Vet--Investigacion Veterinaria.* 2004; 6(1): 21-27. ISSN: 1514-6634. Note: In Spanish with an English summary.

URL: www.fvet.uba.ar/invet/contendos.htm

Descriptors: llamas, muscle fiber types, meat production, meat quality, biceps femoris, gluteus medius, rectus femoris and semitendinosus muscles, staining with myofibrillar adenosine triphosphatase, taste, juiciness, pH postmortem.

Gauly, M.; Erhardt, G; Dzapo, V. **Annual changes in serum levels of thyroid hormones in male llamas (*Lama glama*) and their correlation with reproduction parameters.** In: *Selected Research on Camelid Physiology and Nutrition.* The Camelid Publishers, Bikaner, India. 2004: 186-194. ISBN: 8190114123

NAL call no.: SF401.C2S46 2004

Descriptors: male llamas, male fertility, factors affecting reproductive efficiency, reproductive performance, blood chemistry, ejaculate volume, semen, spermatozoa, environmental temperature, hormone secretion, seasonal variation, thyroid gland, thyroxine, triiodothyronine.

- Gauly, M. **Tierschutzaspekte bei der Haltung Neuweltkameliden.** [Aspects of animal welfare in South American Camelids husbandry.] *DTW-Deutsche Tierärztliche Wochenschrift.* 2004; 111(3): 127-130. ISSN: 0341-6593. Note: In German.
NAL call no.: 41.8 D482
Descriptors: llamas, alpacas, animal welfare, guidelines development, husbandry, feeding, lack of basic knowledge about requirements, veterinary care, education needed, Germany.
- Hunter, Robert P.; Isaza, Ramiro; Koch, David E.; Dodd, Charles C.; Goately, Marie A. **Moxidectin plasma concentrations following topical administration to llamas (*Lama glama*) and alpacas (*Lama pacos*).** *Small Ruminant Research.* 2004; 52(3): 275-279. ISSN: 0921-4488
URL: <http://www.sciencedirect.com/science/journal/09214488>
NAL call no.: SF380.I52
Descriptors: llamas, alpacas, extra label usage of pharmaceuticals, pharmacokinetic parameters between species, study of pour-on moxidectin, clipped along dorsal midline, serial blood sampling post dosing, variability in absorption, moxidectin not well absorbed, no adverse affects, pharmacokinetic parameters not determined.
- Hunter, R.P.; Isaza, R.; Koch, D.E.; Dodd, C.C.; Goatley, M.A. **The pharmacokinetics of topical doramectin in llamas (*Lama glama*) and alpacas (*Lama pacos*).** *Journal of Veterinary Pharmacology and Therapeutics.* 2004; 27(3): 187-189. ISSN: 0140-7783
URL: <http://www.wiley.com/bw/journal.asp?ref=1467-2987&site=1>
NAL call no.: SF915.J63
Descriptors: llamas, alpacas, avermectin, doramectin, avermectin enectocide, milbecycin, moxidectin, plasma concentration, pharmacokinetics, topical treatments.
- Kalicki, M. **Powikania ciąży i porodu u ssaków z gdanskiego zoo w latach 1995-1999.** [Pregnancy complications and cases of dystocia in mammals in Gdansk Zoo in 1995-1999.] *Zycie Weterynaryjne.* 2004; 79(3): 152-153. ISSN: 0137-6810. Note: In Polish.
URL: <http://www.vetpol.org.pl/zycie.htm>
NAL call no.: SF604.Z9
Descriptors: captive zoo animals, includes 1 pony, 1 zebra, 1 llama, 2 dromedaries, 687 mammalian pregnancies, spontaneous miscarriage, dystocia, pregnancy complications.
- Knight, A.P. **Plant poisoning of small ruminants.** In: *Proceedings of the Thirty-Seventh Annual Conference, American Association of Bovine Practitioners, Forth Worth, Texas, City, USA, 23-25 September, 2004.* 2004: 127-134. ISSN: 0743-0450
NAL call no.: SF961.A5
Descriptors: sheep, goats, llamas, alpacas, grazing and browsing toxic plants, grazing behavior, toxic plant danger when overgrazing, drought, access to high levels of toxic plants, oxalates, nitrates, cyanogenic glycosides, photosensitizing compounds, *Halogeton glomeratus*, *Cicuta douglasii*, *Conium maculatum*, *Eupatorium rugosum*, *Xanthium*, *Karwinskia*, North America.

- Kraus, M.S.; Calvert, C.A.; Spier, A.W.; Meurs, K.M.; Anderson, D.E. **Determination of electrocardiographic parameters in healthy llamas and alpacas.** *American Journal of Veterinary Research*. 2004 Dec.; 65(12): 1719-1723. ISSN: 0002-9645
URL: <http://avmajournals.avma.org/loi/ajvr/>
NAL call no.: 41.8 AM3A
Descriptors: llamas, alpacas, healthy animals, cardiac scanning, electrocardiographic parameters.
- Kutzler, Michelle A.; Baker, Rocky J.; Mattson, Donald E. **Humoral response to West Nile virus vaccination in alpacas and llamas.** *Journal of the American Veterinary Medical Association*. 2004; 225(3): 414-416. ISSN: 0003-1488
URL: <http://avmajournals.avma.org/loi/javma>
NAL call no.: 41.8 AM3
Descriptors: alpacas, llamas, horses, equine West Nile virus vaccine, humoral responses, clinical trial, vaccine intervals varied, results indicate the vaccine is safe.
- Leroy, J.L.; Flahou, T.; Moerloose, K.; de Kruif, A. **De voortplanting bij de llama- en de alpacamerrie. [The reproduction in llama and alpaca mares.]** *Vlaams Diergeneeskundig Tijdschrift*. 2004; 73(5): 31 0-316. ISSN: 0303-9021. Note: In Dutch with an English summary.
Descriptors: llamas, alpacas, females, care in those imported into Europe, veterinary care, reproduction and breeding, assisted reproductive techniques, pregnancy, pregnancy diagnosis, reproductive efficiency, reproductive performance, Belgium.
- Long, P. **A practitioner approach to llama and alpaca nutrition.** In: *Selected Research on Camelid Physiology and Nutrition*. The Camelid Publishers, Bakaner, India. 2004; 747-749. ISBN: 8190114123
NAL call no.: SF401.C2S46 2004
Descriptors: alpacas, llamas, animal husbandry, animal nutrition, body condition, nutrient requirements, wool producing animals, Arab countries.
- Majewska, M.; Panasiewicz, G.; Klisch, K.; Olivera, L.; Abd Elnaeim, M.M.; Borkowski, K.; Szafranska, B. **Pregnancy-associated glycoproteins (PAG) in camelids.** *Reproduction in Domestic Animals*. 2004; 39(4): 282-283. ISSN: 0936-6768. Note 8th Annual Conference of the European Society for Domestic Animal Reproduction (ESDAR), Warsaw, Poland; September 23-25, 2004
URL: <http://www.wiley.com/bw/journal.asp?ref=0936-6768&site=1>
NAL call no.: SF105.A1Z8
Descriptors: camelids, camels, llamas, alpaca, reproductive biochemistry, glycoproteins, pregnancy, PAG gene.
- Mate, M.L.; Di Rocco, F.; Zambelli, A.; Vidal-Rioja, L. **Mitochondrial DNA structure and organization of the control region of South American camelids.** *Molecular Ecology Notes*. 2004; 4(4): 765-767. ISSN: 1471-8278
URL: <http://www.wiley.com/bw/journal.asp?ref=1755-098X&site=1>
NAL call no.: QH541.15.M632

Descriptors: llamas, alpacas, vicunas, guanaco, mitochondrial DNA molecular organization of control region, conserved sequence blocks, potential as a molecular marker to infer data for camelid genetic relationships, population diversity tool.

McClelland, Grant B. **Fat to the fire: the regulation of lipid oxidation with exercise and environmental stress.** *Comparative Biochemistry and Physiology Part B Biochemistry and Molecular Biology*. 2004; 139(3): 443-460. ISSN: 1096-4959

URL: <http://www.sciencedirect.com/science/journal/10964959>

NAL call no.: QP501.C3

Descriptors: rats, horses, humans, fish, birds, llamas, dogs, squids, submaximal aerobic exercise, lipid oxidation, fatty acids, exercise, environmental stress, muscles.

Medina , Mirta A.; Fernandez, Francisco; Saad, Silvia; Rebuffi, Gustavo; Yapur, Jose. **Inmunoglobulinas G de Cadenas pesadas en la leche de los camelidos sudamericanos. [Heavy-chain IgG in the milk of South American camelids.]** *Mastozoologia Neotropical*. 2004; 11(1): 19-26. ISSN: 0327-9383. Note: In Spanish with an English and Spanish summary.

URL: <http://www.scielo.org.ar>

Descriptors: camelids, llamas, vicunas, alpacas, guanacos, conventional IgG, IgG with two heavy chains, identify types of IgG in milk, PAGE-SDS, immunoblotting, immunoblotting assays, both types of IgG found.

Middleton, J.R. **Haematology of South American camelidae.** In: *Selected Research on Camelid Physiology and Nutrition*. The Camelid Publishers, Bakaner, India. 2004: 400-408. ISBN: 8190114123

NAL call no.: SF401.C2S46 2004

Descriptors: Bactrian camels, alpacas, vicunas, guanacos, llamas, blood chemistry, blood disorders, hematocrit, anemia, blood cells morphology, basophils, bone marrow, dissolved oxygen, eosinophilia, eosinophils, erythrocyte count, erythrocytes, erythropoietin, transferring, hematology, hemoglobin, iron deficiency anemia, leukocyte count, lymphocytes, monocytes, morphology, neutrophils, normal values, platelets, South America.

Odbileg, R.; Konnai, S.; Ohashi, K.; Onuma, M. **Molecular cloning and phylogenetic analysis of inflammatory cytokines of Camelidae (llama and camel).** *Journal of Veterinary Medical Science*. 2005; 67(9): 921-925. ISSN: 0916-7250

DOI:<http://dx.doi.org/10.1292/jvms.67.921>

Abstract: We cloned, sequenced and analysed the complementary DNAs encoding Camelidae inflammatory cytokines, including llama (*Lama glama*) interleukin (IL)-1 alpha , IL-1 beta , IL-6, tumour necrosis factor (TNF)- alpha and camel (*Camelus bactrianus*) IL-6 and TNF- alpha. The similarity levels of the deduced amino acid sequences of IL-1 alpha , IL-1 beta , IL-6 and TNF- alpha from llama (camel) to those from other mammalian species, ranged from 60.7-87.7%, 52.8-75.3%, 41.4-98.6 and 72.9-99.6%, respectively. Phylogenetic analyses based on nucleic acid sequences showed that llama IL-1 alpha , IL-1 beta , IL-6 and TNF- alpha were more closely related to those of camel, pig, cattle, sheep and horse than to those of human, dog, cat, mouse and rat. Reproduced with permission from CAB Abstracts.

Descriptors: llamas, Bactrian camel, cachectin, cachexin, cytokines. amino acid sequences, complementary DNA, DNA cloning, immune system, immunity, interleukin 1, interleukin 6, nucleotide sequences, phylogenetics, tumor necrosis factor.

Odbileg, R.; Lee, SungIl; Yoshida, R.; Chang, KyungSoo; Ohashi, K.; Sugimoto, C.; Onuma, M.

Cloning and sequence analysis of llama cytokines related to cell-mediated immunity.

Veterinary Immunology and Immunopathology. 2004; 99(1/2): 1-10. ISSN: 0165-2427

URL: <http://www.elsevier.com>

NAL call no.: SF757.2.V38

Descriptors: llamas, pigs, cattle, amino acid sequences, cell mediated immunity, complementary DNA, cytokines, DNA cloning, genes, interferon, interleukin 12, interleukin 12p35, interleukin 12p40, interleukin 2, nucleotide sequences, open reading frames, species differences, T lymphocytes.

Oevermann, A.; Pfyffer, G.E.; Zanolari, P.; Meylan, M.; Robert, N. **Generalized tuberculosis in**

llamas (*Lama glama*) due to *Mycobacterium microti*. *Journal of Clinical Microbiology.*

2004; 42(4): 1818-1821

URL: <http://jcm.asm.org/cgi/content/full/42/4/1818>

NAL call no.: QR46.J6

Descriptors: 2 llamas, caseous nodules, acid fast bacilli in various organs, tuberculosis, spoliotyping, *Mycobacterium microti* (vole type), infectivity, post mortem study.

Otazu, D.A. **Alpaca and vicuna: general perspectives.** In: Cardellino, R.; Rosati, A; Mosconi, C.

[Editors] *ICAR Technical Series.* 2004; (11): 31-36. ISSN: 1563-2504. ISBN: 9295014065.

Note: conference proceedings: "Current Status of Genetic Resources, Recording and Production Systems in African, Asian and American Camelids, Sousse, Tunisia, 30 May 2004."

URL:http://www.icar.org/DOCS/technical_series_11_sousse.pdf

Abstract: In the landscapes of the high plains at over 4 000 meters above sea level, thousands of years ago the Incas domesticated two species of the South American camelids: Alpaca and Llama, using techniques that are a mystery to these days. The first one would later be used as a source of soft, fine and resistant fibre and the second one as a mean of transportation. From the two species that continued being wild: Guanaco and especially Vicuna, a fantastic and very fine fibre was obtained, which was reserved only for nobility. Its threads were mixed with gold threads to create varied work of art. It was the fibre of the gods. Reproduced with permission of CAB Abstracts.

Descriptors: alpacas, llamas, guanacos, vicunas, animal fibers, fiber quality, wool producing animals.

Patel, J.H.; Kosheluk, C.; Nation, P.N. **Renal teratoma in a llama.** *Canadian Veterinary Journal - La*

Revue Veterinaire Canadienne. 2004 Nov; 45(11): 938-940. ISSN: 0008-5286. Note: In English with a summary in French.

URL: <http://www.pubmedcentral.nih.gov/articlerender.fcgi?artid=545984>

NAL call no.: 41.8 R3224

Descriptors: llamas, renal teratoma, diseases, diagnosis, treatment, case study.

- Pugh, D.G.; Walldridge, B.M. **Goat and llama trace mineral nutrition.** In: "Proceedings of the Thirty Seventh Annual Conference, American Association of Bovine Practitioners, Forth Worth, Texas, City, USA, 23-25 September, 2004." 2004: 112-113.
NAL call no.: SF961.A5
Descriptors: goats, llamas, mineral nutrition, nutritional edema, trace element deficiencies, copper, selenium, zinc.
- Pugh, D.G.; Walldridge, B.; Wenzel, J.G.W. **Trace mineral nutrition in llamas.** In: *Selected Research on Camelid Physiology and Nutrition.* The Camelid Publishers, Bikaner, India. 2004: 728-737. ISBN: 8190114123
NAL call no.: SF401.C2S46 2004
Descriptors: llamas, trace mineral nutrition, nutrient requirements, mineral deficiency diseases, copper, zinc, iodine, iron, selenium, clinical aspects, dietary minerals, disease prevention, mineral nutrition, reviews.
- Ramos Vara, J.A.; Loiacono, C.M.; Williams, F. III; Pardo, I.; Lakritz, J. **Pulmonary neoplasia in two llamas (*Lama glama*).** *Veterinary Pathology.* 2004; 41(5): 520-523. ISSN: 0300-9858
URL:<http://www.vetpathology.org/cgi/content/full/41/5/520>
NAL call no.: 41.8 P27
Descriptors: llamas, pulmonary tumors, description of the types of cells and nodules, neoplasms, adenosquamous carcinoma, clinical aspects, histopathology, diagnosis, case reports.
- Ray, W.M.; Gustafson, S.B.; Huber, M.J. **Tibial plateau leveling osteotomy in a llama with a ruptured cranial cruciate ligament.** *Journal of the American Veterinary Medical Association.* 2004 Dec 1; 225(11): 1739-1742. ISSN: 0003-1488
URL: <http://www.avma.org/>
NAL call no.: 41.8 AM3
Abstract: A 3-year-old 155-kg (342-lb) castrated male llama was examined because of left hind limb lameness of acute onset. A diagnosis of cranial cruciate ligament and medial collateral ligament rupture was made, and tibial plateau leveling osteotomy was recommended. The tibial plateau leveling osteotomy procedure was performed as described for dogs, except that 2 orthopaedic plates were used to stabilize the osteotomy because of the size of the llama. The medial collateral ligament was sutured and reinforced with 2 strands of size-2 polypropylene placed in a figure-8 fashion between cancellous bone screws in the femur and tibia. Four days after surgery, failure of the medial collateral ligament repair was evident. Approximately 3.5 years after surgery, the llama was reexamined. The owners reported that the llama had full use of its left hind limb, and only mild lameness (grade 1 of 5) was evident. Results suggest that tibial plateau leveling osteotomy may be applicable in camelids with rupture of the cranial cruciate ligament. However, additional study is needed before tibial plateau leveling osteotomy can be routinely recommended. In particular, additional information is needed on the tibial plateau slope in healthy camelids, the role of the fibula in tibial plateau leveling osteotomy procedures, and the prevalence of cranial cruciate ligament rupture in camelids.
Descriptors: llama, case study, ruptured cranial cruciate ligament, treatment, tibial plateau leveling osteotomy, recovery.

- Reggiani, C.; Mascarello, F. **Fibre type identification and functional characterization in adult livestock animals.** In: *Muscle Development of Livestock Animals: Physiology, Genetics and Meat Quality*. 2004; 39-68. CABI Publishing, Wallingford, UK. ISBN: 0851998119
NAL call no.: SF768.M87 2004
Descriptors: llamas, cattle, sheep, goats, pigs, horses, adult animals, livestock, myofibrils, muscle contraction, muscle fatigue, muscle fibers, muscle physiology.
- Rojas, X.; Munoz, S.; Otto, B.; Perez, B.; Nielsen, K. **Utilizacion de los test de Fluorescencia Polarizada (FP) y Elisa de Competencia (C-Elisa) en el diagnostico de brucelosis de camelidos.** [The use of polarized fluorescence as say (PF) and competitive ELISA test (C-ELISA) for the diagnosis of brucellosis in South American camelids.] *Archivos de Medicina Veterinaria*. 2004; 36(1): 59-64. ISSN: 0301-732X. Note: In Spanish with an English summary.
URL: <http://www.scielo.cl>
NAL call no.: SF604.A75
Descriptors: alpacas, llamas, *Brucella*, bacterial disease, diagnostic techniques, detection of antibodies, assays, camelid sera, fluorescence polarization assay (PF), competitive ELISA (C-ELISA), rose Bengal (RB), seroagglutination (SAT), comple ment fixation (CF) tests.
- Serrano Martinez, E.; Collantes Fernandez, E.; Rodriguez Bertos, A.; Casas Astos, E.; Alvarez Garcia, G.; Chavez Velasquez, A.; Ortega Mora, L.M. **Neospora species-associated abortion in alpacas (*Vicugna pacos*) and llamas (*Lama glama*).** *Veterinary Record*— London. 2004 Dec 4; 155(23): 748-749. ISSN: 0042-4900
URL: <http://veterinaryrecord.bvapublications.com/>
NAL call no.: 41.8 V641
Descriptors: alpacas, *Vicugna pacos*, llamas, *Lama glama*, abortion associated with *Neospora* sp.
- Spinelli, Silvia; Desmyter, Aline; Frenken, Leon; Verrips, Theo; Tegoni, Mariella; C ambillau, Christian. **Domain swapping of a llama VHH domain builds a crystal-wide beta-sheet structure.** *FEBS Letters*. 2004; 564(1-2): 35-40. ISSN: 0014-5793
URL: <http://www.febsletters.org/>
NAL call no.: QD415.F4
Descriptors: camelids, llamas, VHH-R9 heavy chain functional antibodies, description of the structure, domain swapping, molecular properties, hapten, immunoglobulin proteins.
- Tichit, M.; Ingrand, S.; Moulin, C.H.; Cournut, S.; Lasseur, J.; Dedieu, B. **Analyser la diversite des trajectoires productives des femelles reproductrices: interets pour modeliser le fonctionnement du troupeau en elevage allaitant.** [Analysis of the diversity of breeding female productive trajectories: interest for modelling the functioning of suckling herds.] *Productions Animales* (Paris). 2004; 17(2): 123-132. ISSN: 0990-0632. Note: In French.
URL: <http://www.inra.fr>
Descriptors: cattle, sheep, llamas, variable animal productivity, production trajectory herd model, based on 6 case studies, breeding and replacement practices, decreasing or increas-

ing within herd diversity of female productive trajectories, consequences for modelling herd functioning are reviewed.

Tichit, Muriel; Hubert, Bernard; Doyen, Luc; Genin, Didier. **A viability model to assess the sustainability of mixed herds under climatic uncertainty.** *Animal Research*. 2004; 53(5): 405-417. ISSN: 1627-3583

URL: <http://animres.edpsciences.org/>

Descriptors: llamas, sheep, herd diversification strategies, breeding rate control, unpredictable environmental conditions, dynamic mathematical model, different levels of care practices, efficiency measurements, animal production system sustainability, pastoral system management in arid conditions, Bolivia.

Vaughan, J.L. **Eradication of the camelid biting louse, *Bovicola breviceps*.** *Australian Veterinary Journal*. 2004; 82(4): 218-219. ISSN: 0005-0423

URL: <http://www.blackwellpublishing.com/443/journal.asp?ref=0005-0423&site=1>

NAL call no.: 41.8 AU72

Descriptors: alpacas, llamas, sheep, camelid biting louse, *Bovicola breviceps*, common parasite, pesticide, egg counts, shearing, treatment, Extinosad (spinosad 25 g/l spinosad suspension concentrate) with wetting agent, efficacy of treatment.

Waldridge, B.M.; Duran, S.H.; Ravis, W.R.; Paxton, R.; Herdt, T.H.; Pugh, D.G. **Pharmacokinetics of subcutaneous selenium in adult llamas.** *Veterinary Therapeutics Research in Applied Veterinary Medicine*. 2004 Winter; 5(4): 272-278. ISSN: 1528-3593

NAL call no.: SF601.V4

Abstract: Selenium (Se) deficiency disease has been described in camelids, and only clinical data are available for administration of parenteral Se supplements. This study investigated the pharmacokinetic effects of subcutaneous Se injection (0.1 mg/kg) in llamas fed a diet adequate in Se. Absorption of Se was rapid, with peak whole blood Se concentration at the first sampling time. Significant differences in whole blood Se concentration before versus after injection of Se were not found beyond 2 days after injection. Parenteral Se is unlikely to have a long-term effect on whole blood Se concentration in llamas fed adequate dietary Se. 745

Descriptors: llamas, subcutaneous selenium, pharmacokinetics, deficiency diseases, dietary mineral supplements.

Wauters, J.J.M.; Duchi, N.; Guevara, P.; Onate, W.; Castillo, P.; Lopez, J.; de Wilde, R. **Comparison of the digestibility of paja de paramo and barley straw between sheep (*Ovis aries*), llamas (*Lama glama*) and alpacas (*Lama paco*).** In: *Selected Research on Camelid Physiology and Nutrition*. The Camelid Publishers, Bakaner, India. 2004: 766-769. ISBN: 8190114123

NAL call no.: SF401.C2S46 2004

Descriptors: sheep, llamas, alpacas, animal nutrition, forage, feed digestibility study, barley straw, *Hordeum vulgare*, lignin, nutritive value, species differences, *Calamagrostis rigida*, *Festuca dolichophylla*, *Festuca humilior*, *Muhlebergia angustata*.

Webb, A.I.; Baynes, R.E.; Craigmill, A.L.; Riviere, J.E.; Haskell, S.R.R. **Drugs approved for small ruminants.** *Journal of the American Veterinary Medical Association*. 2004; 224(4): 520-523.
ISSN: 0003-1488
URL: <http://www.avma.org/>
NAL call no.: 41.8 AM3A
Descriptors: alpacas, deer, goats, llamas, sheep, drugs for small ruminants, pharmacology, regulations.

Wernery, U.; Kaaden, O.R. **Foot-and-mouth disease in camelids: a review.** *Veterinary Journal*. 2004; 168(2): 134-142. ISSN: 1090-0233
URL: <http://www.sciencedirect.com/science/journal/10900233>
NAL call no.: SF601.V484
Descriptors: South American camelids, dromedaries, Bactrian camels, foot and mouth diseases, infectability, disease transmission risks, dromedaries may contract the disease in experimental infection and close contact with infected animals, camels not FMDV carriers, llamas and alpacas infected by direct contact, not very susceptible and no risk of transmitting to susceptible species, Bactrians have similar lesions, but no samples have been positive, recommend further research in camelids.

Alpacas

2008

Agapito, J.; Rodrcguez, J.; Herrera Velit, P.; Timoteo, O.; Rojas, P.; Boettcher, P.J.; Garcca, F.; Espinoza, J.R. **Parentage testing in alpacas (*Vicugna pacos*) using semi-automated fluorescent multiplex PCRs with 10 microsatellite markers.** *Animal Genetics*. 2008 Apr; 39(2): 201-203. ISSN: 0268-9146

URL : <http://www.blackwellpublishing.com/submit.asp?ref=0268-9146>

DOI : <http://dx.doi.org/10.1111/j.1365-2052.2007.01697>

NAL call no.: QP98.A1A5

Abstract: The aim of this study was to assess and apply a microsatellite multiplex system for parentage determination in alpacas. An approach for parentage testing based on 10 microsatellites was evaluated in a population of 329 unrelated alpacas from different geographical zones in Perc. All microsatellite markers, which amplified in two multiplex reactions, were highly polymorphic with a mean of 14.5 alleles per locus (six to 28 alleles per locus) and an average expected heterozygosity (HE) of 0.8185 (range of 0.698-0.946). The total parentage exclusion probability was 0.999456 for excluding a candidate parent from parentage of an arbitrary offspring, given only the genotype of the offspring, and 0.999991 for excluding a candidate parent from parentage of an arbitrary offspring, given the genotype of the offspring and the other parent. In a case test of parentage assignment, the microsatellite panel assigned 38 (from 45 cases) offspring parentage to 10 sires with LOD scores ranging from $2.19 \times 10^{\#pd}$ to $1.34 \times 10^{\#e}$ and values ranging from $2.80 \times 10^{\#po}$ to $1.34 \times 10^{\#e}$ with an estimated pedigree error rate of 15.5%. The performance of this multiplex panel of markers suggests that it will be useful in parentage testing of alpacas.

Descriptors: alpacas, microsatellite repeats, determination of parentage, genotyping, microsatellite multiplex system.

Cebra, C.K.; Tornquist, S.J.; Reed, S.K. **Collection and analysis of peritoneal fluid from healthy llamas and alpacas.** *Journal of the American Veterinary Medical Association*. 2008 May 1; 232(9): 1357-1361. ISSN: 0003-1488

URL:<http://www.avma.org>

NAL call no.: 41.8 AM3

Abstract: Objective - To compare relative sensitivity and overall yields of various methods of fecal examination for gastrointestinal parasites in llamas and alpacas. Design - Prospective study. Sample Population - Fecal samples from 42 alpacas and 62 llamas. Procedures - Fecal samples were analyzed via direct smear, a modified McMaster technique with sucrose solution or saturated saline (approx 36% NaCl) solution, and a centrifugation-flotation procedure. McMaster flotation chambers were examined 15 and 60 minutes after loading. Centrifugation-flotation samples were examined after 10 and 60 minutes of flotation. The proportions of samples with positive results and concentrations of parasites were compared

among methods. Results - The centrifugation-flotation technique yielded more positive results than other methods for all parasites except small coccidia. Longer flotation time increased the proportion of positive results and parasite concentrations for all parasites except *Nematodirus* spp. Longer time in the McMaster chamber made little difference. By use of the modified McMaster technique, sucrose solution yielded more positive results for *Trichuris* spp., *Eimeria macusaniensis*, and strongyles, whereas saline solution yielded more positive results for *Nematodirus* spp. and small coccidia. The saline solution McMaster test yielded more positive results for small coccidia than did most other methods, and the sucrose McMaster technique yielded more positive results for *Trichuris* spp. Conclusions and Clinical Relevance - The centrifugation-flotation technique appeared to offer clear advantages in detecting infection with *E. macusaniensis*, *Trichuris* spp., *Nematodirus* spp., and capillarids. The saline McMaster technique appeared to offer an advantage in detecting small coccidia. **Descriptors:** healthy llamas (17), alpacas (5), abdominocentesis, peritoneal fluid biochemical and cytologic findings, collected safely, compared with blood, peritoneal fluid had a low cell count, low protein concentration, some individual differences, electrolyte concentrations resembled blood, high values of some animals may complicate interpretation of peritoneal fluid values.

Cebra, C.K.; Stang, B.V. **Comparison of methods to detect gastrointestinal parasites in llamas and alpacas.** *Journal of the American Veterinary Medical Association*. 2008 Mar 1; 232(5): 733-741. ISSN: 0003-1488

URL:<http://www.avma.org/>

NAL call no. : 41.8 AM3

Descriptors: 62 llamas; 42 alpacas; gastrointestinal parasites; detection methods; comparison study; direct smear; McMaster technique with sucrose solution or saturated saline; centrifugation-flotation procedure; centrifugation-flotation detected *E macusaniensis*, *Trichuris* spp, *Nematodirus* spp, and capillarids; saline McMaster technique detected small coccidian, strongyles.

Conesa, C.; Sanchez, L.; Rota, C.; Perez, M.D.; Calvo, M.; Farnaud, S.; Evans, R.W. **Isolation of lactoferrin from milk of different species: calorimetric and antimicrobial studies.** *Comparative Biochemistry and Physiology. Biochemistry and Molecular Biology*. 2008; 150(1): 131-139. ISSN: 1096-4959

URL:<http://www.sciencedirect.com/science/journal/10964959>

Abstract: Lactoferrin (LF) is an iron-binding glycoprotein found in different biological fluids of mammals and in neutrophils. It has been proposed to be involved in many functions, including protection from pathogens. In this work, purification of lactoferrin using an ion-exchange chromatography (SP-Sepharose) was attempted for the milk of the following animals: sheep (*Ovis aries*), goat (*Capra hircus*), camel (*Camelus bactrianus*), alpaca (*Lama pacos*), elephant (*Elephas maximus*) and grey seal (*Halichoerus grypus*), as well as human (*Homo sapiens*). Lactoferrin was identified in all the milks apart from that from grey seal. The thermal stability of the purified lactoferrins, in their native and iron-saturated forms, was studied by differential scanning calorimetry (DSC). Maximum temperature, onset temperature and enthalpy change of denaturation were higher when lactoferrins were saturated with

iron than in their native form, indicating an increase in the stability of the protein structure upon iron-binding. Human lactoferrin was found to be the most heat-resistant and the other lactoferrins presented different degrees of thermo-resistance, that of elephant being the least resistant. The antimicrobial activity of the different isolated lactoferrins was investigated against *Escherichia coli* 0157:H7. The minimal inhibitory concentrations (MICs) were determined by measuring the absorbance at 620 nm. The minimum bactericidal concentrations (MBCs) were also measured and it was found that camel lactoferrin was the most active lactoferrin against *E. coli* 0157:H7, whereas alpaca and human lactoferrins were the least active. Reproduced with permission from CAB Abstracts.

Descriptors: goats, sheep, alpacas, elephants, Bactrian camels, humans, *Halichoerus grypus*, antibacterial properties, calorimetry, lactoferrin, milk, protein analysis, bactericidal properties, calorimetric methods.

Cranwell, M.P.; Josephson, M.; Willoughby, K.; Marriott, L. **Louping ill in an alpaca.** *Veterinary Record*—London. 2008; 162(1): 28. ISSN: 0042-4900. Note: A correspondence.

URL : <http://veterinaryrecord.bvapublications.com/archive/>

NAL Call no.: 41.8 V641

Abstract: A case of Louping ill virus infection in an 8-month-old male alpaca with nervous signs in Dartmoor, UK, in June 2007 is reported. The animal improved after supportive therapy and was clinically normal 2 weeks after presentation. None of the other 20 alpacas were affected and no further illness has been reported in the herd. Reproduced with permission from CAB Abstracts.

Descriptors: alpaca, young male, case report, clinical aspects, diagnosis, viral diseases. Louping ill virus, UK.

Firshman, A.M.; Wconschmann, A.; Cebra, C.K.; Bildfell, R.; McClanahan, S.L.; Valentine, B.A.; McKenzie, E.; Waitt, L.; Margiocco, M.; Sisson, D.D. **Thrombotic endocarditis in 10 alpacas.** *Journal of Veterinary Internal Medicine*. 2008 Mar-Apr; 22(2): 456-461. ISSN: 0891-6640

URL:<http://www.blackwell-synergy.com/doi/ref/10.1111/j.1939-1676.2008.0072.x>

NAL call no.: SF601.J65

Abstract: Background: A description of the clinical signs and necropsy findings in 10 alpacas with thrombotic endocarditis. Animals: Clinical cases admitted to 2 veterinary referral hospitals between May 1998 and December 2006. Methods: A retrospective study was performed by searching hospital records to identify alpacas diagnosed with endocarditis. Results: Common clinical findings included sternal recumbency, tachycardia, tachypnea, and abdominal distension. Heart sounds were recorded as normal in 7 of 10 alpacas. Pleural and pericardial effusion and ascites were often present. Complete blood cell counts often suggested inflammation, and liver enzyme activity was often increased. When echocardiography was performed, a soft tissue density was imaged within the right ventricle. All alpacas died or were euthanized. Necropsy revealed mural endocarditis with right ventricular or biventricular fibrinous thrombi obliterating the ventricular lumina with no valvular involvement in 6 of 10 affected animals. Bacteria were not consistently identified as a cause for the endocarditic lesions. Eight of the 10 alpacas had evidence of hepatic fluke infestation. Conclusions and

Clinical Importance: Valvular and mural thrombotic endocarditis should be included in the list of differential diagnoses for hepatomegaly, abdominal distension, and other signs of right-sided congestive heart failure in alpacas. The prognosis of this disease is grave. Reproduced with permission of CAB Abstracts.

Descriptors: alpacas, heart conditions, thrombotic endocarditis, symptoms, prognosis.

Foster, A.P.; Otter, A.; Barlow, A.M.; Pearson, G.R.; Woodward, M.J.; Higgins, R.J. **Naturally occurring intestinal lesions in three alpacas (*Vicugna pacos*) caused by attaching and effacing *Escherichia coli*.** *Veterinary Record*— London. 2008 Mar 8; 162(10): 318-320. ISSN: 0042-4900

URL:<http://veterinaryrecord.bvpublications.com/>

NAL call no.: 41.8 V641

Descriptors: alpacas, intestinal lesions, bacterial pathogen, *Escherichia coli*, digestive system diseases, case studies.

Gamarra, G.; Gallegos, A.; Alvarado, E.; Asparrin, M.; Vivanco, W. **Techniques for ovum pick-up in gonadotropin-treated alpacas.** *Reproduction Fertility and Development*. 2008; 20(1): 159-160. ISSN: 1031-3613. Note: Annual Conference of the International Embryo Transfer Society, Denver, CO, USA; January 05 -09, 2008.

URL:<http://www.publish.csiro.au/?nid=45&aid=35>

NAL call no: QP251.R47

Descriptors: alpaca females, reproductive hormones, oocytes, ovum, follicular fluid, progesterone intravaginal administration, estradiol, estrogen drugs, intramuscular administration, leutinizing hormone, intramuscular administration, laparotomy, transvaginal follicular aspiration, Peru.

Gerspach, C.; Hull, B.L.; Rings, D.M.; Chew, D.J.; Beamer, G.L.; Hubbell, J.A.E.; Lakritz, J.

Hematuria and transitional cell papilloma of the renal pelvis treated via unilateral nephrectomy in an alpaca. *Journal of the American Veterinary Medical Association*. 2008 Apr 15; 232(8): 1206-1209. ISSN: 0003-1488

URL: <http://avmajournals.avma.org/doi/abs/10.2460/javma.232.8.1206>

NAL call no.: 41.8 AM3

Abstract: Case Description - An 11-year-old 72-kg (158-lb) sexually intact female alpaca was examined for diagnosis and treatment of hematuria of 4 months' duration. Clinical Findings - Pigmenturia was detected by the owner when the alpaca was 8 months pregnant. Radiographic, ultrasonographic, vaginal speculum, and cystoscopic evaluation of the urinary tract revealed normal vaginal and urethral epithelia and increased bladder vessel tortuosity, with pulses of hemorrhage from the left ureter. Regenerative anemia and mild leukopenia were detected and serum urea nitrogen and creatinine concentrations were within reference ranges. Treatment and Outcome - Chronic hematuria resolved after unilateral nephrectomy of the left kidney, and no dysfunction was detected in the remaining kidney. Histologic evaluation of the kidney revealed a transitional cell tumor in the renal pelvis. Clinical Relevance - Although anemia is common in South American camelids, hematuria is an uncommon sign of this condition. Chronic urinary tract infection, toxin ingestion, and neoplasia causing

hematuria or hemoglobinuria should be considered in South American camelids with pigmenturia. Thorough and systematic evaluation of the urinary tract should be performed to locate the site of hemorrhage to treat hematuria appropriately. Reproduced with permission from CAB Abstracts.

Descriptors: sexually intact pregnant female alpaca, case study, hematuria, diagnosis and treatment, pigmenturia while pregnant, pulses of hemorrhage from left ureter, nephectomy of left kidney, histology of kidney showed transitional cell tumor.

Hill, F.I.; Mirams, C.H. **Intracranial teratoma in an alpaca (*Vicugna pacos*) in New Zealand.** *Veterinary Record*— London. 2008 Feb 9; 162(6): 188-189. ISSN: 0042-4900

URL : <http://veterinaryrecord.bvapublications.com/>

NAL call no.: 41.8 V641

Abstract: A four-year-old breeding female alpaca was presented with a gradual onset of lethargy, anorexia, ill-thrift, blindness and ataxia. Haematological examination revealed a non-regenerative anaemia and neutrophilic leukocytosis. Seven days after initial presentation, the alpaca became recumbent with a right head tilt, opisthotonos and increased respiratory sounds on thoracic auscultation. Because of the poor prognosis, the animal was euthanized. Postmortem examination revealed a multilobular, irregular, firm, black mass on the left ventral dura mater adjacent to the caudal sylvian gyrus of the left temporal lobe. Histopathologically, the tumour was confined to the dura mater, encapsulated by a layer of organized connective tissue and had characteristic features of a teratoma. To the author's knowledge, this is the first report of an intracranial teratoma in an alpaca or camelid. The dural location of the teratoma is also atypical, but reflects the potential for these tumours to arise in any tissue. Reproduced with permission of CAB Abstracts.

Descriptors: alpaca, case study, brain tumor, teratoma, intracranial tumor, clinical aspects, diagnosis, neoplasms, postmortem examination, New Zealand.

Larenza, M.P.; Zanolari, P.; Jaggin-Schmucker, N. **Balanced anesthesia and ventilation strategies for an alpaca (*Lama pacos*) with an increased anesthetic-risk.** *SAT--Schweizer Archiv für Tierheilkunde*. 2008; 150(2): 77-81. ISSN: 0036-7281. Note: In English with a German summary.

URL:<http://verlag.hanshuber.com/ezm/index.php?ezm=SAT>

DOI:<http://dx.doi.org/10.1024/0036-7281.150.2.77>

NAL call no.: 41.9 SCH9

Abstract: We report the use of a balanced anesthetic technique in a three-year-old, female Huacaya alpaca with an increased anesthetic risk that underwent an extensive dental surgery. Anesthesia was provided with an infusion of midazolam, fentanyl, S-ketamine and low concentrations of isoflurane in oxygen. The mandibular alveolar nerve was desensitized with a lidocaine-bupivacaine combination. The alpaca showed signs of hypoxemia fifteen minutes after anesthesia induction and arterial blood gases confirmed severe venous admixture. Application of positive end expiratory pressure (PEEP) of 6-9 cm H₂O improved the arterial oxygenation. Other cardiopulmonary variables remained within the normal range. At the end of surgery, sarmazenil was administered to antagonize the effects of midazolam and emergence from anesthesia was smooth and uneventful. Flunixin meglumine and a transdermal delivery system for fentanyl were administered for post-operative analgesia. This

method of balanced anesthesia allowed for an adequate anesthetic plane and a safe recovery, however, special ventilation strategies (PEEP) had to be applied.

Descriptors: Huacaya alpaca, tooth diseases, dental surgery, balanced anesthesia, fentanyl, isoflurane, ketamine, arterial blood gases, special ventilation strategies, analgesia, case reports, clinical aspects, risks.

Ledbetter, Eric C.; Scarlett, Janet M. **Isolation of obligate anaerobic bacteria from ulcerative keratitis in domestic animals.** *Veterinary Ophthalmology*. 2008 Mar; 11(2): 114-122. ISSN: 1463-5216

URL:<http://www3.interscience.wiley.com/journal/118507707/home>

DOI: <http://dx.doi.org/10.1111/j.1463-5224.2008.00610>

NAL call no.: SF891.V47

Abstract: To determine the frequency of obligate anaerobic bacterial isolation from corneal samples of domestic animals with ulcerative keratitis and to characterize the historical, clinical, cytological, and microbiological features of culture-positive cases. Three hundred and thirty domestic animals with ulcerative keratitis. Anaerobic bacteriologic culture and Gram stain were performed on corneal samples from consecutive animals examined with suspect septic ulcerative keratitis. Additional corneal diagnostics included: aerobic bacteriologic culture for all species; fungal culture for ungulates; *Mycoplasma* culture and virus isolation or feline herpesvirus-1 (FHV-1) polymerase chain reaction (PCR) for cats. Historical, clinical, and cytological findings were correlated with microbiologic data. Anaerobic bacteria were isolated from 13.0% of corneal samples (dogs: 14.0%; horses: 12.9%; cats: 7.9%; alpacas: 18.8%). The most frequent isolates were *Clostridium*, *Peptostreptococcus*, *Actinomyces*, *Fusobacterium*, and *Bacteroides* species. The majority of these infections were mixed anaerobic and aerobic bacteria, unless antimicrobial therapy had been administered prior to presentation. The clinical appearance of anaerobic bacterial culture-positive cases was highly variable. Ocular trauma, pre-existing corneal disease, previous corneal surgery, and chronic dermatological disease were significantly ($P \leq 0.05$) correlated with positive anaerobic cultures in one or more species. The results of the present study demonstrate that obligate anaerobic bacteria are present within the intralesional flora of ulcerative keratitis in domestic animals. In most species evaluated, these bacteria were identified infrequently. Anaerobic bacterial infection of the cornea most frequently occurs in association with other ocular pathogens and previous corneal abnormalities.

Descriptors: alpacas, dogs, cats, horses, ulcerative keratitis, corneal sampling, clinical picture, microbial features, anaerobic bacterial culture, fungal culture, Gram stain, *Clostridium*, *Peptostreptococcus*, *Actinomyces*, *Fusobacterium*, *Bacteroides*.

Mangan, Brendan G.; Gionfriddo, Juliet R.; Powell, Cynthia C. **Bilateral nasolacrimal duct atresia in a cria.** *Veterinary Ophthalmology*. 2008 Jan; 11(1): 49-54. ISSN: 1463-5216

URL:<http://www3.interscience.wiley.com/journal/118507707/home>

DOI: <http://dx.doi.org/10.1111/j.1463-5224.2007.00595>.

NAL call no.: SF891.V47

Abstract: A 2-month-old, male alpaca had a 1-month history of mucoid ocular discharge from the left eye. Signalment, history and clinical findings were suggestive of a congenital nasolacrimal outflow obstruction. A dacryocystorhinogram confirmed bilateral nasolacrimal

duct atresia, which involved the distal half of both nasolacrimal ducts. In order to establish alternative outflow, a conjunctivomaxillo sinusotomy and conjunctivorhinostomy were performed on the right and left eye, respectively. The surgical openings remain patent after 11 months, and there have been no clinical signs of nasolacrimal disease.

Descriptors: alpacas, animal diseases, congenital abnormalities, young animals, nasal cavity, lacrimal apparatus, mucus, case studies, signs and symptoms, disease diagnosis, image analysis, resection, disease course, abnormal development, nasolacrimal duct atresia, dacryocystorhinography.

Marques, F.J. **Fluid therapy: general practical recommendations for camelids.** *Large Animal Veterinary Rounds*. 2008; 8(1): 6 pp.

URL: <http://www.larounds.ca>

Abstract: The camelid industry is relatively new and ever-evolving, as is our knowledge about these animals. Camelids differ from ruminants in several ways and in many situations they must be treated differently. Llama and alpaca caseloads tend to rise from year to year, both in the Western College of Veterinary Medicine hospital and in other referral practices, and it is essential that veterinarians keep up with the latest information available in this developing medical field. Further, since recommendations given today may not be valid in the near future, veterinarians must remain open to considering new ideas. This issue of *Large Animal Veterinary Rounds* reviews general fluid therapy principles and indicates some practical recommendations for camelids. The concepts discussed are based on current literature, research, the available reference material and the personal experience of well-respected camelid veterinarians around the world. Reproduced with permission from CAB Abstracts.

Descriptors: alpacas, llamas, dehydration, rehydration, fluid therapy for camelids, clinical aspects, complications, intravenous injection, oral administration, literature review.

McKenzie, Erica C.; Tornquist, Susan J.; Gorman, M. Elena; Cebra, Christopher K.; Payton, Mark E. **Hematologic effects of subcutaneous administration of recombinant human granulocyte colony-stimulating factor (filgrastim) in healthy alpacas.** *American Journal of Veterinary Research*. 2008; 69(6): 770-776. ISSN: 0002-9645

URL: <http://avmajournals.avma.org/loi/ajvr/>

NAL call no.: 41.8 AM3A

Abstract: Objective-To determine the effects of SC administration of filgrastim on cell counts in venous blood and bone marrow of healthy adult alpacas. Animals-10 healthy alpacas. Procedures-Alpacas were randomly assigned to receive treatment with filgrastim (5 μ g/kg, SC; n = 5) or an equivalent volume of physiologic saline (0.9% NaCl) solution (5 ml once a day for 3 days. Blood samples were obtained via jugular venipuncture 1 day prior to treatment and once a day for 5 days commencing 24 hours after the first dose was administered. Complete blood counts were performed for each blood sample. Bone marrow aspirates were obtained from the sternum of each alpaca 48 hours before the first treatment was administered and 72 hours after the third treatment was administered. Myeloid-to-erythroid cell (M:E) ratio was determined via cytologic evaluation of bone marrow aspirates. Results-In filgrastim-treated alpacas, substantial increases in counts of WBCs and neutrophils were detected within 24 hours after the first dose was administered. Band cell count and percentage significantly increased 24 hours after the second dose. Counts of WBCs, neutrophils, and

band cells remained high 48 hours after the third dose. Red blood cell counts and PCV were unaffected. The M:E ratio also increased significantly after treatment with filgrastim. Conclusions and Clinical Relevance-Filgrastim induced rapid and substantial increases in numbers of circulating neutrophils and M:E ratios of bone marrow in healthy alpacas. Therefore, filgrastim may be useful in the treatment of camelids with impaired bone marrow function.

Descriptors: alpacas, filgrastim, hematologic drug, drug dosage, recombinant human granulocyte colony stimulating factor, pharmacokinetics.

Montes, M.; Quicano, I.; Quispe, R.; Quispe, E.; Alfonso, L. **Quality characteristics of Huacaya alpaca fibre produced in the Peruvian Andean Plateau region of Huancavelica.** *Spanish Journal of Agricultural Research*. 2008; 6(1): 33-38. ISSN: 1695-971X. Note: In English with a Spanish summary.

URL:<http://www.inia.es>

Abstract: The quality of alpaca fibre produced in the region of Huancavelica (Peru) is described based on a sample of 203 animals belonging to eight herding communities located between 4,100 and 4,750 m above sea level. The mean fibre diameter, 22.7 micro m (SE 0.2), was lower than values reported for Huacaya alpacas from other areas and varied with sex, age, and community origin ($P < 0.01$). In contrast with results from other studies, males had finer fibre than females, but this may be because they represent selected breeding stock brought from Puno and Cusco. No linear relationship was found between fibre diameter and staple length. Further research is needed to better characterise fibre production traits and quantify their economic values prior to establishing a breeding program to improve fibre production in the region. Although conducting this type of research in the Peruvian Andean Plateau might seem difficult, the active participation of alpaca owners and development promoters made it feasible. Reproduced with permission from CAB Abstracts.

Descriptors: Huacaya breed alpacas, fleece, fiber characteristics, staple, fiber diameters, stable length, quality, age differences, sex differences, animal breeding, selective breeding, animal fibers, geographical variation, selection, Peru.

Pinares-Patino, C.S.; Clark, H. **Reliability of the sulfur hexafluoride tracer technique for methane emission measurement from individual animals: an overview.** *Australian Journal of Experimental Agriculture*. 2008; 48(1/2): 223-229. ISSN: 0816-1089

URL:<http://www.publish.csiro.au/nid/72/paper/EA07297.htm>

Abstract: Measurements of enteric methane (CH_4) emissions from individual animals have traditionally been made with indirect calorimetry techniques, which are both accurate and reliable. However, the expense and need for animal training and the extent to which calorimetric results can be extrapolated to free-ranging animals have been questioned and stimulated the development of the sulfur hexafluoride (SF_6) tracer technique. The tracer technique is now widely used in New Zealand and many other countries for CH_4 emission measurements on grazing and pen-fed cattle, sheep, deer and alpacas. Few studies with cattle and sheep have examined the validity of the SF_6 tracer technique. Most of these studies have concluded that estimations of CH_4 emission by this technique do not differ from those of calorimetric techniques, though some exceptions have been reported. There is general agreement that the tracer technique is associated with large between-animal variability in the CH_4 emission

estimates from animals on the same diet, but it remains unknown whether this is due to the environment, housing conditions or the technique itself. High within-animal variability has also been reported from tracer CH₄ measurements. There is growing evidence that CH₄ emission estimates by the tracer technique are positively influenced by the permeation rate (PR) of the SF₆ gas from permeation tubes and it has been suggested that fate of the tracer in the rumen rather than unrepresentative breath sample collection is the likely reason for the latter. It is concluded that although some issues related to the tracer technique need to be clarified, using a narrow range in PR and balancing of PR between treatments should be practised in order to overcome the relationship between PR and CH₄ emission estimates.

Descriptors: alpacas, cattle, deer, sheep, beef cattle, dairy cattle, pastured livestock, air pollutants, air pollution, air quality, emission, grazing, methane, sulfur, tracer techniques, tracers, atmospheric pollution, elemental sulphur, New Zealand.

Prado, Tulio M.; DuBois, William R.; Ko, Jeff C.H.; Mandsager, Ronald E.; Morgan, Gregor L. **A comparison of two combinations of xylazine-ketamine administered intramuscularly to alpacas and of reversal with tolazoline.** *Veterinary Anaesthesia and Analgesia*. 2008 May; 35(3): 201-207. ISSN: 1467-2987

URL:<http://www3.interscience.wiley.com/journal/118516519/home>

DOI: <http://dx.doi.org/10.1111/j.1467-2995.2007.00375>

NAL call no.: SF914.V47

Abstract: To evaluate the anesthetic and cardiorespiratory effects of two doses of intramuscular (IM) xylazine/ketamine in alpacas, and to determine if tolazoline would reduce the anesthetic recovery time. Prospective randomized crossover study. Six castrated male alpacas. Each alpaca received a low dose (LD) (0.8 mg/kg xylazine and 8 mg/kg ketamine IM) and high dose (HD) (1.2 mg/kg xylazine and 12 mg/kg ketamine IM) with a minimum of one week between trials. Time to sedation, duration of lateral recumbency and analgesia, pulse rate, respiratory rate, hemoglobin oxygen saturation, arterial blood pressure, blood-gases, and the electrocardiogram were monitored and recorded during anesthesia. With each treatment three alpacas were randomly selected to receive tolazoline (2 mg/kg IM) after 30 minutes of lateral recumbency. Onset of sedation, lateral recumbency and analgesia was rapid with both treatments. The HD was able to provide ≥ 30 minutes of anesthesia in five of six alpacas. The LD provided ≥ 30 minutes of anesthesia in three of six alpacas. Respiratory depression and hypoxemia occurred with the HD treatment during the first 10 minutes of lateral recumbency: two animals were severely hypoxemic and received nasal oxygen for 5 minutes. Heart rate decreased, but there were no significant changes in arterial blood pressure. Tolazoline significantly shortened the duration of recumbency with the HD. The HD provided more consistent clinical effects in alpacas than the LD. Intramuscular tolazoline shortened the duration of lateral recumbency in alpacas anesthetized with the HD combination. Both doses of the combination were effective in providing restraint in alpacas and the duration of restraint was dose dependent. Supplemental oxygen should be available if using the HD and IM administration of tolazoline will shorten the recovery time.

Descriptors: alpacas, 6 castrated males, anesthesia, ketamine, xylazine, tolazoline.

Semevolos, Stacy A.; Huber, Michael J.; Parker, Jill E.; Reed, Shannon K. **Complications after orthopedic surgery in alpacas and llamas: 24 cases (2000-2006).** *Veterinary Surgery*. 2008 Jan; 37(1): 22-26. ISSN: 0161-3499

URL:<http://www3.interscience.wiley.com/journal/118532623/home>

DOI: <http://dx.doi.org/10.1111/j.1532-950X.2007.00342>

NAL call no.: SF911.V43

Abstract: To report complications associated with orthopedic surgery in alpacas and llamas. Retrospective study. Alpacas (n=18) and llamas (n=6) that orthopedic surgery using internal or external fixation. Medical records (January 2000-December 2006) and radiographs were reviewed and owners contacted for follow-up information for alpacas and llamas that had orthopedic surgery involving internal or external fixation. Fourteen camelids had internal fixation, 7 had external fixation, and 3 had a combination of internal and external fixation. Twenty-two animals (92%) were discharged after surgery (mean hospitalization, 15 days). Of 20 animals with >=1 year follow-up information, 18 were alive (82%). Postoperative complications related to fracture healing, infection, soft tissue structures, or joints occurred in 21 camelids (87%). Thirteen animals returned to their intended use, 4 animals returned to breeding but not their intended use, 4 were euthanatized, and 3 were only able to be used as pets. Fixation type (internal, external) did not have any significant effect on complications involving fracture healing, infection, soft tissue structures, or chronic lameness. Camelids with open fractures were more likely to have complications associated with fracture healing, repair, and infection than closed fractures. Complications after orthopedic surgery in alpacas and llamas are more common than previously reported and may result in chronic lameness or prevent return to their intended use.

Descriptors: alpacas, llamas, musculoskeletal diseases, bone fractures, surgery, veterinary equipment, disease course, postoperative complications, morbidity, lameness, inflammation, data analysis, image analysis, radiography.

Slack, Joann; Johns, Imogen; Van Eps, Andrew; Reef, Virginia B. **Imaging diagnosis--tricuspid atresia in an alpaca.** *Veterinary Radiology and Ultrasound*—The Official Journal of the American College of Veterinary Radiology and the International Veterinary Radiology Association. 2008 May-June; 49(3): 309-312. ISSN: 1058-8183

URL:<http://www3.interscience.wiley.com>

NAL call no.: SF757.8.A4

Descriptors: 8 day old alpaca cria, clinical picture when presented to veterinary care, electrocardiography performed, tricuspid heart valve leaflets absent, ventricular septal defect, patent foramen ovale, congestive heart failure, septicemia, pneumonia, humane euthanasia recommended.

Trout, James M.; Santin, Monica; Fayer, Ronald. **Detection of Assemblage A, *Giardia duodenalis* and *Eimeria* spp. in alpacas on two Maryland farms.** *Veterinary Parasitology*. 2008; 153(3-4): 203-208. ISSN: 0304-4017

URL: <http://www.sciencedirect.com/science/journal/03044017>

NAL call no.: SF810.V4

Descriptors : adult alpacas, males and females, crias, suri and Huacaya breeds, fecal sampling, density gradient centrifugation, intestinal parasite sampling and identification,

immuno-fluorescent and differential interference contrast microscopy, oocysts, *Eimeria punoensis*, *Eimeria alpacas*, single and mixed infections, no clinical signs, PCR utilizing specific primers ssu-rRNA gene, *Cryptosporidium*, *Giardia duodenalis*, zoonotic potential of *Giardia*, 2 farms in Maryland, US.

Twomey, D.F.; Barlow, A.M.; Hemsley, S. **Immunophenotyping of lymphosarcoma in South American camelids on six British premises.** *Veterinary Journal*. 2008 Jan; 175(1): 133-135. ISSN: 1090-0233

URL: <http://www.sciencedirect.com/science/journal/10900233>

DOI: <http://dx.doi.org/10.1016/j.tvjl.2006.12.008>

NAL call no.: SF601.V484

Abstract: Six cases of lymphosarcoma (LSA) in South American camelids (SACs) were selected from submissions to a diagnostic laboratory network servicing England and Wales. Immunophenotyping was carried out using anti-human CD3 and anti-human CD5 for T-cells; and anti-human CD79a and anti-human CD79b for B-cells/plasma cells. On the basis of labelling with mainly anti-CD3, four of the tumours were classified as T-cell tumours. One case was labelled with anti-CD79a and anti-CD79b, and was classified as a B-cell tumour. In the other case the majority of cells were labelled with anti-CD3, anti-CD79a and anti-CD79b, and was classified as a mixed T- and B-cell tumour. To the authors' knowledge this is the first reported attempt at immunophenotyping LSA in SACs on British premises and is only the second time that a presumptive mixed T- and B-cell LSA has been reported in alpacas and the veterinary literature in general.

Descriptors: South American camelids, alpacas, lymphosarcoma, immunophenotyping, T cell tumors, B cell tumor, mixed T and B cell tumors, England, Wales.

Twomey, D.F.; Barlow, A.M.; Bell, S.; Chalmers, R.M.; Elwin, K.; Giles, M.; Higgins, R.J.; Robinson, G.; Stringer, R.M. **Cryptosporidiosis in two alpaca (*Lama pacos*) holdings in the South-West of England.** *Veterinary Journal*. 2008 Mar; 175(3): 419-422. ISSN: 1090-0233

URL : <http://www.sciencedirect.com/science/journal/10900233>

DOI: <http://dx.doi.org/10.1016/j.tvjl.2007.01.017>

NAL call no.: SF601.V484

Abstract: Cryptosporidiosis was investigated on two alpaca (*Lama pacos*) holdings in the South-West of England. Diagnosis was initially confirmed in a cria with diarrhoea from each holding. Cohort faeces samples were subsequently collected and examined for presence of *Cryptosporidium* oocysts by immunofluorescence microscopy. On the first holding, 30 samples (24 adults, 6 crias) were tested, and oocysts were detected in three of the cria samples but in none of the adults. On the second holding, 14 floor faeces samples representing apparently healthy crias and one faeces sample from a cria with diarrhoea were collected. Oocysts were detected in four of the healthy faeces samples and the sample of diarrhoeic faeces. All isolates were confirmed as *Cryptosporidium parvum* using polymerase chain reaction restriction fragment length polymorphism of the cryptosporidium oocyst wall protein (COWP) and ssu rRNA genes. Sequence analysis of a 741 bp region of ssu rDNA was carried out on nine of these and revealed high sequence homology with previously reported isolates. This investigation highlights the possibility of alpaca crias subclinically shedding oocysts, which has implications for epidemiology and transmission in animals as well as raising zoonotic

concerns for human contacts. Gene sequencing of UK isolates from South American camelids is also described for the first time.

Descriptors: alpacas, crias, diarrhea, fecal sampling, testing for *Cryptosporidium parvum*, PCR diagnostic test, oocysts, subclinical infections possible, epidemiology, transmission, zoonotic risk to humans, England.

Waite, L.H.; Cebra, C.K. **Characterization of hypertriglyceridemia and response to treatment with insulin in llamas and alpacas: 31 cases (1995-2005).** *Journal of the American Veterinary Medical Association*. 2008 May 1; 232(9): 1362-1367. ISSN: 0003-1488

URL: <http://avmajournals.avma.org/doi/abs/10.2460/javma.232.9.1362>

NAL call no.: 41.8 AM3

Descriptors : 23 alpacas, 8 llamas, 7 pregnant alpacas and 1 lactating, hypertriglyceridemic, multiple triglycerides concentration, treated and non-treated with insulin, insulin seems to reduce serum and plasma triglycerides, can affect all ages and both sexes.

Waite, Laura H.; Cebra, Christopher K.; Firshman, Anna M.; McKenzie, Erick C.; Schlipf, John W. Jr. **Cryptosporidiosis in 20 alpaca crias.** *Journal of the American Veterinary Medical Association*. 2008; 233(2): 294-298. ISSN: 0003-1488

NAL Call no.: 41.8 AM3

URL: <http://avmajournals.avma.org/>

Abstract: Case Description-20 alpaca crias (13 females and 7 males) were examined for diarrhea (n = 20), weight loss (15), and poor appetite (5). Fourteen crias were between 8 and 18 days of age at time of admission. Clinical Findings-Cryptosporidiosis was diagnosed in all crias. Common biochemical abnormalities included acidemia, hyperlactemia, azotemia, and hyperglycemia and increases in aspartate transaminase and gamma-glutamyltransferase activities. Serum sodium and chloride concentrations were high or low. Other potential gastrointestinal tract pathogens were identified in only 7 crias. Treatment and Outcome-Supportive care was instituted, including IV administration of fluids with partial parenteral administration of nutrients (n = 19 crias), antimicrobials (19), supplemental orally administered nutrients (11), administration of plasma (10), and insulin treatment (9). Other palliative treatments used by attending clinicians were sucralfate, flunixin meglumine, vitamin A/D/E/B complex, antiparasitic agents, antidiarrheal agents, and azithromycin. Three crias with inadequate urine production and severe azotemia were treated with furosemide administered IV as a bolus or as a constant-rate infusion. Treatment resulted in a successful outcome in 16 of 20 crias. Weight loss and refractory azotemia were common in nonsurvivors but not in surviving crias. Clinical Relevance-Findings suggested that *Cryptosporidium* spp may be a diarrheal pathogen of unweaned alpaca crias that may be more widespread than has been recognized and can become endemic on some farms. Metabolic derangements were unpredictable and should be determined by biochemical analysis before fluid and electrolyte replacement is initiated. Cryptosporidiosis has zoonotic potential, and the infection can be self-limiting in alpacas receiving supportive treatment. Reproduced with permission from CAB Abstracts.

Descriptors: alpacas, crias, females, males, cryptosporidiosis, *Cryptosporidium*, clinical picture, symptoms, treatment, outcomes, antiparasitic agents, zoonotic parasite.

Watts , Ashlee E.; Fortier, Lisa A.; Nixon, Alan J.; Ducharme, Norm G. **A technique for internal fixation of scapulohumeral luxation using scapulohumeral tension sutures in three alpacas and one miniature steer.** *Veterinary Surgery*. 2008 Feb; 37(2): 161-165. ISSN: 0161-3499
URL : <http://www3.interscience.wiley.com/journal/118532623/home>
DOI:<http://dx.doi.org/10.1111/j.1532-950X.2007.00365>

NAL call no .: SF911.V43

Abstract: To report a technique for open reduction and internal fixation of scapulohumeral joint luxation in large animals, and outcome. Clinical case reports. Mature alpacas (n=3) and immature miniature steer (1). Shoulder joint luxation was diagnosed by physical examination and confirmed by radiography. Open reduction was performed with internal fixation using lateral tension band sutures. Animals maintained shoulder joint reduction and were sound with radiographically normal shoulder joints (n=2) and normal range of motion without appreciable gait abnormalities (4) at follow-up 8-36 months later. In contrast to previous reports of open reduction with internal fixation of shoulder joint luxation in large animals, open reduction and use of lateral scapulohumeral tension sutures resulted in functionally normal shoulder joints. Stabilization of the shoulder joint with lateral scapulohumeral tension sutures after open reduction is effective, technically simple, and should be considered in large animal species weighing <100 kg.

Descriptors: immature miniature steer, mature alpacas, animal injuries, shoulder joint diseases, humerus, scapula, surgery, veterinary equipment, sutures, case studies, disease course, musculoskeletal system physiology, physical activity, functional status.

Webster, J.D.; Miller, M.A.; Vemulapalli, R. ***Encephalitozoon cuniculi*-associated placentitis and perinatal death in an alpaca (*Lama pacos*).** *Veterinary Pathology*. 2008 Mar; 45(2): 255-258. ISSN: 0300-9858

URL:<http://www.vetpathology.org/>

NAL call no.: 41.8 P27

Abstract: Placentitis, premature birth, and perinatal death were associated with *Encephalitozoon cuniculi* infection in an alpaca. Histologically, chorionic trophoblasts contained many Gram-positive, period acid-Schiff positive, variably acid-fast spores. Multifocal necrosis and infiltration by lymphocytes, eosinophils, and neutrophils were scattered throughout the chorionic membrane. Spores in trophoblasts were approximately 1 om x 2 om, thick-walled, and contained polar filaments and polar vacuoles consistent with microsporidia. The presence of *E. cuniculi* DNA was confirmed by sequencing the polymerase chain reaction amplicon from frozen placental tissue. A few glial nodules were scattered throughout the cerebrum, and mild lymphocytic inflammation was present in the heart, liver, and lung. No organisms were detected in tissues other than the placenta. This is the first reported case of *E. cuniculi* infection in an alpaca.

Descriptors: alpaca, *Encephalitozoon cuniculi* infection, placentitis, premature birth, perinatal death, first report of pathogen in alpaca.

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Abd El Aty, A.M.; Goudah, A.; Shah, S.S.; Shin, H.C.; Shimoda, M.; Shim, J.H. **Pharmacokinetic variables of moxifloxacin in healthy male camels following intravenous and intramuscular administration.** *Journal of Veterinary Pharmacology and Therapeutics*. 2007; 30(6): 586-591. ISSN: 0140-7783

URL:<http://www3.interscience.wiley.com/journal/117986825/home>

Descriptors: llamas, alpacas, camels, males, *Chlamydia* infection, *Mycoplasma* infection, drug therapy, moxifloxacin, fluoroquinolone, moxidectin, mocifloxacin, antibiotics, intravenous administration, intramuscular administration, pharmacokinetics.

Adams, G.P. **Theriogenology in llamas and alpacas.** *Large Animal Veterinary Rounds*. 2007; 7(10): 6 PP

URL:<http://www.larounds.ca>

Abstracts: The reproductive characteristics of llamas and alpacas are similar, and clinical management need not distinguish between the two. Camelids are the only large domestic species that are induced ovulators. Sexual behaviour and copulation time is strikingly different from any other domestic species. In addition, gestation is unusually long and uterine anatomy, placentation, and birthing distinctly differ from any other species. This issue of Large Animal Rounds discusses the reproductive management of South American camelids. The paper covers sexual and mating behaviour, ultrasonography of the ovaries and uterus, follicular dynamics, luteal dynamics, ovarian irregularities, breeding schemes, puberty and postpartum period, synchronization and fixed-time breeding and pregnancy diagnosis. Reproduced with permission from CAB Abstracts.

Descriptors: alpacas, llamas, breeding camelids, reproduction, mating behavior, sexual behavior, corpus luteum, ovarian follicles, ovaries, ovulation, uterus, pregnancy gestation period, sexual maturity, synchronization, pregnancy diagnosis, ultrasonography, postpartum period.

Balmus, Gabriel; Trifonov, Vladimir A.; Biltueva, Larisa.S.; O' Brien, Patricia.C.M.; Alkalaeva, Elena.S.; Fu, Beiyuan; Skidmore, Julian.A.; Allen, Twink; Graphodatsky, Alexander S.; Yang, Fengtang; Ferguson-Smith, Malcolm A. **Cross-species chromosome painting among camel, cattle, pig and human: further insights into the putative Cetartiodactyla ancestral karyotype.** *Chromosome Research*. 2007 June; 15(4): 499-514. ISSN: 0967-3849

URL:<http://dx.doi.org/10.1007/s10577-007-1154-x>

NAL call no.: QH600 .C47

Abstract: The great karyotypic differences between camel, cattle and pig, three important domestic animals, have been a challenge for comparative cytogenetic studies based on conventional cytogenetic approaches. To construct a genome-wide comparative chromosome map among these artiodactyls, we made a set of chromosome painting probes from the dromedary camel (*Camelus dromedarius*) by flow sorting and degenerate oligonucleotide primed-PCR. The painting probes were first used to characterize the karyotypes of the dromedary camel (*C. dromedarius*), the Bactrian camel (*C. bactrianus*), the guanaco (*Lama guanicoe*), the alpaca (*L. pacos*) and dromedary x guanaco hybrid karyotypes (all with $2n =$

74). These FISH experiments enabled the establishment of a high-resolution GTG-banded karyotype, together with chromosome nomenclature and idiogram for *C. dromedarius*, and revealed that these camelid species have almost identical karyotypes, with only slight variations in the amount and distribution patterns of heterochromatin. Further cross-species chromosome painting between camel, cattle, pig and human with painting probes from the camel and human led to the establishment of genome-wide comparative maps. Between human and camel, pig and camel, and cattle and camel 47, 53 and 53 autosomal conserved segments were detected, respectively. Integrated analysis with previously published comparative maps of human/pig/cattle enabled us to propose a Cetartiodactyla ancestral karyotype and to discuss the early karyotype evolution of Cetartiodactyla. Furthermore, these maps will facilitate the positional cloning of genes by aiding the cross-species transfer of mapping information.

Descriptors: camels, alpacas, guanacos, cattle, pigs, cytogenetics, evolution, Cetartiodactyla, chromosome painting, karyotype.

Bella, A.; Sousa, N.M.; Dehimi, M.L.; Watts, J.; Beckers, J.F. **Western analyses of pregnancy-associated glycoprotein family (PAG) in placental extracts of various mammals.** *Theriogenology*. 2007; 68(7): 1055-1066. ISSN: 0093-691X

URL:<http://www.sciencedirect.co./science/journal/0093691x>

DOI:<http://dx.doi.org/10.1016/j.theriogenology.2007.08.002>

Abstract: The present study was conducted in order to analyze the immunoreactivity of placental extracts of several animal species and humans against the following three groups of PAG antisera: anti-boPAG-I (R#497), -boPAG-II (R#435), and -caPAG (R#706). Placental proteins were obtained after extraction at neutral pH, followed by ammonium sulfate (A.S.) precipitation, dialysis, and lyophilization. The immunoreactivity of different placental extracts was revealed by the use of monodimensional SDS-PAGE, followed by blotting on nitrocellulose membrane and the identification of immunoreactive proteins after incubation with PAG antisera (Western blot technique). A strong immunoreactivity of proteins from synepitheliochorial placenta (cattle, sheep, goat, bison, buffalo, and deer) was demonstrated in both 20-50% and 50-80% A.S. fractions using the three antisera. Proteins from species with epitheliochorial placenta presented variable profiles of detected PAG-like proteins: in the sow, many immunoreactive forms were revealed by antisera boPAG-I and boPAG-II, whereas in the dromedary, only two forms were revealed by anti-boPAG-II. Concerning other species, our protocols showed for the first time a cross-reaction between PAG antisera with proteins extracted from dog, alpaca, dromedary, sea lion, and human placenta.

Descriptors: bison, buffalo, cattle, deer, goats, pigs, sheep, dogs, alpacas, dromedary, sea lions, humans, placenta, placental fluids, pregnancy, proteins, glycoproteins, sows, gestation.

Braga, W.U. **Protection in alpacas against *Corynebacterium pseudotuberculosis* using different bacterial components.** *Veterinary Microbiology*. 2007 Jan 31; 119(2-4): 297-303. ISSN: 0378-1135

URL:<http://www.sciencedirect.com/science/journal/03781135>

DOI:<http://dx.doi.org/10.1016/j.vetmic.2006.08.019>

NAL call no.: SF601.V44

Abstract: *Corynebacterium pseudotuberculosis* is a Gram positive bacterium that produces

caseous lymphadenitis in sheep and goats, and a granulomatous lymphadenitis in llamas and alpacas. To evaluate the immune potential of different doses of cell wall and toxin components of *C. pseudotuberculosis* from alpaca origin, 12 adult alpacas were allotted at random to four groups, and SC inoculated in the left flank with vaccines composed of low and high doses of bacterial crude antigens, cell wall: 250 and 500 og/ml and toxin: 133 and 265 og/ml, respectively. The vaccines were supplemented with 20 og/ml of muramyl dipeptide as adjuvant. Three alpacas were sham inoculated with adjuvant as a control. After 3 weeks, immunized and naive alpacas were challenged intradermally in the right flank with $1 \times 10(6)$ colony forming units (CFU) of *C. pseudotuberculosis*. The alpacas were sacrificed at days 28, 58 and 112 after inoculation, and the degree of protection induced by vaccines was demonstrated by the absence of abscesses and/or bacteria. The alpacas vaccinated with high dose of toxin, did not show abscesses. In contrast, the alpacas vaccinated with a low dose of toxin showed abscesses at the inoculation site, regional, and renal lymph nodes. The cell wall vaccinated alpacas showed a lesser degree of protection than the other groups with superficial and internal abscesses. The control alpacas had persistent fever and abscesses at the inoculation site, regional, and internal lymph nodes. In addition, a robust and early humoral response was observed in all vaccinated alpacas after challenge, lasting at least 3 months. The results suggest that the toxin of *C. pseudotuberculosis* is a very important antigen, inducing a dose dependant protective immunity against this bacterium in alpacas.

Descriptors: animal health, alpacas, *Corynebacterium pseudotuberculosis*, caseous lymphadenitis, vaccination, immune response, animal diseases, bacterial antigens, abscesses, bacterial virulence, vaccine adjuvants.

Braga , W.; Schul, S.; Nunez, A.; Pezo, D.; Franco, E. **A primary *Corynebacterium pseudotuberculosis* low dose infection in alpacas (*Lama pacos*) protects against a lethal challenge exposure.** *Small Ruminant Research*. 2007 Oct; 72(2-3): 81-86. ISSN: 0921-4488

URL:<http://www.sciencedirect.com/science/journal/09214488>

DOI: <http://dx.doi.org/10.1016/j.smallrumres.2006.04.017>

NAL call no.: SF380.I52

Abstract: *Corynebacterium pseudotuberculosis* is the agent of alpaca's lymphadenitis. The present study was to demonstrate the effect of a primary infection with low (1.1×10^{pd}), moderate (1×10^t), and high (1.2×10^e) doses of *C. pseudotuberculosis* against a significant higher challenge dose of 9×10^i CFU of *C. pseudotuberculosis*. Three groups of 4 healthy male alpacas were inoculated subcutaneously (SC) in the left flank behind the costal arch with the above doses of bacteria. A fourth group of 4 alpacas was sham inoculated with phosphate buffered saline as control. After 5 weeks all animals were challenged with a dose of 9×10^i CFU of *C. pseudotuberculosis* inoculated SC in the right flank. The alpacas were clinically inspected for local and regional abscesses, body temperature and behavior changes. The primary infected alpacas had a febrile response, and abscesses at the inoculation point and regional lymph nodes. However, after challenge, the primary infected animals showed no superficial lesions or febrile response. In contrast, the immune naive alpacas from group D developed a severe disease characterized by fever, abscesses in regional lymphnodes, and in one alpaca a subcutaneous edema and sudden death 2 weeks after exposure. In addition, primary infected alpacas had a robust antibody response against *C. pseudotuberculosis* cell wall antigen with significant differences with respect the naive challenged alpacas. At necropsy,

the primary infected alpacas had abscesses only in the regional or internal renal-lymph nodes from the left or primary inoculation side of the body, with no lesions in the right challenged side. In contrast, the primary sham inoculated alpacas had abscesses in the regional and internal lymph nodes from the right challenged side. This work showed that a primary infection with at least 1.1×10^9 viable *C. pseudotuberculosis* induces protection against a second high dose exposure to this bacterium. These results will be useful for further study of prevention methods to control lymphadenitis in alpacas.

Descriptors: alpacas, lymphadenitis, bacterial infections, *Corynebacterium pseudotuberculosis*, disease prevention, vaccination, vaccines, inoculum, pharmacology, dosage, dose response, in vivo studies, normal values, immune response, antibody formation, protective effect, pathogenesis, disease severity, animal pathology, signs and symptoms, abscess.

Braga, W.; Leyva, V.; Cochran, R. **The effect of altitude on alpaca (*Lama pacos*) fiber production.** *Small Ruminant Research*. 2007 Apr; 68(3): 323-328. ISSN: 0921-4488
URL:<http://www.sciencedirect.com/science/journal/09214488>
DOI:<http://dx.doi.org/10.1016/j.smallrumres.2005.11.008>
NAL call no.: SF380.I52

Abstract: In the Peruvian highlands, alpaca rearing areas are located between 4100 and 4700 m above sea level, with the finest fiber production believed to be associated with higher altitudes. The purpose of this experiment was to study the effect of differences in altitude on alpaca production, body weight (BW), clean fiber weight (FW) and fiber diameter (FD). Two areas with similar carrying capacities were identified at 4200 and 4600 m and stocked with 40 2-year-old (tuis), white, huacaya breed male alpacas in total. The experiment was conducted during two phases (phase 1: dry season; phase 2: wet season), with 4 x 28-day periods in each phase, plus a pre-experimental adaptation period of 28 days at 4200 m. Fiber samples were taken from a 10 cm² area on the left flank region every 28 days. For phase 1, 20 alpacas were transported to 4600 m, while the remaining 20 were kept at 4200 m. In phase 2, 10 alpacas from each group were switched to the alternate elevations, while the remaining animals were kept at their respective altitudes. In general, BW, FW and FD increased continuously during the course of the trial. The standard error for BW least squares means was 0.9343 kg, with a significant difference ($p < 0.0001$) between periods. The initial FW (1.3 pl 0.3 g x 10 cm²) and FD (22.9 pl 2.6 om) did not differ significantly between treatments, with the standard error for FW and FD being 0.1842 g x 10 cm² and 1.0663 om, respectively with significant difference ($p < 0.0001$) between periods, but not between treatments. In general, altitude treatments did not exert a significant effect on any of the variables measured. In contrast, time (period) effects were clearly evident for all the traits measured. Changes in response over time largely appeared to reflect the normal maturation processes of tuis and the availability of higher quality pastures during the wet season. Conclusion, altitude within the normal elevation range for alpaca production does not appear to significantly affect fiber production.

Descriptors: alpacas, wool production, wool, fiber quality, rearing, altitude, highlands, integumentary system, animal growth, fleece, hairs, dimensions, males, body weight, seasonal variation, wet season, ruminant nutrition, statistical analysis, Peru.

Cabezas, O.I.; Giannetto, C.; Islas, A.; Merino, V.; Morgante, M.; Piccione, G. **Profile of some haematochemical parameters in alpaca housed at three different altitudes.** *Asian Journal of Animal and Veterinary Advances.* 2007; 2(3): 146-151. ISSN: 1683-9919

URL : <http://www.academicjournals.net/2/c4p.php?id=2&theme=2&jid=ajava>

Abstract: The aim of this study was to describe the glucose, aspartate aminotransferase (AST), gamma-glutamyltransferase (gamma -GT), beta-hydroxybutyrate (B-OH), glutathione peroxidase (GSH-PX), calcium and phosphorus concentrations in healthy alpacas under farming conditions. The differences due to seasons and environmental condition were studied to obtain reference values for this species. 36 Huacaya alpacas were used in this study carried out from March to December 2004 in 3 different regions of Chile: north zone (group A) - altitude of 4000 m above sea level; centre zone (group B) - altitude of 80 m above sea level; and south centre zone (group C) - altitude of 150 m above sea level. The highest glucose values were observed in group A during spring, summer and winter and in group B during autumn. The highest AST values were observed in group A during spring, in group B during summer and autumn and in group C during winter. The highest gamma -GT and B-OH values were observed in group A during the 4 seasons. The highest GSH-PX values were observed in group C during spring and summer and in group B during autumn and winter. The highest calcium values were observed in group A during spring and autumn and in group B during summer and winter. The highest phosphorus values were observed in group A during spring, summer and autumn and in group B during winter. ANOVA showed a highly significant effect of the environmental conditions and annual period on all the studied parameters. The results for AST, gamma GT and B-OH could be considered as reference values.

Descriptors: alpacas, blood biochemistry, blood sugar, blood calcium, blood glucose, blood phosphorus, 3-hydroxybutyric-acid, aspartate aminotransferase, gamma-glutamyltransferase; glutathione peroxidase, seasonal variation, beta-hydroxybutyrate, glutamyl transferase, GOT, effects of altitude and season, seasonal fluctuations, Chile.

Catone, G.; Zerani, M.; Scrollavezza, P.; Vullo, C.; Russo, M. **Laparoscopic folliculocentesis and PGs determination in alpacas (*Lama pacos*): Preliminary report.** *Reproduction in Domestic Animals.* 2007; 42(Suppl. 2): 109. ISSN: 0936-6768. Note: 11th Annual Conference of the European Society for Domestic Animal Reproduction, Celle, Germany; September 21 -22, 2007

URL: <http://www3.interscience.wiley.com/cgi-bin/fulltext/118522125/PDFSTART>

Descriptors: alpacas, mature female, ovary, oocytes, prostaglandin E-2 and Prostaglandin F2 alpha, laparoscopy therapeutic and prophylactic techniques, transvaginal ultrasound, imaging and microscopic techniques, ovulation, follicular dynamics, laparoscopic folliculocentesis, lipidic fraction, aspiration needle.

Cebra, C. **Diarrhea in llama and alpaca crias.** In: R.A. Smith [Editor]. *Proceedings of the Fortieth Annual Conference, American Association of Bovine Practitioners, Vancouver, British Columbia, Canada, 20-22-September 2007.* 2007; 170-173. Note: In English with a French summary.

Abstract: Neonatal and juvenile diarrhea are common complaints among owners of cattle, sheep, pigs, horses, and goats. Microbial causes are usually blamed, although in some cases nutritional or other considerations come in to play. The most commonly identified patho-

gens are viruses and protozoa. These are relatively self-limiting, and clinical signs are more related to fluid and electrolyte loss than anything else. For ruminants and pigs especially, various products have been developed which specifically address water, base and salt loss. Various antibody and vaccine preparations are available to directly combat the causative organisms, but with the exception of *Eimeria*, antimicrobial treatment is usually not considered necessary. Reproduced with permission from CAB Abstracts.

Descriptors: alpacas, llamas, protozoal agents of disease, etiology, clinical aspects, diagnosis, diarrhea, disease control, disease prevention, drug therapy, fluid therapy, therapy, clinical picture, rehydration, therapeutics.

Cebra, C. **Uterine torsion in llamas and alpacas.** In: R.A. Smith [Editor]. *Proceedings of the Fortieth Annual Conference, American Association of Bovine Practitioners, Vancouver, British Columbia, Canada, 20-22 September, 2007.* 2007; 174-175. Note: In English with a French summary.

Abstract: Uterine torsion is a recognized cause of dystocia in large animals. Relative frequency and severity vary between species, but both dam and offspring can be saved and torsion corrected if the condition is diagnosed in a timely fashion. Uterine torsion is recognized as a cause of colic and dystocia in llamas and alpacas, but is usually regarded as less common than malpresentations involving the long neck and limbs of crias. In fact, uterine torsion may be responsible for some of those malpresentations.

Descriptors: alpacas, llamas, etiology, clinical aspects, colic, diagnosis, dystocia, malpositions, prognosis, surgery, therapy, torsion, uterine diseases, uterine torsion.

Cebra, C.K.; Valentine, B.A.; Schlipf, J.W.; Bildfell, R.J.; McKenzie, E.; Waitt, L.H.; Heidel, J.R.; Cooper, B.J.; Lohr, C.V.; Bird, K.E. ***Eimeria macusaniensis* infection in 15 llamas and 34 alpacas.** *Journal of the American Veterinary Medical Association.* 2007 Jan 1; 230(1): 94-100. ISSN: 0003-1488

URL:<http://www.avma.org/>

NAL call no.: 41.8 AM3

Descriptors: animal diseases, llamas, alpacas, coccidiosis, *Eimeria macusaniensis*, digestive system diseases, gastrointestinal system, case studies, animal disease outbreaks, signs and symptoms, disease detection, disease diagnosis, fecal egg count, disease course, alternative livestock, Oregon.

Cebra, C. **Internal parasites in llamas and alpacas: importance and detection methods.** *Large Animal Proceedings of the North American Veterinary Conference, Volume 21, Orlando, Florida, USA, -2007.* 2007; 251-252

URL:<http://www.tnavc.org>

Descriptors: alpacas, llamas, internal parasites, importance, economic impact, detection methods, *Capillaria*, *Cryptosporidium*, *Eimeria*, *Fasciola*, *Fasciola hepatica*, *Giardia*, Strongylidae, *Trichuris*, *Adenophorea*, *Enoplida*.

Chapman, H.M.; Taylor, E.G.; Buddle, J.R.; Murphy, D.J. **Student training in large-animal handling at the School of Veterinary and Biomedical Sciences, Murdoch University, Australia.** *Journal of Veterinary Medical Education.* 2007; 34(5): 576-582. ISSN: 0748-321X

URL:<http://www.jvmeonline.org>

Abstract: The ability to handle animals safely, competently, and with confidence is an essential skill for veterinarians. Poor animal-handling skills are likely to compromise credibility, occupational health and safety, and animal welfare. In the five-year veterinary science degree at Murdoch University, animal handling is taught in a prerequisite unit in the second semester of the second year. From 2008, however, this unit will be taught in the first year of the five-year course. Students are taught to handle sheep, cattle, pigs, and horses safely and competently. Each student receives 30 hours of formal practical instruction. Animal-to-student ratios are 2:1, and staff-to-student ratios vary from 1:8 (sheep, cattle, horses) to 1:17 (pigs). Students must pass the practical exam to proceed into third year. Additional experience with animals is gained during third year (14 hours of practical instruction with sheep, goats, pigs, and cattle) and during the 5 weeks and 2 days of vacation farm experience during the second and third years. In the fourth and fifth years, students consolidate their handling experience with sheep (including rams), goats, pigs, cattle (including bulls), horses (including stallions), and alpacas. As a result, students are able to handle and restrain client animals with confidence. There is no formal course in small-animal handling at Murdoch University. Factors that have enhanced the success of the large-animal handling program include purpose-built on-campus facilities. Inadequate resources (time, facilities, and animals) remain the main impediment to effective learning, further compounded by the increasing tendency of university administrators to make decisions based on economic expediency rather than educational benefit. Reproduced with permission from CAB Abstracts.

Descriptors: training in animal handling, domestic livestock, horses, cattle, bulls, sheep, goats, pigs, alpacas, college curriculum, educational courses, handling, large animal practice skills, students, veterinarians, veterinary education, veterinary medicine, veterinary schools, instruction, veterinary colleges, veterinary surgeons, Australia.

Chigerwe, M.; Middleton, J.R.; Williams, F., III; Tyler, J.W.; Kreeger, J.M. **Atypical coccidiosis in South American camelids.** *Journal of Veterinary Diagnostic Investigation*. 2007; 19(1): 122-125. ISSN: 1040-6387

URL:<http://jvdi.org/>

NAL call no.: SF774.J68

Abstract: Reported clinical signs of coccidiosis in South American camelids include anorexia of a few days duration, sudden death, and diarrhoea. Antemortem diagnosis of clinical coccidiosis is usually based on clinical signs and supported by detection of coccidial oocysts in faeces. This report describes 2 atypical cases of coccidiosis in South American camelids that had no coccidial oocysts detected on antemortem faecal flotation, prolonged weight loss, and normal faecal consistency.

Descriptors: llamas, alpacas, *Eimeria macusaniensis* anorexia, case report, clinical picture, coccidiosis, diagnosis, diarrhea, differential diagnosis, histopathology, oocysts, sudden death.

Davies, H.L.; Robinson, T.F.; Roeder, B.L.; Sharp, M.E.; Johnston, N.P.; Christensen, A.C.; Schaalje, G.B. **Digestibility, nitrogen balance, and blood metabolites in llama (*Lama glama*) and alpaca (*Lama pacos*) fed barley or barley alfalfa diets.** *Small Ruminant Research*. 2007 Nov; 73(1-3): 1-7. ISSN: 0921-4488

URL:<http://www.sciencedirect.com/science/journal/09214488>

DOI:<http://dx.doi.org/10.1016/j.smallrumres.2006.10.006>

NAL call no.: SF380.I52

Abstract: To determine the effect of barley diets on digestibility, nitrogen balance, and blood metabolites, mature gelded llamas and alpacas (n = 8; 4 llamas, 36 pl 4 months, 90 pl 10.7 kg; 4 alpacas, 24-36 months, 50 pl 4 kg) were randomly fed 100% barley (B) and 20% alfalfa/80% barley (BA) hay. Animals were housed in metabolism crates and diets were fed for a 7 days adjustment period followed by a 5 days collection period. Feed, feed refusal, feces and urine were collected, dried and N content determined by combustion analysis. Blood samples were collected on day 12 at 30 min intervals over a 6 h period. Plasma was harvested and analyzed for electrolytes (Na, K, Cl, Ca, Capo, P, Mg), metabolites glucose, non-esterified fatty acids (NEFAs), urea N, creatinine, albumin, total protein (TPP), osmolality (Osm). Plasma glucose, urea N, albumin, osmolality, electrolyte and metabolite levels were similar between species, and were unaffected by diet. On a metabolic weight basis, only diet was significant for N intake, urinary and fecal N, and total N excreted. Dry matter intake was not significantly different; however, BA consumption was greater than B, (B) 1272 g N/day and (BA) 1636 g N/day for llamas, and for alpacas (B) 835 g N/day and (BA) 1034 g N/day, respectively. Nitrogen intake followed the same pattern, (B) 21.4 g N/day and (BA) 33.9 g N/day, respectively for llamas, and (B) 13.6 g N/day and (BA) 20.6 g N/day, respectively for alpacas (diet, P < 0.002). Diet affects were significant for urine N excretion (P < 0.02), (B) 11.2 g/day and (BA) 18.2 g/day for llamas, and (B) 6.8 and (BA) 10.8 g N/day for alpacas. Fecal N excretion was different for diet (P < 0.03), with fecal excreted N of 9.0 g N/day and 11.9 g N/day for B and BA in llamas, and 5.9 g N/day and 9.1 g N/day for B and BA respectively in for alpacas, respectively. Nitrogen retention, DM digestibility and N digestibility were unaffected by diet or species. However, the llamas in this study displayed an increase in nitrogen intake of 64.6% between the B and BA diets with a 381% increase in N retention. Alpacas increased their N intake by 57.4% when they consumed the BA forage, which only increased N retention by 22.2%. These species differences indicate that alpacas have a lower N requirement to meet metabolic needs than llamas, which are likely related to the smaller body size of the alpaca. When examining the biological value of N from the respective diets, alpacas and llamas had a value of 56.2% when consuming barley. The BA diet had a higher biological value of 65.0% in llamas compared to 57.4% in alpacas. Therefore, on the basis of this study, extrapolations between llamas and alpacas with respect to nitrogen requirement and balance are not valid.

Descriptors: llamas, alpacas, ruminant nutrition, dietary protein, forage, barley, alfalfa, nutritive value, nutrient utilization, digestibility, digestible protein, energy requirements, protein requirement, nitrogen balance, nitrogen metabolism, biomarkers, blood chemistry, electrolytes, species differences.

Dong, Chang sheng; Yan, Yong ping; He, Jun ping; He, Xiao yan; Ben, Yu hong; Bai, Rui. **Expression of transforming growth factor-beta 1 and its signal transducer Smad2 and Smad4 in alpaca testis.** *Jieyou Xuebao*. 2007; 38(4): 481-485. ISSN: 0529-1356. Note: In Chinese. **Descriptors:** alpacas, males, 2 year olds, testis, testicular development, spermatogenesis, TGF beta, transforming growth factor, signal transducer Smad2 and Smad4, Western blot and SABC.

Dukti, S.A.; Southwood, L.L.; Metre, D.C. van. **Survival and factors affecting survival in small ruminants and camelids attacked by dogs: 62 cases (1994-2004)**. *Journal of Veterinary Emergency and Critical Care*. 2007; 17(3): 257-261. ISSN: 1479-3261

URL:<http://www.blackwell-synergy.com/loi/vec>

DOI:<http://dx.doi.org/10.1111/j.1476-4431.2007.00229.x>

Abstract: Objective: To determine the survival rates and factors affecting survival in small ruminants and camelids attacked by dogs. Design: Retrospective study. Setting: Two university teaching hospitals. Animals: Thirty goats, 28 sheep, 3 alpacas, and 1 llama. Measurements and main results: Medical records were reviewed to obtain signalment, time between injury and admission, hospitalization length, lesion site, treatment, complications, survival rate, and cost. Follow-up information was obtained by telephone conversation with the owner. Sixty-two patients met the inclusion criteria. Six animals were euthanized at admission and thus excluded. Of the 56 animals that were treated, 43 (77%) were discharged, 5 (9%) died, and 8 (14%) were euthanized. Animals that had thoracic or abdominal injuries, required surgery, or received more potent analgesic therapy were less likely to survive to discharge from hospital compared with animals that did not. Complications developed in 50 (82%) animals. Animals with respiratory complications were also less likely to survive to discharge from hospital than animals that did not. Long-term follow up was available on 38/43 (88%) animals that were discharged. Thirty-five of 38 (92%) animals were discharged and recovered from their injuries and 5 animals had long-term complications. Conclusions: Small ruminants and camelids that are attacked by dogs have a good prognosis for short-term survival. Short-term survival is affected by lesion location and complications. Reproduced with permission from CAB abstracts.

Descriptors: alpacas, goats, llamas, sheep, dog bites, dog attacks, chemotherapy, traumas, complications, therapeutics, drug therapy, lesions, prognosis, risk factors; surgery, long term survival, Colorado, US.

Foster, A.P.; Houlihan, M.G.; Holmes, J.P.; Watt, E.J.; Higgins, R.J.; Errington, J.; Iбата, G.; Wakeley, P.R. **Bovine viral diarrhoea virus infection of alpacas (*Vicugna pacos*) in the UK**. *Veterinary Record*— London. 2007 July 21; 161(3): 94-99. ISSN: 0042-4900

URL:<http://veterinaryrecord.bvapublications.com/>

NAL call no.: 41.8 V641

Abstract: Three alpacas (*Vicugna pacos*) aged two to 22 months with a history of ill thrift and diarrhoea were examined postmortem, and tissues were collected for histology, including immunohistochemical labelling for pestivirus antigen, virus isolation and TaqMan reverse transcriptase-PCR assay. Blood samples from two clinical cases and the remaining herd members were tested for bovine viral diarrhoea virus (BVDV) antibody by serum neutralisation, antigen detection and PCR assay. The three affected alpacas were positive for BVDV by PCR of splenic tissue and/or heparinised blood. Non-cytopathic BVDV was isolated from several tissues and plasma of two of the alpacas. DNA sequencing and phylogenetic analysis of the viral genome from the PCR product showed that the BVDV was of subgenotype 1 b. Immunohistochemical examination of brain tissue was positive in two cases, consistent with a persistent infection. BVDV antibodies were detected in 16 of 25 clinically unaffected alpacas. There was no evidence of persistent infection in the in-contact animals. The source of the infection was not determined. Reproduced with permission from CAB Abstracts.

Descriptors: alpacas, *Vicugna*, viral diseases, Bovine viral diarrhea virus, source of persistent infection, United Kingdom.

Foster, A.; Jackson, A.; D'Alterio, G.L. **Skin diseases of South American camelids.** *In Practice*. 2007; 29(4): 216-223. ISSN: 0263-841X

URL:www.bvapublications.com

Abstract: Camelids, and alpacas in particular, are growing in popularity in the UK. These animals often present with skin disease and provide a diagnostic and therapeutic challenge for the veterinary clinician. While much has been made about the role of nutritional problems related to zinc, dermatological problems in these species are frequently associated with chronic infestation with Chorioptes mites. The use of macrocyclic lactones and other products may readily treat infestations with other ectoparasites, such as Psoroptes and Sarcoptes mites, but these agents may have to be administered repeatedly to reduce the population of Chorioptes mites. This article describes the most common ectoparasitic conditions seen in South American camelids in the UK as well as some less common problems associated with nutrition, infections, neoplasia and immune-mediated disease, and discusses an approach to the diagnosis and management of skin disease in these species. Reproduced with permission from CAB Abstracts.

Descriptors: camels, alpacas, South American camelids, autoimmune diseases, bacterial diseases, diagnosis, ectoparasites, ectoparasiticides, fungal diseases, infestation, metabolic disorders, neoplasms, parasitoses, scabies, skin, skin diseases, treatment, *Chorioptes*, fungi, *Psoroptes*, *Sarcoptes*, bacterial infections, bacterioses, cancers, dermis, metabolic diseases, parasitic diseases, parasitic infestations, parasitosis, UK.

Gamarra, G.; Gallegos, A.; Asparrin, M.; Vivanco Mackie, H.W. **Development of superovulatory strategies in alpacas.** *Reproduction Fertility and Development*. 2007; 19(1): 238. ISSN: 1031-3613. Note: 33rd Annual Conference of the International Embryo Transfer Society, Kyoto, Japan; January 06-10, 2004. 2007

URL:<http://www.publish.csiro.au/?nid=45&aid=35>

NAL call no: QP251.R47

Descriptors : alpacas, females, reproductive organs, ovaries, superovulation strategies, follicular development, luteinizing hormone, FSH, gonadotropins, medroxyprogesterone acetate, progestins, progestogen drug, transvaginal ultrasonography, imaging techniques, clinical techniques.

Garcia-Pereira, Fernando L.; Greene, Stephen A.; Keegan, Robert D.; McEwen, Margaret M.; Tibary, Ahmed. **Effects of intravenous butorphanol on cardiopulmonary function in isoflurane-anesthetized alpacas.** *Veterinary Anaesthesia and Analgesia*. 2007 July; 34(4): 269-274. ISSN: 1467-2987

URL: <http://www3.interscience.wiley.com/journal/118516519/home>

DOI:<http://dx.doi.org/10.1111/j.1467-2995.2006.00325.x>

NAL call no.: SF914 .V47

Abstract: To determine the effects of intravenous (IV) butorphanol on the cardiopulmonary system and on the bispectral index (BIS) in isoflurane-anesthetized alpacas. Randomized, blinded cross-over experimental trial. Eight healthy, young (3 pl 1 SD years) adult female

alpacas weighing 64 pl 9 SD kg. Alpacas were anesthetized with isoflurane by mask followed by tracheal intubation and maintenance of anesthesia with isoflurane in oxygen and intermittent positive pressure ventilation. Animals were assigned to two treatments, butorphanol (0.1 mg/kg, IV) and saline (0.01 mL/kg, IV) in a randomized manner allowing a 2-week interval between treatments. Cardiovascular variables included systolic, diastolic, and mean arterial blood pressure, heart rate, pulmonary arterial pressure, pulmonary arterial occlusion pressure (PAOP), central venous pressure, cardiac output, and pulmonary temperature (TEMP). Cardiac index, systemic vascular resistance (SVR), and pulmonary vascular resistance (PVR) were calculated. Bispectral index was also measured. Arterial and mixed venous blood samples were collected for blood gas analysis. All variables were recorded at baseline (time 0) and at 5, 10, 15, 30, 45 and 60 minutes following injection and were analyzed by using repeated-measures anova ($p < 0.05$). PAOP, PVR, and BIS were analyzed by paired t-tests. Butorphanol decreased SVR at all times when compared with the baseline, but no difference was detected between treatments. TEMP decreased with time in both treatments, but they were not different from each other. Other cardiovascular, BIS, and blood gas variables were not different between groups. We conclude that butorphanol had minimal effects on the cardiovascular system of the alpacas, causing a mild decrease in SVR.

Descriptors: alpacas, anesthesia, cardiac output, bispectral index, butorphanol.

Gerspach, C.; Varga, A.; Niehaus, A.; Nichols, S.; Lakritz, J. **Serum IgG concentrations in crias: How much is enough?** *Journal of Veterinary Internal Medicine*. 2007; 21(3): 583-584. ISSN: 0891-6640. Note: 25th Annual Forum of the American College of Veterinary Internal Medicine, Seattle, WA, USA; June 06 -09, 2007.

URL:<http://www.blackwell-synergy.com/doi/ref/10.1111/j.1939-1676.2008.0072.x>

NAL call no.: SF601.J65

Descriptors: alpacas, crias, serum, plasma, IgG levels, dystocia, reproductive conditions, sepsis, plasma transfusion, therapeutic and prophylactic techniques, clinical recommendations.

Gishen, M.; Cozzolino, D. **Feasibility study on the potential of visible and near infrared reflectance spectroscopy to measure alpaca fibre characteristics.** *Animal: an International Journal of Animal Bioscience*. 2007 July; 1(6): 899-904. ISSN: 1751-7311

URL:<http://journals.cambridge.org/>

DOI:<http://dx.doi.org/10.1017/S1751731107000146>

NAL call no.: SF1.A45

Abstract: Visible (Vis) and near infrared (NIR) reflectance spectroscopy is a rapid and non-destructive technique that has found many applications in assessing the quality of agricultural commodities, including wool. In this study, Vis and NIR spectroscopy combined with multivariate data analysis was investigated regarding its feasibility in predicting a range of fibre characteristics in raw alpaca wool samples. Mid-side samples (n=149) were taken from alpacas from a range of colours and ages at shearing time over 4 years (2000 to 2004) and subsequently analysed for fibre characteristics such as mean fibre diameter (MFD) and standard deviation (and coefficient of variation), spin fineness, curvature degree (and standard deviation), comfort factor, medullation percentage (by weight and number in white samples only) using traditional reference laboratory testing methods. Samples were scanned

in a large cuvette using a FOSS NIRSystems 6500 monochromator instrument in reflectance mode in the Vis and NIR regions (400 to 2500 nm). Partial least squares (PLS) regression was used to develop a number of calibration models between the spectral and reference data. Mathematical pre-treatment of the spectra (second derivative) as well as various combinations of wavelength range were used in model development. The best calibration model was found when using the NIR region (1100 to 2500 nm) for the prediction of MFD, which had a coefficient of determination in cross-validation (R²) of 0.88 with a root mean square standard error of cross validation (RMSECV) of 2.62 micro m. The results show the NIR technique to have promise as a semiquantitative method for screening purposes. The lack of grease in alpaca wool samples suggests that the technique might find ready application as a rapid measurement technique for preliminary classing of shorn fleeces or, if used directly on the animal, the technology might offer an objective tool to assist in the selection of animals in breeding programmes or shows. Reproduced with permission from CAB Abstracts.

Descriptors: alpacas, animal fibers, characteristics, reflectance spectroscopy.

Gonzalez-Acuna, D.; Cabezas, I.; Moreno, L.; Castro, D. **Nuevos registros de Phthiraptera (Artropoda: Insecta) en *Lama pacos* Linnaeus 1758, en Chile.** [New records of Phthiraptera (Arthropoda: Insecta) in *Lama pacos* Linnaeus 1758, in Chile.]. *Archivos de Medicina Veterinaria*. 2007; 39(1): 71-72. ISSN: 0301-732X. Note: In Spanish with an English summary.

URL: www.uach.cl

Abstract: For the first time in Chile, the presence of *Microthoracius mazzai* and *Bovicola breviceps*, is reported. The presence of *M. praelongiceps* parasitizing alpacas in the General Lagos area (I Region) is also confirmed. The importance of this situation is discussed in the present report. Reproduced with permission from CAB Abstracts.

Descriptors: alpacas, *Bovicola breviceps*, Phthiraptera, *Microthoracius mazzai*, *Microthoracius mazzai*, new host records, Chile.

Gray, G.A.; Dascanio, J.J.; Kasimanickam, R.; Sponenberg, D.P. **Bilateral epididymal cysts in an alpaca male used for breeding.** *Canadian Veterinary Journal = La Revue Veterinaire Canadienne*. 2007 July; 48(7): 741-744. ISSN: 0008-5286. Note: In English with an English summary.

URL: <http://www.pubmedcentral.nih.gov/tocrender.fcgi?action=archive&journal=202>

NAL call no.: 41.8 R3224

Descriptors: male alpacas, epididymis, case studies, animal diseases, male genital diseases, cysts, neoplasms, animal age, ultrasonography, biopsy, disease diagnosis, histopathology, testes.

Grosche, A.; Hoops, M.; Wittek, T. **Akutes renales Nierenversagen bei einem Alpakahengst infolge einer hochgradigen Dehydratation.** [Acute kidney failure in a male alpaca caused by a severe dehydration.]. *Praktische Tierarzt*. 2007; 88(5): 348...360. ISSN: 0032-681X. Note: In German with an English summary.

URL: <http://www.vetline.de/dprt/>

NAL call no.: 41.8 P882

Abstract: The clinical and laboratory findings, therapy and outcome of 10-year-old male

alpaca suffering from acute renal failure caused by severe dehydration were reported [Germany]. Two days after an accidentally high intake of concentrates, the alpaca sire was submitted to the veterinary hospital in a recumbent and somnolent condition. In addition to tachycardia, dyspnoea and anuria, physical examination showed severe hypovolaemia, metabolic acidosis and azotaemia. Following aggressive shock therapy and diuresis (furosemide at one mg/kg BW i.v.), the animal started to produce urine in small amounts. The urine was yellow, cloudy, turbid, had a pH of 5.0 and contained one g/litre protein, 17 mmol/litre glucose, numerous leukocytes and bacteria. The gamma-glutamyltransferase (GGT)/creatinine ratio was 34.7 U/mmol. Further therapy consisted of parenteral application of antibiotics and NSAIDs as well as oral substitution of glucoplastic substances, substances that facilitate rumen function and humine acids during a 12-day period. After admission to the hospital, a total parenteral nutrition was performed for 3 days followed by partial parenteral nutrition up to 10 days. Despite the effective treatment of hypovolaemia and acidosis, the concentrations of urea and creatinine increased. This was accompanied by hypoproteinaemia, hypoalbuminaemia and hyperglycaemia. Urine production ceased again at day 3. However, diuresis could be induced again by administration of furosemide (1.5 mg/kg BW i.v. every 2 h for 8 h) and a single administration of mannitol (0.7 kg BW i.v.). On day 5, the alpaca showed generalized tonic-clonic spasms which could be controlled by administration of diazepam (0.05 mg/kg BW i.v.). These spasms were followed by atactic, paretic and splaying hind limbs. After day 8, the clinical signs improved, oliguria was followed by polyuria and faeces and azotaemia were normalized. On day 16, the alpaca was released from the clinic, since it had normal food intake, general behaviour, faeces and polyuria.

Descriptors: alpacas, acidosis, antibiotics, case report, clinical aspects, concentrates, creatinine, dehydration physiological, diagnosis, diuresis, drug therapy, dyspnoea, furosemide, gamma glutamyltransferase, hyperglycaemia, hypoalbuminaemia, hypoproteinaemia, hypovolaemia, kidneys, mannitol, NSAIDS, parenteral feeding, polyuria, renal failure, shock, spasms, uraemia, urea, urine, azotaemia, azotemia, chemotherapy, clinical picture, dyspnea, glutamyl transferase, high blood glucose, hyperglycemia, hypoalbuminemia, hypoproteinaemia, hypovolemia, kidney failure, oliguria, protein feeds, tachycardia, uremia, Germany.

Hallowell, G.D.; Potter, T.J.; Mills, N.J. **Labial fusion causing urinary tract obstruction in an alpaca cria.** *Veterinary Record*— London. 2007 Dec 22-29; 161(25): 862. ISSN: 0042-4900
URL:<http://veterinaryrecord.bvapublications.com/>

NAL call no.: 41.8 V641

Abstract: The first case of congenital vulval abnormality in alpacas in Europe was described. A 6-h-old female alpaca cria was presented at the Royal Veterinary College as an out-of-hours emergency due to a vulval swelling [UK, date not given]. Physical examination was unremarkable other than the swollen vulva and absence of identifiable vulval opening. Increased lactate concentration, reduced total protein and increased creatinine and urea concentrations were observed. A diagnosis of labial fusion was made with secondary azotaemia and partial failure of passive transfer. The imperforate tissue was opened surgically by incising through the midline of the fused labia. At this stage, urine was passed. The animal was seen to urinate normally and was discharged 3 days after presentation with 3-day further treatment of oral trimethoprim-sulfadiazine and ranitidine. No further problems were reported with the

animal, and 8 weeks later, it did well.

Descriptors: alpacas, crias, vulva, congenital abnormalities, case studies.

Hardefeldt, L.Y.; Textor, J.A.; Dart, A.J. **Renal agenesis in an alpaca cria.** *Australian Veterinary Journal*. 2007 May; 85(5): 185-187. ISSN: 0005-0423

URL:<http://www.ava.com.au/avjpast.php?journalid=9&plink=avj03.htm>

DOI:<http://dx.doi.org/10.1111/j.1751-0813.2007.00125.x>

NAL call no.: 41.8 Au72

Abstract: A 4-day-old alpaca cria presented for inappetence that responded to symptomatic treatment. The cria re-presented with acute signs of inappetence and azotaemia. The azotaemia persisted despite intravenous fluid therapy. There was no right kidney on ultrasound and there appeared to be perirenal oedema around the left kidney. A diagnosis of right renal agenesis and acute renal failure of the left kidney was made. The cria failed to improve and was euthanased. Necropsy examination confirmed right renal agenesis and agenesis of the right ureter and right renal artery. A section of left kidney submitted for histological examination revealed diffuse, acute, marked tubular degeneration and nephrosis. The cause of the renal failure in the left kidney was not determined. Reproduced with permission from CAB Abstracts.

Descriptors: alpacas, neonates, renal failure, kidneys, kidney diseases, animal diseases, congenital abnormalities, case studies, anorexia, disease diagnosis, signs and symptoms of disease, histopathology, disease course, renal agenesis.

Hearn, F.P.D. [Editor]. **Proceedings of the Annual Conference of the Society for Theriogenology, Monterey, California, USA, 7-11 August 2007.** *Theriogenology*. 2007; 68(3): 295-520. ISSN: 0093-691X. Note: A special issue on reproduction—technologies and diseases.

URL:<http://www.sciencedirect.co./science/journal/0093691x>

DOI : <http://dx.doi.org/10.1016/j.theriogenology.2007.05.051>

Descriptors: alpacas, buffalo, cats, cattle, dogs, pigs, horses, llamas, reproduction, reproductive technologies, reproductive diseases, etiology, animal breeding, semen handling, artificial insemination, AI, cryopreservation, diagnosis, diagnostic techniques, domestic animals, drug therapy, embryo transfer, embryos, fertility, in vitro fertilization, livestock, pharmacodynamics, pregnancy, reproductive disorders, reproductive performance, gestation, drugs.

Henrich, M.; Reinacher, M.; Hamann, H.P. **Lethal bluetongue virus infection in an alpaca.** *Veterinary Record*. 2007; 161(22): 764. ISSN: 0042-4900. Note a correspondence.

URL:<http://veterinaryrecord.bvapublications.com/archive/>

NAL call no.: 41.8 V641

Abstract: The clinical, pathological, postmortem and histopathological features of bluetongue virus infection in a 5-year-old alpaca in Germany are described.

Descriptors: alpacas, clinical picture, case study, postmortem organ sampling, animal pathology, histopathology, clinical aspects, diagnosis, histopathology, Bluetongue virus, viral diseases, Germany.

Heuer, C.; French, N.P.; Jackson, R.; Mackereth, G.F. **Application of modelling to determine the absence of foot-and-mouth disease in the face of a suspected incursion.**

URL:<http://www.vetjournal.org.nz>

Abstract: AIM: To use disease modelling to inform a response team about the number of animals per herd/flock to be examined, and the start date and duration of clinical surveillance required to be confident that foot-and-mouth disease (FMD) was not present on an island in New Zealand with a population of approximately 1,600 cattle, 10 000 sheep and a small number of pigs, goats and alpacas. METHODS: Because the probability of detecting clinical disease in (the) primary case(s) in larger herds and flocks was extremely low, deterministic and stochastic mathematical SLIR (susceptible, latent, infectious, recovered) models for the transmission of infection were constructed to estimate the date when clinical lesions in herds and flocks would be detected with 95% confidence. Surveillance targeted the first wave of infections following a suspect index case. RESULTS: If 70 cattle in herds of about 400 cattle were examined it was estimated it would take approximately 13 (90% stochastic range 9-19) days from first exposure before it would be possible to achieve 95% confidence for detecting clinical signs for a low-virulence virus, and 9 (7-14) days for a high-virulence virus. The duration of sufficiently accurate clinical detection was 17 (15-19) days and 13 (12-14) days for low- and high-virulence viruses, respectively. A sample of 70 sheep from flocks of >1,000 would be required to achieve clinical detection at about the same time but with a shorter period of detection than for cattle. The duration of effective detection could be increased by examining a larger sample in most sheep flocks, however the small size of many cattle herds in the study population limited the confidence of detecting group-level disease in cattle, therefore necessitating repeated herd inspections. The model suggested that group-level detection was not feasible if it was based on elevated body temperature alone because of short durations of fever in infected animals. CONCLUSION AND CLINICAL RELEVANCE: Simulation modelling is a useful and powerful tool for informing ongoing surveillance activities in the face of an exotic disease incursion. Results of modelling suggested to start clinical inspection activities at 4 days and to continue regular inspection twice a week for about 35 days after the date of first exposure, to satisfy the required 95% confidence threshold of clinical detection of FMD in cattle herds and sheep flocks.

Descriptors: alpacas, cattle, pigs, sheep, goats, livestock diseases, foot and mouth disease, virulence, body temperature, clinical aspects, disease models, disease surveys, disease transmission, livestock, mathematical models, simulation models, New Zealand.

Hongo, A.; Toukura, Y.; Choque, J.L.; Aro, J.A.; Yamamoto, N. **The role of a cleft upper lip of alpacas in foraging extremely short grasses evaluated by grazing impulse.** *Small Ruminant Research*. 2007 May; 69(1-3): 108-114. ISSN: 0921-4488

NAL call no.: SF380.I52

URL:<http://www.sciencedirect.com/science/journal/09214488>

DOI:<http://dx.doi.org/10.1016/j.smallrumres.2005.12.020>

Abstract: The role of a cleft upper lip of alpaca (*Lama pacos*) in foraging short pastures was investigated using biting forces and associated impulses in animal grazing. Three Merino wethers and three castrated alpacas were used. Ten (10L), 20 (20L), 30 (30L), 40 (40L) or 50 (50L) leaves of orchardgrass (*Dactylis glomerata*) per load cell were offered to animals, and three-directional biting forces were digitally recorded at 5 s-1000. From the total biting force/time curve, grazing impulse was calculated, equivalent to the area surrounded by the

curve. The grand mean of the number of grazed leaves per bite was 9.8 pl 0.53 in alpaca and 17.9 pl 1.31 in sheep. Remaining leaf length after grazing trial was significantly lower in alpaca than in sheep (11.9 pl 0.19 mm versus 18.5 pl 0.41 mm). Alpaca grazed leaves with significantly lower mean biting force (7.0 pl 0.69 N versus 20.0 pl 1.80 N) and significantly shorter duration time per one biting force (0.11 pl 0.005 s versus 0.18 pl 0.19 s) than sheep. The grand mean of sum of grazing impulse was lower ($P < 0.002$) in alpaca (2.8 pl 0.42 N s) than in sheep (9.4 pl 1.95 N s). Grazed DM weight increased with increasing leaf densities, but there was no difference between alpaca and sheep. The ratio of DM intake to grazing impulse was significantly higher in alpaca than in sheep (0.18 pl 0.016 g DM/N s versus 0.08 pl 0.010 g DM/N s). The grazing strategy in alpaca seems to be an adaptation for foraging extremely short grasses. Alpacas may push aside cleft upper lips when trying to grasp short leaves, resulting in keeping incisors at lower insertion position near the ground surface. **Descriptors:** sheep, alpacas, *Lama*, cleft palate, lips, mechanics, forces, sensation, animal feeding, browsing, foraging, dry matter intake, forage, pasture plants, leaves, height, grazing, grazing species differences, grazing impulse.

Hustace, J.L.; Firshman, A.M.; Villarroel, A.; Cebra, C.K. **Prognostic indicators for survival in crias aged \leq 60 days.** *Journal of Veterinary Internal Medicine*. 2007; 21(3): 584. ISSN: 0891-6640. Note: 25th Annual Forum of the American College of Veterinary International Medicine, Seattle, WA, USA; June 06 -09, 2007
URL:<http://www.blackwell-synergy.com/doi/ref/10.1111/j.1939-1676.2008.0072.x>
NAL call no.: SF601.J65

Descriptors: alpacas, females, males, crias survival, indicators of survival in neonates, blood cells, platelets, white blood cells, lymphocytes, neutrophils, immune system, fibrinogen creatinine, liver enzymes, blood urea, non-esterified fatty acids, beta hydroxybutyrate, blood gas analysis, heart rate, respiration rate, clinical techniques.

Jin, L.; Cebra, C.K.; Baker, R.J.; Mattson, D.E.; Cohen, S.A.; Alvarado, D.E.; Rohrmann, G.F. **Analysis of the genome sequence of an alpaca coronavirus.** *Virology*. 2007 Aug 15; 365(1): 198-203. ISSN: 0042-6822
URL:<http://www.sciencedirect.com/science/journal/00426822>
DOI:<http://dx.doi.org/10.1016/j.virol.2007.03.035>
NAL call no.: 448.8 V81

Abstract: Coronaviral infection of New World camelids was first identified in 1998 in llamas and alpacas with severe diarrhea. In order to understand this infection, one of the coronavirus isolates was sequenced and analyzed. It has a genome of 31 076 nt including the poly A tail at the 3' end. This virus designated as ACoV-00-1381 (ACoV) encodes all 10 open reading frames (ORFs) characteristic of Group 2 bovine coronavirus (BCoV). Phylogenetic analysis showed that the ACoV genome is clustered closely (>99.5% identity) with two BCoV strains, ENT and LUN, and was also closely related to other BCoV strains (Mebus, Quebec, DB2), a human coronavirus (strain 043) (>96%), and porcine hemagglutinating encephalomyelitis virus (>93% identity). A total of 145 point mutations and one nucleotide deletion were found relative to the BCoV ENT. Most of the ORFs were highly conserved; however, the predicted spike protein (S) has 9 and 12 amino acid differences from BCoV LUN and ENT, respectively, and shows a higher relative number of changes than the other

proteins. Phylogenetic analysis suggests that ACoV shares the same ancestor as BCoV ENT and LUN. Reproduced with permission of CAB Abstracts.

Descriptors: alpacas, Camelidae, Coronaviridae, genome, molecular cloning, complementary DNA, sequence analysis, viral diseases of animals, diarrhea, bovine coronavirus.

Johnson, J.L.; Bishop, M.A.; Jenner, F. **The effects of oral omeprazole on third compartment pH in healthy male alpacas.** *Journal of Veterinary Internal Medicine.* 2007; 21(3): 584. ISSN: 0891-6640. Note: "25th Annual Forum of the American College of Veterinary International Medicine, Seattle, WA, USA; June 06 -09, 2007."

DOI:<http://www.blackwell-synergy.com/doi/ref/10.1111/j.1939-1676.2008.0072.x>

NAL call no.: SF601.J65

Descriptors: llamas, alpacas, males, effects on digestive system, effects of antibiotics, ranitidine, drug, anti-ulcer drug, antihistamine, histamine H2 receptor antagonist drug, cimetidine, omeprazole, enzyme inhibitor drug, gastric secretions, oral administration, surgery.

Kaufmann, C.; Meli, M L.; Robert, N.; Willi, B.; Hofmann-Lehmann, R.; Wengi, N.; Lutz, H.; Zanolari, P. **Haemotrophic mycoplasmas in South American camelids in Switzerland.** In: G. Wibbelt; N. Bergholz ; S. Seet; and H. Hofer. **Management of cryptosporidiosis in a hoofstock contact area.** *Proceedings of the Institute of Zoo and Wildlife Research*, Berlin. 2007; (7): 14-17. ISSN: 1431-7338. Note: "Erkrankungen der Zootiere. Verhandlungsbericht des 43. Internationalen Symposiums über die Erkrankungen der Zoo und Wildtiere, Edinburgh, UK, 19-20 May, 2007. "

URL:<http://www.izw-berlin.de>

Abstract: 140 South American camelids imported from Peru in 2004 was raised in a farm located in the southern part of Switzerland on an altitude of 850 to 1000 meters above sea level. The animals were divided into 6 groups on different pastures and were subjected to a regular coprological monitoring for parasites and were given adequate treatment. For breeding reasons group 1 was separated from the other groups from the date of importation. The distance between pastures ranged from 50 to 750 meters. From the parasites that were examined, *Candidatus haemolamae* was identified using PCR. In June 2006, a female alpaca from group 1 died unexpectedly after giving birth to a foal. Parasitological investigation revealed *Eimeria* spp., *Dicrocoelium dendriticum*, and nematodes from the faeces of the animal. A sample of blood from the heart was analysed and was positive for *Candidatus M. haemolamae*. One month later another female alpaca from group 1 died and histopathological examination of the liver showed *Dicrocoelium dendriticum* as the culprit. Further coprological analysis revealed the presence of *Eimeria*, *Nematodirus* and *Trichuris*. Of the ten infected animals that were treated with oxytetracycline, four continued to be infected after two weeks and even after re-treatment the remaining three infected animals was positive for *Candidatus haemolamae*. This incident was the first recorded case of *Candidatus M. haemolamae* infections in alpacas in Europe. Reproduced with permission from CAB Abstracts.

Descriptors: alpacas, farm raised animals, disease prevalence, disease surveys, disease transmission, epidemiology, histopathology, *Dicrocoelium dendriticum*, *Eimeria*, *Nematoda*, *Nematodirus*, *Trichuris*, *Adenophorea*, *Candidatus haemolamae*, disease surveillance, *Enoplida*, parasite control, *Secernentea*, *Strigeida*, *Strongylida*, Switzerland.

Lau, Peri; Hill, Peter B.; Rybnc#ek, Jan; Steel, Lynne. **Sarcoptic mange in three alpacas treated successfully with amitraz.** *Veterinary Dermatology*. 2007 Aug; 18(4): 272-277. ISSN: 0959-4493

URL: <http://www3.interscience.wiley.com/journal/117989328/home>

DOI:<http://dx.doi.org/10.1111/j.1365-3164.2007.00601>

NAL call no.: SF901.V47

Abstract: Sarcoptic mange is a serious skin disease in alpacas that can result in high morbidity and even mortality. Three alpacas were presented with sarcoptic mange that had previously failed to respond to repeated topical applications of eprinomectin, and an injection of doramectin. They were moderately to severely pruritic, had extensive lesions of alopecia, erythema, scaling and crusting, and had lost weight. As no drug is currently licensed for the treatment of sarcoptic mange in alpacas in the UK, they were treated with a topical solution of amitraz (50 mL in 10 L) after initial bathing with antibacterial or keratolytic shampoos. The clinical signs completely resolved with no relapse over a 10-month follow-up period. In this small group of alpacas, amitraz was an effective and well-tolerated treatment for sarcoptic mange.

Descriptors: alpacas, animal skin parasites, scabies, *Sarcoptes scabiei*, amitraz, topical application, aqueous solutions, combination drug therapy, pretreatment, washing with antibacterial or keratolytic shampoos, antimicrobial agents, dosage, disease course, drug resistance, doramectin, eprinomectin, case studies, United Kingdom.

Llanos, Anibal J.; Riquelme, Raquel A.; Herrera, Emilio A.; Ebensperger, German; Krause, Bernardo; Reyes, Roberto V.; Sanhueza, Emilia A.; Pulgar, Victor M.; Behn, Claus; Cabello, Gertrudis; Parer, Julian T.; Giussani, Dino A.; Blanco, Carlos E.; Hanson, Mark A. **Evolving in thin air - Lessons from the llama fetus in the altiplano.** *Respiratory Physiology and Neurobiology*. 2007; 158(2-3): 298-306. ISSN: 1569-9048

Descriptors: llamas, alpacas, vicunas, guanacos, fetal life, high altitude animals, fetal response to acute hypoxia, peripheral vasoconstriction mediated by alpha adrenergic mechanisms, high plasma concentration of catecholamines, high plasma concentration of neuropeptide Y, NO and endothelin 1, local blood flows, cerebral hypometabolic response, reduced oxygen consumption, Na-K-ATPase activity, temperature, absence of seizures and apoptosis of neural cells, Andean altiplano.

Lyashchenko, K.P.; Greenwald, R.; Esfandiari, J.; Meylan, M.; Burri, I.H.; Zanolari, P. **Antibody responses in New World camelids with tuberculosis caused by *Mycobacterium microti*.** *Veterinary Microbiology*. 2007 Dec 15; 125(3-4): 265-273. ISSN: 0378-1135

URL:<http://dx.doi.org/10.1016/j.vetmic.2007.05.026>

NAL call no.: SF601.V44

Abstract : Antibody responses in New World camelids (NWC) infected with *Mycobacterium microti* were studied by two serological methods, multiantigen print immunoassay (MAPIA) and lateral-flow-based rapid test (RT). Serum samples were collected during 2004-2006 from 87 animals including 1 alpaca and 7 llamas with confirmed or suspected *M. microti* infection, 33 potentially exposed but clinically healthy animals from known infected herds, and 46 control NWC from herds where infection had not been previously diagnosed. The serological assays correctly identified infection status in 97% (MAPIA) or 87% (RT) cases. In three

llamas with confirmed *M. microti* infection and one llama with gross pathology suggestive of disease, for which multiple serum samples collected over time were available, the antibody-based tests showed positive results 1-2 years prior to the onset of clinical signs or being found dead. In MAPIA, MPB83 protein was identified to be an immunodominant serological target antigen recognized in NWC infected with *M. microti*. With the limited number of animals tested in this study, the serological assays demonstrated the potential for convenient, rapid, and accurate diagnosis of *M. microti* infection in live llamas and alpacas.

Descriptors: llamas, alpacas, *Lama*, animal diseases, tuberculosis, *Mycobacterium microti*, disease detection, serodiagnosis, immunologic techniques, new methods, rapid methods, antibody detection, immunoassay, accuracy, validity, epidemiological studies, herds, screening, seroprevalence, multi-antigen print immunoassay, lateral-flow-based rapid test.

Maass, D.R.; Sepulveda, J.; Pernthaner, A.; Shoemaker, C.B. **Alpaca (*Lama pacos*) as a convenient source of recombinant camelid heavy chain antibodies (VHHs)**. *Journal of Immunological Methods*. 2007; 324(1/2): 13-25. ISSN: 0022-1759

URL:<http://www.sciencedirect.com/science/journal/00221759>

Abstract: Recombinant single domain antibody fragments (VHHs) that derive from the unusual camelid heavy chain only IgG class (HCAbs) have many favourable properties compared with single-chain antibodies prepared from conventional IgG. As a result, VHHs have become widely used as binding reagents and are beginning to show potential as therapeutic agents. To date, the source of VHH genetic material has been camels and llamas despite their large size and limited availability. Here we demonstrate that the smaller, more tractable and widely available alpaca is an excellent source of VHH coding DNA. Alpaca sera IgG consists of about 50% HCAbs, mostly of the short-hinge variety. Sequencing of DNA encoding more than 50 random VHH and hinge domains permitted the design of PCR primers that will amplify virtually all alpaca VHH coding DNAs for phage display library construction. Alpacas were immunized with ovine tumour necrosis factor alpha (TNF alpha) and a VHH phage display library was prepared from a lymph node that drains the sites of immunizations and successfully employed in the isolation of VHHs that bind and neutralize ovine TNF alpha.

Descriptors: alpacas, antibodies, bacteriophages, DNA, DNA sequencing; IgG, immunization, recombination, tumor necrosis factor, cachectin, cachexin, deoxyribonucleic acid, genetic recombination, immune sensitization, nucleotide sequence analysis, nucleotide sequencing.

Mangan, Brendan G; Gionfriddo, Juliet R.; Powell, Cynthia C. **Bilateral nasolacrimal duct atresia in a cria**. *Veterinary Ophthalmology*. 2008 Jan; 11(1): 49-54. ISSN: 1463-5216

URL:<http://www3.interscience.wiley.com/journal/118507707/home>

DOI: <http://dx.doi.org/10.1111/j.1463-5224.2007.00595>

NAL call no.: SF891.V47

Abstract: A 2-month-old, male alpaca had a 1-month history of mucoid ocular discharge from the left eye. Signalment, history and clinical findings were suggestive of a congenital nasolacrimal outflow obstruction. A dacryocystorhinogram confirmed bilateral nasolacrimal duct atresia, which involved the distal half of both nasolacrimal ducts. In order to establish alternative outflow, a conjunctivomaxillo sinusotomy and conjunctivorhinostomy were per-

formed on the right and left eye, respectively. The surgical openings remain patent after 11 months, and there have been no clinical signs of nasolacrimal disease.

Descriptors: alpaca, male cria, case study, signalment, history and clinical findings, congenital nasolacrimal outflow obstruction, nasolacrimal duct atresia.

Marai, I.F.M.; Zeidan, A.E.B. **Artificial insemination in Camelidae.** *Tropical and Subtropical Agroecosystems*. 2007; 7(1): 1-13. Note: In English with a Spanish summary. Literature review.

URL:<http://www.veterinaria.uady.mx/publicaciones/journal/2007-1/128-camels2.pdf>

Abstract: The most important problems of Artificial Insemination (AI) in Camelidae is its timing in relation to ovulation in the she-camel. The present article reviewed collection of semen, processing of semen, manipulation of the female and semen deposition technique in Camelidae species. Commonly, semen is collected by electroejaculation, artificial vagina (AV), flushing of the epididymus with saline solution, while the more accepted methods are the former two methods. Semen is usually used in raw condition or after extension, depending on the method of semen processing. In the fresh raw method, whole semen is used within minutes or after few hours. Extension of the semen ejaculate is carried out by adding extenders and it is required in more efficient use of AI, in short-term preservation or liquid semen (within a few hours or days) and long-term preservation or frozen semen (months or years). In short-term preservation, semen is used extended under different temperatures (30, 25 or 4 degrees C). Long-term preservation is carried out by cryopreservation. Packaging methods such as pellets, ampoules or in plastic straws with different volumes (0.25, 0.5 or 4 ml) represent different freezing procedures. The quality and survival of spermatozoa of post-thaw semen are highly variable from one male to the other, even after using the same freezing technique. To ensure that the inseminated females ovulate, hormonal manipulation of ovarian activity is used such as the induction of follicular activity and ovulation, as well as, synchronization of these phases in a group of females. The best time for insemination can only be determined by ultrasonography and/or rectal palpation of the ovaries. The other alternative is to inseminate at known intervals following induction of ovulation by hormonal treatment with human-chorionic gonadotropin (hCG) or gonadotropin-releasing hormone (Gn-RH).

Descriptors: alpacas, llamas, dromedaries, Bactrian camels, guanacos, vicunas, artificial insemination, cryopreservation, deposition site, freezing, frozen semen, GnRH, HCG, estrus, ovulation, reproduction, semen, semen diluent additives, semen preservation, spermatozoa, synchronization, synchronized females, gonadoliberin, gonadotropin releasing hormone, techniques.

Marin, Juan C.; Zapata, Beatriz.; Gonzalez, Benito A.; Bonacic, Cristian; Wheeler, Jane C. ; Casey, Ciara; Bruford, Michael W.; Palma, R. Eduardo; Poulin, Elie; Alliende, M. Angelica; Sportorno, Angel E. **Sistematica, taxonomia y domesticacion de alpacas y llamas: nueva evidencia cromosomica y molecular.** [Systematics, taxonomy and domestication of alpaca and llama: new chromosomal and molecular evidence.] *Revista Chilena de Historia Natural*. 2007; 80(2): 121-140. ISSN: 0716-078X. Note: In Spanish with an English summary.

URL:<http://www.scielo.cl>

Abstract: Four camelid species exist in South America: two wild, the guanaco (*Lama guanicoe*)

coe) and the vicuna (*Vicugna vicugna*), and two domestic, the alpaca (*Lama pacos*) and the llama (*Lama glama*). However, the origin of the domestic species has been a matter of debate. In the present study, variations in chromosome G banding patterns and in two mitochondrial gene sequences have been used to study the origin and classification of the llama and alpaca. Similar patterns in chromosome G band structure were observed in all four Lamini species, and these in turn were similar to the bands described for camels, *Camelus bactrianus*. However, fine and consistent differences were found in the short arms of chromosome 1, separating camels, guanacos and llamas from vicunas and alpacas. This pattern was consistent even in a hybrid guanaco x alpaca. Equivalent relationship showed the complete cytochrome b gene sequences, and the minimum expansion tree of the partial control region sequence, grouping guanaco with llama and vicuna with alpaca. Phylogenetic analyses showed *V. vicugna* and *L. guanicoe* as monophyletic groups. Analysis of both gene sequences revealed two clades within vicuna, concordant with the two described subspecies, but the results for guanaco did not confirm existence of the four previously proposed subspecies. The combined analysis of chromosomal and molecular variation showed close genetic similarity between alpacas and vicunas, as well as between llamas and guanacos. Although directional hybridization was revealed, our results strongly support the hypothesis that the llama would have derived from *L. guanicoe* and the alpaca from *V. vicugna*, supporting reclassification as *V. pacos*. Reproduced with permission from CAB Abstracts.

Descriptors: camelids, Bactrian camels, 2 wild species, guanacos (*Lama guanicoe*) and vicunas (*Vicugna vicugna*), 2 domesticated species, alpacas (*Lama pacos*) and llamas (*Lama glama*), classification of species, chromosome G banding pattern variations, 2 mitochondrial gene sequences variations, analysis showed close genetic similarity of alpacas and vicunas and of llamas and guanacos, hypothesize llama derived from *L. guanicoe*, alpaca derived from *V. vicugna*, supporting reclassification as *V. pacos*, genetic variability, South American camelids.

Mate, M.L.; Di Rocco, F.; Zambelli, A.; Vidal-Rioja, L. **Mitochondrial heteroplasmy in Control Region DNA of Small Ruminant Research.** *South American camelids*. 2007 Aug; 71(1-3): 123-129. ISSN: 0921-4488

URL:<http://www.sciencedirect.com/science/journal/09214488>

DOI:<http://dx.doi.org/10.1016/j.smallrumres.2006.04.016>

NAL call No.: SF380.I52

Abstract: In the present work, polymerase chain reaction-single strand conformation polymorphism and sequencing were used to investigate the length and nucleotide variability in the Control Region mitochondrial DNA of the four South American camelid species from Argentina. To assess these the complete Control Region of 20 animals, 5 each of guanaco, llama, alpaca and vicuna species were cloned. Seventy-three clones corresponding to the 20 animals were screened and 7 different SSCP patterns were identified. Sequencing of all clones showed 9 different haplotypes contained in the 350 bp hypervariable segment of the Control Region. Interestingly, 3 guanacos, 3 vicunas, 3 alpacas and 1 llama were heteroplasmic for different nucleotide positions. The screening of the Control Region mitochondrial DNA in blood samples from about 200 wild guanacos from Argentine Patagonia supported the above results. After comparison with other vertebrate species, we concluded that nucleotide substitutions are the main cause of heteroplasmy found in Control Region mitochondrial DNA of these taxa.

Descriptors: *Lama*, llamas, alpacas, vicunas, *Lama guanicoe*, phylogeny, genetic variation, genetic-markers, mitochondrial DNA, molecular cloning, clones, nucleotide sequences, polymerase chain reaction, single stranded conformational polymorphism, mutation, single nucleotide polymorphism, genome, genomics, heteroplasmy, molecular sequence data, Argentina.

Merriwether, D.A. **Domestication of alpacas: Genetics of the North American herd.** *American Journal of Physical Anthropology*. 2007; (Suppl. 44): 171. ISSN: 0002-9483. Note: 76th Annual Meeting of the American Association of Physical Anthropologists, Philadelphia, PA, USA; March 28 -31, 2007.

Descriptors: vicunas, llamas, alpacas, guanacos, domesticated animals, breeding, genetics, North America.

Mey, Eberhard; Gonzalez-Acuna, Daniel. **Ueber einen Massenbefall von *Bovicola (Lepikentron) breviceps* (Rudow) (Insecta, Phthiraptera, Ischnocera, Bovicolidae) auf einem Alpaka *Vicugna vicugna* forma *pacos* in Thueringen (Deutschland), mit Anmerkungen zur Parthenogenese bei Tierlaeusen. [On a mass infestation of *Bovicola (Lepikentron) breviceps* (Rudow) (Insecta, Phthiraptera, Ischnocera, Bovicolidae) on an alpaca *Vicugna vicugna* forma *pacos* in Thueringen (Germany), with remarks on parthenogenesis in animal lice.]** *Rudolstaedter Naturhistorische Schriften*. 2007 January; 14: 71-82. ISSN: 0863-0844. Note: In German with summaries in English, German, and Spanish.

Descriptors: alpaca, female imported from Chile, lice infestation, *Bovicola (Lepikentron) breviceps*, shearing of infected fleece, 231 female lice, 2 male lice 637 larvae, 500 nits and husks, confirms thelytoky (obligatory parthenogenesis) dominant method of reproduction, Central Germany.

Morgante, Massimo; Stelletta, Calogero; Costa, Anna; Bevilacqua, Francesca; Piccione, Giuseppe. **Daily rhythms of some physiological variables in alpaca (*Lama pacos*).** *Journal of Animal and Veterinary Advances*. 2007; 6(3): 335-339. ISSN: 1680-5593

Abstract: Circadian rhythmicity, an intrinsic characteristic of some physiological parameters in livestock, may be influenced by different exogenous synchronizers. The aim of the present study was to evaluate the influence of environmental temperature on the circadian pattern of some hormonal, haematochemical, urinary and physiological parameters in Alpaca (*Lama pacos*). For this purpose, 6 clinically healthy adult female alpacas aged 7 [plus or minus] 1 years and bred under similar conditions on a farm 400 meters above sea level were used. Twice, at two different environmental temperatures (5-13.5[degree]C vs. 11.5-33.5[degree]C), blood samples were collected by means of a jugular puncture and urine samples were collected by means permanent catheters on each subject every 2 h during 24 h. A trigonometric statistic model has been applied to the records' mean values obtained during the experimental sessions to describe analytically the periodic phenomenon; furthermore, the singles Cosinor method was applied to the periodic parameters. The application of the periodic model enabled us to point out the circadian pattern of the following blood parameters: Melatonin, glucose, triglycerides, urea, phosphorus, magnesium and potassium. The same model was applied to the following urinary and physiological parameters: Creatinine, magnesium, sodium, fractional clearance of magnesium and potassium and body temperature. Rhythm

stability and periodicity keeping under natural environmental conditions (characterized by variable temperature, relative humidity and photoperiod), though with different acrophases, enable us to establish that periodical parameters pattern shows a strong rhythm. This one can be influenced by exogenous factors (daylength and temperature in this particular instance) able to modify its synchronicity but not its intrinsic periodicity.

Descriptors: alpacas; *Lama pacos*; circadian rhythms; physiological parameters; effect of 2 environmental temperatures on hormones, blood chemistry, urinary changes, melatonin, glucose, triglycerides, urea, phosphorus, magnesium, potassium, creatinine, clearance, body temperature.

Morton, K.M.; Bathgate, R.; Evans, G.; Maxwell, W.M.C. **Cryopreservation of epididymal alpaca (*Vicugna pacos*) sperm: a comparison of citrate-, Tris- and lactose-based diluents and pellets and straws.** *Reproduction, Fertility and Development*. 2007; 19(7): 792-796. ISSN: 1031-3613

URL:<http://www.publish.csiro.au/nid/45.htm>

DOI: doi:10.1071/RD07049

NAL Call no: QP251.R47

Abstract: Epididymal spermatozoa were harvested from male alpacas and frozen after extension and cooling to 4 degrees C in citrate-, Tris- and lactose-based diluents (Experiment 1) and as pellets in 0.25- and 0.5-mL straws on either dry ice or over liquid nitrogen vapour (Experiment 2) to determine the effects diluents and packaging on their motility and acrosome integrity. In Experiment 1, sperm motility was higher after cooling to 4 degrees C and after freeze-thawing (0 but not 3 h post-thaw) for spermatozoa extended in the lactose- than the citrate- or Tris-based diluent ($P < 0.05$). Post-thaw acrosome integrity after cooling to 4 degrees C and post-thaw 0 (h) was reduced for spermatozoa frozen in citrate- compared with lactose- or Tris-based diluents, but was similar for all groups 3 h after thawing. In Experiment 2, sperm motility immediately after thawing was higher for pellet freezing than for 0.25- or 0.5-mL straws on dry ice or liquid nitrogen vapour ($P < 0.05$), although by 3 h post-thaw motility was similar for pellets and straws ($P > 0.05$). Acrosome integrity was similar for all groups immediately after thawing and 3 h post-thaw. Cryopreservation of epididymal alpaca spermatozoa is feasible, with retained motility and acrosome integrity post-thaw. Freezing as pellets in a lactose-based diluent is recommended. Reproduced with permission from CAB Abstracts.

Descriptors: alpacas, acrosome, artificial insemination, citric acid, milk sugar, sperm motility, cryopreservation, epididymis, freezing, frozen semen, lactose, sperm motility, semen diluents, semen preservation, spermatozoa, techniques.

Navarre, C.B. **Fluid therapy in small ruminants.** In R.A. Smith [Editor]. *Proceedings of the Fortieth Annual Conference, American Association of Bovine Practitioners, Vancouver, British Columbia, Canada, 20-22 September, 2007*. 2007; 176-178. Note: In English with a French summary.

Abstract: Methods for fluid therapy in adult and neonatal sheep, goats and camelids are presented, as well as catheters and key formulas. Fluid therapy regimes for common clinical situations, such as diarrhea and sepsis, are provided. Reproduced with permission from CAB Abstracts.

Descriptors: alpacas, goat kids, llamas, sheep, lambs, catheters, dehydration physiological, diarrhea, scouring, dehydration, rehydration, fluid therapy, methodology, sepsis.

Nielsen, K.; Smith, P.; Yu, W.L. **Detection of anti-*Brucella* antibodies in llama (*Lama glama*).** *Journal of Immunoassay and Immunochemistry*. 2007; 28(1): 61-66. ISSN: 1532-1819.

Descriptors: 7 llamas, killed vaccine of *Brucella abortus* S1119.3, 299 other llamas and 2075 alpaca sera tested, buffered antigen plate agglutination test, complement fixation test, indirect enzyme immunoassays using smooth and rough lipopolysaccharides, competitive enzyme immunoassay, fluorescence polarization assays, results compared, specificity values, false positives.

Nes, E. van; Pieterse, M.C. **Voortplanting bij lama en alpaca. [Reproduction in the llama and alpaca.]** *Veehouder en Dierenarts*. 2007; 21(2): 20-22. ISSN: 1381-8007. Note: In Dutch.

Descriptors: alpacas, llamas, reproduction, anatomy, pregnancy, gestation, semen, reproductive organs, birth.

Newman, Kenneth D.; Anderson, David E. **Humerus fractures in llamas and alpacas: Seven Cases(1998-2004).** *Veterinary Surgery*. 2007 Jan; 36(1): 68-73. ISSN:

URL:<http://www3.interscience.wiley.com/journal/118532623/home>

DOI: <http://dx.doi.org/10.1111/j.1532-950X.2007.00237>

Abstract: To describe treatment and outcome of humerus fractures in llamas and alpacas. Retrospective study. Llamas (n=4) and alpacas (3) with humerus fracture. Medical records (January 1, 1998-August 1, 2004) were reviewed for small camelids with a humeral fracture. Retrieved data were signalment, history, physical examination and radiographic findings, surgical and medical treatment, and outcome. Humeral fracture occurred in 7 of 38 (18%) camelids admitted with fractures. Affected animals were aged from 1 month to 3 years old. Fracture configuration included long-oblique (n=4), short-oblique (2), and Salter-Harris Type II fracture of the proximal physis (1). One adult llama was managed by stall confinement and surgical repair was attempted in the other camelids: fixation by screws inserted in lag fashion (n=3), intramedullary pinning and fixation by screws inserted in lag fashion (1), rush pinning (1), and bone plating (1). A Velpeau sling was used for additional support in 3 animals. All fractures healed but temporary radial nerve paresis occurred in 3 animals. Limb shortening and permanent lameness occurred in the llama managed conservatively. Humerus fractures in small camelids are amenable to surgical repair which may offer better long-term outcome than medical treatment alone. Surgical treatment of humerus fractures should have a good prognosis in llamas and alpacas. In select cases, minimally invasive techniques, such as rush pinning or fixation by screws inserted in lag fashion are sufficient for fracture healing.

Descriptors: llamas, alpacas, bone fractures, humerus, fracture fixation, screws, nails (equipment), disease course, postoperative complications, lameness, paralysis, case studies, recommendations.

Niehaus, A.J.; Anderson, D.E. **Tooth root abscesses in llamas and alpacas: 123 cases (1994-2005).**

Journal of the American Veterinary Medical Association. 2007 July 15; 231(2): 284-289. ISSN: 0003-1488

URL:<http://www.avma.org/>

DOI:<http://dx.doi.org/10.2460/javma.231.2.284>

NAL call no.: 41.8 AM3

Abstract: Objective - To determine features, outcome, and complications of surgical treatment of camelid tooth root abscesses. Design - Retrospective case series. Animals - 123 camelids with tooth root abscesses. Procedures - Signalment, history, teeth involved, surgery performed, ancillary diagnostic tests, and short-term complications were recorded from each medical record. An owner questionnaire was used to obtain long-term (>1 year) follow-up information. Results - The most common surgical treatments included tooth extraction (n=106) and apicoectomy (13). Owners provided follow-up information on 84 animals. Postoperative complications were reported in 42 of 84 animals. The most common complications included reinfection (n=15), chronic draining tract (14), and osteomyelitis (14). Significantly more camelids that were in good or obese body condition at the time of surgery were alive at the time of follow-up, compared with those with thin body condition at the time of surgery. Camelids with 2 teeth extracted had significantly more complications than those with 1 tooth extracted. Thirty-four of 47 owners reported that they were completely satisfied with the outcome. Conclusions and Clinical Relevance - Owners of camelids in poor body condition should be forewarned that such animals are at greater risk for complications following dental surgery. Clinicians should recognize that the number of teeth affected was not associated with a poorer outcome. Reproduced with permission from CAB Abstracts.

Descriptors: alpacas, llamas, teeth, dental caries, dental abscess, surgery, postoperative complications, disease diagnosis, risk factors, body condition, tooth extraction, apicoectomy, prognosis.

Nolen-Walston, R.; Bedenice, D.; Rodriguez, C.; Rushton, S.; Bright, A.; Fecteau, M.E.; Short, D.; Majdalany, R.; Tewari, D.; Pedersen, D.; Kiupel, M.; Maes, R.; Piero, F.del **Eastern equine encephalitis in 9 South American camelids.** *Journal of Veterinary Internal-Medicine.* 2007; 21(4): 846-852. ISSN: 0891-6640

URL:<http://www.blackwell-synergy.com/doi/ref/10.1111/j.1939-1676.2008.0072.x>

DOI: [http://dx.doi.org/10.1892/0891-6640\(2007\)21\[846:EEEISA\]2.0.CO;2](http://dx.doi.org/10.1892/0891-6640(2007)21[846:EEEISA]2.0.CO;2)

NAL call no.: SF601.J65

Abstract: Background: Eastern equine encephalitis (EEE) virus is a mosquito-borne togavirus (alphavirus) that causes severe (often fatal) encephalitis in many mammalian species, but it has not been reported previously in South American camelids. Hypothesis: South American camelids can become naturally infected with EEE virus and show encephalitic signs similar to those observed in other affected species. Animals: Nine cases (8 alpacas and 1 llama, aged 3.5 weeks to 12 years) were identified; 4 of 9 were <=10 weeks old. All cases were from the East Coast of the United States and presented in late summer and fall. Methods: A retrospective study was performed to include confirmed cases of EEE in camelids in North America before 2006. Results: Eight of nine (89%) camelids died or were euthanized in extremis, with the mean time to death of 2 days. Clinical signs were consistent with encephalitis and included fever, lethargy, ataxia, seizures, recumbency, torticollis, opisthotonus, and vestibular signs. No consistent hematologic abnormalities were identified, and cerebrospinal fluid contained an increased protein concentration in the single camelid analyzed. No successful therapy was identified. EEE was confirmed by alphavirus detection by using immunohistochemistry (IHC) and polymerase chain reaction (PCR) in the central nervous system (CNS) and by

serology. Findings included polioencephalitis with lymphocytic perivascular cuffing; neutrophil infiltration; gliosis; neuron satellitosis; necrosis; and edema, with intracytoplasmic alphavirus within neurons and glial cells. No virus was detected in extraneural tissues. Conclusions and Clinical Importance: In endemic areas, EEE should be considered a differential diagnosis for young and adult camelids with CNS disease. Brain histopathology with indirect IHC or PCR is diagnostic. Reproduced with permission of CAB Abstracts.

Descriptors: alpacas, llamas, animal pathology, clinical aspects, diagnosis, encephalitis, histopathology, immunohistochemistry, postmortem examinations, autopsy, clinical picture, encephalomyelitis, PCR, postmortem inspections, viral diseases, Eastern equine encephalitis virus, Massachusetts, New Hampshire, New Jersey, New York, North Carolina, US.

Parillo, F.; Mancuso, R.; Catone, G. **Glycohistochemistry of the alpaca epididymis.** *Reproduction in Domestic Animals.* 2007; 42(Suppl. 2): 77. ISSN: 0936-6768. Note: 11th Annual Conference of the European Society for Domestic Animal Reproduction, Celle, Germany; September 21-22, 2007

Descriptors: alpaca; immature male reproduction; lectin staining; sperm; epididymis; sialoglycoconjugates; glycoconjugates; secretion; horseradish conjugates: Con A, LTA, UEA I, DBA, ECA, PNA, SBA, GSA IB4, GSA II, WGA; sialidase degradation; lectin binding.

Parillo, F.; Mari, S.; Tortora, G.; Catone, G. **Glycoconjugate features of the alpaca *Ductuli efferentes*.** *Reproduction in Domestic Animals.* 2007; 42(Suppl. 2): 77. ISSN: 0936-6768. Note: "11th Annual Conference of the European Society for Domestic Animal Reproduction, Celle, Germany; September 21-22, 2007."

Descriptors: alpacas; testis; reproduction system; ductuli efferentes; endocytosis; sialic acid; alpha D mannose; glycoconjugate; L fucose; alpha D glucose; alpha D galactose; sialoglycoconjugate; horseradish peroxidase; lectin conjugants: LTA, UEA I, DBA, ECA, PNA, SBA, GSA IB4, GSA II, WGA, Con A; sialidase; enzymatic digestion; glucidic residue; oligosaccharidic sequence; South America.

Parry, A.J.; Dart, A.J. **Surgical correction of metacarpophalangeal valgus deformity in an alpaca.** *Australian Veterinary Journal.* 2007 Sept; 85(9): 368-370. ISSN: 0005-0423

URL:<http://www.ava.com.au/avjpast.php?journalid=9&plink=avj03.htm>

DOI:<http://dx.doi.org/10.1111/j.1751-0813.2007.00169.x>

NAL call no.: 41.8 AU72

Abstract: A 1-month-old alpaca cria presented with a 13 degree valgus deformity of the left metacarpophalangeal joint. The angular limb deformity was centered on the distal metacarpal physes. Transphyseal bridging of the physes was recommended. Two 2.7 mm cortical bone screws were placed either side of the distal metacarpal physes and a figure of eight wire was placed medially around the screw heads. The screws extended through the medial metacarpus into the axial cortex of the lateral metacarpus. Seven weeks after surgery the limb was straight and the screws and wire were removed. Transphyseal bridging of the distal metacarpal physes can be effectively used for the treatment of metacarpophalangeal valgus in crias with open physes.

Descriptors: alpacas, young animals, case studies metacarpus, phalanges, joints, congenital abnormalities, surgery, screws, metacarpophalangeal joint, metacarpophalangeal valgus.

Plant, Jon D.; Kutzler, Michelle A.; Cebra, Christopher K. **Efficacy of topical eprinomectin in the treatment of *Chorioptes* sp. infestation in alpacas and llamas.** *Veterinary Dermatology*. 2007 Feb; 18(1): 59-62. ISSN: 0959-4493

URL:<http://dx.doi.org/10.1111/j.1365-3164.2007.00558>

NAL call no.: SF901.V47

Abstract: *Chorioptes* sp. mite infestation is increasingly recognized as a cause of skin disease in New World camelids and there is a need for an effective treatment protocol to eliminate herd infestation. In this field trial, eprinomectin applied topically at the rate of 0.5 mg/kg weekly for 10 weeks was found to be ineffective in a herd of 12 llamas and 16 alpacas.

Descriptors: alpacas, llamas, alternative livestock herds, animal parasitic diseases, mange, mites, *Chorioptes*, chorioptic mange, eprinomectin, topical application, drug evaluation, in vivo studies, dosage, dose response, acaricidal properties, drug resistance.

Polidori, P.; Antonini, M.; Torres, D.; Beghelli, D.; Renieri, C. **Tenderness evaluation and mineral levels of llama (*Lama glama*) and alpaca (*Lama pacos*) meat.** *Meat Science*. 2007. Dec; 77(4): 599-601. ISSN: 0309-1740

URL: <http://www.sciencedirect.com/science/journal/03091740>

DOI:<http://dx.doi.org/10.1016/j.meatsci.2007.05.011>

NAL call no.: TX373.M4

Abstract: Tenderness and mineral levels were determined in the Longissimus thoracis taken from 20 llama and 30 alpaca males reared in Peru and slaughtered at 25 months of age. Mineral contents were determined using an inductively coupled plasma emission spectrometer. Tenderness evaluation was determined two and seven days post slaughter using a Warner-Bratzler shear force device. Potassium is the mineral with the highest content, with a significant difference ($P < 0.05$) between the two species of camelids. The other mineral contents were, in decreasing order, phosphorus, sodium, magnesium and calcium, in addition to smaller percentages of zinc and iron. Shear force values determined seven days post slaughter were significantly ($P < 0.01$) lower in both the species compared with the results obtained two days post slaughter.

Descriptors: llamas, alpacas, males, meat quality, slaughter animals, mineral content, tenderness, Peru.

Rainwater-Lovett, K.; Pauszek, S.J.; Kelley, W.N.; Rodriguez, L.L. **Molecular epidemiology of vesicular stomatitis New Jersey virus from the 2004-2005 US outbreak indicates a common origin with Mexican strains.** *Journal of General Virology*. 2007; 88(7): 2042-2051. ISSN: 0022-1317

URL:<http://vir.sgmjournals.org>

DOI:<http://dx.doi.org/10.1099/vir.0.82644-0>

Abstract: Vesicular stomatitis (VS) outbreaks of unknown origin occur at 8-10-year intervals in the south-western USA with the most recent outbreak beginning in 2004. A previous study has suggested that strains causing US outbreaks are closely related to strains causing outbreaks in Mexico [Rodriguez (2002) *Virus Res* 85, 211-219]. This study determined the phylogenetic relationships among 116 vesicular stomatitis New Jersey virus (VSNJV) strains obtained from the 2004 outbreak and from endemic areas in Mexico. All 69 US viruses showed little sequence divergence ($\leq 1.3\%$), regardless of their location or time of collec-

tion, and clustered with 11 Mexican viruses into a genetic lineage not previously present in the USA. Furthermore, viruses with identical phosphoprotein hypervariable region sequences to those causing the US outbreaks in 1995-1997 and 2004-2005 were found circulating in Mexico between 2002 and 2004. Molecular adaptation analysis provided evidence for positive selection in the phosphoprotein and glycoprotein genes during a south-to-north migration among 69 US viruses collected between the spring and autumn of 2004 and 2005. Phylogenetic data, temporal-spatial distribution and the finding of viral strains identical to those causing major outbreaks in the USA circulating in Mexico demonstrated that VS outbreaks in the south-western USA are the result of the introduction of viral strains from endemic areas in Mexico.

Descriptors: alpacas, asses, cattle, horses, donkeys, vesicular stomatitis New Jersey virus, viral disease outbreaks, genes, glycoproteins, molecular epidemiology, nucleotide sequences, phosphoprotein, phylogeny, US Pacific Island Trust Territory, American Oceania, Mexico.

Ramsay, E.C.; Sykes, J.M.; Schumacher, J.; James, E.; Chapman, A.; Patton, S. In: G. Wibbelt; N. Bergholz ; S. Seet; and H. Hofer. **Management of cryptosporidiosis in a hoofstock contact area.** *Proceedings of the Institute of Zoo and Wildlife Research*, Berlin. 2007; (7): 37-41. ISSN: 1431-7338. Note: "Erkrankungen der Zootiere. Verhandlungsbericht des 43. Internationalen Symposiums über die Erkrankungen der Zoo und Wildtiere, Edinburgh, UK, 19-20 May, 2007. "

URL:<http://www.izw-berlin.de>

Abstract: A 7-month-old Dexter heifer with projectile watery dysentery, cough and nasal discharge is reported. The animal was bought by the Knoxville Zoo, Tennessee, USA for exhibition in the Kid's Zoo contact yard. The animal arrived on 29 October 2004, but due to the lack of available quarantine space, the animal was placed in an enclosure on public display which were adjacent to the alpaca and goat stalls. It was observed that the animal had an unformed faeces a day after its arrival in the zoo. Faecal cultures were negative for *Salmonella* sp. and *Mycobacterium pseudotuberculosis*. Faecal analysis revealed the presence of *Strongyloides* sp. eggs, trichostongyle eggs, *Eimeria* sp. oocysts, and *Cryptosporidium* sp. oocysts. The faeces was negative for *Giardia* sp. antigen, but positive for *Cryptosporidium* sp. antigen when tested. The animal was treated with trimethoprim and sulfamethoxazole at 1920 mg p.o. twice a day and was given an electrolyte. The animal's diarrhoea resolved but the cough continued, and was given with an immunoglobulin supplement. The trimethoprim and sulfamethoxazole was discontinued and florfenicol was administered to the animal. On 4 December 2004, the animal was clinically normal was shipped from the zoo on 24 December 2005. Reproduced with permission from CAB Abstracts.

Descriptors: Dexter cattle, heifers, alpacas, goats, captive zoo animals, case reports, clinical aspects, protozoal diseases, cryptosporidiosis, *Cryptosporidium*, *Eimeria*, *Strongyloides*, Trichostrongylidae, electrolytes infusion, florfenicol, protozoal infections, sulfamethoxazole, trimethoprim, *Rhabditida*, *Secernentea*, sulphamethoxazole, Tennessee, US.

Ratto, M.; Gomez, C.; Berland, M.; Adams, G.P. **Effect of ovarian superstimulation on COC collection and maturation in alpacas.** *Animal Reproduction Science*. 2007 Feb; 97(3-4): 246-256. ISSN: 0378-4320

URL:<http://www.sciencedirect.com/science/journal/03784320>

DOI:<http://dx.doi.org/10.1016/j.anireprosci.2006.02.002>

NAL call no.: QP251.A5

Abstract: The objective of the present study was to compare the ovarian follicular response, cumulus-oocyte complex (COC) collection rate, and maturational status of COC collected from alpacas subsequent to treatment with two different superstimulatory protocols. Alpacas (n=7 per group) were treated with: (1) 200 mg of FSH im divided bid for 3 d, plus a single i.v. dose of 1000 IU hCG 24 h after the last FSH treatment, or (2) 1200 IU of eCG as a single i.m. dose, plus a single i.v. dose of 1000 IU of hCG on day 3 after eCG treatment (day 0=start of superstimulatory treatment). At 20–24 h post-hCG treatment, the ovaries were surgically exposed and COC were collected by needle aspiration of all follicles ≥ 6 mm. The FSH and eCG treatment groups did not differ with respect to the number of follicles ≥ 6 mm at the time of COC collection (20.0+or-7.5 versus 27.0+or-3.3; P=0.5), the number of COC collected (26.2+or-8.4 versus 23.3+or-3.7; P=0.7), or the collection rate per follicle aspirated (89% versus 87%; P=0.7). No differences were detected between FSH- and eCG-treated alpacas in the number of expanded COC collected per alpaca (11.5+or-2.9 versus 8.8+or-2.8; P=0.54), the number of expanded COC in metaphase II (8.5+or-1.9 versus 6.0+or-2.1; P=0.1), or the number of compact COC with ≥ 3 layers of cumulus cells (12.5+or-4.3 versus 14.3+or-2.6; P=0.72). A greater proportion (P<0.05) of compact COC collected after FSH treatment matured in vitro to the metaphase II stage than after eCG treatment. Eight expanded alpaca COC were fertilized in vitro with llama sperm, three of which were fixed and stained 18 h after exposure to sperm and five were cultured in vitro. Two of the three stained oocytes were in the pronuclear stage, and all five of the cultured oocytes developed to the two-cell and morula stages at 2 and 7 days, respectively, after in vitro fertilization. In summary, FSH and eCG treatments were equally effective for ovarian superstimulation and oocyte collection. Cumulus-oocyte complexes were collected from more than 80% of follicles aspirated during laparotomy. Nearly one third of the COC collected after superstimulation were in metaphase II, and more than 70% of the remaining COC progressed to metaphase II after in vitro maturation for 26 h, bringing the mean number of oocytes available for in vitro fertilization to 16 per alpaca. Preliminary results support the hypothesis that alpaca oocytes obtained after superstimulation in the absence of progesterone are developmentally competent since morulae developed from all five COC fertilized and cultured in vitro.

Descriptors: alpacas, llamas, ovarian development, ovaries, superovulation, cumulus oophorus, ovarian follicles, oocytes, follicle stimulating hormone, equine chorionic gonadotropin, in vitro culture, in vitro fertilization, spermatocytes, embryogenesis, morula, metaphase, in vitro maturation.

Richter, M.; Grest, P.; Spiess, B. **Bilateral lipid keratopathy and atherosclerosis in an alpaca (*Lama pacos*) due to hypercholesterolemia.** *Journal of Veterinary Internal Medicine.* 2006 Nov-Dec; 20(6): 1503-1507. ISSN: 0891-6640

URL:<http://www.blackwell-synergy.com/doi/ref/10.1111/j.1939-1676.2008.0072.x>

NAL call no.: SF601.J65

Descriptors: alpacas, cornea, corneal diseases, hypercholesterolemia, atherosclerosis, heart, aorta, histopathology, blood lipids, high cholesterol.

Riek, Alexander; Van Der Sluijs, Leendert; Gerken, Martina **Measuring the energy expenditure and water flux in free-ranging alpacas (*Lama pacos*) in the Peruvian Andes using the doubly labelled water technique.** *Journal of Experimental Zoology*. 2007; 307A(12): 667-675. ISSN: 1932-5223

URL: <http://www3.interscience.wiley.com/journal/102521318/home>

Descriptors: 16 alpacas, males, free ranging, natural pastures at 4,400 m above sea level, energy expenditure, metabolic rate, water flux rate, hydrogen and oxygen isotopes, similar to other wild ruminants in harsh climates, Peruvian Andes, Peru.

Rodriguez, C.T.; Quispe, J.L. **Domesticated camelids, the main animal, genetic resource of pastoral systems in the region of Turco, Bolivia.** In: K.A. Tempelman; R.A. Cardellino. *People and Animals, Traditional Livestock Keepers: Guardians of Domestic Animal Diversity*. 2007; 33-45. ISBN: 9789251056844

NAL call no.: SF105.3 P46 2007

Abstract: The Turco region has a harsh, microthermal, semi-arid climate, but people make a living there from llamas and alpacas which have advantages over exotic species and are managed in a transhumant system. These camelids are the main source of food and income for herders. The inhabitants have a holistic world view and see themselves, the land and their animals as an integrated unit. Group selection is being done by herders assisted by the Camelid Research and Improvement Centre. There is little conservation activity by government agencies or NGOs. A programme, compatible with the maintenance of genetic diversity and the producers' interests and economic needs, is needed to focus primarily on in situ conservation, inventorying, characterization and utilization. Reproduced with permission of CAB Abstracts.

Descriptors: alpacas, llamas, agropastoral systems, livestock farming systems, animal genetic resources, conservation, ecology, ecosystems, food security, genetic diversity, livestock farming, policy, selection, selection criteria, traditional farming, Bolivia.

Ross, Callum F.; Dharia, Ruchi; Herring, Susan W.; Hylander, William L.; Liu, Zi Jun; Rafferty, Katherine L.; Ravosa, Matthew J.; Williams, Susan H. **Modulation of mandibular loading and bite force in mammals during mastication.** *Journal of Experimental Biology*. 2007; 210(6): 1046-1063. ISSN: 0022-0949

URL: <http://jeb.biologists.org/cgi/content/full/210/6/1046>

Descriptors: goats, pigs, horses, alpacas, mammalian mastication, bite force modulation, rhythmic and cyclic behaviors, bone strain, duration of force production, varying rate of force produced, rosette strain data, chew cycle, species comparison study, *Aotus trivigatus*, owl-monkey, *Macaca mulatta*, rhesus macaque, *Chlorocebus aethiops*, vervet monkey, *Macaca fascicularis*, long tailed macaque, bivariate correlation, multiple regression methods.

Rubio-Martinez, L.M.; Koenig, J.B.; Halling, K.B.; Wilkins, K.; Schulz, K. **Use of a circular external skeletal fixator for stabilization of a comminuted diaphyseal metatarsal fracture in an alpaca.** *Journal of the American Veterinary Medical Association*. 2007 Apr 1; 230(7): 1044-1048. ISSN: 0003-1488

URL: <http://www.avma.org/>

DOI : <http://dx.doi.org/10.2460/javma.230.7.1044>

NAL call no.: 41.8 AM3

Abstract: Case Description - A 3-year-old male alpaca was evaluated because of non-weight-bearing lameness (grade 5/5) in the left hind limb. Clinical Findings - Clinical and radiographic examination revealed a closed, comminuted, nonarticular, displaced diaphyseal fracture of the left third and fourth metatarsal bones. Treatment and Outcome - Initial attempts at treatment via reduction of the fracture under traction and subsequent application of a cast were unsuccessful, and more stable fracture fixation was pursued. The alpaca underwent closed reduction of the fracture, which was stabilized by the application of a 3-ring circular external skeletal fixator (CESF). Improved weight bearing on the affected limb was evident soon after surgery and gradually increased; full weight bearing was evident by the seventh day after discharge from the hospital (day 20 after application of the CESF). Lameness was hardly noticeable during walking at that time. After 3 months, complete fracture healing was evident and the CESF was removed; mild outward rotation of the distal fragment and metatarsophalangeal joint was present. A Robert Jones bandage was applied to the limb, and the alpaca was kept in a stall for another 4 weeks. Eleven months after CESF application, the owners and referring veterinarian reported that the alpaca was healthy, not lame, and serving as a stallion without apparent impediment. Clinical Relevance - Although mostly restricted to small animals, application of a CESF can be a viable alternative for management of long bone fractures in South American camelids.

Descriptors: bone fractures, fracture fixation, alpacas, metatarsus, case studies, males, animal-age, lameness, veterinary equipment, diaphyseal metatarsal fracture, circular external skeletal fixator.

Russo, M.; Catone, G.; Cocchia, N.; England, G.C.W. **Doppler ultrasonography of the alpaca's testis: Normal values.** *Reproduction in Domestic Animals.* 2007; 42(Suppl. 2): 66. ISSN: 0936-6768. Note: 11th Annual Conference of the European Society for Domestic Animal Reproduction, Celle, Germany; September 21-22, 2007.

URL: <http://www3.interscience.wiley.com/journal/118521993/home>

Descriptors: alpacas, male, reproductive structures, doppler ultrasonography, clinical techniques, diagnostic techniques, testicular morphology, testes, normal values.

Saitone, Tina L.; Sexton, Richard.J. **Alpaca lies? Speculative bubbles in agriculture: Why they happen and how to recognize them.** *Review of Agricultural Economics.* 2007 Summer; 29(2): 286-305. ISSN: 1058-7195

DOI:<http://dx.doi.org/10.1111/j.1467-9353.2007.00343.x>

NAL call no.: HD1773.A3N6

Abstract: The speculative bubble phenomenon has been studied extensively by economists and psychologists in recent years. The recent literature is surveyed and extended to enhance the understanding of speculative bubbles in agricultural industries. The analysis is applied to the U.S. alpaca industry, where prices for breeding stock are many times higher than in Peru, home of the world's largest alpaca herd. We present a framework to assess whether current prices for U.S. alpaca stock are supported by market fundamentals or are likely to represent a speculative bubble. Finally, we identify "warning signs" common to agricultural bubbles.

Descriptors: alpacas, speculative bubble, U.S. alpaca industry, breeding stock prices, current places, market fundamentals, warning signs of such bubbles, US.

Schock, A.; Bidewell, C.A.; Duff, J.P.; Scholes, S.F.; Higgins, R.J. **Coccidiosis in British alpacas (*Vicugna pacos*)**. *Veterinary Record*— London. 2007 June 9; 160(23): 805-806. ISSN: 0042-4900

URL:<http://veterinaryrecord.bvapublications.com/>

NAL call no.: 41.8 V641

Descriptors: alpacas, coccidiosis, *Eimeria*, case studies, United Kingdom.

Serrano-Martinez, E.; Collantes-Fernandez, E.; Chavez-Velasquez, A.; Rodriguez-Bertos, A.; Casas-Astos, E.; Risco-Castillo, V.; Rosadio-Alcantara, R.; Ortega-Mora, L.M. **Evaluation of *Neospora caninum* and *Toxoplasma gondii* infections in alpaca (*Vicugna pacos*) and llama (*Lama glama*) aborted foetuses from Peru**. *Veterinary parasitology*. 2007 Nov 30; 150(1-2): 39-45. ISSN: 0304-4017

URL: <http://www.sciencedirect.com/science/journal/03044017>

DOI:<http://dx.doi.org/10.1016/j.vetpar.2007.08.048>

NAL call no.: SF810.V4

Abstract: The aim of this study was to investigate the participation of *Neospora caninum* and *Toxoplasma gondii* in abortion cases of Peruvian llamas and alpacas. Fifteen aborted foetuses were recovered from two main rearing areas of camelids in Peru (Central or South Andean region). Foetal histopathology was used to detect the presence of protozoal-associated lesions in target organs. *N. caninum* and *T. gondii* infections were confirmed by immunohistochemistry (IHC) combined with PCR and by PCR alone, respectively. The influence of the species (llama and alpaca), foetal age (first, second and third gestational periods) and geographical location (Central or South Andean region) of the foetuses was also studied. Thirteen of the samples (26%, 13/50) showed lesions suggestive of protozoal infection. *N. caninum* infection was detected by either IHC or specific PCR in 14 out of 50 foetuses (28%), of which 8 also showed protozoal-associated lesions. *T. gondii* DNA was not detected in any of the foetuses analysed. Protozoal infection was more frequent in the foetuses from the second gestational period ($P < 0.05$, Fisher F-test). No significant association was observed between protozoal infection and species or geographical location ($P > 0.05$, chi 2 test). The results of the present study indicate that neosporosis should be included during the differential diagnosis of abortion in llamas and alpacas.

Descriptors: alpacas, llamas, vicuna, *Vicugna*, *Lama*, *Neospora caninum*, *Toxoplasma gondii*, neosporosis, toxoplasmosis, animal abortion, fetus, disease prevalence, disease detection, histopathology, immunohistochemistry, polymerase chain reaction, PCR, gestational age, Peru, Andes region.

Shoemaker, R.W.; Wilson, D.G. **Surgical repair of femoral fractures in New World camelids: five cases (1996-2003)**. *Australian Veterinary Journal*. 2007 Apr; 85(4): 148-152. ISSN: 0005-0423

URL:<http://www.ava.com.au/avjpast.php?journalid=9&plink=avj03.htm>

DOI:<http://dx.doi.org/10.1111/j.1751-0813.2006.00099.x>

NAL call no.: 41.8 AU72

Abstract: Five New World camelids were admitted to the Western College of Veterinary Medicine between 1996 and 2003 for evaluation of femoral fractures. There were three alpacas and two llamas. Four of the animals were female and three were less than 3 months of

age. Fracture configurations consisted of distal physal fractures (three), a comminuted diaphyseal/metaphyseal fracture, and a transverse diaphyseal fracture. Fractures were diagnosed with a combination of physical examination and radiographs in all cases. All five fractures were repaired with internal fixation and three animals were discharged from the hospital with fractures that healed. One cria underwent successful internal fixation but died from pulmonary oedema during recovery from anaesthesia. Postoperative complications were rare and limited to inadequate fracture stability in one alpaca and prolonged recovery to weight bearing in another. One llama with a comminuted metaphyseal fracture, repaired with a 4.5 mm dynamic compression plate, subsequently had catastrophic failure of the bone 17 days after surgery. Overall the clients were pleased with the outcome of discharged animals. Although femoral fractures are considered rare, they pose a unique opportunity for the large animal veterinarian to successfully achieve fracture union with the aid of internal fixation. Reproduced with permission from CAB Abstracts.

Descriptors: alpacas, llamas, females, males, age differences, case studies, bone fractures, surgical repairs, fracture fixation, femur.

Snyder, J.H. **Small ruminant tips for small animal practitioners.** *Small Animal and Exotics Proceedings of the North American Veterinary Conference, Volume 21, Orlando, Florida, USA, 2007.* 2007; 664-667

URL:<http://www.tnavc.org>

Descriptors: alpacas, llamas, deer, goats, sheep, adverse effects, anesthesia, anesthetics, analgesics, anthelmintics, disease prevention, drug therapy, drug toxicity, adverse drug reactions, euthanasia, foot rot, grooming, lidocaine, non steroidal anti-inflammatory agents (NSAIDS), opioids, pain control, parasitoses, quarantine, rumen, surgery, vaccination, *Clostridium perfringens*, *Dichelobacter nodosus*, parasitic infections.

Spire, Mark F. **Update on the USDA National Animal Identification System (NAIS) program.**

Bovine Practitioner. 2007; 41(1): 66-69. ISSN: 0524-1685

NAL Call no. SF779.5.A1B5

Abstract: The National Animal Identification System proposed and under development by the USDA-APHIS is a comprehensive program designed to provide rapid response following the introduction of a foreign animal disease (accidental or intentional), the discovery, of an emerging pathogen or within the framework of existing regulatory programs for currently known domestic animal diseases. It is being planned as a three-part voluntary program: premises registration, individual or group/lot animal identification and animal movement tracking. The premises and animal identification components of the program fit well with other USDA programs, particularly the Agricultural Marketing Service source and age verification program, for use by producers for value discovery in animals entering marketing channels.

Descriptors: sheep, cattle, goats, llamas alpacas, cervids, equines, tuberculosis, brucellosis, USDA, National Animal Identification System program, identification program, tracking to deal with introduced diseases. US.

Starkey, S.R.; Johnson, A.L.; Ziegler, P.E.; Mohammed, H.O. **An outbreak of cryptosporidiosis among alpaca crias and their human caregivers.** *Journal of the American Veterinary Medical Association.* 2007 Nov 15; 231(10): 1562-1567. ISSN: 0003-1488

URL:<http://www.avma.org/>

DOI:<http://dx.doi.org/10.2460/javma.231.10.1562>

NAL call no.: 41.8 AM3

Abstract: Case Description - 6 alpaca crias from a single farm were examined because of diarrhea (n=4) or decreased fecal production (n=2). Clinical Findings - *Cryptosporidium parvum* was identified by means of fecal flotation in samples from 5 of the 6 crias, and a diagnosis of cryptosporidiosis was made. In the remaining cria, a presumptive diagnosis of cryptosporidiosis was made. Three people involved in caring for the crias from this farm were subsequently confirmed to have cryptosporidiosis, and 3 other people were suspected to have cryptosporidiosis. Sequence analysis of the ssu rDNA gene loci confirmed *C. parvum* as the causative agent in 4 of the 6 crias. Subsequent evaluation of the farm revealed 2 additional crias confirmed to have cryptosporidiosis. Stocking densities on the farm were high, with approximately 20 adults/acre in some pastures. Treatment and Outcome - All 6 hospitalized crias were given supportive treatment consisting of antimicrobials, gastroprotectants, and fluids. All but 1 survived. Farm owners were advised to decrease stocking density on the farm. Clinical Relevance - Findings suggested that zoonotic transmission of *C. parvum* from alpacas to humans can occur.

Descriptors: alpacas, zoonoses, young animals, crias, disease outbreaks, cryptosporidiosis, case studies, diarrhea, *Cryptosporidium parvum*, feces, disease diagnosis, humans, nucleotide sequences, loci, drug therapy, antiprotozoal agents, molecular sequence data.

Storz, Jay F. **Hemoglobin function and physiological adaptation to hypoxia in high-altitude mammals.** *Journal of Mammalogy.* 2007; 88(1): 24-31. ISSN: 0022-2372. Note: A review.

URL: <http://www.bioone.org/perlserv/?request=get-archive&issn=1545-1542&ct=1>

Descriptors: sheep, Bactrian camels, dromedaries, alpacas, guanacos, vicunas, deer mouse, *Peromyscus maniculatus*, *Peromyscus maniculatus nebracensis*, *Peromyscus maniculatus sonoriensis*, *Peromyscus maniculatus rufinus*, humans, hemoglobin, hemoglobin function, species variation in hemoglobins, chronic hypoxia, physiological adaptation, physiological performance, high altitude adaptations, hemoglobin polymorphism in North American deer mice, evolutionary changes.

Talbot, C.E.; Mueller, K.; Granger, N.; Jeffery, N.D. **Diagnosis and surgical removal of brain abscesses in a juvenile alpaca.** *Journal of the American Veterinary Medical Association.* 2007 Nov 15; 231(10): 1558-1561. ISSN: 0003-1488

URL:<http://www.avma.org/>

NAL call no.: 41.8 AM3

Abstract: Case Description - A 1-month-old female alpaca was examined because of progressive clinical signs consistent with an intracranial lesion. Clinical Findings - Clinical signs included signs of depression, lethargy, tetraparesis, and neck weakness. Two large iso-intense intracranial masses could be seen on T1-weighted magnetic resonance images. On T2-weighted images, the masses contained concentric rings of hypointense and hyperintense material. Treatment and Outcome - 2 abscesses were removed via a craniotomy that incor-

porated removal of the sagittal crest and surrounding skull and transection of the sagittal sinus. The bony deficit was replaced with polypropylene mesh. The alpaca recovered within 2 weeks and was fully integrated into the herd within 1 month after surgery. Clinical Relevance - Findings indicated that surgical removal is a feasible means of successfully treating intracranial abscesses in juvenile alpacas.

Descriptors: juvenile alpaca, brain abscess, surgical excision, disease diagnosis, case study clinical signs and symptoms, magnetic resonance imaging, medical treatment, craniotomy, intracranial abscess.

Tibary, A.; Semrad, Susan, University of Wisconsin, Madison. School of Veterinary Medicine. ***Reproduction and Diseases of the Alpaca and Llama***. Published by the Veterinary School. Madison, WI. 2007. Note: Cover title. "March 2007". Contents: Overview of physiology and infertility in the male and female camelid / by Ahmed Tibary -- Diagnostic imaging in camelid theriogenology / by Ahmed Tibary -- Reproductive surgery in the male and female / by Ahmed Tibary -- Pregnancy complications and obstetrical management / by Ahmed Tibary -- Postpartum care of the dam and neonate / by Ahmed Tibary -- Update on selected medical conditions / by Susan Semrad -- Supplemental notes.

NAL call no.: SF745.5 .M64 2006

Descriptors: see contents in the note above.

Valdivia, Martha; Alvarez, Cristian; Rodriguez, Claudia; Canorio, Nadia; Reyes, Fanny; del Pilar Suyo, Maria; Perez, Susan; Guzman, Luis; Conislla, Javier. **Molecular recognition of fresh and frozen alpaca's spermatozoas with zona pellucida**. *Biology of Reproduction*. 2007; (Sp. Iss. SI): 238. ISSN: 0006-3363. Note: 40th Annual Meeting of the Society for the Study of Reproduction, San Antonio, TX, USA; July 21 -25, 2007.

URL: <http://www.biolreprod.org/>

Descriptors: alpacas, sperm evaluation, with mouse embryos, determining between fresh and frozen spermatozoas.

Valentine, B.A.; Martin, J.M. **Prevalence of neoplasia in llamas and alpacas (Oregon State University, 2001-2006)**. *Journal of Veterinary Diagnostic Investigation*. 2007 Mar; 19(2): 202-204. ISSN: 1040-6387

URL: <http://jvdi.org/>

NAL call no.: SF774.J68

Abstract: Prevalence and type of neoplastic disease were determined in 551 camelid submissions (368 alpacas [*Lama pacos*], 180 llamas [*Lama glama*], and 3 cases in which species was not identified) over a 5-year period. Forty neoplasms were identified in 38 animals (6.9%). Prevalence of neoplasia in llamas was higher (11%) than in alpacas (4.9%). Mean age of camelids with neoplasia was 9.42±4.9 years. Mean age of alpacas with neoplasia (5.48±3.7 years) was significantly less than of llamas with neoplasia (12.53±3.2 years; P<0.001). Cutaneous and mucocutaneous fibroma/fibropapilloma was most common (10 animals), followed by cutaneous and mucocutaneous squamous cell carcinoma (6 animals), disseminated lymphoma (5 animals), and fibrosarcoma (4 animals). Four of 5 animals with lymphoma were alpacas, aged 0.21 to 4 years. Lymphoma occurred in 1 aged llama (15 years). Disseminated carcinoma and adenocarcinoma occurred in 4 llamas and 2 alpacas,

and included biliary (2), gastrointestinal (2), mammary gland (1), and unknown (1) origin. Mean age of camelids with any type of carcinoma or adenocarcinoma (12.36+or-2.8 years) was significantly greater than that of camelids with lymphoma (4.24+or-6.2 years; P=0.02). Results indicate that neoplasia is relatively common in camelids and that there are differences between llamas and alpacas as regards prevalence of neoplasia, tumor types, and age at diagnosis. Reproduced with permission of CAB Abstracts.

Descriptors: llamas, alpacas, neoplasms, disease prevalence, animal age, species differences, fibroma, squamous cell carcinoma, lymphoma, fibrosarcoma, Oregon, US.

Vandeweerd, J.M.; Clegg, P.; Wawra, E.; Dugdale, A. **Treatment of recurrent luxation of the shoulder in an alpaca.** *Veterinary Record*-- London. 2007 Mar 3; 160(9): 304-306. ISSN: 0042-4900

URL:<http://veterinaryrecord.bvapublications.com/>

NAL call no.: 41.8 V641

Descriptors: alpacas, shoulders, dislocations injuries, surgery, case study.

Waldron, I.; Alpacas, L. **Alpacas and general husbandry.** *GVJ Government Veterinary Journal*. 2007; 17(1): 32-34. ISSN: 0269-5545

URL:<http://www.defra.gov.uk/animalh/gvj/default.htm>

Descriptors: alpacas, animal husbandry, breeding programs, animal fibers, profitability, fiber producing animals, wool production, Britain, UK.

Williams, Susan H.; Vinyard, Christopher J.; Wall, Christine E.; Hylander, William L. **Masticatory motor patterns in ungulates: A quantitative assessment of jaw-muscle coordination in goats, alpacas and horses.** *Journal of Experimental Zoology*. 2007; 307A(4): 226-240. ISSN: 1932-5223

URL: <http://www3.interscience.wiley.com/journal/102521318/home>

Descriptors: alpacas, goats, horses, jaw muscle coordination, rhythmic mastication, electromyograms, superficial masseter, deep masseter, posterior temporalis, medial pterygoid muscles, timing differences, evolutionary model of jaw muscle function, species comparison, muscles used in different functions, chewing, masticatory patterns, inter-specific differences, transverse jaw movements.

Wolff, P.L. **The geriatric small ruminant - dental care, body condition scoring, and nutrition.** *Large Animal Proceedings of the North American Veterinary Conference, Volume 21, Orlando, Florida, USA, 2007*. 2007; 290-292.

URL:<http://www.tnavc.org>

Descriptors: alpacas, deer, goats, llamas, sheep, physical exam, animal nutrition, arthritis, body condition, body weight, dental health, feeding, geriatrics, lameness, lifespan, teeth, teeth diseases, periodontal diseases.

Wang, Hai Dong; Xue, Lin Li; Dong, Chang Sheng. **Anatomy and histology of auxiliary sex glands in alpacas.** *Veterinary Science in China*. 2007; 37(11): 987-989. ISSN: 1673-4696. Note: In Chinese with an English summary.

URL:<http://www.zgsykh.com/>

Abstract: A report on a study conducted to study the anatomy and physiology of the male alpacas was discussed. Emphasis of the report focused on the auxiliary sex glands of the male alpacas. Reproduced with permission from CAB Abstracts.

Descriptors: alpacas, access, accessory glands, animal anatomy, bulbo urethral gland, morphology, physiological functions, prostate, body components.

Zielinska, P.; Jurka, P. **Charakterystyka rozrodu lam i alpaka.** [Characteristics of llamas and alpacas reproduction.] *Zycie Weterynaryjne*. 2007; 82(3): 202-207. ISSN: 0137-6810. Note: In Polish with and English summary.

URL: <http://www.vetpol.org.pl/zycie.htm>

Descriptors: alpacas, llamas, reproductive physiology, production performance, reproductive disorders, common conditions.

2006

Abutarbush, S.M.; Petrie, L. **Fatal sand impaction of the spiral colon in a 1-month-old alpaca.**

Canadian Veterinary Journal = La Revue Veterinaire Canadienne. 2006 July; 47(7): 683-684. ISSN: 0008-5286. Note: In English with a French summary.

URL: <http://www.pubmedcentral.nih.gov>

NAL call no.: 41.8 R3224

Descriptors: alpacas, neonates, case studies, anorexia, diarrhea, animal conditions, digestive system diseases, colon, sand ingestion, sand impaction.

Almy, F.S.; Ladd, S.M.; Sponenberg, D.P.; Crisman, M.V.; Messick, J.B. ***Mycoplasma haemolamae* infection in a 4-day-old cria: Support for in utero transmission by use of a polymerase chain reaction assay.** *Canadian Veterinary Journal = La Revue Veterinaire Canadienne*. 2006 Mar; 47(3): 229-233. ISSN: 0008-5286. Note: In English with a French summary.

URL: <http://www.pubmedcentral.nih.gov/articlerender.fcgi?artid=1371050>

NAL call no.: 41.8 R3324

Abstracts: Blood smear examination in a 4-day-old alpaca revealed massive erythrocyte parasitism by *Mycoplasma haemolamae*. Blood collected from both the nonparasitaemic dam and the cria were positive for *M. haemolamae* by polymerase chain reaction (PCR) analysis. These findings suggest in utero transmission of *M. haemolamae* in camelids, even when the dam is not parasitemic.

Descriptors: alpacas, crias, neonates, case study animal diseases, *Mycoplasma haemolamae* mycoplasmosis, neonates, disease transmission, periparturient diseases and disorders, disease diagnosis.

Alternative Farming Systems Information Center (U.S.). **Web Selections: Llama and Alpaca Production.** 2006

URL: http://www.nal.usda.gov/afsic/AFSIC_pubs/wsllama.htm

NAL call no.: aSF401.L6

Descriptors: llama, alpaca, production, management, alternative livestock species, fiber production.

Anderson , D.E. **Periapical tooth root infections in llamas and alpacas.** *Small Ruminant Research: The Journal of The International Goat Association.* 2006 Feb; 61(2-3): 235-240. ISSN: 0921-4488. Note: In the special issue: South American Camelids / edited by A. Tibary and S.M. Parish. Includes references.

URL:<http://www.sciencedirect.com/science/journal/09214488>

NAL call no.: SF380.I52

Abstract: Head and neck abscesses are a common complaint in llamas and alpacas in North America representing 3% of clinical cases presented at the Veterinary Teaching Hospital at Ohio State University (OSU-VTH). Approximately 20% of infected teeth have infection of the pulp cavity most often associated with a patent infundibulum, approximately 60% have evidence of periodontal disease and compromised periodontal ligament, and 20% are of unknown cause. Differential diagnosis includes tooth root abscess, osteomyelitis, soft tissue abscess (*Corynebacterium pseudotuberculosis*), foreign body, parotid duct lesion, facial bone fracture, retained food bolus, and malocclusion. The aim of this paper is to review available information and provide clinical observation on etiology, diagnosis, and treatment option for tooth root infection in llamas and alpacas.

Descriptors: llamas, alpacas, tooth pulp, tooth diseases, tooth abscesses, disease diagnosis, etiology, medical treatment, surgery, literature reviews, veterinary teaching hospital, Ohio State University, US.

Animal Welfare Information Center (U.S.). **Information Resources on Farm Animals.** The Center, U.S. Dept. of Agriculture, Agricultural Research Service, National Agricultural Library, Beltsville, MD [2006]. Note: Farm animals. Title from disc label. "June 2006." "Induced molting, dairy cattle, beef cattle, swine, disposal of dead animals, swine housing, proceedings livestock and poultry handling and transport, Emus and ostriches, llamas, alpacas, guanacos and vicunas." System requirements: CD-ROM drive and Adobe Acrobat.

Ansaloni, F.; Pyszny, F.; Claros, A.L.; Marquina, R.; Zapana-Pineda, J.; Claros, A.J.; Quispe-Huanca, J.L. **DECAMA-project: Analysis of farm income from South American camelids meat production in Latin American countries: Preliminary results of a comparison between case studies.** *4th European Symposium on South American Camelids/DECAMA European Seminar, Gottingen, Germany; October 07-09, 2004.* 2006. ISBN: 9076998981

Nal Call no.: SF401.L35 E97 2004

Descriptors: camelid meat production, economic development, hygiene status and quality of animal based products, income and production costs of camelid meat production, homogeneous questionnaire, visits and direct interviews with agricultural entrepreneurs, Andean rural areas, Peru, Bolivia, South America.

Baitchman, E.J.; Aiken, S.W.; Calle, P.P. **Successful treatment of atlantooccipital luxation in an alpaca (*Lama pacos*)**. *Journal of Zoo and Wildlife Medicine*. 2006; 37(1): 71-74. ISSN: 1042-7260

URL:<http://www.bioone.org>

Descriptors: alpaca, 7 mo old male alpaca, zoo animal, clinical picture, abnormal lowered posture of head and neck, reluctance to walk, diagnosis, cervical radiographs, atlantooccipital luxation, treated with manual closed reduction, resolved to a normal gait and posture.

Barrington, G.M.; Allen, A.J.; Parish, S.M.; Tibary, A. **Biosecurity and biocontainment in alpaca operations**. *Small Ruminant Research: The Journal of the International Goat Association*. 2006 Feb; 61(2-3): 217-225. ISSN: 0921-4488. Note: In the special issue: South American Camelids / edited by A. Tibary and S.M. Parish. Includes references.

URL:<http://www.sciencedirect.com/science/journal/09214488>

NAL call no.: SF380.I52

Abstract: Biosecurity on South American camelid operations involves both external and internal measures to prevent the introduction and spread of disease. External biosecurity involves practices and techniques directed at the prevention of entry of new diseases into a group of animals. Internal biosecurity or biocontainment, involves practices and techniques that are directed at the prevention or spread of disease within an existing group of animals. External biosecurity is particularly important in North America camelid operations due to the extensive movement of animals for breeding or show purposes. Internal biosecurity typically involves this the prevention and treatment of failure of passive transfer, maintenance of proper nutrition and housing, and the implementation of an appropriate vaccination program for endemic or relevant diseases. Attention to appropriate cleaning and disinfection procedures related to housing, feeding, and treatment equipment is important for the maintenance of both internal and external biosecurity practices. This paper discusses various risk factors associated with the control of infectious disease in the context of external and internal biosecurity measures in camelids operations.

Descriptors: alpacas, livestock production, livestock biosecurity, disease prevention, disease transmission, animal nutrition, animal housing, vaccination, disinfection, cleaning, animal feeding, risk factors, literature reviews, animal diseases.

Becerra, Jorge Alberto Bustamante. **Grazing intensity, plant diversity, and rangeland conditions in the Southeastern Andes of Peru (Palccoyo, Cusco)**. In: Spehn E.M.; Liberman M.; Korner C [Editors]. *Land Use Change and Mountain Biodiversity*. CRC Press Taylor & Francis Group. Boca Raton, FL. 2006. 376p. ISBN: 084933523X. Note: Global Mountain Biodiversity Assessment Workshop, Bolivia, Colombia; August 20 -23, 2003.

NAL call no.: QH541.5 M65 L36 2006

Descriptors: sheep, goats, llamas, alpacas, *Opuntia floccosa*, *Polylyspis*, primary production, grazing intensity, plant diversity, rangeland conditons, Peru.

Beghelli, D.; D'Alterio, G.L.; Severi, G.; Moscati, L.; Pezzotti, G.; Foglini, A.; Battistacci, L.; Cagiola, M.; Ayala-Vargas, C. **Evaluation of the immune response to vaccination against *C-Pseudotuberculosis* in an alpaca herd in Italy: Preliminary results**. *4th European Symposium on South American Camelids/DECAMA European Seminar, Göttingen, Germany; October*

07-09, 2004. 2006. ISBN: 9076998981

NAL call no.: [SF401.L35 E97 2004](#)

Descriptors: alpaca herd, caseous lymphadenitis, *Corynebacterium pseudotuberculosis*, vaccination program, homotypic, autogenous inactivated and adjuvated (aluminium hydroxide) vaccine, subcutaneous injection, blood testing for immune reaction.

Bella, A; Sousa, N.M.; Dehimi, M.L.; Watts, J.; Beckers, J.F. **Western analyses of pregnancy-associated glycoprotein family (PAG) in placental extracts of various mammals.** *Theriogenology*. 2006 Oct 15; 68(7): 1055-1066. ISSN: 0093-691X

URL:<http://www.sciencedirect.com/science/journal/0093691X>

DOI:<http://dx.doi.org/10.1016/j.theriogenology.2007.08.002>

NAL call no.: QP251.A1T5

Abstract: The present study was conducted in order to analyze the immunoreactivity of placental extracts of several animal species and humans against the following three groups of PAG antisera: anti-boPAG-I (R#497), -boPAG-II (R#435), and -caPAG (R#706). Placental proteins were obtained after extraction at neutral pH, followed by ammonium sulfate (A.S.) precipitation, dialysis, and lyophilization. The immunoreactivity of different placental extracts was revealed by the use of monodimensional SDS-PAGE, followed by blotting on nitrocellulose membrane and the identification of immunoreactive proteins after incubation with PAG antisera (Western blot technique). A strong immunoreactivity of proteins from synepitheliochorial placenta (cattle, sheep, goat, bison, buffalo, and deer) was demonstrated in both 20-50% and 50-80% A.S. fractions using the three antisera. Proteins from species with epitheliochorial placenta presented variable profiles of detected PAG-like proteins: in the sow, many immunoreactive forms were revealed by antisera boPAG-I and boPAG-II, whereas in the dromedary, only two forms were revealed by anti-boPAG-II. Concerning other species, our protocols showed for the first time a cross-reaction between PAG antisera with proteins extracted from dog, alpaca, dromedary, sea lion, and human placenta.

Descriptors: mammals, dogs, alpacas, dromedaries, sea lions, humans, placenta, animal tissue extracts, glycoproteins, immunochemistry, cross reaction, antiserum, Western blotting technique, placental glycoproteins, immunoreactivity.

Berardino, D. di; Nicodemo, D.; Coppola, G.; King, A.W.; Ramunno, L.; Cosenza, G.F.; Iannuzzi, L.; Meo, G. P. di; Balmus, G.; Rubes, J. **Cytogenetic characterization of alpaca (*Lama pacos*, fam. Camelidae) prometaphase chromosomes.** *Cytogenetic and Genome Research*. 2006; 115(2): 138-144. ISSN: 1424-8581

URL : www.karger.com/cgr

DOI : <http://dx.doi.org/10.1159/000095234>

Abstract: The present study provides specific cytogenetic information on prometaphase chromosomes of the alpaca (*Lama pacos*, fam. Camelidae, 2n=74) that forms a basis for future work on karyotype standardization and gene mapping of the species, as well as for comparative studies and future genetic improvement programs within the family Camelidae. Based on the centromeric index (CI) measurements, alpaca chromosomes have been classified into four groups: group A, subtelocentrics, from pair 1 to 10; group B, telocentrics, from pair 11 to 20; group C, submetacentrics, from pair 21 to 29; group D, metacentrics, from pair 30 to 36 plus sex chromosomes. For each chromosome pair, the following data are provided:

relative chromosome length, centromeric index, conventional Giemsa staining, sequential QFQ/C-banding, GTG- and RBG-banding patterns with corresponding ideograms, RBA-banding and sequential RBA/silver staining for NOR localization. The overall number of RBG-bands revealed was 391. Nucleolus organizer-bearing chromosomes were identified as pairs 6, 28, 31, 32, 33 and 34. Comparative ZOO-FISH analysis with camel (*Camelus dromedarius*) X and Y painting probes was also carried out to validate X-Y chromosome identification of alpaca and to confirm close homologies between the sex chromosomes of these two species.

Descriptors: alpacas, centromeres, chromosomes, cytogenetics, genetic mapping, karyotypes, metacentric chromosomes, nucleolus organizer, sex chromosomes, telocentrics, X chromosomes, Y chromosome, nucleolus organizing region.

Borgsteede, F.H.M.; Timmerman, A.; Harmsen, M.M. **Een geval van ernstige Sarcoptes-schurft bij alpaca's (*Lama pacos*).** [A case of severe sarcoptic mange in four alpacas (*Lama pacos*).]

Tijdschrift voor Diergeneeskunde. 2006; 131(8): 282-283. ISSN: 0040-7453. Note: In Dutch.

URL:<http://www.tijdschriftvoordiergeneeskunde.nl/>

NAL call no.: 41.8 T431

Descriptors: 4 alpacas, sarcoptic mange, treatments with drugs, doramectin, ivermectin, amitraz, diazinon, none of the drugs were effective against the mites.

Braga, W.U.; Chavera, A.E.; Gonzalez, A.E. **Clinical, humoral, and pathologic findings in adult alpacas with experimentally induced *Corynebacterium pseudotuberculosis* infection.**

American Journal of Veterinary Research. 2006 Sept; 67(9): 1570-1574. ISSN: 0002-9645.

URL: <http://avmajournals.avma.org/loi/ajvr/>

DOI:<http://dx.doi.org/10.2460/ajvr.67.9.1570>

NAL call no.: 41.8 AM3A

Abstracts: Objective - To experimentally infect adult alpacas by ID inoculation of *Corynebacterium pseudotuberculosis*, follow the clinical and pathologic course of disease, and study the humoral response to infection. Animals - 13 adult alpacas. Procedures - 9 alpacas were inoculated with 1.1x10⁶ CFUs of *C. pseudotuberculosis* from llama (n=4) or alpaca (5) origin, and 4 alpacas were sham inoculated as controls. Alpacas were clinically observed after inoculation and euthanized on days 16, 58, 93, or 128 after inoculation; necropsy examination and histologic evaluation were performed. An indirect ELISA, which made use of the *C. pseudotuberculosis* cell wall as the antigen, was used to measure antibody titres in serum samples. Results - Alpacas had a persistent febrile response, a local severe inflammatory response, and leukocytosis (>30x10³ WBCs/ micro L). Internal abscesses that localized mainly in the renal lymph node were observed. *Corynebacterium pseudotuberculosis* was recovered from the inoculation site 1 week after inoculation and from internal abscesses at 58 days after inoculation. Initial lesions were typical pyogranulomas with central caseous necrosis, whereas later lesions consisted of connective tissue, mononuclear cells, abundant neutrophils, and liquefactive necrosis. Infected alpacas had detectable serum antibody titres starting on day 16 that persisted until day 93 after inoculation. Sham-inoculated alpacas did not develop serum antibody titres, clinical signs of infection, or lesions. Conclusions and Clinical Relevance - Alpacas inoculated with *C. pseudotuberculosis* developed abscesses at the inoculation site and internally in the renal lymph nodes, without lung lesions. *Corynebacterium pseudotuberculosis*

isolates from llama and alpaca origin were found to be pathogenically indistinct. Reproduced with permission from CAB Abstracts.

Descriptors: alpacas, *Corynebacterium pseudotuberculosis*; animal pathogenic bacteria, caseous lymphadenitis, animal diseases, disease course, immune response, humoral immunity, symptoms, bacterial antigens, blood chemistry, abscess, lesions, experimental infections.

Braga, W.U.; Chavera, A.; Gonzalez, A. ***Corynebacterium pseudotuberculosis* infection in highland alpacas (*Lama pacos*) in Peru.** *Veterinary Record*— London. 2006 July 1; 159(1): 23-24. ISSN: 0042-4900

URL : <http://veterinaryrecord.bvapublications.com/archive/>

NAL Call no.: 41.8 V641

Abstract: This short communication describes the abscesses found in alpacas of varying age and sex from two herds located between 4200 and 4600 m above sea level in the southern Peruvian highlands in 1997. Of the 3943 alpacas investigated, 84 were found to have abscesses consistent with a diagnosis of caseous lymphadenitis (CLA). The diagnosis was made by direct inspection and palpation of the superficial lymph nodes and/or mammary glands one month after shearing. Samples were taken from 45 of the 84 alpacas for microbiological and histopathological examinations. In addition, postmortem examinations were carried out on 42 culled alpacas that were negative at clinical investigation. *Corynebacterium pseudotuberculosis* was isolated from 45 of the 84 alpacas with abscesses. Twenty-three of the 45 positive alpacas were euthanized and examined postmortem. All 23 were found to have internal abscesses due to *C. pseudotuberculosis*. A total of 52 abscesses were found during postmortem examination, most of which were found superficially or in the mammary glands. Four of the 42 culled alpacas that were negative at clinical inspection had a single internal abscess in the renal lymph node. It is possible that the bacterium was disseminated by alpacas with chronic mastitis to suckled offspring and/or to the environment. In conclusion, natural infections with *C. pseudotuberculosis* in Andean alpacas produces mastitis and abscesses in superficial lymph nodes, as well as internal abscesses mainly in the renal lymph node lines.

Descriptors: alpacas, wild highland populations, *Corynebacterium pseudotuberculosis*, abscess, Peru.

Bromage, Gina. ***Llamas and Alpacas: A Guide to Management.*** Crowood in Ramsbury. 2006. 208 p. ISBN: 186126884X; 9781861268846

NAL call no.: SF401.L6.B76 2006

Abstract: This book serves as a guide to those who own llamas and alpacas or considering to own these animals. It is comprised of 13 chapters. The housing, fencing, routine husbandry procedures, welfare, behaviour and training of these animals are covered. The assessment of the animal, shearing, fleece evaluation and marketing are examined. The breeding, birth, care of newborn animals and common diseases are discussed. Reproduced with permission of CAB Abstracts.

Descriptors: llamas, alpacas, care, handling, breeding, housing, behavior, reproduction, etc.

Burgt, G. van der; Dowle, M. ***Microchip insertion in alpacas.*** *Veterinary Record*-- London. 2007; 160(6): 204. ISSN: 0042-4900

URL:<http://veterinaryrecord.bvapublications.com/archive/>

NAL call no.: 41.8 V641

Abstract: A 6-month-old alpaca in the UK was implanted with a microchip behind the left ear in the upper part of the neck at a 90 degrees angle to the skin. The alpaca collapsed and died within 5 min of insertion of the microchip. Postmortem examination showed that the microchip was located in the spinal cord between C2 and C3 vertebrae. The resulting neurogenic shock was thought to be the cause of death. This case emphasizes the importance of inserting the needle so that it is not perpendicular to the longitudinal axis of the spine when microchipping camelids in the upper neck. Reproduced with permission from CAB Abstract.

Descriptors: alpacas, micro chip insertion accident, spinal cord injury, animal pathology, case report, clinical aspects, complications, postmortem examinations, shock.

Burkhalter, B.; Feldmann, H. **Sichere Zaune.**[Safe fencing.]*Forum Kleinwiederkauer/Petits Ruminants*. 2006; (3): 12-19. Note: In German and French.

URL:<http://www.caprovis.ch>

Descriptors: alpacas, goats, llamas, sheep, mobile and permanent fences, economic factors, illustrations, Switzerland.

Catone, G.; Basile, M.; Barbato, O.; Ayala, C. **Transvaginal embryo biometry in alpaca (*Lama pacos*): Preliminary report.** *4th European Symposium on South American Camelids/DECAMA European Seminar, Göttingen, Germany; October 07-09, 2004*. 2006. ISBN: 9076998981

NAL call no.: [SF401.L35 E97 2004](#)

Descriptors: 5 adult female alpacas, transvaginal sonography, high frequency transducers, microconvex 6,5 MHz transvaginal probe, gestational sac diameter, crown rump length, early pregnancy, 12-65 days post copulation, alternative option to transrectal ultrasonography, Maridiana Farm, Umbetidel, Perugia, Italy.

Cebra, C.K. **Camelid anaemia.***Large Animal Proceedings of the North American Veterinary Conference, Volume 20, Orlando, Florida, USA, 7-11 January, 2006*. 2006; 277

URL:<http://www.tnavc.org>

Descriptors: alpacas, *Eimeria*, anemia, clinical aspects, coccidiosis, diagnosis, differential diagnosis, fluid therapy, hematocrit, hematology, hemoglobin, rehydration, blood transfusion.

Cebra, C.K.; Bildfell, R.J.; Fischer, K.A. **Microanatomic features of pancreatic islets and immunolocalization of glucose transporters in tissues of llamas and alpacas.** *American Journal of Veterinary Research*. 2006 Mar; 67(3): 524-528. ISSN: 0002-9645

URL: <http://avmajournals.avma.org/loi/ajvr/>

DOI:<http://dx.doi.org/10.2460/ajvr.67.3.524>

NAL call no.: 41.8 AM3A

Abstract: Objective - To describe the microanatomic features of pancreatic islets and the immunohistochemical distribution of glucose transporter (GLUT) molecules in the pancreas and other tissues of New World camelids. Animals - 7 healthy adult New World camelids, 2 neonatal camelids with developmental skeletal abnormalities, and 2 BALB/c mice. Procedure - Samples of pancreas, liver, skeletal muscle, mammary gland, brain, and adipose tissue were collected postmortem from camelids and mice. Pancreatic tissue sections from camelids

were assessed microscopically. Sections of all tissues from camelids and mice (positive control specimens) were examined after staining with antibodies against GLUT-1, -2, -3, and -4 molecules. Results - In camelids, pancreatic islets were prominent and lacked connective tissue capsules. Numerous individual endocrine-type cells were visible distant from the islets. Findings in neonatal and adult tissues were similar; however, the former appeared to have more non-islet-associated endocrine cells. Via immunostaining, GLUT-2 molecules were detected on pancreatic endocrine cells and hepatocytes in camelids, GLUT-1 molecules were detected on the capillary endothelium of the CNS, GLUT-3 molecules were detected throughout the gray matter, and GLUT-4 molecules were not detected in any camelid tissues. Staining characteristics of neonatal and adult tissues were similar. Conclusions and Clinical Relevance - In New World camelids, microanatomic features of pancreatic islets are similar to those of other mammals. Data suggest that the poor glucose clearance and poor insulin response to hyperglycemia in adult camelids cannot be attributed to a lack of islet cells or lack of GLUT molecules on the outer membrane of those cells. Reproduced with permission of CAB Abstracts.

Descriptors: llamas, alpacas, Islets of Langerhans, microstructure, glucose transporters, immunohistochemistry, adult animals, neonates, mice, animal models, abnormal development, skeletal development, hepatocytes, central nervous system, brain, adipose tissue, liver, skeletal muscle, mammary glands.

Cebra, C. **Advanced diagnostic testing.** *Large Animal Proceedings of the North American Veterinary Conference, Volume-20, Orlando, Florida, USA, 7-11 January, 2006.* 2006; 275-276

URL:<http://www.tnavc.org>

Descriptors: camels, dromedaries, alpacas, diagnostic testing, diagnosis, diagnostic techniques, laparoscopy, radiography, ultrasonography, ultrasonography, fecal analysis, rectal palpation, ultrasound, clinical picture, body fluids, restraint of animals.

Cebra, C. **Practical fluid therapy.** *Large Animal Proceedings of the North American Veterinary Conference, Volume-20, Orlando, Florida, USA, 7-11 January, 2006.* 2006; 273-274.

URL:<http://www.tnavc.org>

Descriptors: camels, alpacas, dromedaries, dehydration conditions, rehydration approaches, fluid therapy, oral rehydration, drug delivery systems, rehydration solutions.

Cebra, C.K. **Acute recumbency in camelids.** *Large Animal Proceedings of the North American Veterinary Conference, Volume-20, Orlando, Florida, USA, 7-11 January, 2006.* 2006; 272.

URL:<http://www.tnavc.org>

Descriptors: alpacas, *Dermacentor*, recumbency, possible causes, botulism, causal agents, etiology, clinical aspects, diagnosis, differential diagnosis, mortality, death rate,

Cebra, C.K. **Camelid blood test interpretations.** *Large Animal Proceedings of the North American Veterinary Conference, Volume 20, Orlando, Florida, USA, 7-11 January, 2006.* 2006; 268-271

URL:<http://www.tnavc.org>

Descriptors: alpacas, dromedaries, blood chemistry, blood profiles, normalities regarding blood components, normal blood values, hematology, 3 hydroxybutyric acid, alanine aminotransferase, aspartate aminotransferase, chlorides, potassium, serum albumin, sodium,

triacylglycerols, creatinine, electrolytes, erythrocytes, fatty acids, glucose, immunoglobulins, leukocytes, eosinophils, lymphocytes, leucocytes, thrombocytes, platelets, beta hydroxybutyrate, blood platelets, blood urea nitrogen, dextrose, gamma globulins, glutamate pyruvate transaminase, glutamic pyruvic transaminase, GOT, GPT, immune-globulins, triglycerides, white blood cells, disease markers;

Cebra, C.K.; Bildfell, R.J.; Lohr, C.V. **Determination of internal organ weights in llamas and alpacas.** *4th European Symposium on South American Camelids/DECAMA European Seminar, Göttingen, Germany; October 07-09, 2004.* 2006. ISBN: 9076998981

NAL call no.: SF401.L35 E97 2004

Descriptors: camelids, llamas, alpacas, organ weights, gender differences, species differences, first and second gastric compartments, third stomach, liver, pancreas, post mortem sampling, no gender differences found, species differences observed.

Cebra, C.K.; Tornquist, S.J. **Meta-analysis of glucose tolerance in llamas and alpacas.** *4th European Symposium on South American Camelids/DECAMA European Seminar, Göttingen, Germany; October 07-09, 2004.* 2006. ISBN: 9076998981

NAL call no.: SF401.L35 E97 2004

Descriptors: glucose tolerance, 5 adult female llamas, 9 adult llama geldings, 22 adult alpacas geldings, 0.5g/kg glucose in bolus after overnight fast, blood draws at various intervals, no difference for llama genders, alpacas had greater volume of distribution than llamas, potentially require different dosing regimens for medications that distribute throughout the extracellular fluid, lower insulin response to hyperglycemia in alpacas result of lower peak glucose concentrations, not pancreatic insufficiency.

Celedon, M.O.; Osorio, J.; Pizarro, J. **Aislamiento e identificación de pestivirus obtenidos de alpacas (*Lama pacos*) y llamas (*Lama glama*) de la Region Metropolitana, Chile.** [Isolation and identification of pestiviruses in alpacas (*Lama pacos*) and llamas (*Lama glama*) introduced to the Region Metropolitana, Chile.] *Archivos de Medicina Veterinaria.* 2006; 38(3): 247-252. ISSN: 0301-732X. Note: In Spanish with an English summary.

URL:www.uach.cl

Abstract: The natural habitat for more than 90% of the domestic South American camelids (SAC) in Chile, alpaca (*Lama pacos*) and llama (*Lama glama*), is located between 11 degrees and 21 degrees South latitude at 3800 and 5000 ms of altitude. Lately, alpacas and llamas have been introduced to other geographic parts of the country where they are in contact with domestic ruminants, making likely infection with BVDV, present in cattle, goats and sheep. The BVDV includes two species, BVDV genotype I (BVDV I) and BVDV genotype II (BVDV II), which along with the border disease virus (BDV) and classical swine fever virus (CSFV) conforms the Pestivirus genus of the Flaviviridae family. This study evaluates the hypothesis that SAC introduced to the Metropolitan Region (MR) of Chile are infected with pestiviruses. In order to perform viral isolation, samples were taken from 80 SAC (42 live alpacas, 35 live llamas, 2 dead llamas and 1 aborted fetus of llama), coming from 4 flocks suspected to be infected with pestivirus. The samples were inoculated in primary culture of bovine fetus lung cells (free of BVDV), passing each sample 5 times, and were then analysed by direct immunofluorescence and indirect immunoperoxidase techniques to detect the pres-

ence of pestivirus antigens. For molecular characterization, a fragment of the 5'-untranslated region (5'-UTR) of RNA of the isolates was amplified by reverse transcription-polymerase chain reaction (RT-PCR) and treated with restriction enzymes Pst I, Bgl I and Xho I in order to identify species of viruses. The results show that 18 SAC (10 alpacas and 8 llamas from the 4 studied flocks), were infected with pestivirus. All isolates were non cytopathogenic. BVDV I was isolated from 6 alpacas while BVDV II was isolated from 4 alpacas and 8 llamas. The viral samples were obtained from 8 healthy alpacas, 2 alpacas with abortion, 5 healthy llamas, 2 llamas with abortion and 1 dead llama without clinical history. It is concluded that alpacas and llamas from the MR of Chile are infected with BVDV I and BVDV II.

Descriptors: alpacas, llamas, amplification, disease prevalence, identification, isolation, molecular genetics, RNA, bovine diarrhea virus, pestivirus, biochemical genetics, BVD, mucosal disease, mucosal disease virus, ribonucleic acid, Chile.

Condori, G.; Ayala, C.; Cochi, N.; Rodriguez, T. **DECAMA-project: Evaluation and classification of carcass quality of alpaca.** *4th European Symposium on South American Camelids/DECAMA European Seminar, Gottingen, Germany; October 07--09, 2004.* 2006. ISBN: 9076998981

NAL call no.: SF401.L35 E97 2004

Descriptors: alpacas; 16 month old animals; carcass quality assessment; visual assessment; 5 classes: 1) poor, 2) normal, 3) good, 4) very good, and 5) excellent; fat covering considered 5 regions for the grades; carcass weight and length for the compactness indices; rump width and leg length; longissimus dorsi muscle; South America.

D'Alterio, G.L. **Skin lesions in UK alpacas (*Lama pacos*): Prevalence, aetiology and treatment.** *4th European Symposium on South American Camelids/DECAMA European Seminar, Gottingen, Germany; October 07-09, 2004.* 2006. ISBN: 9076998981

NAL call no.: [SF401.L35 E97 2004](#)

Descriptors: camelid breeders, llamas, alpacas, 3,520 animals counted, zinc deficiency, ectoparasitism, *Chorioptes* mite, mail survey, characterize the camelid population, features of skin disease, efficacy of eprinomectin vs ivermectin, anti miticide, Britain.

D'Alterio, G.L. **Introduction to the alpaca and its veterinary care in the UK.** *In Practice.* 2006 July-Aug; 28(7): 404-411. ISSN: 0263-841X

NAL call no.: SF601.I4

Abstract: South American camelids, particularly alpacas (*Lama pacos*), are becoming increasingly popular exotic livestock species in the UK. As with most exotic animals, veterinary intervention relies heavily on knowledge gained with more conventional and familiar species. However, species differences must be taken into consideration, and it is crucial that exotic patients are placed within the appropriate biological context. This article discusses the husbandry procedures commonly adopted for alpacas in the UK and describes how routine veterinary techniques are conducted in this species. It also outlines an approach to disease prevention. Reproduced with permission of CAB Abstracts.

Descriptors: alpacas, large animal practice, animal health, animal care, blood composition, digestive system, endoparasites, vaccination, *Clostridium perfringens*, animal reproduction, castration, United Kingdom.

D'Alterio, G.L.; Knowles, T.G.; Eknaes, E.I.; Loevland, I.E.; Foster, A.P. **Postal survey of the population of South American camelids in the United Kingdom in 2000/01.** *Veterinary Record*— London. 2006; 158(3): 86-90. ISSN: 0042-4900

URL:www.bvapublications.com

NAL call no.: 41.8 V641

Abstract: The members of the two leading British camelid breeders associations were surveyed by means of a postal questionnaire between December 2000 and January 2001; 696 questionnaires were posted and 218 usable responses were returned. A total of 3520 camelids were recorded, of which 2719 (77.2 per cent) were alpacas (*Lama pacos*) and 726 (20.6 per cent) were llamas (*Lama glama*). Ninety-four per cent of the camelid herds were of one species, and 70 per cent of the animals were kept for more than one purpose. Camelids imported from South America were present on 45 per cent of the units surveyed. Husbandry procedures and preventive health measures were uniform; 92.2 per cent of the animals were kept on pasture all year around, 99 per cent were supplemented with hay and 97.7 per cent with concentrate feed; 88.1 per cent were vaccinated against clostridial disease with a multivalent vaccine licensed for sheep, and 96.3 per cent were treated periodically with anthelmintic drugs. During 2000, ill health, other than dermatological conditions, was reported by 24.3 of respondents, and 32 different conditions were described. Skin disease was reported by 51 per cent of breeders. Zinc deficiency was diagnosed presumptively as the cause of skin disease by 31.9 per cent of the respondents, and ectoparasitism by 26.4 per cent. Of those who treated a skin condition, 71.9 per cent reported an improvement, but less than half of them considered the improvement to have been permanent.

Descriptors: alpacas, llamas, postal questionnaire survey, animal health, animal husbandry, disease prevalence, disease prevention, populations, skin diseases, therapy, vaccination, South America, UK.

D'Alterio, G.L.; Bazeley, K.J. **Referral service for South American camelids at the University of Bristol Veterinary School: A review of cases from 1999 to 2002.** *4th European Symposium on South American Camelids/DECAMA European Seminar, Gottingen, Germany; October 07-09, 2004.* 2006. ISBN: 9076998981

NAL call no.: SF601.I4

Descriptors: vicunas, llamas, alpaca, guanaco, veterinary medicine, clinical and surgical camelid cases, Farm Animal Practice & Hospital of the University of Bristol, Britain, UK.

Davis, W.C.; Hamilton, M.J. **Use of flow cytometry to characterize immunodeficiency syndromes in camelids.** *Small Ruminant Research: The Journal of the International Goat Association.* 2006 Feb; 61(2-3): 187-193. ISSN: 0921-4488. Note: In the special issue: South American Camelids / edited by A. Tibary and S.M. Parish. Includes references.

URL:<http://www.sciencedirect.com/science/journal/09214488>

NAL call no.: SF380.I52

Abstract: Disorders in immune function in llamas have been observed over the past years. However, it has been difficult to determine how many types of deficiencies exist. Through the use of flow cytometry and monoclonal antibodies specific for leukocyte differentiation molecules, it has been possible to characterize the immune system of llamas and determine

the genetic basis of one disease, the juvenile lama immunodeficiency syndrome (JLIDS). The availability of monoclonal antibodies and flow cytometry now afford an opportunity to clinically diagnose animals with JLIDS at birth and characterize other immunodeficiencies in animals presenting with similar clinical signs of immune dysfunction. The findings also show that flow cytometry can be used to characterize disorders in other species.

Descriptors: llamas, alpacas, immunosuppression, flow cytometry, monoclonal antibodies, leukocytes, cell differentiation, genetic disorders, disease diagnosis, juvenile llama immunodeficiency syndrome.

De Fidelibus, G.; Vecchi, A.; Minucci, G.; Lebboroni, G.; Antonini, M.; Renieri, C. **Morphological variation of Italian alpaca population.** *4th European Symposium on South American Camelids/DECAMA European Seminar, Göttingen, Germany; October 07-09, 2004.* 2006. ISBN: 9076998981

Nal call no: SF401.L35 E97 2004

Descriptors: alpacas, adult animals, Italian populations, ITALPACA Association, morphology, coat colors, hoof color, ear length and type, forehead and nose profile, 30% white, 69% pigmented, 32% percent are red with black extremities, 32% black, 18% wild, 10% reddish brown, 1% black and tan, 47% Huacaya, 8% Suri, 44% intermediate, locations of fleece, age effects, Italy.

Di Berardino, D.; Nicodemo, D.; Coppola, G.; King, A.W.; Ramunno, L.; Cosenza, G.F.; Iannuzzi, L.; Di-Meo, G.P.; Balmus, G.; Rubes, J. **Cytogenetic characterization of alpaca (*Lama pacos*, fam. Camelidae) prometaphase chromosomes.** *Cytogenetic and Genome Research.* 2006; 115(2): 138-144. ISSN: 1424-8581

URL:<http://content.karger.com>

NAL call no.: QH431.C95

Descriptors: alpacas, cytogenetics, prometaphase chromosomes, karyotype standardization and gene mapping, comparative studies, future genetic improvement program applications, entromeric index on chromosomes, 4 groups, A group subtelocentrics pair 1-10, B group telocentrics pair 11-20, C group submetacentrics pair 21-29, Group D metacentrics from pair 30-36, relative chromosome length, centromeric index, conventional Giemsa staining, sequential QFQ/C-banding, GTG- and RBG-banding patterns with corresponding ideograms, RBA-banding, sequential RBA/silver staining for NOR localization, ZOO-FISH analysis with camel (*Camelus dromedarius*) X and Y painting probes, validate X-Y chromosome identification of alpaca, homologies between the sex chromosomes camels and alpacas.

Dykgraaf, S.; Pusterla, N.; Van Hoogmoed, L.M. **Rattlesnake envenomation in 12 New World camelids.** *Journal of Veterinary Internal Medicine.* 2006 July-Aug; 20(4): 998-1002. ISSN: 0891-6640

URL:<http://www.blackwell-synergy.com/doi/ref/10.1111/j.1939-1676.2008.0072.x>

NAL call no.: SF601.J65 .

Descriptors: llamas, alpacas, snake bites, snake venoms, *Crotalus atrox*, antivenoms, antibiotics, fluid therapy, mortality, California.

Evermann, J.F **Pestiviral infection of llamas and alpacas.** *Small Ruminant Research: The Journal of the International Goat Association.* 2006 Feb; 61(2-3): 201-206. ISSN: 0921-4488. Note: In the special issue: South American Camelids / edited by A. Tibary and S.M. Parish. Includes references.

URL:<http://www.sciencedirect.com/science/journal/09214488>

NAL call no.: SF380.I52

Abstract: This review summarizes the literature pertaining to pestiviral infections of members of the camelid family. The exact nature of pestiviral infections, in particular bovine viral diarrhoea virus (BVDV), is the subject of active investigation especially in llamas and alpacas. Earlier reports based on serology-detected pestiviral (BVDV) antibodies in members of the camelid group ranging from a low 4% to a high of 53%. These studies indicate that members of the camelid group are susceptible to infection and do seroconvert. Over the past decade, clinical reports have documented disease conditions in llamas, alpacas and more recently, camels. These conditions range from respiratory and enteric diseases to chronic wasting and in utero infections resulting in stillbirths, and abortion. The review brings together some thoughts on whether infections of the camelid group are due to interspecies transmission and/or the potential that members of this group have their own unique pestiviral infections.

Descriptors: llamas, alpacas, bovine viral diarrhoea virus; viral diseases of animals and humans, literature reviews, seroprevalence, pestivirus, respiratory tract diseases, digestive system diseases, wasting syndrome, disease transmission, disease vectors.

Finucane, Brian; Agurto, Patricia Maita; Isbell, William H. **Human and animal diet at Conchopata, Peru: stable isotope evidence for maize agriculture and animal management practices during the Middle Horizon.** *Journal of Archaeological Science.* 2006; 33(12): 1766-1776. ISSN: 0305-4403

URL:<http://www.sciencedirect.com/science/journal/03054403>

Descriptors: humans, plant species, alpacas, llamas, guanacos, vicunas, *Avaia porcellus*, maize, various grasses, nitrogen 15, delta C 13, analysis of skeletal remains, Middle Horizon period (AD550-1000) Conchopata, Peruvian highlands, animal management strategies, no sex differences in diet, Peru.

Frank, E.N.; Hick, M.V.H.; Gauna, C.D.; Lamas, H.E.; Renieri, C.; Antonini, M. **Phenotypic and genetic description of fibre traits in South American domestic camelids (llamas and alpacas).** *Small Ruminant Research: The Journal of the International Goat Association.* 2006 Feb; 61(2-3): 113-129. ISSN: 0921-4488. Note: In the special issue: South American Camelids / edited by A. Tibary and S.M. Parish. Includes references.

URL:<http://www.sciencedirect.com/science/journal/09214488>

NAL call no.: SF380.I52

Abstract: Even though llamas and alpacas are multipurpose animals, fibre production remains the main trait from an international market point of view. The objectives of this review are to describe the phenotypic traits that determine fibre quality, and to identify the genetic mechanisms governing them. The finer and lesser prickling effect the fibre has, the higher its value is. All these characteristics are related to fibre diameter and evenness, and to other traits such as color, type of fleece, fibre length and yield. Studies on genetic mechanisms for llama and alpaca fleece traits show that the white phenotype is dominant to the

pigmented phenotype and to the spotted phenotype. Black face and extremities phenotypes are dominant to black and wild phenotypes. Lustre is dominant to non-lustre type and double coated is governed by an additive genetic mechanism. Heritabilities of fleece weight, staple length and fibre diameter are low to moderate in the high plateau environment and very high outside Altiplano conditions.

Descriptors: llamas, alpacas, fiber quality, phenotype, animal genetics, wool production, fiber color, fiber staple, fleece, yields, dominance (genetics), heritability, diameter, genotype, literature-reviews.

Gall, David A.; Zekas, Lisa J.; Van Metre, David; Holt, Timothy. **Imaging diagnosis--pulmonary metastases in new world camelids.** *Veterinary Radiology and Ultrasound*. 2006 Oct-Nov; 47(6): 571-573. ISSN: 1058-8183

URL:<http://www3.interscience.wiley.com>

DOI:<http://dx.doi.org/10.1111/j.1740-8261.2006.00187>

NAL call no.: SF757.8.A4

Abstract: The radiographic appearance of pulmonary metastatic disease from carcinoma is described in a llama and an alpaca. In one, a diffuse miliary pattern was seen. In the other, a more atypical unstructured interstitial pattern was recognized. Metastatic pulmonary neoplasia in camelids may assume a generalized miliary or unstructured pattern.

Descriptors: Doberman Pinscher dogs, llamas, alpacas, lymphoma, prostate gland, ultrasonography, case studies, carcinoma, radiography, respiratory tract diseases.

Garcia-Pereira, F.L.; Greene, S.A.; McEwen, M.M.; Keegan, R. **Analgesia and anesthesia in camelids.** *Small Ruminant Research The Journal of The International Goat Association*. 2006 Feb; 61(2-3): 227-233. ISSN: 0921-4488. Note: In the special issue: South American Camelids / edited by A. Tibary and S.M. Parish. Includes references. A literature review.

URL:<http://www.sciencedirect.com/science/journal/09214488>

NAL call no.: SF380.I52

Abstract: South American camelids, alpacas and llamas, are increasing in popularity. As a result, veterinarians in North American and European countries are treating increasing numbers of these species in their practices. This article reviews some of the common anesthetic and analgesic practices used in camelids.

Descriptors: alpacas, llamas, analgesia, anesthesia, veterinary medicine, tranquilizers.

Genin, D.; Alzerreca, H. Le Houerou, H.N. [Editors]. **Campos nativos de pastoreo y produccion animal en la puna semiarida y arida andina. Entre fragilidad, saberes tradicionales y marginalidad, inverted-?cual desarrollo duradero? [Native pastures and animal production in the semi-arid puna and arid Andes. What type of sustainable development between fragility, traditional knowledge and marginalization?]** *Secheresse*. 2006; 17(1/2): 265-274. ISSN: 1147-7806. Note: In Spanish with a French summary.

URL:<http://www.secheresse.info>

Abstract: Natural pasture types in the altiplano and altoandino regions of the Andes are described and precipitation and temperature data are presented. The advantages and disadvantages of sheep, llamas, and alpacas are discussed and linked to vegetation type and altitude. Reproduced with permission from CAB Abstracts.

Descriptors: alpacas, sheep, llamas, livestock farming at high altitudes, altiplano, indigenous knowledge, high pastures, dry zones, grazing lands, rural development, sustainability, Andes, South America.

Gilbert, R.; Kutzler, M.; Valentine, B.A.; Semevolos, S. **Hyperandrogenism from an ovarian interstitial-cell tumor in an alpaca.** *Journal of Veterinary Diagnostic Investigation.* 2006 Nov; 18(6): 605-607. ISSN: 1040-6387

URL:<http://jvdi.org/>

NAL call no.: SF774.J68

Abstract: An 8-year-old intact female Huacaya alpaca (*Lama pacos*) was presented for recent development of male behavior. Serum testosterone concentration was determined to be 969.1 pg/ml by using radioimmunoassay, while the range in 33 healthy female adult intact alpacas was 11.7-62.1 pg/ml. An ovarian mass was suspected, and an exploratory laparotomy was performed. A tan mass was present on the left ovary. Histologically, the mass was composed of closely packed, plump, polygonal cells with central round nuclei with granular chromatin and abundant eosinophilic finely granular to vesiculate cytoplasm. An ovarian benign interstitial (Leydig) cell tumor was diagnosed.

Descriptors: alpacas, ovaries, neoplasms, Leydig cells, androgens, hormone secretion, females, animal behavior, blood chemistry, testosterone, ovulation, hyperandrogenism.

Grubb, Tamara L.; Schlipf, John W.; Riebold, Thomas- W.; Cebra, Christopher K.; Poland, Lisa; Zawadzka, Xenia; Mailhot, Nicole. **Minimum alveolar concentration of desflurane in llamas and alpacas.** *Veterinary Anaesthesia and Analgesia.* 2006 Nov; 33(6): 351-355. ISSN: 1467-2987

URL: <http://www3.interscience.wiley.com/journal/118516519/home>

DOI:<http://dx.doi.org/10.1111/j.1467-2995.2005.00278>

NAL call no.: SF914 .V47

Abstract: To determine the minimum alveolar concentration (MAC) of desflurane in llamas and alpacas. Prospective study. Six healthy adult llamas and six healthy adult alpacas. Anesthesia was induced with desflurane delivered with oxygen through a mask. An endotracheal tube was inserted, and a port for continuous measurement of end-tidal and inspired desflurane concentrations was placed between the endotracheal tube and the breathing circuit. After equilibration at an end-tidal-to-inspired desflurane concentration ratio >0.90 for 15 minutes, a 50-Hz, 80-mA electrical stimulus was applied to the antebrachium until a response was obtained (i.e. gross purposeful movement) or for up to 1 minute. The vaporizer setting was increased or decreased to effect a 10-20% change in end-tidal desflurane concentration, and equilibration and stimulus were repeated. The MAC was defined as the average of the lowest end-tidal desflurane concentration that prevented a positive response and the highest concentration that allowed a positive response. Mean \pm SD MAC of desflurane was 7.99 \pm 0.58% in llamas and 7.83 \pm 0.51% in alpacas. The MAC of desflurane in llamas and alpacas was in the range of that reported for other species.

Descriptors: alpacas, llamas, veterinary drugs, anesthetics, pulmonary alveoli, chemical concentration, drug evaluation, anesthesia, desflurane, inhalant anesthesia, minimum alveolar concentration, Internet resource.

Grubb, Tamara L.; Schlipf, John W.; Riebold, Thomas W.; Cebra, Christopher K.; Poland, Lisa; Zawadzka, Xenia; Mailhot, Nicole. **Minimum alveolar concentration of desflurane in llamas and alpacas.** *Veterinary Anaesthesia and Analgesia*. 2006 Nov; 33(6): 351-355. ISSN: 1467-2987

URL: <http://www3.interscience.wiley.com/journal/118516519/home>

DOI: <http://dx.doi.org/10.1111/j.1467-2995.2005.00278.x>

NAL call no.: SF914 .V47

Abstract: To determine the minimum alveolar concentration (MAC) of desflurane in llamas and alpacas. Prospective study. Six healthy adult llamas and six healthy adult alpacas. Anesthesia was induced with desflurane delivered with oxygen through a mask. An endotracheal tube was inserted, and a port for continuous measurement of end-tidal and inspired desflurane concentrations was placed between the endotracheal tube and the breathing circuit. After equilibration at an end-tidal-to-inspired desflurane concentration ratio >0.90 for 15 minutes, a 50-Hz, 80-mA electrical stimulus was applied to the antebrachium until a response was obtained (i.e. gross purposeful movement) or for up to 1 minute. The vaporizer setting was increased or decreased to effect a 10-20% change in end-tidal desflurane concentration, and equilibration and stimulus were repeated. The MAC was defined as the average of the lowest end-tidal desflurane concentration that prevented a positive response and the highest concentration that allowed a positive response. Mean +/- SD MAC of desflurane was 7.99 +/- 0.58% in llamas and 7.83 +/- 0.51% in alpacas. The MAC of desflurane in llamas and alpacas was in the range of that reported for other species.

Descriptors: alpaca, llama, desflurane, inhalant anesthesia, llama.

Gruntman, A.M.; D Nolen Walston, R. **Albendazole toxicity in nine alpaca crias.** *Journal of Veterinary Internal Medicine*. 2006; 20(3): 724. ISSN: 0891-6640. Note: 24th Annual Forum of the American College of Veterinary Internal Medicine, Louisville, KY, USA; May 31 -June 03, 2006.

URL: <http://www.blackwell-synergy.com/doi/ref/10.1111/j.1939-1676.2008.0072.x>

NAL call no.: SF601.J65

Descriptors: alpaca, crias, albendazole, drug toxicity, symptoms, antihelminthic drug, oral administration, iv administration, fluconazole, enrofloxacin, Neupogen, mtronicazole.

Gunsser, I.; Haenichen, T.; Kiesling, C. **Breeding and/or Handling Problems? Causes of Death in Camelids.** In: M. Gerken and C. Renueri [Editors]. *The 4th European Symposium on South American Camelids/DECAMA European Seminar, Gottingen, Germany; October 07 -09, 2004*. 2006. ISBN: 9076998981

NAL call no.: SF401.L35 E97 2004

Descriptors: 179 camelids; 63 alpacas; 5 guanacos; 1 guanaco-llama mix; 5 dromedary camels; 3 Bactrian camels; 1 vicuna; post mortem sampling; causes of death; most common problems: pulmonary edema; next most common: liver, digestive system, abdomen, endoparasites, chronic feeding mistakes; pathology of other organs: urinary tract, head, spleen, skin; degeneration of parenchymas, teeth problems, spleen reactions, mites or other infections; less frequent pathology: genitals, neck, bones, limbs; general causes of death: infectious diseases (22.5%), euthanasia (17.1%), emaciation (9.5%), fatty degeneration of parenchyma (9.0%), diagnosis inconclusive (14.4%).

Gunsser, I.; Aigner, A.; Kiesling, C. **Evaluation of laboratory results of camelids, made for import, export or participation in shows.** *4th European Symposium on South American Camelids/ DECAMA European Seminar, Gottingen, Germany; October 07-09, 2004.* 2006. ISBN: 9076998981

NAL call no.: SF401.L35 E97 2004

Descriptors: 2,546 llamas and alpacas; importing, exporting, show animals, 9, 391 tests for ruminant diseases, brucellosis, leucosis, tuberculosis, leptospirosis, bovine herpes virus 1, and other diseases, testing products evaluated, negative for most ruminant diseases, false positives found, laboratories in Switzerland, Germany, France, Italy, Sweden, and Finland, United States, Chile, Peru.

Halloy, Stephan; Seimon, Anton; Yager, Karina; Tupayachi, Alfredo. **Multidimensional (climatic, biodiversity, socioeconomic), changes in land use in the Vilcanota watershed, Peru.** In: Spehn E.M.; Liberman M.; Korner C. [Editors]. *Land Use Change and Mountain Biodiversity.* CRC Press Taylor & Francis Group. Boca Raton, FL. 2006. 376p. ISBN: 084933523X. Note: Global Mountain Biodiversity Assessment Workshop, Bolivia, Colombia; August 20-23, 2003.

NAL call no.: QH541.5 M65 L36 2006

Descriptors: alpaca, crop plants, vascular plants, watershed areas, biodiversity, socioeconomics,

Hertzberg, H.; Kohler, L.: **Prevalence and significance of gastrointestinal helminths and protozoa in South American Camelids in Switzerland.** *Berliner und Munchener Tierarztliche Wochenschrift.* 2006; 119(7/8): 291-294. ISSN: 0005-9366. Note: In English with a German summary.

URL:<http://www.vetline.de/bmtw/>

NAL call no.: 41.8 B45

Abstract: A cross-sectional study was conducted to determine the prevalence and significance of endoparasitic infections in South American Camelids (SAC) in Switzerland. Qualitative and quantitative coproscopic examinations were performed in 38 farms during the grazing period. Management practices with possible interference with parasitic infections were analysed. On the farm level, prevalences of endoparasitic infections were: trichostrongyles, 87%; *Trichuris* sp., 74%; *Capillaria* sp., 68%; *Nematodirus battus*, 63%; *Nematodirus* sp., 53%; *Dicrocoelium dendriticum*, 34%; *Moniezia* sp., 8%; *Fasciola hepatica*, 5%; protostrongylids, 5%; *Eimeria macusaniensis*, 68%. The level of helminth egg excretion was generally low. The highest values were recorded for trichostrongyles with an average for all investigated farms of 53 eggs per gram of faeces. The mean trichostrongyle egg output was approximately three-fold in SAC on farms that also kept sheep and/or goats, although this difference was not significant ($P=0.11$). Clinical trichostrongylidosis was not reported from any of the farms. The low infection level with gastrointestinal nematodes is attributed to the defaecation behaviour of SAC, depositing their faeces focally on small spots on pasture. As a consequence, pasture infectivity is largely restricted to the area adjacent to the dung piles. Dicrocoeliosis is regarded as the most relevant parasitic infection of llamas and alpacas in Switzerland causing severe clinical symptoms and death in untreated animals. 16% of the owners regularly treated their herds against dicrocoeliosis using praziquantel at a dose of 50

mg/kg body weight orally. Reproduced with permission from CAB Abstracts.

Descriptors: alpacas, llamas, animal parasitic nematodes, anthelmintics, disease control, disease prevalence, disease surveys, epidemiology, fecal testing, disease surveillance, helminthoses, praziquantel, protozoal infections, *Capillaria*, *Dicrocoelium dendriticum*, *Eimeria macusaniensis*, *Fasciola hepatica*, *Moniezia*, *Nematodirus*, *Nematodirus battus*, Protostrongylidae, *Trichostrongylus*, *Trichuris*, *Enoplida*, protozoal diseases, Switzerland.

Hoffman, Eric; Baum, Karen. ***The Complete Alpaca Book***. Bonny Doon Press, LLC. Santa Cruz, Calif.: 2006. ISBN: 9780972124218; 0972124217

NAL call no.: SF401.A4.H65 2006

Descriptors: alpacas, rearing, management, nutrition, feeding, breeding, reproduction, behavior, common diseases, etc.

Huanca, W.; Cervantes, M.P.; Huanca, T. **Embryo mortality and its relation with the phase of follicular development at mating in alpaca**. *4th European Symposium on South American Camelids/DECAMA European Seminar, Göttingen, Germany; October 07-09, 2004*. 2006. ISBN: 9076998981

NAL call no.: SF401.L35 E97 2004

Descriptors: 116alpacas, 3 year old females, follicular development phase (growth, maintenance, or regression) during mating, embryo mortality 35 days post mating, transrectal ultrasonography for follicular status, testing at various intervals, male acceptance, ovulation and conception rate compared with Chi Square test, follicular development at mating did not influence embryo mortality between 20 and 35 days of gestation.

Jakes, K.A.; Shim, S.; Thompson, A. **A pilot study of the effects of diet on Huacaya and Suri alpaca fibre**. *Journal of Camel Practice and Research*. 2006; 13(2): 185-192. ISSN: 0971-6777
URL:www.camelsandcamelids.com

Abstract: A two-year pilot study was undertaken to determine whether a difference in calorie and protein intake influences alpaca health or fibre quality in ways that override differences that stem from colour, age or breed. 36 Huacaya and Suri animals were divided into low and high nutrition groups. The low nutrition diet was a low protein, trace mineral supplemented diet, while the high diet was a protein and energy supplemented one. Animal health was monitored throughout the study; extreme cold and naturally occurring diseases resulted in some attrition from the groups. Fibre was collected at approximate 3-month intervals from the midside of each animal. Fibre diameter was evaluated quarterly, while growth rate, scale length and bundle tensile strength was evaluated at the end of 12 and 24 months. Fibre diameter was thinner after growth in the winter months but thickened again through the summer. Huacaya fibre was stronger than Suri but it was not clear whether diet influenced strength. Growth rate was not affected by diet. Scale length was not affected by diet nor could scale length be used as a reliable measure to distinguish Huacaya and Suri fibres. Reproduced with permission from CAB Abstracts.

Descriptors: alpacas, animal feeding, animal fibers, fiber staple length, dietary protein, diets, energy intake, feed supplements, growth rate, hair, minerals, animal fiber staple, trace elements.

Jensen, J M. *Camelid Drug Formulary*. Published by Game Ranch Health. San Antonio, USA: 2006, 405 p. ISBN: 9781424312177

NAL call no.: SF916.5.J46 2006

Abstract: The book is divided into two main sections, the first dealing with South American Camelids (SAC), llama (*Lama glama*), alpaca (*Lama pacos*), guanaco (*Lama guanicoe*), and vicuna (*Vicugna vicugna*), and the second with dromedaries (*Camelus dromedaries*) and Bactrian camels (*C. bactrianus*). The drugs are grouped in the book according to clinical application (for example, Analgesia, Anaesthesia, Gastrointestinal, Immunization, Reproductive, Vitamins-Minerals). The information consists of a table with five columns entitled Drug, Species, Dosage, Comments, and Reference. For example the information for penicillin in the Reproduction - SAC section is: Drug: penicillin, Species: SAC, Dosage: 22,000 mg/kg, SC, q24h for 3 treatments, Comments: prevention of uterine infection, References: Johnson, L. 1989 [the full references are listed at the end of each of the SAC and Camel sections]. This book will be extremely useful to all veterinarians who come across camelids in their work.

Descriptors: llamas, alpacas, dromedaries, Bactrian camels, vicunas, guanacos, drug formulary, pharmaceuticals, antibiotics, anti-infective agents, anti-inflammatory agents, anti-parasitic agents, drug therapy; gastrointestinal-agents, pharmacology.

Johnson, A.L.; Lamm, C.G.; Divers, T.J. **Acquired cervical scoliosis attributed to *Parelaphostrongylus tenuis* infection in an alpaca.** *Journal of the American Veterinary Medical Association*. 2006 Aug 15; 229(4): 562-565. ISSN: 0003-1488

URL:<http://www.avma.org/>

NAL call no.: 41.8 AM3

Abstract: Case Description - A 2-year-old alpaca was evaluated because of acute onset of cervical scoliosis. Clinical Findings - Physical examination revealed severe scoliosis of the caudal portion of the cervical vertebral column with a C-shaped curvature to the right side. No gait deficits were observed. Cervical radiography confirmed severe curvature of C4 to C6 but did not reveal any bony changes. Cerebrospinal fluid had high total protein concentration and extremely high nucleated cell count with a high proportion of eosinophils, suggesting parasitic infection. Treatment and Outcome - The alpaca was treated for suspected parelaphostrongylosis with ivermectin, fenbendazole, flunixin, vitamin E, thiamine, physical therapy, and a custom-made neck brace. The alpaca's condition continued to deteriorate, and it developed tetraparesis and ataxia and was euthanized after approximately 1 month. Microscopic evaluation of the cervical spinal cord revealed marked vacuolar changes in the left medial portion of the ventral funiculus, mild lymphoplasmacytic infiltration, and multifocal granulomas. The lesions were continuous from C1 to C7 and were compatible with parasite migration. Clinical Relevance - To the authors' knowledge, this is the first report of acquired scoliosis in an alpaca, which appears to represent an unusual manifestation of parelaphostrongylosis that was reported in horses. Reproduced with permission from CAB Abstracts.

Descriptors: alpacas, animal diseases, scoliosis, curvature of the neck bones, nematode infections, *Parelaphostrongylus tenuis*, case study, clinical picture, disease detection, disease course, disease diagnosis, drug therapy, veterinary equipment, acquired cervical scoliosis.

Kobera, R.; Poehle, D. **Case reports in South American camelids in Germany.** *4th European Symposium on South American Camelids/DECAMA European Seminar, Göttingen, Germany; October 07-09, 2004.* 2006. ISBN: 9076998981

NAL call no.: [SF401.L35 E97 2004](#)

Descriptors: alpaca, females, males, infection, epidemiology, pathogens, *Candida albicans*, *Corynebacterium pseudotuberculosis*, pseudotuberculosis vaccine, acute kidney failure, pathology, mortality, yeast infection, diagnosis, pancreas, spleen, immune response, myocardium tissue, case reports, Germany.

Kutzler, M.A.; Shoemaker, M.; Valentine, B.A.; Bildfell, R.J.; Tornquist, S.J. **Bilateral cystic rete testis in an alpaca (*Lama pacos*).** *Journal of Veterinary Diagnostic Investigation.* 2006 May; 18(3): 303-306. ISSN: 1040-6387

URL: <http://jvdi.org/>

NAL call no.: SF774.J68

Abstract: A 9-year-old intact male alpaca (*Lama pacos*) was examined because of marked enlargement of the left scrotum. Ultrasound examination revealed a thin-walled anechoic structure in the area of the left testis. Aspirated fluid contained spermatozoa, many of which had abnormal morphology. Castration was performed and the left testis was markedly enlarged with a clear fluid-filled cyst. The cyst was lined by a single layer of squamous to cuboidal epithelial cells consistent with those originating from rete testis. The right testis was of a comparable size and shape to that of normal alpaca testis, but the rete testis was mildly to moderately dilated. Additional findings included chronic inflammation of the right testis and epididymis and epididymal fibrosis with ductal hyperplasia on the left. The diagnosis was bilateral cystic rete testis, most likely secondary to chronic inflammation.

Descriptors: alpacas, adult intact males, rete testis, scrotum, spermatozoa, cysts (neoplasms), epithelial cells, inflammation, epididymis, male genital diseases, animal diseases, anatomy and morphology, symptoms, epididymal fibrosis.

Lakritz, J.; Middleton, J.R.; Anderson, D.E.; Linden, D.R.; Sams, R.A.; Tessman, R.K.; Tyler, J.W. **Pharmacokinetics of intravenously administered caffeine in healthy alpacas (*Lama pacos*) and llamas (*Lama glama*).** *American Journal of Veterinary Research.* 2006 June; 67(6): 1063-1069. ISSN: 0002-9645

URL: <http://avmajournals.avma.org/loi/ajvr/>

NAL call no.: 41.8 AM3A

Abstract: Objective-To determine the pharmacokinetic disposition of IV administered caffeine in healthy *Lama* spp camelids. Animals-4 adult male alpacas and 4 adult female llamas. Procedures-Caffeine (3 mg/kg) was administered as an IV bolus. Plasma caffeine concentrations were determined by use of high-performance liquid chromatography in 6 animals and by use of liquid chromatography-mass spectrometry in 2 llamas. Results-Median elimination half-life was 11 hours (range, 9.3 to 29.8 hours) in alpacas and 16 hours (range, 5.4 to 17 hours) in llamas. The volume of distribution at steady state was 0.60 L/kg (range, 0.45 to 0.93 L/kg) in alpacas and 0.75 L/kg (range, 0.68 to 1.15 L/kg) in llamas. Total plasma clearance was 44 mL/h/kg (range, 24 to 56 mL/h/kg) in alpacas and 42 mL/h/kg (range, 30 to 109 mL/h/kg) in llamas. Conclusions and Clinical Relevance-High-performance liquid chromatography and liquid chromatography-mass spectrometry were suitable methods

for determination of plasma caffeine concentrations in alpacas and llamas. Plasma caffeine concentration-time curves were best described by a 2-compartment model. Elimination half-lives, plasma clearance, volume of distribution at steady state, and mean residence time were not significantly different between alpacas and llamas. Intravenous administration of caffeine at a dose of 3 mg/kg did not induce clinical signs of excitement.

Descriptors: llamas, alpacas, males, females, pharmacokinetics, intravenous injection, caffeine, behavioral effects, half life, drug evaluation.

Leotta, Gerardo A.; Deza, Natalia; Origlia, Javier; Toma, Claudia; Chinen, Isabel; Miliwebsky, Elizabeth; Iyoda, Sunao; Sosa-Estani, Sergio; Rivas, Marta. **Detection and characterization of Shiga toxin-producing *Escherichia coli* in captive non-domestic mammals.** *Veterinary Microbiology*. 2006; 118(1-2): 151-157. ISSN: 0378-1135

URL:<http://www.sciencedirect.com/science/journal/03781135>

DOI:<http://dx.doi.org/10.1016/j.vetmic.2006.08.019>

NAL call no.: SF601.V44

Descriptors: ruminants, goats, giraffes, *Taurotragus oryx*, elands, *Antilope cervicapra*, black-buck antelopes, *Ovis musimon*, mouflon sheep, *Ovis aries somalicus*, Somali sheep, *Bos grunniensis*, yaks, *Lama pacos*, alpaca, *Lama guanicoe*, guanaco, *Lama guanico glama*, llama, *Hydrochoerus hydrochaeris*, capybaras, *Dolichotis patagonus*, Patagonian cavy, *Cervus elaphus*, red deer, *Ozotoceros bezoarticus*, pampas deer, *Axis axis*, axis deer, *Mazama gouazoubira*, fallow deer, *Dama dama*, paint deer, *Elaphrus davidianus* (Coleoptera-), pere david deer, *Escherichia coli*, serovar-O12:H25, serovar-O13:H6, strain 25 strains, strain 27 strains, strain O146:H28; Shiga toxin producing-*Escherichia coli*, 7 different sero-types, testing fecal samples, PCR, Shiga toxin gene sequences, natural reservoir, frequency in non-domestic animals, zoo habitat, living in a pit, Zoo and Botanical Garden, La Plata City, Argentina.

Li, PengFei; Dong, ChangSheng; Fan, RuiWen; Bai, Rui; Zhu, ZhiWei; Du HaiYan. **Study on the relation of ribosomal protein S5 (RPS5) gene and alpaca fleece growth** *Journal of Economic Animal*. 2006; 10(4): 215-218. ISSN: 1007-7448. Note: In Chinese with an English summary.

URL:<http://jjdwxw.periodicals.net.cn>

Abstract: The ribosomal protein S5 gene from the alpaca DNA library was studied using southern blotting. The gene was sequenced and the deduced nucleotide and amino acid sequences were compared with that of other mammals. The gene sequence was also analysed using bioinformatics to determine its special functional structure. The results will be used as basis for future research.

Descriptors: alpacas, amino acid sequences, fleece, genes, growth, nucleotide sequences, proteins, protein sequences.

Linden, D.R.; Anderson, D.E.; Ramsey, P.M. **Seasonal variation in water intake in llama (*Lama glama*) and alpaca (*Lama pacos*) species.** *Journal of Camel Practice and Research*. 2006; 13(2): 201-205. ISSN: 0971-6777

URL:www.camelsandcamelids.com

NAL call no.: SF997.5.C3

Abstract: Water consumption was recorded during selected periods throughout the year to

determine the variation that occurs with climactic changes and between species for llamas (*L. glama*) and alpacas (*L. pacos*) housed in North America (Ohio, USA). Llamas had mean water consumption of 46.1 ml/kg during summer, 34.1 ml/kg during autumn, 25.0 ml/kg during winter and 33.2 ml/kg during spring. Alpacas had mean water consumption of 69.0 ml/kg during summer, 50.2 ml/kg during autumn, 40.6 ml/kg during winter and 46.1 ml/kg during spring. On a metabolic body weight basis, llamas and alpacas had mean water consumptions of 117.2 and 101.1 ml kg (0.75)⁻¹, respectively, during spring, 157.1 ml kg (0.75)⁻¹ and 194.8 ml kg (0.75)⁻¹, respectively during summer, 116.2 ml kg (0.75)⁻¹ and 141.6 ml kg (0.75)⁻¹, respectively, during autumn and 86.7 ml kg (0.75)⁻¹ and 114.9 ml kg (0.75)⁻¹, respectively, during winter. Mean daily ambient temperature during summer, autumn, winter and spring sample periods were 25.4, 24.6, 4.4 and 21.0 degrees C, respectively. Mean relative humidity during the summer, autumn, winter and spring sample periods were 69.6, 64.2, 82.5 and 87.2%, respectively. This study showed that seasonal environmental variations correlated with variations in water consumption in llamas and alpacas (P<0.05). This study determined that alpacas consume greater amounts of water per kg body weight than llamas in any given season under the same temperature and humidity (P<0.05). Reproduced with permission from CAB Abstracts.

Descriptors: llamas, alpacas, body weight, environmental temperatures, relative humidity, seasonal variation, seasonality, species differences, spring, summer, autumn, winter, water-intake, seasonal changes, seasonal fluctuations, Ohio, USA.

Lupton, C.J.; Elvestad, R.P.; Pfeiffer, F.A.; MacKinnon, K. **Effects of age, location, and nutrition on body weight, fiber production, and fiber quality characteristics of penned alpaca males.**

Journal of Animal Science. 2006; 84(Suppl. 1): 58. ISSN: 0021-8812. Note: 2006 ADSA/ASAS Joint Annual Meeting, Minneapolis, MN, USA; July 09-13, 2006.

URL:<http://jas.fass.org/>

Descriptors: alpacas, males, body weight, age effect, fleece quality, fiber production, fiber quality, location effect, nutrition effect, Texas, US.

Lupton, C.J.; McColl, A.; Stobart, R.H. **Fiber characteristics of the Huacaya alpaca.***Small Ruminant Research*. 2006 Aug; 64(3): 211-224. ISSN: 0921-4488

URL:<http://www.sciencedirect.com/science/journal/09214488>

DOI:<http://dx.doi.org/10.1016/j.smallrumres.2005.04.023>

NAL call no.: SF380.I52

Abstract: A study was conducted to establish a comprehensive profile of US Huacaya Alpaca fiber characteristics that could be useful for educational, promotional, policy, selection, and breeding purposes. Specifically, the means, distributions, and ranges of 23 fiber characteristics and body weight of a representative sample (n = 585) of US Alpacas were measured or calculated using internationally accepted objective test methods. Animals in specified age groups and of known sex representing six geographical regions in the USA were weighed and sampled in approximate proportion to their population density in the respective regions. Fiber samples were shorn from the mid-side of the Alpacas, representing female, male, and castrated male registered animals in the three age categories: 1- and 2-year-old and adult Alpacas. Each sample was measured for mean fiber diameter, prickly factor, comfort factor, mean fiber curvature, medullation (white and light fawn samples only), laboratory scoured

yield, mean staple length, mean staple strength, position of break, and resistance to compression. In addition, yellowness and brightness were measured on the white samples and color differences were measured on the colored samples using a colorimeter. With one exception (laboratory scoured yield), the measured characteristics exhibited considerable variability. The only difference in fiber characteristics that was attributable to sex was mean staple strength. Males produced stronger fibers than females. In contrast, differences due to age were apparent for all but two of the measured traits, these being coefficient of variation of staple length and resistance to compression. Compared to wool of comparable fineness, the Alpaca was shown to be higher yielding, more heavily medullated (a distinctive feature of Alpaca), longer, and considerably stronger. Resistance to compression was invariably lower for Alpaca compared to wool of comparable fiber diameter likely due to the lower levels of crimp in the Alpaca fibers.

Descriptors: alpacas, animal fibers, textile fibers, fiber quality, mechanical properties, fatigue strength, color, gender differences, animal age, national surveys, alternative livestock, United States.

Madaleno, I.M. **Raising camelids up the Andes: Aymara indians animal and vegetable farming complementarities in Chile.** *4th European Symposium on South American Camelids/ DECAMA European Seminar, Göttingen, Germany; October 07-09, 2004.* 2006. ISBN: 9076998981

NAL call no.: [SF401.L35 E97 2004](#)

Descriptors: llamas, alpacas, Indian camelid herders, Aymara Indian communities, 3,800 meter above sea level, lack of crops, quinoa, social structure, villages, ethnic pastoralism, bofedal, animals for meat, milk and wool fibers, traditional camelid husbandry, current status, Chile.

McGregor, B.A. **Production, attributes and relative value of alpaca fleeces in southern Australia and implications for industry development.** *Small Ruminant Research:- The Journal of The International Goat Association.* 2006 Feb; 61(2-3): 93-111. ISSN: 0921-4488. Note: In the special issue: "South American Camelids" edited by A. Tibary and S.M. Parish. Includes references.

URL: <http://www.sciencedirect.com/science/journal/09214488>

NAL call no.: SF380.I52

Abstract: An investigation of commercially important alpaca fibre attributes aimed to identify the influence of management and production variables on alpaca fibre and to quantify the relative economic value of fibre production. Fleeces from five farms in southern Australia (n = 1100) were measured using midside samples and standard tests and were assigned a relative economic value based on an analysis of market price data. Greasy fleece (GFW) and saddle weights of Huacayas peaked at 2 years and Suris at 3 years of age and then declined with increases in age until 6 years of age. GFW of Huacaya were not affected by mean fibre diameter (MFD). In Suris, GFW increased with MFD reaching a peak at 29-33 micrometer. Mean +/- S.D. of clean washing yield was 92.0 +/- 1.5%. The proportion of the fleece as saddle, neck and skirting components was (mean +/- S.E., %): saddle 55.9 +/- 0.9, neck 16.3 +/- 0.5, skirtings 27.8 +/- 0.6. About, 10% of Huacayas had fleeces with MFD < 24.0 micrometer, while 14% of Suris had fleeces < 24.0 micrometer. Both Huacayas and Suris had

about 50% of fleeces with mean fibre diameter > 29.9 micrometer. One-third of Huacaya and Suri saddles had <20% of their fibres medullated. Only, 30% of white Huacaya and Suri samples had >50% of their fibres medullated. For Huacaya and Suri alpaca, the incidence of medullated fibres increased linearly from 10 to 60% by weight as MFD increased from 20 to 36 micrometer. The ratio of medullated fibre diameter to MFD declined as MFD increased. For Huacaya, there was no change in average staple length as MFD increased. Huacaya alpaca had a greater fibre curvature than Suri alpaca. Data on resistance to compression and staple strength was correlated with other fibre attributes. The price declined by 11% per 1 micrometer increase in MFD from 22 to 26 micrometer and by 5% per 1 micrometer increase between 27 and 34 micrometer. The total relative economic value increased with increasing GFW and with increasing saddle weight up to 2.5 kg. Total relative economic value declined as MFD increased above 23 micrometer, increasing live weight above 60 kg and with increasing age above 2 years for Huacaya and 3 years for Suri. The productivity and economic returns from fleece production of Huacaya and Suri breeds was similar. The Australian industry needs to implement commercial mating, shearing and culling strategies to maximise production and returns from animals aged less than 3 years. The main driver of economic value from fleece production was lower MFD of the fleece.

Descriptors: alpacas, Huacaya breed; Suri breed, fleece, commodity prices, wool production, wool industry, animal age, fiber quality, fiber staple, costs and returns, productivity, diameter, livestock production, South Australia.

McKenna, P.B. *Eimeria macusaniensis* in camelids - a brief review. *Surveillance Wellington*. 2006; 33(4): 8-10

URL:www.biosecurity.govt.nz

Descriptors: alpacas, fecal sampling, oocysts of *Eimeria macusaniensis*, parasite life cycle, distribution, pathogenicity, disease diagnosis, epidemiology, pathogen control and prevention, Otago, New Zealand.

McKenna, P.B. **Register of new host-parasite records.** *Surveillance Wellington*. 2006; 33(4): 6-7. ISSN: 0112-4927

URL:www.biosecurity.govt.nz

Abstract: This article presents some new host-parasite records in domestic, zoo and wild animals in New Zealand, including *Eimeria macusaniensis* in an alpaca; *Lamanema chavezii* in llamas and alpacas; *Nematodirus spathiger*, *Camelostrongylus mentulatus*, *Cooperia oncophora* and *Trichostrongylus colubriformis* in llamas; *T. vitrinus* in an alpaca; *Oxyuris karamoja* in a white rhinoceros (*Ceratotherium simum*); *Syngamus trachea* in a stitchbird (*Notiomystis cincta*) and *Heterakis gallinarum* in a guineafowl. Reproduced with permission from CAB Abstracts.

Descriptors: domestic animals, wild animals, zoo animals, wild birds, poultry, guinea fowl, hosts, new host records, parasitoses, alpacas, llamas, birds, parasitic organisms, *Camelostrongylus mentulatus*, *Ceratotherium simum*, *Cooperia oncophora*, *Eimeria macusaniensis*, *Heterakis gallinarum*, *Nematodirus spathiger*, *Syngamus trachea*, *Trichostrongylus colubriformis*, *Trichostrongylus vitrinus*, *Lamanema chavezii*; *Notiomystis cincta*, *Oxyuris karamoja*, New Zealand.

Mattson, D.E.; Baker, R.J.; Catania, J.E.; Imbur, S.R.; Wellejus, K.M.; Bell, R.B. **Persistent infection with bovine viral diarrhea virus in an alpaca.** *Journal of the American Veterinary Medical Association.* 2006 June 1; 228(11): 1762-1765. ISSN: 0003-1488

URL:<http://www.avma.org/>

NAL call no.: 41.8 AM3

Abstract: Case Description-A 2.5-month-old female alpaca that had been born prematurely was examined because of moderate mucopurulent nasal discharge and high rectal temperature. Clinical Findings-In addition to pyrexia and clinical signs of disease of the upper portion of the respiratory tract, the cria had inappetence and was in an unthrifty condition. Hematologic abnormalities included low WBC count, low hemoglobin concentration, and low PCV. Samples of blood were submitted for bovine viral diarrhea virus (BVDV) isolation and serologic evaluation. Other adults and newborn crias in the herd were similarly examined. Bovine viral diarrhea virus was detected in the cria, and a diagnosis of persistent infection with BVDV was made at 5.5 months of age. Persistent BVDV infection was suspected in another cria born into the herd but was not identified in any of the adult alpacas. Treatment and Outcome-Despite several treatments with antimicrobials, no permanent improvement of the cria's condition was achieved. Because of the poor prognosis, the owners requested euthanasia of the cria; BVDV was isolated from specimens of multiple organs collected at necropsy. Clinical Relevance-To date, BVDV infection in New World camelids has not been regarded as a major disease entity. Findings in the cria of this report illustrate that some strains of BVDV readily infect alpacas. Clinical description of the disease plus clinicopathologic findings suggest that persistent BVDV infection may be greatly overlooked as a cause of chronic anemia and failure to thrive in alpacas.

Descriptors: young female alpaca, case study, bovine viral diarrhea virus, viral diseases, chronic diseases, fever, respiratory tract diseases, anorexia, leukocyte count, hemoglobin, hematocrit, disease diagnosis, drug therapy, antimicrobial agents, symptoms.

Miesner, M.D.; Anderson, D.E. **Factor-VIII deficiency in a newborn alpaca.** *Journal of Veterinary Internal Medicine.* 2006 Sept-Oct; 20(5): 1248-1250. ISSN: 0891-6640

URL:<http://www.blackwell-synergy.com>

NAL call no.: SF601.J65

Descriptors: alpacas, neonates, blood coagulation factors, blood coagulation disorders, genetic disorders, hemophilia, hemophilia Type A.

Miesner, M.D.; Anderson, D.E.; Linden, D.; Walker, W.; Specht, T.; Rings, D.M.; Lakritz, J. **Serum and cerebrospinal fluid concentrations of fenbendazole and oxfendazole in alpacas after five daily oral doses of 50mg/kg fenbendazole 10% suspension.** *Journal of Veterinary Internal Medicine.* 2006; 20(3): 724. ISSN: 0891-6640. Note: 24th Annual Forum of the American College of Veterinary Internal Medicine, Louisville, KY, USA; May 31-June 03, 2006.

URL:<http://www.blackwell-synergy.com>

NAL call no.: SF601.J65

Descriptors: alpaca, males, parasitic helminth infection, *Parelaphostrongylus tenuis*, oxfendazole, antiparasite drug, oral administration, serum and cerebrospinal levels.

Miragaya, M.H.; Chaves, M.G.; Agüero, A. **Reproductive biotechnology in South American camelids.** *Small Ruminant Research: The Journal of The International Goat Association.* 2006 Feb; 61(2-3): 299-310. ISSN: 0921-4488. Note: In the special issue: "South American Camelids" edited by A. Tibary and S.M. Parish. Includes references.

URL:<http://www.sciencedirect.com/science/journal/09214488>

NAL call no.: SF380.I52

Abstract: Basic and applied research on physiology of reproduction in alpacas and llamas has gained much importance in the last decades because of their increasing economic value. Reproductive biotechnology would allow propagation of genetically superior individuals, especially those with excellent quality fiber. The objective of this review is to provide an update on the most relevant subjects related to reproductive biotechnology in female and the male. In the female, follicular synchronization, ovarian superstimulation, embryo recovery and transfer, oocyte maturation, assisted reproduction techniques (in vitro fertilization, ICSI), nuclear transfer and embryo cryopreservation are reviewed. In the male, this review concerns artificial insemination.

Descriptors: llamas, alpacas, males, females, animal reproduction, biotechnology, genetic improvement, estrus synchronization, fiber quality, literature reviews, embryo transfer, oocytes, in vitro fertilization, cryopreservation, germplasm conservation, artificial insemination.

Molinillo, Marcelo; Monasterio, Maximina. **Vegetation and grazing patterns in Andean environments: A comparison of pastoral systems in punas and paramos.** In: Spehn E.M.; Liberman M.; Korner C [Editors]. *Land Use Change and Mountain Biodiversity.* CRC Press Taylor & Francis Group. Boca Raton, FL. 2006. 376p. ISBN: 084933523X. Note: Global Mountain Biodiversity Assessment Workshop, Bolivia, Colombia; August 20 -23, 2003.

NAL call no.: QH541.5 M65 L36 2006

Descriptors: cattle, llamas, alpacas, vegetation patterns, punas, paramos, grazing patterns, Andes mountains, South America.

Morton, K.M.; Bathgate, R.; Evans, G.; Maxwell, W.M.C. **A comparison of three diluents for the Cryopreservation of epididymal alpaca sperm.** *Reproduction in Domestic Animals.* 2006; 41(4): 329. ISSN: 0936-6768. Note: 10th Annual Conference of the European Society for Domestic Animal Reproduction, Portoroz, Slovenia; September 07-09, 2006.

URL :<http://www3.interscience.wiley.com>

Descriptors: alpacas, epididymal sperm, post thaw motility, citrate, lactose, cryopreservation diluents, laboratory techniques.

Mosaad, A.A.; Elbagory, A.R.; Khalid, A.M.; Waters, W.R.; Tibary, A.; Hamilton, M.J.; Davis, W.C. **Identification of monoclonal antibody reagents for use in the study of the immune response to infectious agents in camel and water buffalo.** *Journal of Camel Practice and Research.* 2006; 13(2): 91-101. ISSN: 0971-6777

URL:www.camelsandcamelids.com

Abstract: Progress in elucidating the mechanisms regulating the immune response to infectious agents and derived vaccines in domestic species, especially in camels and water buffaloes, has been impeded by the lack of monoclonal antibody (mAb) reagents needed to

study the immune response in the species of interest. As a first step to address this problem, we conducted a study to determine how many existing mAbs developed against leukocyte differentiation molecules (LDM) in various species recognize conserved epitopes on orthologous (identical) molecules in two or more species of Artiodactyla. Analysis of 490 monoclonal antibodies raised against LDM in cattle, goat, sheep, llama, pig, dog and human revealed that many epitopes have been conserved on orthologous molecules in the course of evolution in closely related species in the suborder Ruminantia such as in cattle, bison and water buffalo, and fewer on more distantly related species such as goat and sheep. Only a few of the epitopes conserved in Ruminantia were conserved in the suborders Suiformes (pigs) and Tylopoda (llamas and camels). The highest level of conservation in all suborders was found with major histocompatibility complex (MHC) class I (MHC I) and class II (MHC II) molecules. These findings show the potential as well as the limitations of screening existing mAbs for research in less use studied species. Importantly, the findings also provide further insight into the composition of the immune system in Artiodactyla and factors to be considered when studying the immune response to infectious agents and vaccines in the different suborders of Artiodactyla.

Descriptors: alpacas, llamas, *Bison bison*, buffalo, Bactrian camel, *Camelus bactrianus*, cattle, dogs, dromedaries, goats, human, pigs, rabbits, sheep, epitopes, evolution, immune response, immune system, immunity, major histocompatibility complex, monoclonal antibodies, antigenic determinants, histocompatibility complex, hogs, immunity reactions, immunological reactions.

Newman, K.D.; Anderson, D.E. **Fracture management in llamas and alpacas.** *Small Ruminant Research: The Journal of the International Goat Association*. 2006 Feb; 61(2-3): 241-258. ISSN: 0921-4488. Note: In the special issue: "South American Camelids" edited by A. Tibary and S.M. Parish. Includes references.

URL:<http://www.sciencedirect.com/science/journal/09214488>

NAL call no.: SF380.I52

Abstract: Fracture management in llamas and alpacas present a unique and interesting challenge to the veterinary surgeon compared to other species. Camelids are considered to be excellent patients for the treatment of orthopedic injuries because they have a relative low body weight, tolerate external coaptation devices, are able to ambulate on three legs post-operatively, and can tolerate prolonged periods of recumbency for recuperation after surgery. Reports in the literature on camelid fractures (28 cases) and the authors' experiences with an additional 38 fractures are reviewed. There are a number of repair techniques that can be employed, depending primarily on fracture configuration and the surgeon's experience. Complications to fracture repair include mal-union, delayed union, non-union, osteomyelitis, sequestrum formation, and implant failure. Complications are associated with damage to the neurovascular bundle, damage to adjacent soft tissue at the fracture site, and compound fractures. Complications may be managed through the use antibiotics, surgical debridement, and staged destabilization of the fixation device. When irreversible damage to the neurovascular bundle has occurred, limb amputation with or without a prosthetic device may be alternatives to euthanizing the patient.

Descriptors: llamas, alpacas, bone fractures, fracture fixation, literature reviews, postoperative complications, osteomyelitis, risk factors, amputation.

- Nolen-Walston, R.; Rushton, S.; Rodriguez, C.; Bedenice, D.; Del-Piero, F. **Eastern equine encephalitis (EEE) in South American Camelids: 9 cases.** *Journal of Veterinary Internal Medicine.* 2006; 20(3): 723-724. ISSN: 0891-6640. Note: 24th Annual Forum of the American College of Veterinary Internal Medicine, Louisville, KY, USA; May 31-June 03, 2006.
URL:<http://www.blackwell-synergy.com>
NAL call no.: SF601.J65
Descriptors: llamas, alpacas, infection with Eastern equine encephalitis virus (Togaviridae-), clinical picture, blood sampling, neurological symptoms, cerebrospinal fluid, epidemiology, immunology, laboratory techniques.
- Pachao, N. **DECAMA-Project: Characteristics of the supply and demand of charqui.** *4th European Symposium on South American Camelids/DECAMA European Seminar, Göttingen, Germany; October 07 -09, 2004.* 2006. ISBN: 9076998981
NAL call no.: SF401.L35 E97 2004
Descriptors: llama, alpaca, charqui, meat product, jerky, Arequipa markets, volumes of production, characteristics of demand, commercialization of systems, financial margins, 443.4 MT/year, Peruvian markets.
- Palacios C.A.; Perales, R.A.; Chavera, A.E.; Lopez, M.T.; Braga, W.U.; Moro, M. ***Eimeria macusaniensis* and *Eimeria ivitaensis* co-infection in fatal cases of diarrhoea in young alpacas (*Lama pacos*) in Peru.** *Veterinary Record*— London. 2006 Mar 11; 158(10): 344-345. ISSN: 0042-4900
NAL call no.: 41.8 V641
Abstract: Seven 4-5-month-old alpacas in Peru were presented with clinical signs of sudden watery to bloody diarrhoea, dehydration, emaciation and death in July-August 2002. Small (duodenum, jejunum and ileum) and large intestine (caecum, colon and rectum) tissue samples showing gross pathological lesions were obtained postmortem for analysis. *E. macusaniensis* and *E. ivitaensis* schizonts were both present in the intestinal mucosa samples; macrogamonts and immature oocysts were found in the cytoplasm and between the nuclei and basal membrane of epithelial cells in the caecum and colon. This is the first description of *E. macusaniensis* and *E. ivitaensis* coinfection leading to death in young alpacas.
Descriptors: young alpacas, *Eimeria*, diarrhea, intestinal disease, high mortality, post mortem sampling, co-infection with 2 *Eimeria* species, Peru.
- Palma, R.L.; McKenna, P.B.; Aitken, P. **Confirmation of the occurrence of the chewing louse *Bovicola (Lepikentron) breviceps* (Insecta: Phthiraptera: Trichodectidae) on alpacas (*Lama pacos*) in New Zealand.** *New Zealand Veterinary Journal.* 2006; 54(5): 253-254. ISSN: 0048-0169
URL:www.vetjournal.org.nz
Abstract: The presence of *Bovicola breviceps* in New Zealand (28 October 2005) was confirmed. This confirmation was based on the examination of a large number of nymphs and at least 10 adult female lice collected from a Huacayan alpaca. Slide-mounted samples of *B. breviceps* could be easily identified and distinguished from other species of *Bovicola* by the morphology of their ventral terminalia, in particular the shape of the gonapophyses and configuration of their pigmented sclerites. Treatment with cypermethrin at a dose rate of 10 mg/

kg was effective in eradicating louse infestation in the alpaca. Reproduced with permission of CAB Abstracts.

Descriptors: alpacas, *Bovicola breviceps*, case reports, cypermethrin, drug therapy, diagnosis, disease control, geographical distribution, infestation, new geographic-records.

Patitucci, A.N.; Perez, M.J.; Barril, G.; Carcamo, C.M.; Munoz, A. **Deteccion de anticuerpos sericos contra *Toxoplasma gondii* (Nicolle y Manceaux, 1909) en llamas (*Lama glama* Linneaus, 1758) y alpacas (*Lama pacos* Linneaus, 1758) de Chile. [Serum antibodies to *Toxoplasma gondii* in llamas and alpacas from Chile.] *Archivos de Medicina Veterinaria*. 2006; 38(2): 179-182. ISSN: 0301-732X. Note: In Spanish with an English summary.
URL:www.uach.cl**

Abstract: Serum samples from 113 llamas (*Lama glama*) and 127 alpacas (*Lama pacos*) from the IX and V Regions, respectively, of Chile were tested for *Toxoplasma gondii* antibodies. The modified agglutination test (MAT) was used in both species and titres of 1:25 were considered diagnostically significant. Sera from 49 llamas (43.3%) and 15 alpacas (11.8%) were positive for *T. gondii*. Percentage seropositivity in serum dilutions of 1:25, 1:50, 1:500 and 1:5000 was 17.6, 7.9, 14.1 and 3.5% in llamas and 0, 2.3, 0.7 and 8.6% in alpacas. The rather low prevalence in alpacas may be associated with geographical conditions, management practices or contact with cats rather than different species susceptibility. As expected, older animals showed higher *T. gondii* reactivity than young animals. Reproduced with permission from CAB Abstracts.

Descriptors: llamas, alpacas, *Toxoplasma gondii*, antibodies, agglutination tests, blood serum, immune response, seroprevalence, susceptibility, immunity reactions, immunological reactions.

Poulsen K.P.; Elce, Y.A.; Frederico, L.M.; Remick, A.K.; Capucille, D.J. **Atresia coli in an alpaca cria.** *Veterinary Record*— London. 2006 Apr 29; 158(17): 598-599. ISSN: 0042-4900
URL:www.bvapublications.com
NAL call no.: 41.8 V641

Abstract: Atresia coli in a 10-day-old alpaca cria was described (USA; date not given). The cria was presented with a history of lethargy and poor appetite from 2 days of age. Moreover, it did not pass faeces since birth. The abdomen was distended, and the animal showed signs of pain upon abdominal palpation. Abdominal ultrasonography was performed, and imaging showed diffused distention of the spiral colon and jejunum with fluid. Intestinal atresia, intussusception and intestinal obstruction were considered to be possible causes of the problem, and a decision to perform an exploratory laparotomy was made. However, the cria developed extreme bradycardia and dyspnoea under maintenance anaesthesia, went into cardiac arrest and died. Upon examination of the descending colon, an atresic section of colon was found. The malformed section of the bowel was approximately 10 cm in length and extended into the pelvic canal. This was the first report of atresia coli in an alpaca in the USA.

Descriptors: alpaca, case study, colon, abnormal development, atresia coli, surgical intervention, US.

- Poulsen, K.P.; Gerard, M.P.; Spaulding, K.A.; Geissler, K.A.; Anderson, K.L. **Bilateral renal agenesis in an alpaca cria.** *Canadian Veterinary Journal = La-Revue-Veterinaire Canadienne*. 2006 Feb; 47(2): 159-161. ISSN: 0008-5286. Note: In English with a French summary.
URL: <http://www.pubmedcentral.nih.gov>
NAL call no.: 41.8 R3224
Descriptors: alpacas, cria, neonates, animal diseases, case studies, kidney diseases, congenital abnormalities, disease diagnosis.
- Prokop, I.; Prokop, B. **Heat stress in alpacas. 2.** *Small Farm Today*. 2006 May-June; 23(3): 26-27. ISSN: 1079-9729
URL:<http://www.penrose-press.com/idd/MAG19155.card>
NAL call no.: S1.M57
Descriptors: alpacas, herd management, small farms, small scale farming, heat stress, *Lama*, temperature, farm management, US.
- Prokop, I.; Prokop, B. **Heat stress in alpacas.** *Small Farm Today*. 2006 Mar-Apr; 23(2): 26-27. ISSN: 1079-9729
URL:<http://www.penrose-press.com/idd/MAG19155.card>
NAL call no.: S1.M57
Descriptors: alpacas, small farms, small scale farming, heat stress, alpacas, *Lama*, temperature, herd management, US.
- Pusterla, N.; Colegrove, K.M.; Moore, P.F.; Magdesian, K.G.; Vernau, W. **Multicentric T-cell lymphosarcoma in an alpaca.** *Veterinary Journal*. 2006 Jan; 171(1): 181-185. ISSN: 1090-0233
URL:<http://www.sciencedirect.com/science/journal/10900233>
NAL call no.: SF601.V484
Abstract: A two-year-old female alpaca with multicentric lymphosarcoma presented because of progressive weakness and recumbency. The diagnosis of lymphosarcoma was based on the detection of immature and atypical lymphocytes in a lumbosacral CSF sample. Post mortem examination confirmed multicentric lymphosarcoma involving multiple organs. Immunophenotyping using cross reactive T- and B-cell antibodies characterized the tumour as a T-cell lymphosarcoma.
Descriptors: alpacas, female, lymphosarcoma, T lymphocytes, case study, disease diagnosis, symptoms.
- Ratto, M.H.; Huanca, W.; Singh, J.; Adams, G.P. **Comparison of the effect of ovulation-inducing factor (OIF) in the seminal plasma of llamas, alpacas, and bulls.** *Theriogenology*. 2006 Sept 15; 66(5): 1102-1106. ISSN: 0093-691X
URL:<http://www.sciencedirect.com/science/journal/0093691X>
DOI:<http://dx.doi.org/10.1016/j.theriogenology.2006.02.050>
NAL call no.: QP251.A1T5
Abstract: We have recently reported the presence of an ovulation-inducing factor (OIF) in the seminal plasma of llamas and alpacas--species characterized as induced ovulators. The study was designed to test the hypothesis that the seminal plasma of bulls will induce ovulation in llamas, and to compare the ovulation-inducing effect of seminal plasma of conspecific

versus hetero-specific males. The seminal plasma of alpacas, a closely related induced ovulator (*Lama pacos*), and cattle, a distantly related ruminant species (*Bos taurus*) considered to be spontaneous ovulators, were compared with that of the llama (*Lama glama*). Ovulation and maximum corpus luteum diameter were compared by ultrasonography among female llamas (n = 19 per group) treated intramuscularly with 2 mL of phosphate buffered saline (PBS, negative control) and those treated with 2 mL of seminal plasma of bulls, alpacas, or llamas (conspecific control). The diameter of the preovulatory follicle did not differ among groups at the time of treatment. Bull seminal plasma induced ovulations in 26% (5/19) of llamas compared to 0% (0/19) in PBS group (P < 0.001). The proportion of females that ovulated was lower (P < 0.01) in bull seminal plasma group compared to the groups treated with alpaca or llama seminal plasma (100%). A corpus luteum was detected on Day 8 (Day 0 = treatment) in all llamas in which ovulation was detected earlier (Day 2) by ultrasonography. The diameter of the CL did not differ among groups. Results document the presence of an ovulation-inducing factor in the seminal plasma of *B. taurus*. The interspecies effects of seminal plasma on ovulation and luteal development provide rationale for the hypothesis that OIF is conserved among both spontaneous and induced ovulating species.

Descriptors: llamas, alpacas, females, ovulation, seminal plasma, intramuscular injection, corpus luteum, Hereford beef bulls.

Rawdon, T.; McFadden, A.; King, C.; Mitchell, V.; Howell, M. **Clinical findings and risk factors associated with the first report of *Eimeria macusaniensis* in New Zealand alpacas.** *Surveillance Wellington*. 2006; 33(4): 11-15. ISSN: 0112-4927

URL: www.biosecurity.govt.nz

Abstract: A cross-sectional survey on the epidemiology of *E. macusaniensis* was conducted after its discovery for the first time in alpacas in New Zealand in July 2005. Faecal samples for analysis were collected from affected properties during 10 August 2005. It was shown that 14 out of 427 alpacas in 4 at-risk farms were shedding oocysts. One out of 33 animals in a fifth farm was also shedding. Interfarm prevalence of shedding was 0.61-7.55%. Shedding was significantly associated with age (<12 months) and exposure to the animals imported from Australia in 30 May 2005. The clinical, pathological, histopathological and postmortem findings in an adult female alpaca with *E. macusaniensis* are also described.

Descriptors: alpacas, age differences, animal pathology, clinical aspects, coccidiosis, diagnosis, disease prevalence, disease surveys, epidemiological surveys, epidemiology, histopathology, hosts, new host records, oocysts, postmortem examinations, risk factors, autopsy, clinical picture, disease surveillance, *Eimeria macusaniensis*, postmortem inspections, New Zealand.

Renieri, C. **DECAMA-project: Sustainable development of camelid products and services marketed oriented in the Andean Region.** *4th European Symposium on South American Camelids/DECAMA European Seminar, Göttingen, Germany; October 07-09, 2004*. 2006. ISBN: 9076998981

NAL call no.: [SF401.L35 E97 2004](#)

Descriptors: alpacas, camelid meat products, sustainable development, Andean region, South America.

Richter, M.; Grest, P.; Spiess, B. **Bilateral lipid keratopathy and atherosclerosis in an alpaca (*Lama pacos*) due to hypercholesterolemia.** *Journal of Veterinary Internal Medicine.* 2006; 20(6): 1503-1507. ISSN: 0891-6640

URL:<http://www.blackwell-synergy.com>

DOI:[http://dx.doi.org/10.1892/0891-6640\(2006\)20\[1503:BLKAAI\]2.0.CO;2](http://dx.doi.org/10.1892/0891-6640(2006)20[1503:BLKAAI]2.0.CO;2)

NAL call no.: SF601.J65

Descriptors: alpaca, atherosclerosis, case report, clinical aspects, hypercholesterolemia, lipids arteriosclerosis, clinical picture, hypercholesterinemia, keratopathy, lipids.

Rohbeck, Simone; Gauly, M.; Bauer, C. **Course of gastro-intestinal parasite and lungworm infections in South American camelids on a farm in central Germany.** *4th European Symposium on South American Camelids/DECAMA European Seminar, Gottingen, Germany; October 07-09, 2004.* 2006. ISBN: 9076998981

NAL call no.: [SF401.L35 E97 2004](#)

Descriptors: llamas, alpacas, parasites, *Eimeria* fauna, *Moniezia*, *Haemonchus contortus*, *Trichostrongylus*, *Trichostrongylus*, *Ostertagia*, *Dictyocaulus viviparus*, oocysts, coccidiosis, gastrointestinal parasitic infections, lungworm infections, epidemiology, Germany.

Robinson, T.F.; Sponheimer, M.; Roeder, B.L.; Passey, B.; Cerling, T.E.; Dearing, M.D.; Ehleringer, J.R. **Digestibility and nitrogen retention in llamas and goats fed alfalfa, C3 grass, and C4 grass hays.** *Small Ruminant Research.* 2006 July; 64(1-2): 162-168. ISSN: 0921-4488

URL:<http://www.sciencedirect.com/science/journal/09214488>

DOI:<http://dx.doi.org/10.1016/j.smallrumres.2005.04.018>

NAL call no.: SF380.I52

Abstract: The objective of this experiment was to determine the relative digestive capabilities and N retention between goats and llamas fed three forages. Four llamas (2 yrs; 125 +/- 7.3 kg BW) and four Boer-cross goats (2 yrs; 53 +/- 8.4 kg BW) were housed in metabolism crates and fed alfalfa (*Medicago sativa*; ALF), temperate C3 grass (*Festuca arundinacea*; C3G) and tropical C4 grass (*Cynodon dactylon*; C4G) hays. Each forage was fed for 21 d during which time the animals were adapted to the forage, followed by a 5 d period of urine and feces sample collection. Dry matter intake species differences, when adjusted to metabolic body weight (kg BW^{0.75}; MW), were noted for ALF and C3G (P < 0.01), while the goats showed a difference between all three forages (P < 0.05; 61.6, 31.0 and 46.2 g/(d kg^{0.75}) for ALF, C3G and C4G, respectively), the llamas showed a difference between the grasses (40.4, 52.1 and 38.5 g/(d kg^{0.75}) for ALF, C3G and C4G, respectively). Digestible DM relative to MW (DDM/MW) was higher for ALF and C4G for the goats versus the llamas (P < 0.03; 42.5 and 29.0 g/(d kg^{0.75}) for goat ALF and C4G and 27.9 and 23.2 g/(d kg^{0.75}) for the llama ALF and C4G, respectively). Llamas had a higher DDM/MW for the C3G, 19.6 and 28.9 g/(d kg^{0.75}) than goats. Both animal species were in positive N balance for all three forages; llamas and goats retained more N on the high-protein ALF, 0.60 and 0.22 g/(d kg^{0.75}), respectively, than they did on either of the grasses (P < 0.05; 0.15 and 0.04 g/(d kg^{0.75}) for C3G and 0.35 and 0.14 g/(d kg^{0.75}) for C4G). Unexpectedly, however, both species retained more N on C4G than on C3G. These results demonstrate that, under these circumstances, llamas do not have a higher digestive efficiency than goats, and goats retained more DM and N than llamas. Thus the goats appear to be more efficient

on these forages than the llamas. Feeding strategy and morphology difference may account for these findings.

Descriptors: llamas, goats, animal feeding, alfalfa, digestibility, nitrogen, nutrient retention, C3 plants, forage grasses, hay, C4 plants, urine, feces, excretion, dry matter intake, body weight, nitrogen balance.

Rodriguez, J.; Dodd, C.; Rosadio, R.; Wheeler, J.C.; Bruford, M.W. **Paternity testing using microsatellite DNA in alpacas (*Vicugna pacos*)**. *4th European Symposium on South American Camelids/DECAMA European Seminar, Gottingen, Germany; October 07-09, 2004*. 2006. ISBN: 9076998981

NAL call no.: [SF401.L35 E97 2004](#)

Descriptors: alpacas, llamas, microsatellites, amplified in 3 multiplex reactions, polymorphic, allele numbers, Cervus 2.0, paternity testing, parentage accuracy in records, IVTA Research Station, Marangani, Canchis Province, Cusco, Peru.

Shim, S.; Jakes, K.A. **Differentiating alpaca fibres by scanning electron microscopy and energy dispersive spectrometry**. *Journal of Camel Practice and Research*. 2006; 13(2): 193-199.

ISSN: 0971-6777

URL: www.camelsandcamelids.com

Abstract: A proposed method to distinguish the fibre from two breeds of alpaca, the Huacaya and the Suri, using scanning electron microscopic examination of cross-sections etched with cold plasma is described. Sulfur distribution in the cross-sections, obtained by energy dispersive spectroscopy, supported the distinctions made between the fibre types. Cell size, appearance and fibre shrinkage indicate that Huacaya fibre was composed of two cell types, while Suri was composed of one in the sample fibres examined. Sulfur was unevenly distributed in Huacaya while it was more evenly distributed in Suri fibres. Applying these methods to a larger number of fibres may resolve controversies concerning the difference in fibre structure between the two breeds.

Descriptors: alpacas, Huacaya breed, Suri breeds, animal fibers, breed differences, alpaca fiber morphology, scanning electron microscopy, spectrometry, structure, sulfur, elemental sulphur.

Sponheimer, M.; Robinson, T.F.; Cerling, T.E.; Tegland, L.; Roeder, B.L.; Ayliffe, L.; Dearing, M.D.; Ehleringer, J.R. **Turnover of stable carbon isotopes in the muscle, liver, and breath CO₂ of alpacas (*Lama pacos*)**. *Rapid Communications in Mass Spectrometry*. 2006; 20(9): 1395-1399. ISSN: 0951-4198

URL: <http://www3.interscience.wiley.com/journal/4849/home>

Descriptors: alpacas, stable carbon isotopes of liver, muscle and breath CO₂, C-3 grass diet experimental isonitrogenous C-4 grass diet, breath sampling, muscle biopsies, 72 day sampling, half lives of C-4 derived carbon.

Stull, J.W.; Talbot, E.A.; MacRae, S.; Montero, J.T.; Matyas, B.; Cantor, F.; Konomi, R.; DeMaria, A.; Hayes, E.B.; Smith, T.L.; Nasci, R.S.; Sejvar, J.J.; O'Leary, D.R.; Campbell, G.L.; Noga, A.J.; Lanciotti, R.S. **Eastern equine encephalitis - New Hampshire and Massachusetts, August-September 2005**. *Morbidity and Mortality Weekly Report*. 2006; 55(25): 697-700.

ISSN: 0149-2195

URL:<http://www.cdc.gov/epo/mmwr/mmwr.html>

Abstracts: This report summarizes the investigations of eastern equine encephalitis virus (EEEV) infection in New Hampshire and Massachusetts, USA, during August-September 2005. Eleven human cases of EEEV infection were reported, 7 cases in New Hampshire and 4 cases in Massachusetts. All infected patients were hospitalized and 4 of them died (36%). Before hospitalization, 3 (27%) patients had symptoms lasting for less than a day, and 8 (73%) patients had symptoms lasting for 2-15 days. Nine (82%) patients had encephalitis marked by altered mental status, and 3 of them had acute neurological symptoms that required hospitalization. Two patients had meningitis without altered mental status. All patients who underwent cerebrospinal fluid examination (n=10) had pleocytosis. Examination of mosquito pools revealed that 0.4% (15 of 3938) and 0.6% (45 of 8136) of mosquito pools in New Hampshire and Massachusetts were positive for EEEV, respectively. The EEEV-positive mosquitoes identified were *Culiseta morsitans*, *C. melanura*, *Coquillettidia perturbans*, *Culex pipiens*, *C. pipiens-restuans*, *Aedes cinereus* and *Ochlerotatus japonicus japonicus* [*A. japonicus japonicus*]. Examination of animals with suspected EEEV infection showed that 52 wild birds, 9 horses, 4 alpacas, 2 emus and one llama in New Hampshire, and 4 horses and one emu in Massachusetts were EEEV-positive. These findings underscore the importance of surveillance for arboviral encephalitis and promotion of preventive measures in the USA. Reproduced with permission from CAB Abstracts.

Descriptors: wild birds, alpacas, humans, horses, emus, disease prevalence, disease vectors, encephalitis, epidemiology, human diseases, mortality, mosquito borne diseases, symptomatology, symptoms, viral diseases, *Aedes cinereus*, *Aedes japonicus japonicus*, *Coquillettidia perturbans*, *Culex pipiens restuans*, Culicidae, *Culiseta melanura*; *Culiseta morsitans*, Eastern equine encephalitis virus, death-rate; encephalomyelitis; hospitalization; mosquitoes, viral infections, Massachusetts, New Hampshire, US.

Szafrańska, B.; Panasiewicz, G.; Majewska, M. **Biodiversity of multiple Pregnancy-Associated Glycoprotein (PAG) family: gene cloning and chorionic protein purification in domestic and wild eutherians (Placentalia) - a review.** *Reproduction, Nutrition, Development*. 2006; 46(5): 481-502. ISSN: 0926-5287

URL:<http://www.edpsciences.org>

DOI:<http://dx.doi.org/10.1051/rnd:2006034>

Abstract: This review presents a broad overview of chorionic glycoproteins encoded by the Pregnancy-Associated Glycoprotein (PAG) gene family and also serves to illustrate how the recent discovery of the PAG family has contributed to our general knowledge of genome evolution, placental transcription and placental protein expression. The complex and large PAG family is restricted to the Artiodactyla order, although single PAG-like genes have also been identified in species outside the Artiodactyla. The PAGs are members of the aspartic proteinase (AP) superfamily. Unexpectedly, however, some members of the PAG family possess amino acid substitutions within and around the active site that likely render them unable to act as proteinases. This paper summarizes the available information regarding biodiversity of PAG gene expression based on cDNA cloning, mRNA localization studies and the structural organization of the PAG genes with a particular emphasis on PAG promoters. It also compares available data regarding PAG protein purifications, sequencing and their N-gly-

codiversity. Finally, it discusses the scientific relevance, possible functional roles of the PAGs and describes possible profitable applications related to the detection of PAG proteins in the blood of pregnant domestic and wild species. Reproduced with permission of CAB Abstracts
Descriptors: *Alces alces*, alpacas, Artiodactyla, *Bison bonasus*, buffalo, *Camelus*, cattle, *Cervus elaphus canadensis*, dromedaries, goats, *Odocoileus virginianus*, pigs, sheep, zebras, zebu, aspartic proteinases, biodiversity, complementary DNA, DNA cloning, cDNA, evolution, exons, gene expression, genes, genomes, glycoproteins, introns, messenger RNA, nucleotide sequences, placenta, pregnancy, promoters, reviews, DNA transcription.

Tibary, A.; Vaughan, J. **Reproductive physiology and infertility in male South American camelids: a review and clinical observations.** *Small Ruminant Research: The Journal of the International Goat Association*. 2006 Feb; 61(2-3): 283-298. ISSN: 0921-4488. Note: In the special issue: "South American Camelids" / edited by A. Tibary and S.M. Parish. Includes references.

URL:<http://www.sciencedirect.com/science/journal/09214488>

NAL call no.: SF380.I52

Abstract: Male South American camelids exhibit several distinctive behavioral and physiological reproductive characteristics. This paper describes the anatomical features of the male reproductive tract and a detailed review of puberty, spermatogenesis and factors affecting semen production. Methods of semen collection and parameters of sperm morphology and semen biochemistry are also described. The most common abnormalities and diseases associated with reduced fertility and infertility are presented based on the authors clinical experience.

Descriptors: llamas, alpacas, males, animal reproduction, male fertility, literature reviews, reproductive behavior, male reproductive system, puberty, spermatogenesis, semen, reproductive disorders, artificial insemination, breeding soundness.

Tibary, A.; Fite, C.; Anouassi, A.; Sghiri, A. **Infectious causes of reproductive loss in camelids.** *The rtiogenology*. 2006 Aug; 66(3): 633-647. ISSN: 0093-691X

URL:<http://www.sciencedirect.com/science/journal/0093691X>

DOI:<http://dx.doi.org/10.1016/j.tierigenology.2006.04.008>

NAL call no.: QP251.A1T5

Abstract: Reproductive losses in camelids are due to infertility, pregnancy loss, udder diseases and neonatal mortality caused by a variety of infectious diseases. Uterine infection and abortion represent the major complaint in camelid veterinary practice. The major infectious organisms in endometritis and metritis are *E. coli* and *Streptococcus equi* subspecies *zooepidemicus*. Abortion rates due to infectious diseases vary from 10% to more than 70% in some areas. Leptospirosis, toxoplasmosis and chlamydiosis have been diagnosed as the major causes of abortion in llamas and alpacas. In camels, brucellosis and trypanosomiasis represent the major causes of infectious abortion in the Middle East and Africa. Mastitis is rare in South American camelids. The prevalence of subclinical udder infection in camels can reach very high proportions in dairy camels. Udder infections are primarily due to *Streptococcus agalactiae* and *Staphylococcus aureus*. Neonatal mortality is primarily due to diarrhea following failure of passive transfer and exposure to *E. coli*, rotavirus, coronavirus, *Coccidia* and *Salmonella*. This paper reviews the etio-pathogenesis of these causes of reproductive losses, as well as the major risk factors and strategies to prevent their occurrence.

Descriptors: large animal practice, llamas, animal reproduction, alpacas, dromedaries, dairy animals, abortion, female fertility, mastitis, neonatal mortality, colostrum immunity, endometritis, *Escherichia coli*, *Streptococcus equi* subsp. *zooepidemicus*, toxoplasmosis, *Chlamydia*, etiology, pathogenesis, risk factors, disease control, disease diagnosis.

Tyler, J.W.; Middleton, J.R.; Tessman, R.K.; Nagy, D.W. **Risk of after-hours visits to an in-hospital food animal service by species.** *Journal of Veterinary Internal Medicine*. 2006 Mar-Apr; 20(2): 407-409. ISSN: 0891-6640

URL:<http://www.blackwell-synergy.com>

NAL call no.: SF601.J65

Descriptors: large animal veterinary practice, veterinary clinics, cattle, swine, Vietnamese potbellied pigs, llamas, alpacas, goats, sheep, risk groups, risk factors, veterinary education, Missouri, US.

Van Saun, R.J. **Nutrient requirements of South American camelids: a factorial approach.** *Small Ruminant Research: The Journal of the International Goat Association*. 2006 Feb; 61(2-3): 165-186. ISSN: 0921-4488. Note: In the special issue: "South American Camelids" edited by A. Tibary and S.M. Parish. Includes references.

URL:<http://www.sciencedirect.com/science/journal/09214488>

NAL call no.: SF380.I52

Abstract: Literature describing digestive physiology and defining specific nutrient requirements for llamas and alpacas was reviewed. Using data from studies defining maintenance energy and protein requirements, llamas and alpacas have lower energy and protein requirements compared to other ruminants; however, they have a greater protein requirement per unit of energy. This is consistent with observed differences in urea and glucose metabolism between camelids and other ruminants suggesting a reliance on protein catabolism to maintain blood glucose concentrations. Evidence suggests llamas and alpacas may have a greater requirement for Vitamin D, but no other evidence of significant differences in requirements between camelids and other ruminants. There are limited data defining other nutrient requirements or differences in requirements based on physiologic state for llamas and alpacas. In spite of limited data, a factorial approach to estimate nutritional requirements of llamas and alpacas was described. Defined maintenance energy and protein requirements were extrapolated to other physiologic states using beef cattle, sheep and goat data as templates. Models were developed to predict energy, protein, mineral and vitamin requirements for growth, pregnancy and lactation. Model development was based on determining beef cattle and sheep nutrient requirements on an amount per kg of body weight and assuming no inherent metabolic differences among species. An averaged value was calculated and used as a basis for defining requirements for llamas and alpacas. Amount per kg body weight requirements were converted to a recommended dietary nutrient density basis using an observed lower dry matter intake per unit body weight. Factorially derived models were in better agreement with North American feeding recommendations compared to predicted requirements using current North American-based requirement models. North American-based requirement equations over predicted energy and protein, resulting in required dietary nutrient densities in excess of practical feeding practices. The proposed factorial models need to be critically validated, but provides a starting point for discussion in advancing the study

and application of llama and alpaca nutrient requirements. There are tremendous gaps in our knowledge of llama and alpaca requirements, requiring further basic research especially in the areas of neonatal and fetal growth and composition, lactational performance and mineral bioavailability.

Descriptors: llamas, alpacas, nutrient requirements, ruminant nutrition, literature reviews, dietary protein, urea, glucose, energy metabolism, vitamin D, dietary minerals, animal growth, pregnancy, lactation, animal models, beef cattle, sheep.

Van Saun, R.J. **Nutritional diseases of South American camelids.** *Small Ruminant Research: The Journal of the International Goat Association*. 2006 Feb; 61(2-3): 153-164. ISSN: 0921-4488. Note: In the special issue: "South American Camelids" edited by A. Tibary and S.M. Parish. Includes references.

URL:<http://www.sciencedirect.com/science/journal/09214488>

NAL call no.: SF380.I52

Abstract: Literature describing nutritional or nutrition-related diseases of llamas and alpacas was reviewed. Case reports of copper toxicity, polioencephalomalacia, plant poisonings and urolithiasis accounted for the greatest number of literature citations relative to llamas and alpaca nutritional diseases. However, the overall number of published studies detailing nutritional disease of llamas and alpacas is very limited. Metabolic bone disease, associated with Vitamin D deficiency, and hepatic lipidosis were metabolic diseases for which controlled research studies were completed to address underlying mechanisms. Circumstantial evidence would suggest llamas and alpacas are similar to other ruminants relative to most nutrient deficiency or toxicity disease problems. Llamas and alpacas are unique compared to other ruminant animals in their susceptibility to zinc and Vitamin D deficiency diseases. A zinc-responsive dermatosis has been described, but the true role of zinc deficiency is debated. Llamas and alpacas show a seasonal deficiency in Vitamin D resulting in a hypophosphatemic rickets syndrome. Camelids may have a lower capacity to endogenously synthesize Vitamin D or higher requirement compared to other species. Although mechanisms are not fully understood, llamas and alpacas are somewhat different in metabolic responses to negative energy balance and subsequent hepatic lipidosis. Further research is necessary to better define llama and alpaca nutrient requirements and metabolism as they directly impact potential for nutritional disease.

Descriptors: llamas, alpacas, animal diseases, diet related diseases, literature reviews, copper, ruminant nutrition, encephalomalacia, poisonous plants, poisoning, developmental orthopedic disease, vitamin deficiencies, vitamin D, fatty liver, zinc, nutrient deficiencies, skin diseases, rickets, seasonal variation, energy balance.

Vaughan, J.L.; Tibary, A. **Reproduction in female South American camelids: a review and clinical observations.** *Small Ruminant Research: The Journal of the International Goat Association*. 2006 Feb; 61(2-3): 259-281. ISSN: 0921-4488. Note: In the special issue: "South American Camelids" edited by A. Tibary and S.M. Parish. Includes references.

URL:<http://www.sciencedirect.com/science/journal/09214488>

NAL call no.: SF380.I52

Abstract: Female South American camelids present striking reproductive peculiarities compared to other domestic livestock. Characteristics such as induced ovulation, pregnancy

recognition and maintenance make reproductive management relatively challenging for practitioners with limited exposure to these species. The aim of this paper is to review the current state of knowledge in reproductive physiology and infertility in these species. Following a brief review of the distinctive anatomical features, we describe the follicular wave patterns in non-mated and mated females, mechanisms of ovulation and corpus luteum development as well as fertilisation and pregnancy. Endocrinology of follicle growth, pregnancy, parturition and the post-partum period are described. The paper concludes with a review of the main causes of infertility, early embryonic death and abortion based on clinical observations by the authors.

Descriptors: llamas, alpacas, females, literature reviews, ovulation, pregnancy diagnosis, pregnancy outcome, female fertility, ovarian follicles, follicular development, corpus luteum, fertilization, parturition, endocrinology, embryonic mortality, abortion, reproductive disorders.

Vaughan, Jane. **Artificial breeding in alpacas.** *4th European Symposium on South American Camelids/DECAMA European Seminar, Gottingen, Germany; October 07-09, 2004.* 2006. ISBN: 9076998981

NAL call no.: [SF401.L35 E97 2004](#)

Descriptors: alpacas; males; reproduction; ejaculations lasting 15-20 minutes; semen of low volume, low density, high viscosity; variation in semen quality; collection best quality sperm; pregnancies; artificial insemination; comparing fresh and chilled or frozen semen; developing non-surgical, transcervical single and multiple ovulation embryo transfer procedure; female preparation; embryo flushing; good body condition; need for green grass and adequate selenium.

Webb, A.A.; Cullen, C.L.; Lamont, L.A. **Brainstem auditory evoked responses and ophthalmic findings in llamas and alpacas in eastern Canada.** *Canadian Veterinary Journal = La Revue Veterinaire Canadienne.* 2006 Jan; 47(1): 74-77. ISSN: 0008-5286. Note: In English with a summary in French.

URL: <http://www.pubmedcentral.nih.gov>

NAL call no.: 41.8 R3224

Abstract: Seventeen llamas and 23 alpacas of various coat and iris colors were evaluated for: 1) deafness by using brainstem auditory evoked response testing; and 2) for ocular abnormalities via complete ophthalmic examination. No animals were deaf. The most common ocular abnormalities noted were iris-to-iris persistent pupillary membranes and incipient cataracts.

Descriptors: llamas, alpacas, brain stem, evoked potentials, hearing, eyes, vision disorders, eye conditions and diseases, Canada.

Weber, H.; Beckmann, K.; Haas, L. **Equines Arteritisvirus (EAV) als Aborterreger bei Alpakas?** **[Equine arteritis virus (EAV) - induced abortion in alpacas?]** *Deutsche Tierärztliche Wochenschrift.* 2006; 113(4): 162-163. ISSN: 0341-6593. Note: In German with an English summary.

URL: <http://www.schaper-verlag.de>

Abstract: Here we report a case of a late abortion of a primiparous alpaca where genome fragments of the equine viral arteritis virus (EAV) could be detected in fetal tissues using

reverse transcription polymerase chain reaction (RT-PCR). All five alpacas of the herd had virus neutralizing antibodies against EAV. EAV thus must be regarded as a potential agent for abortions in alpacas. Possible routes of introduction of the virus are discussed. Reproduced with permission from CAB Abstracts.

Descriptors: alpacas, fetal abortion, equine arteritis virus, late abortion, arteritis, case report, diagnosis, disease transmission, host range, neutralizing antibodies, PCR, reverse transcription.

Whitehead, C.E.; Anderson, D.E. **Neonatal diarrhea in llamas and alpacas.** *Small Ruminant Research: The Journal of the International Goat Association*. 2006 Feb; 61(2-3): 207-215. ISSN: 0921-4488. Note: In the special issue: "South American Camelids" edited by A. Tibary and S.M. Parish. Includes references.

URL: <http://www.sciencedirect.com/science/journal/09214488>

NAL call no.: SF380.I52

Abstract: Diarrhea is an important cause of morbidity in neonatal llamas and alpacas. Diarrhea may be multifactorial in etiology including management and nutritional factors as well as a variety of pathogens. Most of the pathogens involved affect other livestock species and some have host-adapted strains. However, the clinical signs, their expected severity and age of onset of disease varies between species in some cases. The most common pathogens causing diarrhea in neonatal camelids are coronavirus, *Escherichia coli* (*E. coli*), *Cryptosporidium* spp., *Giardia* spp. and coccidia. The purpose of this paper is to review the available literature on neonatal diarrhea in camelids and to present clinical data from 55 cases seen at The Ohio State University.

Descriptors: llamas, alpacas, neonates, diarrhea, etiology, symptoms, disease severity, animal age, Coronavirus, viral diseases of animals and humans, *Escherichia coli*, *Escherichia* infections, *Cryptosporidium*, cryptosporidiosis, coccidiosis, salmonellosis, *Giardia*, giardiasis, literature reviews, disease diagnosis, *Coccidia*.

Wilkins, P.A.; Southwood, L.L.; Bedenice, D. **Congenital vulvar deformity in 6 alpacas.** *Journal of the American Veterinary Medical Association*. 2006 July 15; 229(2): 263-265. ISSN: 0003-1488

URL: <http://www.avma.org/>

DOI: <http://dx.doi.org/10.2460/javma.229.2.263>

NAL call no.: 41.8 AM3

Abstract: Case Description - 6 female alpacas, ranging in age from < 1 day to >2 years, were examined because of primary owner complaints related to urogenital malformation. Clinical Findings - In all instances, the vulva was totally to subtotally imperforate. One neonate had failure of passive transfer of immunity and mild azotemia at the time of initial examination. No additional urogenital malformations were detected in any of the alpacas. Treatment and Outcome - Vulvoplasty performed via local anesthesia was successful in all alpacas. The neonate with failure of passive transfer received a plasma transfusion. Postsurgical wound management was limited to topically applied medications. Clinical Relevance - Congenital vulvar deformity in alpacas may result in interference with urine outflow. Neonates with a completely imperforate vulva may be brought to veterinarians for examination on an emergency basis. Less severely affected alpacas may be examined later in life with owner

complaints ranging from stranguria or dysuria to urogenital malformation. No other primary abnormalities of the urogenital tract in alpacas have been reported, to the authors' knowledge. Vulvoplasty, performed with local anesthesia, resolves obstructed urine flow. Because it is possible that this condition is heritable, affected alpacas, and possibly their sires and dams, should not be used for breeding. Reproduced with permission from CAB Abstracts.

Descriptors: animal diseases, alpacas, female genital diseases, vulva, congenital abnormalities, urinary tract diseases, case studies, symptoms, disease detection, resection, urination, vulvoplasty.

Wolt, D.; Gauly, M.; Huanca, W.; Cardenas, O.; Bauer, C.; Schares, G. **Seroprevalence of *Neospora caninum* und *Toxoplasma gondii* in South American camelids.** *4th European Symposium on South American Camelids/DECAMA European Seminar, Gottingen, Germany; October 07-09, 2004* 2006. ISBN: 9076998981

NAL call no.: SF401.L35 E97 2004

Descriptors: llamas, alpacas, vicunas, *Neospora caninum*, *Toxiplasma gondii*, post-natal infection routes, clinical significance, South America.

Zama , M.M.S.; Bhardwaj, H.R.; Tarunbir Singh; Gupta, A.K.; Chaudhary, R.N. **Dorsal patellar fixation in large animals - a review.** *Indian Journal of Field Veterinarians.* 2006; 1(4): 71-80. ISSN: 0973-3175

URL:<http://www.ivri.nic.in>

Abstract: alpacas, equines, camels, llamas, etiological factors, diagnosis, treatment, patellar fixation, tibio-femoral patellar articulation-stifle joint, bone fractures, diagnosis, ultrasonography.

Zanolari, P.; Konar, M.; Tomek, A.; Hoby, S.; Meylan, M. **Paraparesis in an adult alpaca with discospondylitis.** *Journal of Veterinary Internal Medicine.* 2006 Sept-Oct; 20(5): 1256-1260. ISSN: 0891-6640

URL:<http://www.blackwell-synergy.com>

NAL call no.: SF601.J65

Descriptors: alpacas, spine, intervertebral disks, spinal diseases, inflammation, abscess, paresis, spinal cord, disease diagnosis, magnetic resonance imaging, spinal cord compression.

Zanolari, P. **Neuweltkameliden - von der Geburtsvorbereitung bis zur Versorgung der Neugeborenen.** [**New World camelidae: from birth preparations to care for newborn animals.**] *Forum Kleinwiederkauer/Petits Ruminants.* 2006; (12): 6-12 . Note: In German and French. A literature review.

URL:<http://www.caprovis.ch>

Abstract: This review deals with the gestation period and parturition of alpacas and llamas, and details are given of placental function, the role of colostrum in protecting young animals from infections, failure of passive immunoglobulin transfer and colostrum administration. A checklist of measures required before and after parturition includes the provision of a stress-free environment for dams, neonatal checks of the respiration and navel, ensuring that young animals stand up within 60 minutes of birth and that they suck within 4 h, regular checks of daily gain, the avoidance of extreme temperatures and the provision of selenium. Reproduced

with permission from CAB Abstract.

Descriptors: alpacas, llamas, colostrum, gestation, newborn immunity, vitelline immunity, maternal immunity, newborn animals, parturition, pregnancy, reviews.

2005

Adams, G.P.; Ratto, M.H.; Huanca, W.; Jaswant Singh. **Ovulation-inducing factor in the seminal plasma of alpacas and llamas.** *Biology of Reproduction*. 2005; 73(3): 452-457. ISSN: 0006-3363

URL:<http://www.bioreprod.org/>

DOI:<http://dx.doi.org/10.1095/bioreprod.105.040097>

Abstract: Studies were conducted to document the existence of an ovulation-inducing factor in the seminal plasma of alpacas (experiment 1) and llamas (experiment 2) and to determine if the effect is mediated via the pituitary (experiment 3). In experiment 1, female alpacas (n=14 per group) were given alpaca seminal plasma or saline intramuscularly or by intrauterine infusion. Only alpacas that were given seminal plasma i.m. ovulated (13/14, 93%; P<0.01). In experiment 2, ovulation was detected in 9/10 (90%) llamas at a mean of 29.3±0.7 h after seminal plasma treatment. Plasma progesterone concentrations were maximal by Day 9 and were at nadir by Day 12 post-treatment. In experiment 3, female llamas were given llama seminal plasma, GnRH, or saline i.m., and ovulation was detected in 6/6, 5/6, and 0/6 llamas, respectively (P<0.001). Treatment was followed by a surge (P<0.01) in plasma LH concentration beginning 15 min and 75 min after treatment with GnRH and seminal plasma, respectively. Plasma LH remained elevated longer in the seminal plasma group (P<0.05) and had not yet declined to pre-treatment levels after 8 h. Compared with the GnRH group, corpus luteum tended to grow longer and to a greater diameter (P=0.1) and plasma progesterone concentration was twice as high in the seminal plasma group (P<0.01). Results document the existence of a potent factor in the seminal plasma of alpacas and llamas that elicited a surge in circulating concentrations of LH and induced an ovulatory and luteotropic response. Reproduced with permission from CAB Abstracts.

Descriptors: alpacas, llamas, blood chemistry, blood plasma, corpus luteum, GnRH, LH, ovaries, ovulation, ovulation rate, pituitary, progesterone, semen, seminal plasma, gonadoliberein, gonadotropin releasing hormone, hypophysis, pituitary gland.

Alexander, K.; Drost, W.T.; Mattoon, J.S.; Anderson, D.E. **^{99m}Tc-ciprofloxacin in imaging of clinical infections in camelids and a goat.** *Veterinary Radiology and Ultrasound*. 2005; 46(4): 340-347. ISSN: 1058-8183

URL: <http://www3.interscience.wiley.com/journal/117990755/home>

DOI:<http://dx.doi.org/10.1111/j.1740-8261.2005.00064.x>

Abstract: ^{99m}Tc-ciprofloxacin was used to image five adult camelids and a juvenile goat with clinical and/or radiographic signs of infection. ^{99m}Tc-ciprofloxacin (range 10-33 MBq/kg) was injected intravenously and a series of 2-min static images were acquired at 1- and 4-h postinjection. At 24-h postinjection, 5-min static images were acquired. Only the skull

or abdomen was imaged in the adults; the whole body was imaged in the goat. The quality of the 1-, 4-, and 24-h studies was evaluated subjectively. Normal and abnormal areas of ^{99m}Tc -ciprofloxacin uptake were recorded and subjectively graded as mild, moderate or intense. Image quality was best 4-h postinjection. Twenty-four-hour images were poor because of insufficient radioactivity. ^{99m}Tc -ciprofloxacin imaging resulted in true positive or true negative scans in four of six animals. Two false-negative studies occurred. Intense ^{99m}Tc -ciprofloxacin activity was seen in the lungs and urinary bladder, moderate/intense activity in the kidneys, and mild activity in the physes/epiphyses, liver and intermittently in the gastrointestinal tract. The normal distribution of ^{99m}Tc -ciprofloxacin in camelids/small ruminants differed from people. Further studies to determine the sensitivity and specificity of infection detection using ^{99m}Tc -ciprofloxacin in animals are warranted.

Descriptors: alpacas, goats, goat kids, llamas, glue ear infections, *Arcanobacterium pyogenes*, *Streptococcus*, abscesses, clinical aspects, etiology, antibiotics, ciprofloxacin, diagnosis, diagnostic techniques, drug therapy, osteomyelitis, otitis media, radiography, scintigraphy, tissue distribution, Ohio, US.

Ames, T.R. **Hosts.** In: S.M. Goyal and J.F. Ridpath [Editors]. *Bovine Viral Diarrhea Virus: Diagnosis, Management and Control*. Blackwell Publishing, Oxford. 2005; 171-175. ISBN: 0813804787

NAL call no.: SF967.M78 B68 2005

Abstracts: The reports of naturally occurring disease indicate that pigs and a variety of domestic and wild ruminants can be infected with BVDV. The virus has been shown to produce congenital infection in pigs, sheep, and goats. In some cases, congenital infection results in persistently infected animals that can be a significant source of viral transmission. Wild ruminants are known to be susceptible to acute infections with BVDV, and limited evidence suggests that cervids may also undergo congenital infections leading to persistent infection (Grondahl et al., 2003). This suggests a new potential for this virus to be shed in large amounts from wild ruminants that could then infect cattle. Current evidence suggests that wild ruminants may serve as a transient source of virus while undergoing acute infections and may possibly be a more prolonged source of virus from persistently infected animals. This would be of greatest concern where these animals are in contact for prolonged periods of time, as opposed to transient fence line contact. The role of species from which the virus has never been isolated but in which seroconversion has been observed is not clear. The significance of in vitro growth of BVDV in certain cell lines without infection in whole animals is also not known. It is unlikely, however, that these species would be viremic for significant periods of time and thus are unlikely to shed BVDV in the environment. Based on the previous discussion, it seems that non-bovine domestic ruminants and swine remain the greater concern for disrupting management attempts to control the diseases caused by BVDV in cattle. Reproduced with permission from CAB Abstracts.

Descriptors: alpacas, bison, cats, goats, pigs, rabbits, sheep, whit tailed deer, *Odocoileus virginianus*, bovine diarrhea virus, BVD, disease prevalence, disease surveys, disease transmission, experimental infections, glycoproteins, hosts, host range, isolation techniques, neutralizing antibodies, seroconversion, serological surveys, seroprevalence, bovine diarrhea virus; BVD, disease surveillance, mucosal disease virus, seroepidemiology, cell lines.

Britt, Lisa G.; Middleton, John R.; Warhover, Terri Tucker; Kreeger, John M.; Branson, Keith R. **Acanthomatous ameloblastoma of the maxilla of an adult alpaca.** *Veterinary Radiology and Ultrasound.* 2005; 46(1): 65-68. ISSN: 1058-8183.
URL:<http://www3.interscience.wiley.com/journal/117990755/home>
NAL call no.: SF757.8.A4
Descriptors: adult alpaca, maxillary swelling, histological diagnosis, ameloblastoma, radiation therapy, poor outcome, animal euthanized, case study.

Burri, I.H.; Martig, J.; Sager, H.; Liesegang, A.; Meylan, M. **Neuweltkameliden in der Schweiz. I. Population, Haltung und Gesundheitsprobleme.** [South American camelids in Switzerland. I. Population, management and health problems.] *SAT- Schweizer Archiv fur Tierheilkunde.* 2005; 147(8): 325-334. ISSN: 0036-7281. Note: In German with English, French, and Italian summaries.
URL:<http://verlag.hanshuber.com/ezm/index.php?ezm=SAT>
NAL call no.: 41.8 SCH9
Abstract: At the beginning of 2000, a population of 1622 South American camelids in 257 herds was living in Switzerland. The origin of the animals, their age, the management systems, their feeding habits, their use as well as the observed medical conditions and the indications for treatment were assessed with a questionnaire. It was shown that 60% of the South American camelid population in Switzerland consisted of llamas (999 animals) and 40% of alpacas (623), and that females younger than 4 years of age made up the majority of the animals. South American camelids were predominantly kept as a hobby, for breeding or trekking. The most frequent health problems were related to the digestive tract, the skin, the eyes and metabolism. Veterinarians were consulted for deworming, vaccinations, castrations or obstetric interventions. The parasitological examination of 204 faecal samples showed that llamas and alpacas were infested with the same endoparasites as ruminants (i.e. nematodes, trematodes and protozoa). Reproduced with permission from CAB Abstracts.
Descriptors: alpacas, llamas, herd size, animal diseases, animal feeding, animal health, livestock numbers, parasitoses, parasitic diseases, parasitic infestations, population dynamics, Nematoda, Protozoa, Trematoda, Switzerland.

Burri, I.H.; Tschudi, P.; Martig, J.; Liesegang, A.; Meylan, M. **Neuweltkameliden in der Schweiz. II. Referenzwerte fur hamatologische und blutchemische Parameter.** [South American camelids in Switzerland. II. Reference values for blood parameters.] *SAT-Schweizer Archiv fur Tierheilkunde.* 2005; 147(8): 335-343. ISSN: 0036-7281. Note: In German with English, French, and Italian summaries.
URL:<http://verlag.hanshuber.com/ezm/index.php?ezm=SAT>
NAL call no.: 41.8 SCH9
Abstract: In order to establish reference values for blood parameters of South American camelids in Switzerland, 273 blood samples were collected from 141 llamas and 132 alpacas. These animals were classified in three categories (young animals <six months, adult females and males). Forty-one parameters were measured (red blood cell count, white blood cell count, electrolytes, metabolites and enzymes). Significant differences between llamas and alpacas were evident for 26 parameters. This study also showed that differences between

young animals, females and males must be taken into consideration. A comparison of blood values with the results of faecal analysis for parasite eggs showed that an infestation with *Dicrocoelium dendriticum* was associated with elevated activity of two liver enzymes, glutamate dehydrogenase (GLDH) and gamma-glutamyltransferase (gamma -GT), in the serum. In contrast, no differences were found in the results of blood analyses between animals shedding eggs of gastrointestinal strongyles or not. Reproduced with permission from CAB Abstracts.

Descriptors: alpacas, llamas, age differences, sex differences, species differences, animal parasitic nematodes, *Dicrocoelium dendriticum*, blood chemistry, electrolytes, enzymes, erythrocyte count, gamma glutamyltransferase, glutamate dehydrogenase, hematology, helminth ova, helminthoses, leukocyte count, liver, metabolites, normal values, Strongylidae, Switzerland.

Carman, S.; Carr, N.; DeLay, J.; Baxi, M.; Deregt, D.; Hazlett, M. **Bovine viral diarrhea virus in alpaca: abortion and persistent infection.** *Journal of Veterinary Diagnostic Investigation.* 2005 Nov; 17(6): 589-593. ISSN: 1040-6387

URL:<http://jvdi.org/>

NAL call no.: SF774.J68

Abstract: An alpaca herd in eastern Ontario experienced vague signs of illness, including anorexia and lethargy in 9 animals, 2.5 months after the addition of a chronically ill cria and his dam to the farm. Subsequently 2 alpaca had early pregnancy loss; one aborted at 5.5 months gestation and the other at 7 months gestation. Seventeen were found to have serum antibody to bovine viral diarrhea virus (BVDV), with highest titers to BVDV type 1. The fetus that was aborted at 5.5 months gestation, 3 months after the clinical outbreak, was found to be positive for BVDV on immunohistochemical staining, and noncytopathic BVDV type 1b was isolated. Of the 13 cria born alive that season, a single male underweight alpaca cria, born 9 months after the clinical illnesses, was infected with BVDV type 1b. The cria was positive for BVDV at birth, at 3 and 26 days of age and continued to be positive for noncytopathic BVDV using virus isolation, nested reverse transcription PCR, antigen detection ELISA, and immunohistochemical staining until euthanasia at 46 days of age. The cria remained serum antibody negative to both BVDV type 1 and type 2. A diagnosis of persistent infection was made. This is the first report describing persistent infection with BVDV in an alpaca cria.

Descriptors: alpacas, neonates, crias, bovine viral diarrhea, bovine viral diarrhea virus, disease diagnosis, abortion, disease course, infection, herd health, animal diseases, virus transmission, persistent infection, Ontario, Canada.

Chigerwe, M.; Middleton, J.R.; Pardo, I.; Johnson, G.C.; Peters, J. **Spinose ear ticks and brain abscessation in an alpaca (*Lama pacos*).** *Journal of Camel Practice and Research.* 2005; 12(2): 145-147. ISSN: 0971-6777

NaL call no.: SF997.5.C3 J68

Abstract: An 11-year-old male alpaca (*Lama pacos*) in Missouri, USA, was presented with a 2-week history of ataxia, intermittent seizures, left-sided head tilt and circling towards the left [date not given]. The owner described episodes of seizure-like activity lasting 1-3 min, but the alpaca acted normally between episodes. On presentation, the alpaca was depressed,

ataxic on all four limbs and preferred to remain sternal. The neurological deficits identified on history and physical examination were suggestive of asymmetrical brain stem disease. The seizure-like activity, circling and tilting of head to the left as reported by the owner were not observed during physical examination or hospitalization. Initial diagnostic procedures revealed a mature neutrophilia, hyperglycaemia and elevated creatine phosphokinase. The cerebrospinal fluid (CSF) analysis was within reference range and no bacteria were recovered from culture. Initial therapy included intravenous lactated Ringer's solution at 50 ml/kg/day and oxytetracycline (Oxybiotic-100; Butler) at 10 mg/kg IV for 24 h. The following morning the alpaca's condition had deteriorated and permission was granted to euthanize the animal. Gross necropsy revealed numerous nymphal and adult ticks in the left external ear canal adjacent to the tympanic membrane, which were identified as *Otobius megnini*. A 2-cm diameter proliferation of bone accompanied by a caseous abscess was identified on the second molar of the left mandible. A 2.5x2x1.5-cm encapsulated mass with a 3-mm capsule was adhered to the right lateral aspect of the brainstem, cerebellum and adjacent calverium contained exudate on cut surface and was diagnosed as a brain abscess by histopathology. Bacteriological culture of a swab from the brain abscess identified *Arcanobacterium pyogenes*.

Descriptors: alpacas, case report, *Arcanobacterium pyogenes*, *Metastigmata*, *Otobius megnini*, brain abscess cerebrum, clinical picture, therapeutics, postmortem sampling, animal pathology, clinical aspects, diagnosis, histopathology, postmortem examinations, therapy, Missouri, US.

Cristofanelli, S.; Antonini, M.; Torres, D.; Polidori, P.; Renieri, C. **Carcass characteristics of Peruvian llama (*Lama glama*) and alpaca (*Lama pacos*) reared in the Andean highlands.**

Small Ruminant Research: The journal of the International Goat Association. 2005 June; 58(3): 219-222. ISSN: 0921-4488

URL:<http://www.sciencedirect.com/science/journal/09214488>

NAL call no.: SF380.I52

Abstract: An experiment based on males from 20 llama and 40 alpaca reared in Peru evaluated the carcass characteristics from animals slaughtered at 25 months of age, at a final body weight of 46.1 kg for alpaca and 63.2 kg for llama. Warm carcass weight was significantly higher in llama carcasses compared with alpaca, while dressing percentage was higher in alpacas. In the llama carcasses, leg, thorax and chops were heavier compared with the same cuts taken from the alpaca carcasses ($P < 0.05$). In contrast, the shoulder and neck were proportionately heavier in the alpaca compared with the llama carcasses. Full digestive tract was the heaviest component found in the carcasses. In the llama carcasses, both full digestive tract and digestive content were significantly heavier than in the alpaca carcasses. Significant differences were observed in the proportion of muscle and bone in the shoulder and in the leg of the llama and alpaca carcasses. Llama and alpaca slaughtered at similar age showed different carcass characteristics; considering the results of this study, llama can be more easily bred as animal for meat production.

Descriptors: llamas, alpacas, males, carcass quality, legs, thorax, shoulders, neck, bones, gastrointestinal system, carcass characteristics, livestock production, carcass composition, carcass evaluation, Peru.

D'Alterio, G.L.; Callaghan, C.; Just, C.; Manner-Smith, A.; Foster, A.P.; Knowles, T.G. **Prevalence of *Chorioptes* sp. mite infestation in alpaca (*Lama pacos*) in the south-west of England: implications for skin health.** *Small Ruminant Research*. 2005 Mar; 57(2-3): 221-228.

ISSN: 0921-4488.

URL: <http://www.sciencedirect.com/science/journal/09214488>

NAL call no.: SF380.I52

Abstract: A study aiming to determine the prevalence of *Chorioptes* sp. mite infestation in the alpaca (*Lama pacos*) was carried out following confirmation of widespread skin disorders affecting South American camelids in the United Kingdom, and the isolation of this species of mange mite in conjunction with skin lesions from case material referred to the authors. A total of 209 alpaca in nine units in the south-west of England were included in the study. Every alpaca on the unit was clinically examined for the presence of skin lesions. All alpaca presenting with signs of skin disease, as well as approximately one in five clinically healthy, randomly selected, in-contact alpacas were included in the sampled population (n = 83). Superficial skin scrapings were taken from each animal included in the sampled population from six different sites, in addition to a dry swab taken from the ear canal. Of the 209 alpaca examined, 47 (47/209; 22.5%) showed signs of skin disease, ranging from mild alopecia, thickening, crusting and scaling of the skin of the pinnae, to severe and similar diffuse lesions affecting mostly ears, axilla, face and dorsum. Of the sampled population, 33 alpaca (33/83; 39.8%) were positive for *Chorioptes* sp. mite. Cumulatively, in 29 out of 33 positive cases (87.9%) *Chorioptes* sp. mites were detected in scrapings taken from the forefoot and/or the axilla. Thirteen out of the 47 alpacas affected by skin lesions (27.7%) were concurrently positive for *Chorioptes* sp. mite, 20 out of 36 (55%) un-affected sampled alpaca were positive for the mite, and 34 out of 47 affected alpacas (72.3%) presented skin lesions but were negative for *Chorioptes* sp. mite. Statistical test showed that affected animals tended not to be positive for the mite whilst un-affected animals tended to be positive for the mite. Additionally, there was a highly significant association between lesions, age and mite, in that an increase in the presence of skin lesions and a decrease in the presence of mites with increasing age was observed. *Chorioptes* sp. mites have been previously observed in the llama and the alpaca, but chorioptic mange was considered a rare condition in both host species. Findings from the present study indicate high prevalence of both the mite infestation and related clinical signs in alpaca in the south-west of England.

Descriptors: llamas, skin health implications, *Chorioptes* sp., parasitic mite prevalence, England.

D'Alterio, G.L.; Jackson, A.P.; Knowles, T.G.; Foster, A.P. **Comparative study of the efficacy of eprinomectin versus ivermectin, and field efficacy of eprinomectin only, for the treatment of chorioptic mange in alpacas.** *Veterinary Parasitology*. 2005; 130(3/4): 267-275.

ISSN: 0304-4017

URL: <http://www.sciencedirect.com/science/journal/03044017>

Abstract: The efficacy of eprinomectin versus ivermectin (Study 1: a single-centre, randomised, treatment-controlled, blinded field trial), and the field efficacy of eprinomectin (Study 2: a single-centre, open, un-controlled field trial) for the treatment of chorioptic infestation in naturally infested alpacas were assessed in two studies. Thirty alpacas, all positive for *Chorioptes* sp. mite, were randomly allocated to two treatment groups in Study 1.

Group A received a single topical administration of a 0.5% formulation of eprinomectin at the dose rate of 500 micro g/kg. Group B received three subcutaneous administrations at 14 days interval of a 1% formulation of ivermectin at the dose rate of 400 micro g/kg. Response to treatment was assessed by periodic mite count, and skin lesions scored. In Study 2, one group of 19 alpacas received four administrations at weekly interval of topical eprinomectin at the dose rate of 500 micro g/kg, and response to treatment was monitored by mite counts. No localised or systemic side effects were observed in either trial. There was a statistically significant decrease in mite counts on day 7 ($P < 0.001$) within treatment Groups A and B of Study 1, but mite counts increased again on day 14 and remained high for the duration of the trial in both treatment groups. On day 14 of Study 2, there was a statistically significant reduction in mite counts ($P < 0.008$) and the mite counts remained very low throughout the remainder of the study. The eprinomectin protocol employed in Study 2, consisting of four weekly topical administrations at the dose rate of 500 micro g/kg of body weight, proved highly effective at reducing the *Chorioptes* mite burden in alpacas. Reproduced with permission from CAB Abstracts.

Descriptors: alpacas, natural infections of *Chorioptes* mites, mange mite control, eprinomectin protocol was effective, ivermectin, efficacy of treatments.

Dougherty, N. **An introduction to alpaca medicine.** *Veterinary Times*. 2005; 35(23): 10-11. ISSN: 1352-9374

Descriptors: alpacas, wool producing animals, animal feeding, body condition, nutrition, vitamin A deficiency, crude fiber, carbohydrates, animal husbandry, circadian rhythm castration, conception rates, ovarian follicles, ovulation, pregnancy diagnosis, gestation length, antifungal agents, cloprostenol, facial eczema, gestation-period, protein requirement; reproductive performance, ricketts, sporidesmins, ultrasonography, urea, ranitidine, saccharides, blood transfusion, veterinarians, veterinary medicine.

Eastern States Veterinary Association. ***Proceedings of the North American Veterinary Conference. Large Animal. Volume 19, Orlando, Florida, USA, 8-12 January, 2005.*** Published by the Association. 2005; 530 pp

Abstract: This proceedings is comprised of the papers presented in the North American Veterinary Conference on Large Animals. 38 papers generally deal with bovines, with emphasis given on viral and bacterial diseases and their diagnosis and control, metabolism and lameness disorders, fluid therapy, peripartum disorders, surgical procedures and serological testing. 91 papers on horses are included with following topics: dermatology; incisor reduction; wound healing; managing wounds; skin grafting; diagnostic and surgical arthroscopy of the coffin, pastern and temporomandibular joints; limb deformities; urinary problems; anaesthesia; myositis; colitis; dental care; sinus disease; guttural pouch disease; castration complications; reproductive emergencies; emergency procedures in equine critical care; alternative medicine in equine practice; strangles; reproductive disorders; acupuncture; behaviour; foot problems; viral diseases; zoonotic diseases; pain management; heart failure and corneal diseases. 16 papers on small ruminants are presented, dealing with lameness and foot care, dermatological problems; pregnancy diagnosis; neonatology, infertility, mineral nutrition, artificial rearing, endophytes in forages, chronic wasting disease, techniques for removal of brainstem for TSE testing, myopathy in cervids and small ruminants and diseases of free

ranging and captive North American cervids. Diagnosis and control of bacterial and viral diseases in pigs are discussed in 10 papers. 78 papers on practice management and legal issues are also included.

Descriptors: alpacas, cattle, goats, horses, llamas, sheep, pigs, *Mycobacterium avium* subsp *paratuberculosis*, *Streptococcus equi*, porcine reproductive and respiratory syndrome virus, acupuncture, anesthesia, anesthetics, animal behavior, animal nutrition, bacterial diseases, prognosis, colic, colitis, customer relations, dermatology, diagnosis, diagnostic techniques, disease control, disease prevention, drug therapy, eye diseases, fluid therapy, foot diseases, heart diseases, joint diseases, lameness, law, management, marketing, metabolic disorders, myositis, Arterivirus, personnel management, porcine reproductive and respiratory syndrome, pregnancy diagnosis, reproductive disorders, skin diseases, surgery, tooth diseases, urinary tract diseases, vaccination, veterinary practice, viral diseases, wounds, zoonoses, prognosis, anesthesia, anesthetics, arthropathy, bacterial infections, bacterioses, chemotherapy, coronary diseases, legal aspects, legal principles, humane euthanasia, metabolic diseases, rehydration therapy, surgical techniques, zoonotic infections, emergencies, healing.

Ferasin, L.; Ogden, D.M.; Davies, S.J.; Kirby, R.J.; D'Alterio, G.L. **Electrocardiographic parameters of normal alpacas (*Lama pacos*)**. *Veterinary Record*— London. 2005; 157(12): 341-343. ISSN: 0042-4900

URL: <http://veterinaryrecord.bvpublications.com/>

NAL call no.: 41.8 V641

Abstract: The electrocardiographic parameters of 40 healthy alpacas (*Lama pacos*) were recorded with a base-apex lead system to establish the normal resting electrocardiographic parameters in this species. The following parameters were measured: heart rate and rhythm, QRS and T morphology, ST segment position, P amplitude and duration, QRS duration and PQ and QT intervals. The heart rate varied between 50 and 110 bpm, with a mean (sd) of 80 (17.8) bpm, and no significant differences were observed between males and females or between alpacas of different ages. Sinus arrhythmia was observed in 35 of the animals, and a regular sinus rhythm was recorded in the other five. The QRS morphology was variable, with an 'rS' pattern observed in 29 animals, 'RS' in six, 'Rs' in three and 'QS' in the other two. A variable morphology was also observed for the T wave, which was positive in 27 animals, negative in seven and biphasic in the other six. All the electrocardiographic parameters were normally distributed and no significant differences were observed between the sexes, except that the amplitude of the P wave was higher in males. The PQ interval was significantly shorter in animals less than six months old. Reproduced with permission from CAB Abstracts.

Descriptors: alpacas, age differences, sex differences, arrhythmia, electrocardiography, heart rate, Britain, UK.

Field, C.; Rushton, J.; Viscarra, R.; Urquieta, B.; Salem, H.B. **African camels and South American camelids**. In: E. Owen; A. Kitalyi; N. Jayasuriya; T. Smith [Editors] *Livestock and Wealth Creation: Improving the Husbandry of Animals Kept by Resource Poor People in Developing Countries*. 2005; 411-432. ISBN: 1904761321

NAL call no.: SF55.D44 L56 2005

Descriptors: alpacas, dromedaries, llamas, vicunas, meat production animals, animal dis-

eases, animal feeding, animal health, animal physiology, animal products, geographical distribution, metabolism, milk production, reproduction, Africa, South America.

Foster, A.P.; Houlihan, M.; Higgins, R.J.; Errington, J.; Ibata, G.; Wakeley, P.R. **BVD virus in a British alpaca.** *Veterinary Record*-- London. 2005; 156(22): 718-719. ISSN: 0042-4900.

URL:<http://veterinaryrecord.bvapublications.com/>

NAL call no.: 41.8 V641

Descriptors: alpaca, bovine diarrhea virus, BVD, case report, clinical aspects, diagnosis, diagnostic techniques, disease vectors, postmortem examinations.

Gandolf, A.R.; Papich, M.G.; Bringardner, A.B.; Atkinson, M.W. **Pharmacokinetics after intravenous, subcutaneous, and oral administration of enrofloxacin to alpacas.** *American Journal of Veterinary Research.* 2005; 66(7): 1291. 767-771. ISSN: 0002-9645

URL: <http://avmajournals.avma.org/loi/ajvr/>

NAL call no.: 41.8 AM3A

Descriptors : alpacas, enrofloxacin, pharmacokinetics, administration route comparison study, intravenous, subcutaneous, oral dosing.

Gauly, M.; Vaughan, J; Hogreve, S.K.; Erhardt, G. **Brainstem auditory-evoked potential assessment of auditory function and congenital deafness in llamas (*Lama glama*) and alpacas (*L. pacos*).** *Journal of Veterinary Internal Medicine.* 2005; 19(5): 756-760. ISSN: 0891-6640

URL:<http://www.blackwell-synergy.com>

DOI:[http://dx.doi.org/10.1892/0891-6640\(2005\)19\[756:BAPAOA\]2.0.CO;2](http://dx.doi.org/10.1892/0891-6640(2005)19[756:BAPAOA]2.0.CO;2)

NAL Call no.: SF601.J65

Abstract: Auditory function of llamas and alpacas was assessed objectively by means of brainstem auditory-evoked response audiometry (BAER) to establish the normal hearing range and to test the hypothesis of a correlation between blue eyes, white coat, and deafness. Sixty-three camelids were available for the study. Thirteen animals had blue irides; 1 animal had 1 blue and 1 pigmented iris. Wave latencies, amplitudes, and interpeak latencies were measured under general anesthetic. Click stimuli (dB [HL]) were delivered by an insert earphone.

Four to five positive peaks could be detected; waves I, II, and V were reproducible; wave II appeared infrequently; and wave IV generally merged with wave V to form a complex. Peak latencies decreased and peak amplitudes increased as stimulus intensity increased. A hearing threshold level of 10-20 dB (HL) was proposed as the normal range in llamas and alpacas.

None of the animals with pigmentation of coat and iris showed any degree of hearing impairment. Seven of the 10 blue-eyed, pure-white animals were bilaterally deaf and one of them was unilaterally deaf. However, 2 blue-eyed, white animals exhibited normal hearing ability. Three blue-eyed animals with pigmented coat did not show any hearing impairment. All white animals with normal iris pigmentation had normal auditory function; so did the 1 animal with 1 normal and 1 blue iris. The high frequency (78%) of bilaterally deaf animals with pure white coat and blue iris pigmentation supports the hypothesis of a correlation between pigmentation anomalies and congenital deafness in llamas and alpacas.

Descriptors: alpacas, llamas, auditory threshold, brain stem, coat pigmentation, congenital abnormalities, deafness, diagnosis, diagnostic techniques, eyes, hearing, pigmentation, techniques, birth defects, congenital malformations, deaf, threshold of hearing.

Geurden, T.; Hemelrijk, K. van. **Ivermectin treatment against gastrointestinal nematodes in New World camelids in Belgium.** *Small Ruminant Research*. 2005; 58(1): 71-73. ISSN: 0921-4488

URL:<http://www.sciencedirect.com/science/journal/09214488>

DOI:<http://dx.doi.org/10.1016/j.smallrumres.2004.09.002>

Abstract: Gastrointestinal parasites are a major clinical and economical threat to New World camelids (NWC) throughout the world. Since there are no anthelmintics approved for use in NWC, there is only limited information about the efficacy and safety of these products. In this study, the reduction of the faecal egg output following treatment with an injectable formulation of ivermectin in NWC was evaluated. Therefore, a group of 10 llamas and a group of eight alpacas, naturally infested with *Trichostrongylus* spp. and *Oesophagostomum* spp., were randomly divided into a treated and a control group, and injected with ivermectin subcutaneously at a dose rate of 0.2 mg/kg bodyweight. Faecal samples were collected per rectum immediately prior to treatment from each individual animal in the study, and every week thereafter for the next 5 weeks. Both for the llamas and the alpacas, there was a 100% reduction in faecal egg output during at least 3 weeks. None of the animals showed adverse reactions to the ivermectin treatment.

Descriptors: alpacas, llamas, fecal sampling, *Trichostrongylus* spp., *Oesophagostomum* spp., *Trichostrongylus* spp., *Oesophagostomum* spp., nematode infestation, fecal egg count, digestive tract, ivermectin, nematode control.

Guglielmone, A.A.; Romero, J.; Venzal, J.M.; Nava, S.; Mangold, A.J.; Villavicencio, J. **First record of *Haemaphysalis juxtakochi* Cooley, 1946 (Acari: Ixodidae) from Peru.** *Systematic and Applied Acarology*. 2005; 10: 33-35. ISSN: 1362-1971

URL: <http://www.bioline.org.br/aa>

Abstract: Twenty-four adult ticks were collected from South American alpacas, *Lama pacos* (Linnaeus, 1758), at Anexo Tambo Canahuas (16 degrees 01'S, 71 degrees 26'W), Distrito de Yanahuara, Departamento Arequipa, Peru, altitude 4,300 m. Three male and 20 female ticks were identified as *Amblyomma parvitarsum* Neumann, 1901, a common parasite of camelids belonging to the genera *Lama* G. Cuvier, 1800, and Lesson, 1842, in the Andean region of Argentina, Bolivia, Chile and Peru. The remaining tick was a female of *Haemaphysalis juxtakochi* Cooley, 1946. This is the first Peruvian record of *H. juxtakochi*, a species known from the Neotropical and southern Nearctic Zoogeographic Regions. *Lama pacos* is also a new host for this tick species. Reproduced with permission of CAB Abstracts.

Descriptors: alpacas, *Haemaphysalis juxtakochi*, ectoparasites, *Amblyomma parvitarsum*, epidemiology, geographical distribution, hosts, new geographic records, new host records, zoogeography, Peru.

Gustafson, Nancy R.; Severidt, Julie; Van Metre, David C.; Schultheiss, Patricia C.; LaRue, Susan M.; Callan, Robert J. **Radiation therapy for the treatment of urethral sarcoma in a cria.** *Journal of Veterinary Internal Medicine*. 2005; 19(2): 271-274. ISSN: 0891-6640.

URL:<http://www.blackwellpublishing.com>

NAL call no.: SF601.J65

Descriptors: immature female alpaca, *Enterobacter sakazakii*, antiprotozoal drug, enrofloxacin

cin, sulfamethoxacin, dimethyl sulfoxide, trimethoprim, sulfonamides, renal acting drugs, antiparasitic drug.

Johnson, L.W. **Neonatology of llamas and alpacas.** *Proceedings of the North American Veterinary Conference Large Animal Volume 19, Orlando, Florida, USA, 8-12 January, 2005.* 2005; 306-308.

URL:<http://www.tnavc.org>

Descriptors: alpacas, llamas, animal health, congenital abnormalities, diarrhea, maternal immunity, newborn animals, parturition, umbilical hernia, birth defects, congenital malformations, diarrhea, newborn immunity, scouring, vitelline immunity.

Johnson, L.W. **Small ruminant tips for the small animal practitioner.** *Proceedings of the North American Veterinary Conference Large Animal Volume 19, Orlando, Florida, USA, 8-12 January, 2005.* 2005; 301-303

URL:<http://www.tnavc.org>

Descriptors: alpacas, goats, llamas, sheep, abortion, anesthetics, gestation, polling, anesthetics, animal breeding, animal diseases, animal health, antihelmintics, blood sampling, castration, coccidiosis, dehorning, disease control, mycoses, posthitis, pregnancy, pregnancy complications, pregnancy diagnosis, small animal practice, urolithiasis, vaccination-

Johnson, L.W. **Small ruminant tips for the small animal practitioner.** *Small Animal and Exotics Proceedings of the North American Veterinary Conference, Volume 19,- Orlando, Florida, USA, 8-12 January, 2005.* 2005; 491-493

URL:<http://www.tnavc.org>

Descriptors: alpacas, goats, llamas, sheep, lambs, animal breeding, animal diseases, and disease control, bacterial diseases, infectious diseases, coccidiosis, mycoses, urolithiasis, pregnancy diagnosis, abortion, anesthesia, anesthetics, antihelmintics, blood sampling, castration, immunization lamb, pregnancy complications surgery, surgical operations, vaccination, communicable diseases, immune sensitization.

Johnson, L.W. **Alpaca infertility cases.** *Proceedings of the North American Veterinary Conference Large Animal Volume 19, Orlando, Florida, USA, 8-12 January, 2005.* 2005; 309

URL:<http://www.narc.org>

Descriptors: alpacas, case reports, diagnosis, dysplasia, infertility, pseudohermaphroditism, reproductive disorders, testes, testicles, treatment, Colorado, US.

Klisch, K.; Bevilacqua, E.; Olivera, L.V.M. **Mitotic polyploidization in trophoblast giant cells of the alpaca.** *Cells Tissues Organs.* 2005; 181(2): 103-108. ISSN: 1422-6405

URL: <http://content.karger.com>

DOI:<http://dx.doi.org/10.1159/000091099>

Abstract: Genome multiplication is a typical feature of trophoblast giant cell (TGC) development in many species. Elevated nuclear DNA contents can be achieved by modified cell cycles with a complete lack of mitosis (endoreduplication) or with incomplete mitoses. The aim of this study is to characterize genome multiplication in the alpaca TGC. Placental tissues of gestation days 150, 264 and 347 (near term) and term placentae were processed for light microscopy and for transmission electron microscopy. Each TGC showed many nuclear

profiles. Observation of serial sections revealed that TGCs are truly multinucleate with several highly lobulated nuclei. Feulgen staining showed that TGC nuclei have a higher DNA content than nuclei of other trophoblast cells. The number of argyrophilic nucleolar organizer regions (AgNORs) in nuclear profiles of TGC was between 15 and 100, while other trophoblast cells showed 1 or 2 AgNORs. Large multipolar mitotic figures with maximal diameters of 80 microm were observed in the alpaca placentas on gestation days 264 and 347. No cytokinesis was seen in TGC. The results show that the mode of genome multiplication in the alpaca TGC is mitotic polyploidization. Subsequent acytokinetic mitoses may lead to an accumulation of chromosomes and centrioles in TGC. With increasing ploidy levels, the shape of these polyploidizing mitoses becomes more irregular. The restitution of nuclei after these complex multipolar mitoses is likely to result in the irregular nuclear shape in TGC.

Descriptors: alpacas, chromosomes, DNA, genomes, mitosis, nucleolus organizer, placenta, pregnancy, trophoblast, deoxyribonucleic acid, gestation, nucleolus organizing region.

Kriegel, C.; Klein, D.; Kofler, J.; Fuchs, K.; Baumgartner, W. **Haltungen und Gesundheitsaspekte bei Neuweltkameliden. [South American Camelid husbandry in Austria.]**. *Wiener Tierärztliche Monatsschrift*. 2005; 92(5): 119-125. ISSN: 0043-535X. Note: In German with an English summary.

URL:<http://www.wtm.at/>

Abstract: Introduction: South American Camelids have gained popularity over the last few years in Austria. Therefore veterinarians are often asked about their husbandry, breeding or to intervene in clinical management of different problems. The aim of this work is to get an overview of the development of the current state of new world camelidae husbandry in Austria. Material and methods: At the end of 2002 a 12-page questionnaire was sent to all owners of South American camelids in German-speaking countries. It contained general questions on the animals and their husbandry, questions on preventive measures and on diseases. 179 of the 760 questionnaires that had been sent out were returned, which corresponds to a rate of return of 23.6%. At the same time post mortem findings of the last 6 years were collected and analysed. Results and conclusion: In contrast to Switzerland where alpacas account for 47.6%, in Austria llamas are much more dominant with 89.7%. The average herd size in Austria is 9.5 animals, with the majority of animals being held as a hobby. The animals are mainly used for hiking and trekking tours, breeding, pasture farming and/or wool production. Diseases of the digestive tract and endoparasites constitute the most frequent problems of husbandry. Regular preventive medication against endoparasites led to significantly fewer diseases of the digestive tract. The most frequently used supplements are avermectins with 74.4%. In general breeders with no more than 5 animals had significantly ($p < 0.001$) less diseases than those with more animals. 42.6% of the post mortem examinations of tylopods showed that the animals had died below reproduction age. The share of infectious diseases was particularly high with 18.5%. Altogether 30 parasite findings were recorded from 21 animals (38.9%). Nematodes of the digestive tract were found most frequently with 43.3%. Reproduced with permission from CAB Abstracts.

Descriptors: alpacas, llamas, dromedaries, fiber producing animals, camelids, animal husbandry, endoparasites, avermectins, digestive tract, Austria.

- Lakritz, J.; Linden, D.; Anderson, D.; Specht, T.; Barnum, C.; Newman, K. **Oral absorption of fenbendazole (FBZ) and oxfendazole (OXF) by alpacas after feeding 1.8% fenbendazole impregnated mini-pellets: A comparison with 10% oral suspension.** *Journal of Veterinary Internal Medicine.* 2005; 19(3): 478. ISSN: 0891-6640. Note: 23rd Annual Forum of the American College of Veterinary Internal Medicine, Baltimore, MD, USA; June 01 -04, 2005. URL:<http://www.blackwell-synergy.com>
NAL call no.: SF601.J65
Descriptors: alpacas, *Trichuris* ssp, parasite, oral dosing, fenbendazole, oxfendazole, anti-helminthic drugs, pharmacokinetics, 10% oral suspension, impregnated mini pellets.
- Lupton, C.J.; McColl, A.; Pfeiffer, F.A.; Stobart, R.H. **Fiber characteristics of US huacaya alpacas.** *Journal of Dairy Science.* 2005; 88(Suppl. 1): 173. ISSN: 0022-0302. Note: Annual Meeting of the American Dairy Science Association/American Society of Animal Science/Canadian Society of Animal Science, Cincinnati, OH, USA; July 24 -28, 2005.
URL: <http://jds.fass.org/>
NAL call no.: 44.8 J822
Descriptors: alpacas, mature male, Huacaya breed, fiber characteristics, staple, diameter, smooth, crimped, etc.
- Mason, T.E.; Dowling, B.A.; Dart, A.J. **Surgical repair of a cleft soft palate in an alpaca.** *Australian Veterinary Journal.* 2005 Mar; 83(3): 145-146. ISSN: 0005-0423.
URL: <http://www3.interscience.wiley.com>
NAL call no.: 41.8 AU72
Descriptors: alpaca, cleft soft palate repair, surgical technique, case report.
- McClanahan, S.L.; Malone, E.D.; Anderson, K.L. **Bladder outlet obstruction in a 6-month-old alpaca secondary to pelvic displacement of the urinary bladder.** *Canadian Veterinary Journal.* 2005; 46(3): 247-249. ISSN: 0008-5286. Note: In English with a French summary.
URL:<http://www.pubmedcentral.nih.gov>
NAL call no.: 41.8 R3224
Descriptors: young female alpaca, young animal, stranguria, radiographic studies, bladder outlet obstruction, pelvic displacement of the bladder, case report, clinical aspects, cystopexy surgery, uncomplicated recovery.
- McKenna, P.B.; Hill, F. I.; Gillett, R. **Sarcoptes scabiei infection on an alpaca (*Lama pacos*).** *New Zealand Veterinary Journal.* 2005; 53(3): 213. ISSN: 0048-0169.
Descriptors: male alpaca, pruritus, alopecia, hyperkeratotic crusts on hind legs, histopathological analysis of skin section, *Sarcoptes scabiei*, first record in New Zealand.
- Moore, D.P. **Neosporosis in South America.** *Veterinary Parasitology.* 2005; 127(2): 87-97. ISSN: 0304-4017.
URL:<http://www.sciencedirect.com/science/journal/03044017>
NAL call no.: SF810.4.V4
Descriptors: cattle, goats, sheep, dogs, cats, water buffalo, alpacas, llamas, wild canids, reproductive losses, *Neospora caninum*, epidemiology, disease control, South America.

McKenna, P.B. **Register of new host-parasite records.** *Surveillance Wellington*. 2005; 32(4): 7-8. ISSN: 0112-4927

Abstract: New host parasite relationships diagnosed in New Zealand are presented, including *Eimeria* spp. in a stoat (*Mustela erminae*), *Hepatozoon albatrossi* in an albatross (*Diomedea epomophora*), *Sarcoptes scabiei* in an alpaca, *Capillaria* spp. infection in a kokako (*Callaeas cinerea*) and *Capillaria anatis* in a domestic goose, *Amidostomum anseris* in a goose, *Trichostrongylus tenuis* infection in a goose and *Heterakis gallinarum* infection in a goose. Reproduced with permission from CAB Abstracts.

Descriptors: alpacas, stoats, albatross, kokako, domestic geese, new host records, host-parasite relationships, diagnosis, epidemiology, host parasite relationships, parasitoses, *Heterakis gallinarum*, *Sarcoptes scabiei*, *Trichostrongylus tenuis*, *Callaeas cinerea*, *Capillaria anatis*, *Diomedea epomophora*, *Trichostrongylus tenuis*, *Heterakis gallinarum*, New Zealand.

Middleton, J.R.; Moody, M.M.; Parish, S.M. **Diabetes mellitus in an adult alpaca (*Lama pacos*).** *Veterinary Record*— London. 2005 Oct 22; 157(17): 520-522. ISSN: 0042-4900

URL : <http://veterinaryrecord.bvapublications.com/archive/>

NAL Call no.: 41.8 V641

Descriptors: alpacas, diabetes mellitus, case studies.

Padula, A.M. **Clinical evaluation of caudal epidural anaesthesia for the neutering of alpacas.** *Veterinary Record*— London. 2005; 156(19): 616-617. ISSN: 0042-4900.

URL:<http://veterinaryrecord.bvapublications.com/>

NAL call no.: 41.8 V641

Descriptors: alpacas, neutering of males, castration, surgical procedures, efficacy of caudal epidural anesthesia.

Ratto, Marcelo H.; Huanca, Wilfredo; Singh, Jaswant; Adams, Gregg P. **Local versus systemic effect of ovulation-inducing factor in the seminal plasma of alpacas.** *Reproductive Biology and Endocrinology*. 2005; 3. ISSN: 1477-7827

URL:<http://www.rbej.com/home/>

Descriptors: alpacas, llamas, ovulation factor, seminal plasma, females, seminal plasma or phosphate buffered saline, intramuscular injection intrauterine infusion, intrauterine infusion after endometrial curettage, transrectal ultrasonography, ovulation detection, follicular and luteal diameters, conclusion was systemic effect of seminal plasma.

Robinson, T.F.; Roeder, B.L.; Schaalje, G.B.; Hammer, J. D.; Burton, S.; Christensen, M. **Nitrogen balance and blood metabolites of alpaca (*Lama pacos*) fed three forages of different protein content.** *Small Ruminant Research*. 2005; 58(2): 123-133. ISSN: 0921-4488.

URL:<http://www.sciencedirect.com/science/journal/09214488>

NAL call no.: SF380.I52

Abstract: Sixteen intact male alpaca consisting of four age groups (AG1, 16 +/- 4.4 months, 44.3 +/- 9.2 kg; AG2, 25 +/- 1.8 months, 51.7 +/- 2.3 kg; AG3, 35 +/- 1.1 months, 64.7 +/- 15.6 kg; and AG4, 60 +/- 12.0 months, 67.0 +/- 8.2 kg) were housed in metabolism crates (20 degrees C with 12:12 h on:off light cycle). Three forages, straw (ST), grass hay (GH) and alfalfa (ALF) were fed to each alpaca in random order. The forages were fed at 12 h intervals

with water provided ad libitum. Treatment periods were 14 days, with blood samples collected over a 24 h period on day 14 to determine temporal patterns of plasma metabolite and electrolytes. Dry matter intake was lower ($P < 0.002$) for ST at 212 g/day, while GH and ALF were 678 and 715 g/day, respectively. Nitrogen intake was 2.2, 14.7 and 23.9 g/day ($P < 0.002$), respectively. Fecal N was 1.5 for ST, 4.8 for GH, and 5.1 g/day for ALF ($P < 0.002$). Urine N excretion was 6.3 and 6.2 g/day for ST and GH, increasing to 13.6 g/day for ALF ($P < 0.02$). Nitrogen retained was -5.4, 3.7 and 5.2 g/day for ST, GH and ALF, respectively, with an age and diet x age response ($P < 0.01$ and 0.05, respectively). Plasma glucose was not different for forage or age, averaging 7.6 mmol/L. Lactate was lowest for GH (0.70 mmol/L), with ST and ALF having similar concentrations (0.87 and 0.96 mmol/L; $P < 0.07$). NEFA concentrations were highest for ST (398 micromol/L) and similar for GH and ALF (204 and 201 micromol/L; $P < 0.003$). Plasma urea N concentrations were similar for ST and GH (4.3 and 4.9 mmol/L) increasing to 8.1 mmol/L for ALF ($P < 0.001$). Plasma creatinine was higher for ST (250 micromol/L) than GH and ALF (214 and 205 micromol/L; $P < 0.0001$). Sodium and calcium concentrations were lower for ST than GH and ALF ($P < 0.06$ and 0.002, respectively), while potassium and chloride were not different across forages. Metabolite temporal patterns fluctuated over the 24 h period with glucose, lactate, and alpha-amino N increasing and NEFA concentration decreasing postprandially. Crude N maintenance requirement was calculated to be 0.84, 0.63, 0.80 and 0.51 g/W(0.75) for AG1, AG2, AG3 and AG4, respectively. Overall N requirement was calculated to be 0.60 g/W(0.75). These data demonstrate the effects of feeding forages of varying quality on whole-body N utilization, temporal blood metabolite and electrolyte patterns and a possible age effect on maintenance N requirements.

Descriptors: male alpacas, 4 age groups, metabolism crates, straw, grass hay alfalfa, water ad libitum, 14 day treatment, effects on N balance and blood metabolites, dietary nitrogen requirements.

Rodriguez-Alvaro, A.; Gonzalez-Alonso-Alegre, E.M.; Delclaux-Real del Asua, M.; Martinez-Nevado, E.; Talavera-Canete, C. **Surgical correction of a corneal perforation in an alpaca (*Lama pacos*)**. *Journal of Zoo and Wildlife Medicine*. 2005; 36(2): 336-339. ISSN: 1042-7260
URL : <http://www.bioone.org>

Descriptors: adult alpaca (*Lama pacos*), case study, eye trauma damage, corneal perforation, prolapsed iris, surgical repair, pedicle conjunctival graft was performed, cornea structural integrity, vision returned.

Santiani, A.; Huanca, W.; Sapana, R.; Huanca, T.; Sepulveda, N.; Sanchez, R. **Effects on the quality of frozen-thawed alpaca (*Lama pacos*) semen using two different cryoprotectants and extenders**. *Asian Journal of Andrology*. 2005; 7(3): 303-309. ISSN: 1008-682X
URL:<http://www.blackwellsynergy.com>
DOI:<http://dx.doi.org/10.1111/j.1745-7262.2005.00021.x>

Abstract: Aim: To evaluate two extenders and two cryoprotectant agents (CPA) for alpaca semen cryopreservation. Methods: Semen samples were obtained from four adult alpacas (*Lama pacos*) and frozen using extender I (TRIS, citrate, egg yolk and glucose) or extender II (skim milk, egg yolk and fructose), each containing either glycerol (G) or ethylene glycol (EG) as CPA. Consequently, four groups were formed: (1) extender I-G; (2)

extender I-EG; (3) extender II-G; and (4) extender II-EG. Semen was diluted in a two-step process: for cooling to 5 degrees C (extenders without CPA), and for freezing (extenders with CPA). Viability and acrosome integrity were assessed using trypan blue and Giemsa stains. Results: When compared, the motility after thawing was higher ($P < 0.05$) in groups II-EG (20.0%±6.7%) and II-G (15.3%±4.1%) than that in groups I-G (4.0%±1.1%) and I-EG (1.0%±1.4%). Viable spermatozoa with intact acrosomes in groups II-EG (18.7%±2.9%) and II-G (12.7%±5.9%) were higher than that in groups I-G (5.7%±1.5%) and I-EG (4.0%±1.0%). Conclusion: The skim milk- and egg yolk-based extenders containing ethylene glycol or glycerol to freeze alpaca semen seems to promote the survival of more sperm cells with intact acrosomes than the other extenders. Reproduced with permission of CAB Abstracts.

Descriptors: alpacas, semen, spermatozoa, semen characteristics, semen preservation, cryopreservation, cryoprotectants for semen, egg yolk, ethylene glycol, freezing, fructose, glucose, glycerol, dextrose, fruit sugar, ketohexose, levulose, semen diluent additives; semen diluents, skim milk, semen thawing.

Shapiro, J.L.; Watson, P.; McEwen, B.; Carman, S. **Highlights of camelid diagnoses from necropsy submissions to the Animal Health Laboratory, University of Guelph, from 1998 to 2004.** *Canadian Veterinary Journal*. 2005; 46(4): 317-318. ISSN: 0008-5286.

URL: <http://www.pubmedcentral.nih.gov>

NAL call no.: 41.8 R3224

Descriptors: llamas, alpacas, camelids, age differences, animal diseases, diagnoses, bacterial diseases, causes of death, diseases of gastrointestinal and nervous systems, liver, neoplasms, postmortem examinations, Ontario, Canada.

Smith, J. J.; Dallap, B.L. **Splenic torsion in an alpaca.** *Veterinary-Surgery*. 2005; 34(1): 1-4

URL : <http://www3.interscience.wiley.com/journal/118532623/home>

Abstract: Objective - To describe the clinical signs, diagnostic evaluation and surgical management of an alpaca with splenic torsion. Animals - Six-year-old female alpaca. Results - Splenic torsion and uterine torsion were the inciting cause for persistent abdominal discomfort in this alpaca. Rectal examination, abdominocentesis, and transabdominal ultrasonographic findings were suggestive of a splenic lesion. Surgical management involved splenectomy of a necrotized spleen. Conclusions - Although rare in occurrence, splenic torsion should be considered as a potential cause of abdominal discomfort in alpacas. Splenectomy is a reasonable and successful method of treatment for a devitalized spleen secondary to splenic torsion in alpacas. Clinical Relevance - Splenic torsion causes persistent abdominal discomfort in camelids and may be associated with uterine torsion. Rectal examination, transabdominal ultrasound and abdominocentesis are useful diagnostic tools to differentiate splenic torsion from other causes of abdominal discomfort. Splenectomy is an uncomplicated procedure in camelids and has a favorable prognosis.

Descriptors: alpaca, splenic torsion, case study, clinical signs, abdominal discomfort, uterine torsion, diagnostic evaluation, rectal exam, transabdominal ultrasound, abdominocentesis, splenectomy.

Suedmeyer, W.K.; Williams, F., III. **Multiple trichoepitheliomas in an Alpaca (*Lama pacos*)**. *Journal of Zoo and Wildlife Medicine*. 2005; 36(4): 706-708. ISSN: 1042-7260.

URL: <http://www.bioone.org>

NAL call no.: SF601.J6

Abstract: A 13-yr-old male Alpaca (*Lama pacos*) presented with multiple ovoid, well-circumscribed, nonulcerated intradermal masses. Individual masses measured 1-4 cm in diameter, and the overlying skin was alopecic. Several of the masses were surgically removed and evaluated microscopically. Histopathologic evaluation demonstrated multiple dermal cysts lined by neoplastic follicular epithelium. The cysts were filled with multiple layers of lamellar keratin and lined by abortive inner and outer root sheaths exhibiting cellular atypia, supporting the diagnosis of trichoepitheliomas. No additional treatment was initiated, and the alpaca continues to do well. Reproduced with permission from CAB Abstracts.

Descriptors: alpaca male, case report, cancer, clinical picture, trichoepithelioma, clinical aspects, diagnosis, histopathology, neoplasms, Missouri, US.

Sullivan, E.K.; Callan, R.J.; Holt, T.N.; Van Metre, D.C. **Trichophytobezoar duodenal obstruction in New World camelids**. *Veterinary Surgery*. 2005 Sept-Oct; 34(5): 524-529. ISSN: 0161-3499

URL: <http://www3.interscience.wiley.com/journal/118532623/home>

DOI:<http://dx.doi.org/10.1111/j.1532-950X.2005.00079.x>

NAL call no.: SF911.V43

Abstract: Objective-To describe clinical findings, surgical treatment, and outcome associated with trichophytobezoar duodenal obstruction in New World camelids. Study Design-Retrospective study Animals-Alpacas (7) and 1 llama. Methods-Historical and clinical data were obtained from the medical records of New World camelids with a diagnosis of trichophytobezoar duodenal obstruction confirmed by surgical exploration or necropsy. Results-Seven camelids were <1 year old. Abnormal clinical findings included anorexia, reduced fecal output, recumbency, colic, abdominal distension, regurgitation, decreased serum chloride concentration, increased serum bicarbonate concentration, and/or elevated first gastric compartment chloride concentration. Survey abdominal radiographs obtained (4 animals) revealed gastric distension (4) and/or visualization of the obstruction (2). Diagnosis was confirmed at necropsy (1) or surgery (7). Right paracostal celiotomy was performed on all animals and duodenotomy (3) or retropulsion of the trichophytobezoar combined with third compartment gastrotomy (4) was used to remove the obstruction. Six animals survived to discharge and 5 were healthy at follow-up, 8-20 months later. The remaining discharged alpaca was healthy at 12 months but subsequently died of unrelated causes. Conclusions-Diagnosis of trichophytobezoar duodenal obstruction should be considered in juvenile New World camelids with abdominal distension and hypochloremic metabolic alkalosis. Right paracostal celiotomy can be used for access to the descending duodenum and third gastric compartment for surgical relief of obstruction. Clinical Relevance-Duodenal obstruction from bezoars should be considered in New World camelids <1year of age with abdominal distension and hypochloremic metabolic alkalosis. Surgical relief of the obstruction by right paracostal celiotomy has a good prognosis.

Descriptors: alpacas, llamas, duodenum, intestinal obstruction, trichobezoars, surgery,

clinical examination, animal age, symptoms, anorexia, defecation, colic, chlorides, blood chemistry, bicarbonates, disease diagnosis, juveniles.

Tee, S.Y.; Dowling, B.A.; Dart, A.J. **Treatment of long bone fractures in South American camelids: 5 cases.** *Australian Veterinary Journal*. 2005; 83(7): 418-420. ISSN: 0005-0423

URL:<http://www3.interscience.wiley.com>

NAL call no.: 41.8 AU72

Abstract: An adult llama and four alpacas were referred with long bone fractures. The llama presented with a closed, comminuted fracture of the right metatarsal bones. Two of the alpacas presented with comminuted fractures of the proximal radius. One fracture was closed and one was open. One alpaca had a closed, comminuted fracture of the distal radius, and the final alpaca had a closed, oblique fracture of the metatarsus. A diagnosis was made in each animal on the basis of clinical examination and radiographs. All fractures were managed by open reduction and internal fixation using selective placement of lag screws and dynamic compression plates. Four animals made uneventful recoveries and no long-term complications were encountered. One alpaca was re-admitted for plate failure and non-union of the fracture 5 weeks after surgery. The plate and screws were removed and a transfixation cast was applied. The fracture healed, however the alpaca showed signs of radial nerve paralysis after the cast was removed. With confinement in a small yard, full function gradually returned to the leg over the ensuing 4 months. Using techniques recommended in other species, South American camelids are suitable candidates for long bone fracture repair using open reduction and internal fixation.

Descriptors: alpacas, dromedaries, llama, metatarsus bone fractures, clinical picture, case reports, surgical fracture fixation, radiography, transfixation cast.

Timoteo, O.; Maco, V. Jr.; Maco, V.; Neyra, V.; Yi, P.J.; Leguia, G.; Espinoza, J.R. **Characterization of the humoral immune response in alpacas (*Lama pacos*) experimentally infected with *Fasciola hepatica* against cysteine proteinases Fas1 and Fas2 and histopathological findings.** *Veterinary Immunology and Immunopathology*. 2005; 106(1-2): 77-86. ISSN: 0165-2427

URL:<http://www.sciencedirect.com/science/journal/01652427>

NAL call no.: SF757.2.V38

Abstract: A characterization of the humoral immune response of alpacas to *Fasciola hepatica* Fas1 and Fas2 antigens, two abundant cysteine proteinases in the excretory/secretory (E/S) products, was performed over the course of 6 months of experimental infection. Six adult alpacas aged 1-2 years old received a single dose of 200 *F. hepatica* metacercariae; two non-infected alpacas were kept as control group. All infected animals shed eggs 8 weeks post-infection (PI) and the number of flukes recovered at necropsy averaged 41 +/- 4. The livers of infected animals showed regions with chronic inflammation, granuloma containing parasite eggs, necrosis and cirrhosis. Peripheral eosinophilia in infected animals was greatly enhanced 6 weeks post-infection and later. A single peak of serum glutamic pyruvic transaminase (SGPT) was observed 4 weeks PI and serum glutamic oxalacetic transaminase (SGOT) elevated 3 weeks PI and later. Circulating IgG Abs against Fas1 and Fas2 were measured by enzyme-linked immunosorbent assay (ELISA). Fas2-ELISA detected the infection 10 days PI reaching to highest titer on 7-8 weeks PI and kept elevated, until the end of infection.

Fas1-ELISA detected the infection 2 weeks PI and followed the same pattern as Fas2-ELISA. Anti Fas2 IgG Abs were in higher titers and showed stronger avidity than anti Fas1 IgG Abs. In addition, rabbit IgG antibodies raised against cysteine proteinase Fas2 showed infiltration of this parasite antigen associated to the degradation of bile ducts and liver parenchyma of infected alpacas. In the present study we have established a *F. hepatica* experimental infection of alpacas, Fas2 appears to have a role in the pathogenesis of the liver damage in alpacas caused by the liver fluke. Infected alpacas elicited a strong humoral immune response against fluke cysteine proteinases Fas1 and Fas2, which might be considered as candidates for immunodiagnosis and vaccine development against fasciolosis in alpacas.

Descriptors: 6 adult (1-2 year old) alpacas, *Lama pacos*, liver flukes, experimental infection with 200 metacercariae, *Fasciola hepatica*, proteinases of Fas1 and Fas2 antigens, immune responses, flukes recovered at necropsy, liver affects, circulating IgG antibodies, titers, ELISA.

Urquieta, B.; Flores, P.; Munoz, C.; Bustos-Obregon, E.; Garcia-Huidobro, J. **Alpaca semen characteristics under free and directed mounts during a mating period.** *Animal Reproduction Science*. 2005 Dec; 90(3-4): 329-339. ISSN: 0378-4320

URL:<http://www.sciencedirect.com/science/journal/03784320>

NAL call no: QP251.A5

Descriptors: alpacas, males, females, semen, reproductive behavior, animal reproduction, semen color, semen volume, ejaculation, duration, spermatozoa, animal fertility, semen quality, semen collection, sexual rest, controlled mating, undirected mating.

Urquieta, B.; Flores, P.; Munoz, C.; Bustos-Obregon, E.; Garcia-Huidobro, J. **Alpaca semen characteristics under free and directed mounts during a mating period.** *Animal Reproduction Science*. 2005; 90(3/4): 329-339. ISSN: 0378-4320

URL:<http://www.sciencedirect.com/science/journal/03784320>

NAL call no.: QP251-A5

Abstract: Most studies in alpaca reproductive biology have been focused on female physiology. Only recent research is being conducted in order to increase the knowledge on males. Semen characteristics during breeding periods will contribute to understanding the poor fertility rates in alpaca. Ten adult male alpacas were distributed randomly into two groups and submitted alternatively to two regimens of semen collection of 12 days duration (day 1, initial day of semen collection). Semen samples were collected using an artificial vagina and a receptive, non-pregnant female. With regimen 1, males were maintained with females except for the days of sexual rest (6 and 7). Semen was collected on days 1, 5, 8 and 12. With regimen 2, males were exposed to females for daily semen collection only, before and after sexual rest. Mating duration, color and volume of ejaculates, spermatozoa concentration and morphology were evaluated. No statistical differences for the variables were found between regimens that were used for semen collection. With respect to influence of day, however, the total numbers of spermatozoa ejaculated on days 1 and 5 of semen collection were statistically different ($p < 0.05$). Azoospermic samples increased on days 5 and 12 of semen collection. Partial recovery in spermatozoa concentration and number of spermatozoa ejaculated were observed after sexual rest. Although normal spermatozoa percentage was less on day 1 ($p < 0.05$) as compared with values found in the following ejaculates (days 5 and 12), the total number of normal spermatozoa was greater. These results support the conclu-

sion that when male alpaca have a daily ejaculation during five consecutive days, they might copulate without having enough spermatozoa for fertilization towards the end of the mating period. Reproduced by permission from CAB Abstracts.

Descriptors: alpacas, males, male fertility, mating, spermatozoa, semen, semen characters, ejaculate volume, morphology, reduction in fertility with consecutive days, reproduction.

Varney, K. **Quarterly review of diagnostic cases - July to Sept 2005.** *Surveillance Wellington*. 2005; 32(4): 14-19. ISSN: 0112-4927

Descriptors: cattle, deer, horses, dogs, cats, pet birds, sheep, alpacas, pigs, diseases, disease management, etiology, therapeutics, case studies, New Zealand.

Wernery, U.; Joseph, M.; Johnson, B.; Kinne, J. **Wry-neck - a form of tetanus in camelids.** *Journal of Camel Practice and Research*. 2005; 12(2): 75-79. ISSN: 0971-6777

NAL call no.: SF997.5.C3 J68

Descriptors: *Clostridium tetani*, *Lama guanicoe*, bacterial-toxins, lockjaw, clinical aspects. experimental infections, tetanus toxicity.

Williams, S.H.; Vinyard, C.J.; Wall, C.E.; Hylander, W.L. **Experimental observations on symphyseal fusion in selenodont artiodactyls.** *Integrative and Comparative Biology*. 2005; 45(6): 1209. ISSN: 1540-7063. Note: Annual Meeting of the Society for Integrative and Comparative Biology, Orlando, FL, USA; January 04 -08, 2006

URL : <http://www.bioone.org>

NAL call no.: QL1.I67

Descriptors: alpaca, bone, jaw muscle, masseter muscle, fibrocartilage, mandibular symphysis, symphyseal fusion, repetitive mastication.

Wolf, D.; Schares, G.; Cardenas, O.; Huanca, W.; Cordero, Aida; Baerwald, Andrea; Conraths, F.J.; Gauly, M.; Zahner, H.; Bauer, C. **Detection of specific antibodies to *Neospora caninum* and *Toxoplasma gondii* in naturally infected alpacas (*Lama pacos*), llamas (*Lama glama*) and vicunas (*Lama vicugna*) from Peru and Germany.** *Veterinary Parasitology*. 2005; 130(1-2): 81-87. ISSN: 0304-4017.

URL: <http://www.sciencedirect.com/science/journal/03044017>

NAL call no.: SF810.4.V4

Descriptors: llamas, alpacas, wild vicunas, experimental infection, protozoal parasite, *Neospora caninum*, *Toxoplasma gondii*, sera testing, immunoblot, ELISA, IFAT, antibody detection against *N. caninum* tachyzoites, routes of infection, natural infections in South American camelids, Peru, Germany .

Zacari, M.A.; Pacheco, L.F. **Depredacion vs. problemas sanitarios como causas de mortalidad de ganado camelido en el Parque Nacional Sajama.** [Depredation versus disease problems as causes of mortality in camelid livestock in the Sajama national park.] *Ecologia en Bolivia*. 2005; 40(2): 58-61. ISSN: 1605-2528. Note: In Spanish.

URL: <http://dialnet.unirioja.es>

Abstract: This article discusses the causes of mortality among camelid livestock (llamas and alpacas) in the Sajama National Park in Bolivia. The problems of predation by pumas and

foxes are described, including losses recorded, as well as animal diseases as causes of mortality. The incidence, potential mortality percentage and the numbers of animals at risk of death for the following diseases in a sample of 2078 llamas and alpacas in the national park are presented: conjunctivitis, ocular orbit infections, keratitis, pediculosis, diarrhoea, scabies, fractures, fever (in alpacas), pneumonia and malnutrition. Among these diseases, the most significant were malnutrition (30.22%), followed by scabies (3.22%) and pediculosis (3.22%).

Descriptors: alpacas, llamas, animal diseases, animal nutrition, death rate, causes of death, livestock, malnutrition, mortality, pediculosis, predation, scabies, Bolivia.

Zhang, Qiao Ling; Dong, Chang Sheng; He, Jun Ping; He, Xiao Yan; Fan, Rui Wen; Geng, Jian Jun; Ren, Yu Hong. [Study on the chromosomal karyotype and G-banding of alpacas (*Lama pacos*).] *Yichuan*. 2005; 27(2): 221-226. ISSN: 0253-9772. Note: In Chinese with an English summary.

Descriptors: 23 Huacaya alpacas, 3 males, 20 females, genetics, chromosomes and karyotypes, cytogenetic basis for selection, breeding, disease diagnosis, genetic mechanisms of sex determination, lymphocyte culture, trypase-EDTA for G-banding, 74 chromosomes, XX, XY, autosomes, X chromosome was metacentric, Y chromosome telocentric.

2004

Al Ani, F.K. **Classification and breeds.** In: *Camel: Management and Diseases*. Faculty of Veterinary Medicine, Baghdad University, Baghdad, Iraq. 2004; 61-68.

Descriptors: alpacas, guanacos, llamas, vicunas, dromedaries, Bactrian camels, taxonomy, draft animals, riding animals, dual purpose animals, hybrids, breeds, adaptation, anatomy, physiology, milk and meat production.

Al Ani, F.K. **Domestication, distribution and population.** In: *Camel: Management and Diseases*. 2004; 1-24. Faculty of Veterinary Medicine, Baghdad University, Baghdad, Iraq.

Descriptors: camels, llamas, vicunas, dromedaries, Bactrian camels, domestication, geographical distribution, livestock numbers, population dynamics, Africa, Asia, Australia, Europe, North and South America, Saudi Arabia, United Arab Emirates.

Al Ani, F.K.; Ababneh, M.M. **South American camelids (SAC).** In: *Camel: Management and Diseases*. Faculty of Veterinary Medicine, Baghdad University, Baghdad, Iraq. 2004; 121-136.

Descriptors: alpacas, guanacos, llamas, vicunas, draft animals, riding animals, breeding, crossbreeding, diseases, husbandry, hematology, meat and milk production, reproduction, pregnancy diagnosis, parturition, physiology, surge ry, wool producing animals, South America.

Anderson , D.E. **Common surgical procedures in camelids.** In: *Proceedings of the Thirty Seventh Annual Conference, American Association of Bovine Practitioners, Forth Worth, Texas, City, USA, 23-25 September, 2004.* 2004: 118-125. ISSN: 0743-0450.

NAL call no.: SF961.A5

Descriptors: alpacas, dromedary camels, llamas, surgical procedures, teeth, tooth diseases, abscesses, bone diseases, castration, digestive tract, limb bones, limbs, postoperative care.

Anderson , D.E. **Comparison of trace mineral concentration in the various lobes of the liver of alpacas and llamas.***Journal of Animal and Veterinary Advances.* 2004; 3(3): 162-164. ISSN: 1680-5593.

Descriptors: alpacas, llamas, postmortem study, site of liver collection, affects on selected trace metals postmortem study, left lobe, right lobe, caudate lobe, analysed via inductively coupled argon plasma emission, spectroscopy, calcium, copper, iron, molybdenum, selenium, zinc, potassium.

Anderson , D.E.; Silveira, F.; Grubb, T. **Effects of venipuncture and correlation of plasma, serum and saliva cortisol concentration with transportation stress in camelids.** In: *Selected Research on Camelid Physiology and Nutrition.* The Camelid Publishers. Bikaner, India. 2004: 160-168. ISBN: 8190114123.

NAL call no.: SF401.C2S46 2004

Descriptors: alpacas, dromedary camels, llamas, camels, animal transport related stress effects, blood chemistry, saliva hydrocortisone, effects of venipuncture, intravenous injection, restraint of animals, stress response.

Anderson , D.E.; Rings, D.M.; Kowalski, J. **Infection with *Corynebacterium pseudotuberculosis* in five alpacas.***Journal of the American Veterinary Medical Association.* 2004 Dec 1; 225(11): 1743-1747. ISSN: 0003-1488 .

URL:<http://www.avma.org>

NAL call no.: 41.8 AM3

Descriptors: alpacas, bacterial infection, *Corynebacterium pseudotuberculosis*, case study.

Anderson , D.E. **Liver disease, metabolism and digestion in llamas and alpacas.** In: *Selected Research on Camelid Physiology and Nutrition.* The Camelid Publishers. Bikaner, India. 2004: 545-554. ISBN: 8190114123.

NAL call no.: SF401.C2S46 2004

Descriptors: llamas, alpacas, liver disease, hepatitis, lipidosis, diagnosis, etiology, clinical aspects, therapy, digestion, disease prevalence surveys, disease prevention, energy requirements, epidemiology, metabolism, neoplasms, poisoning, therapy, toxicity.

Antonini, M.; Gonzales, M.; Valbonesi, A. **Relationship between age and postnatal skin follicular development in three types of South American domestic camelids.***Livestock Production Science.* 2004; 90(2-3): 241-246. ISSN: 0301-6226.

URL: <http://www.sciencedirect.com/science/journal/03016226>

NAL call no.: SF1.L5

Descriptors: 15 alpaca kids, (10 huacaya and 5 suri types), 10 llama kids (chaku type), age

of secondary follicle maturity, skin follicular structure, difference in types, fiber study, shearing recommendation, "Alpaquero" Developing Centre of Toccra, Arequipa Plateau, Caylloma Province, Peru.

Buttolph, Lita P.; Coppock, D. Layne. **Influence of deferred grazing on vegetation dynamics and livestock productivity in an Andean pastoral system.** *Journal of Applied Ecology*. 2004; 41(4): 664-674. ISSN: 0021-8901.

URL: <http://www3.interscience.wiley.com/journal/117972213/home>

NAL call no.: 410 J828

Descriptors: sheep, llamas, alpacas, rangeland management, range degradation, livestock productivity, equilibrium and non-equilibrium theory, key grazing resources, Andean pastoral ecosystem, fencing of bofedal and gramadal (wet and dry meadows) seasonally deferred grazing practices, peak standing crop, plant species, enclosures increased survival of young alpacas and sheep, different findings for meadow systems, negative effects of privatizing communal resources, Bolivia.

Campero, J.R. **Lama (*Lama glama* L.) and Guanaco (*Lama guanicoe* M.): general perspective.** In: Cardellino, R.; Rosati, A; Mosconi, C. [Editors] *ICAR Technical Series*. 2004; (11): 11-18. ISSN: 1563-2504. ISBN: 9295014065. Note: conference proceedings: Current Status of Genetic Resources, Recording and Production Systems in African, Asian and American Camelids, Sousse, Tunisia, 30 May 2004.

URL: http://www.icar.org/DOCS/technical_series_11_sousse.pdf

Abstract: The highlands of South America form a special ecosystem with an important biodiversity. Since 4000 or 5000 years ago, two species of domesticated camelids have developed in this region: the llama and the alpaca, as well as two non-domesticated ones, the guanaco and the vicuna. During the Incas period, these genetic resources played an important role in the development of this ancient culture, but the protagonistic role of Camelids ended abruptly with the Spanish conquest of that South American region five centuries ago. The Spaniards initiated their colonization with the systematic elimination of the camelids and replaced them with their own domestic species, principally sheep and cattle. Along with the Spanish conquest, the mines period begins in these highlands as well; the mines' development requested not only an important quantity of camelids' meat, vegetables and natural energy but also large llama caravans, in order to transport the mines products from highlands to the coast. However, the pastoral communities in those high-risk environments have played a major role in conserving the llama, alpaca, guanaco and vicuna species. The mining activity along with human pressure on the fragile ecosystem resulted not only in an important loss of biodiversity but also, and most importantly, in the reproduction of poverty. Consequently, today like five centuries ago, the highlands of South America are characterized by three elements: poverty, soils of low quality and camelids. And it is through these elements that they try to resolve their main problem, that is poverty. The analysis of market trends, the review of the historical context of the use of native breeds, and the efforts of highlands people suggest that the rational use of South American Camelids, both domestic and wild ones, can be an economic alternative in many production systems in the South American highlands, on the condition that the regional governments in co-operation with the producers are able to find

new markets with fair prices and improve the quality of camelids' products. Reproduced with permission from CAB Abstracts.

Descriptors: alpacas, llamas, vicunas, guanacos, animal production, biodiversity, ecosystems, socioeconomics, socioeconomic aspects, South America.

Campero, J.R. **Camelids in South America. Lama (*Lama pacos*) production systems in Bolivia.**

In: Cardellino, R.; Rosati, A; Mosconi, C. [Editors] *ICAR Technical Series*. 2004; (11): 145-158. ISSN: 1563-2504. ISBN: 9295014065. Note: conference proceedings: "Current Status of Genetic Resources, Recording and Production Systems in African, Asian and American Camelids, Sousse, Tunisia, 30 May 2004."

URL:http://www.icar.org/DOCS/technical_series_11_sousse.pdf

Abstract: In this paper, a review about the historical and actual context of the lama production systems, with special focus in the Bolivian Altiplano Lama Production Systems (BALPS) is presented. The BALPS are possible to include in two general systems named Pastoral (lama, or/and alpaca and sheep) System and Agropastoral System, and gather near 54 thousands productive units. During the last five centuries, the life of many people in these systems was very hard, and the poverty and social exclusion are the principal results. Lama is the principal livestock component and has historically been used for their high protein meat, transporting merchandise along the Incan, colonial and republican roads, and in religious rituals; it provides the family with economic security, manure, traction and transport and has and specific cultural significance; moreover, in those Agropastoral Systems, the quantity of manure determined the extension of agricultural activities. In Bolivia as in other countries, the llamas' productive systems are, still, traditional and based on the extensive used of the native pastures. The productivity of the grasslands, not only is scarce but too it has low quality as a result of the extreme climatic fluctuations, characterized for periods prolonged of frosts and droughts, and depended of a ecosystem fragile, marginal and inaccessible. However, the Altiplano, also presents opportunities as its biological diversity and the extreme conditions have generated traditional practices and knowledge that joint with modern technologies should be used to improve the actual low productive systems. The planners of Ministry of Rural Affairs and Agricultural of Bolivia consider that the successful developed of the camelid chain with fiber, meat, and leather productions require to develop of special markets as organic or ecological markets, and consider that this can be a one of a few opportunities that have the Altiplano people in order to resolved the secular poverty cycle. Reproduced with permission from CAB Abstracts.

Descriptors: llama, alpacas, agropastoral systems, animal production, ecosystems, pastoralism, poverty, socioeconomic aspects, reviews, Bolivia.

Cardellino, R.; Rosati, A; Mosconi, C. [Editors]. **Current status of genetic resources, recording and production systems in African, Asian and American Camelids, Sousse, Tunisia, 30 May 2004.** *ICAR-Technical Series*. 2004; (11): 163 pp. ISSN: 1563-2504. ISBN: 9295014065.

Note: conference proceedings: "Current Status of Genetic Resources, Recording and Production Systems in African, Asian and American Camelids, Sousse, Tunisia, 30 May 2004."

URL:http://www.icar.org/DOCS/technical_series_11_sousse.pdf

Abstract: This proceedings contains 14 conference papers on the breeding, handling systems

and milk, meat and fibre production of Bactrian and dromedary camels, llamas, guanacos, alpacas and vicunas in Asia, Africa, Arab Gulf countries and South America. Reproduced with permission from CAB Abstracts.

Descriptors: alpacas, dromedaries, Bactrian camels, guanacos, llamas, vicunas, fiber producing animals, animal breeding, animal fibers; meat production, milk production, wool production, Africa, Arab Countries, Asia, South America.

Castellaro G., G.; Ullrich R., T.; Wackwitz, B.; Raggi S., A. **Composicion botanica de la dieta de alpacas (*Lama pacos* L.) y llamas (*Lamaglama* L.) en dos estaciones del ano, en praderas altiplanicas de un sector de la Provincia de Parinacota, Chile.** [Botanical composition of alpaca (*Lama pacos*) and llama (*Lama glama*) diets in two seasons of the year on highland ranges of Parinacota Province, Chile.] *Agricultura Tecnica*. 2004; 64(4): 353-363. ISSN: 0365-2807. Note: In Spanish with an English summary.

Descriptors: alpacas, llamas, botanical composition of diets, grazing, winter dry and summer wet seasons, matter, dry matter, grazing, *Deschampsia cespitosa*, *Agrostis toluensis*, *Festuca nardifolia*, *Festuca orthophylla*, *Oxychloe*, *Oxychloe andina*, *Parastrephia lucida*, *Ranunculus uniflorus*, highland range of Parinacota, Chile.

Cebra, C.K.; Tornquist, S.J. **Assessment of the effects of epinephrine and insulin on plasma and serum biochemical variables in llamas and alpacas.** *American Journal of Veterinary Research*. 2004 Dec; 65(12): 1692-1696. ISSN: 0002-9645.

URL: <http://www.avma.org>

NAL call no.: 41.8 AM3A

Descriptors: llamas, alpacas, blood values, plasma, serum biochemical variables, effects of epinephrine and insulin.

Chavez-Velasquez, A.; Alvarez-Garcia, G.; Collantes-Fernandez, E.; Casas-Astos, E.; Rosadio-Alcantara, R.; Serrano-Martinez, E.; Ortega-Mora, L.M. **First report of *Neospora caninum* infection in adult alpacas (*Vicugna pacos*) and llamas (*Lama glama*).** *Journal of Parasitology*. 2004 Aug; 90(4): 864-866. ISSN: 0022-3395.

URL: <http://www.bioone.org/perlserv/?request=get-archive&issn=0022-3395>

NAL call no.: QH547.I55

Descriptors: *Vicugna pacos*, alpacas, llamas, *Neospora caninum*, protozoal disease, neosporosis, new host records, adult animals, seroprevalence, antibody detection, fluorescent antibody technique, immunoblotting, Western blotting, Peru.

Clauss, M.; Lendl, C.; Schramel, P.; Streich, W.J. **Skin lesions in alpacas and llamas with low zinc and copper status - a preliminary report.** *Veterinary Journal*. 2004; 167(3): 302-305. ISSN: 1090-0233.

URL: <http://www.sciencedirect.com/science/journal/10900233>

NAL call no.: SF601.V484

Descriptors: alpacas, llamas, species differences, breed differences, sex differences, 13 llamas, 17 huacaya alpacas, 18 suri alpacas predisposition to skin lesions, dry scaly lesions, dietary

deficiencies of copper (Cu) and zinc (Zn) deficiencies, fleece color, non-white colors, wool, Germany.

Coates, W.; Ayerza, R. **Comparison of llama fiber obtained from two production regions of Argentina.** *Journal of Arid Environments*. 2004 Sep; 58(4): 513-524. ISSN: 0140-1963.

URL: <http://www.sciencedirect.com/science/journal/01401963>

NAL call no.: QH541.5.D4J6

Descriptors: llamas, alpacas, farmed animal species, arid zones, overgrazing, environmental degradation, animal production, animal breeding, fiber differences, fleece, color, fiber quality, selection criteria, sustainable agriculture, Argentina.

Cristofanelli, S.; Antonini, M.; Torres, D.; Polidori, P.; Renieri, C. **Meat and carcass quality from Peruvian llama (*Lama glama*) and alpaca (*Lama pacos*).** *Meat Science*. 2004 Mar; 66(3): 589-593. ISSN: 0309-1740.

URL: <http://www.sciencedirect.com/science/journal/03091740>

NAL call no.: TX373.M4

Abstract: An experiment based on 20 llama males and 40 alpaca males reared in Peru has been carried out with the aim to evaluate the live growth performances, carcass quality, the nutritional characteristics of meat from animals slaughtered at 25 months of age, and to determine the physical and chemical parameters of meat obtained from these animals. The live body weights registered during the 25 months of the experiment were significantly lower in alpaca compared with llama. In llama carcasses were significantly higher both warm and cold carcass weight ($P < 0.001$) but dressing percentage was higher in alpacas ($P < 0.01$). The glycolytic fine-course was very similar both in llama and in alpaca muscle Longissimus Thoracis et Lumborum. Chemical composition of muscle Longissimus Thoracis et Lumborum taken from llama and alpaca carcasses was significantly different ($P < 0.01$) in ash content; cholesterol content was significantly higher ($P < 0.001$) in llama meat compared with alpaca.

Descriptors: llamas, alpacas, male animals, alternative livestock, growth, body weight, 25 months old at slaughter, longissimus dorsi, physical and chemical parameters of meat, postmortem changes. pH, nutritional value of meat, carcass quality and weight, dressing percentage, meat quality, moisture content, lipid content, protein content, ash content, cholesterol, water holding capacity, species comparison, Peru.

DeWitt, S.F.; Bedenice, D.; Mazan, M.R. **Hemolysis and Heinz body formation associated with ingestion of red maple leaves in two alpacas.** *Journal of the American Veterinary Medical Association*. 2004 Aug 15; 225(4): 578-583. ISSN: 0003-1488.

URL: <http://www.avma.org>

NAL call no.: 41.8 AM3

Descriptors: alpacas, eating red maple leaves, toxicity, blood effects, hemolysis, Heinz body formation, case reports, US

Dong, Chang Sheng; Zhang, Qiao Ling; He, Xiao Yan; He, Jun Ping; Fan, Rui Wen; Geng, Jian Jun. **[Study on the chromosome of alpacas (*Lama pacos*).]** *Acta Veterinaria et Zootechnica Sinica*. 2004 Sep; 35(5): 594-596. ISSN: 0366-6964. Note: In Chinese with an English summary.

Descriptors: alpacas, cytogenetics, chromosomes, karyotypes, mutations.

- Drew, M.L.; Johnson, L.; Pugh, D.; Navarre, C.B.; Taylor, I.T.; Craigmill, A.L. **Pharmacokinetics of ceftiofur in llamas and alpacas.** *Journal of Veterinary Pharmacology and Therapeutics*. 2004; 27(1): 13-20. ISSN: 0140-7783.
URL: <http://www3.interscience.wiley.com/journal/117986825/home>
NAL call no.: SF915.J63
Descriptors: llamas, alpacas, ceftiofur sodium, pharmacokinetics, antibiotics, dosages based on other domestic species, disposition studies, intramuscular administration in llamas, intravenous and intramuscular administration in alpacas, serial timed blood sampling, similar to values in sheep and goats.
- Dunkel, B.; Del Piero, F.; Wotman, K.L.; Johns, I.C.; Beech, J.; Wilkins, P.A. **Encephalomyelitis from West Nile flavivirus in 3 alpacas.** *Journal of Veterinary Internal Medicine*. 2004 May-June; 18(3): 365-367. ISSN: 0891-6640.
URL: <http://www3.interscience.wiley.com/journal/118902531/home>
NAL call no.: SF601.J65
Descriptors: alpacas, 3 animals, West Nile virus, viral encephalitis, case studies.
- Gauly, M. **Tierschutzaspekte bei der Haltung Neuweltkameliden. [Aspects of animal welfare in South American Camelids husbandry.]** *DTW (Deutsche Tierärztliche Wochenschrift)*. 2004; 111(3): 127-130. ISSN: 0341-6593. Note: In German.
NAL call no.: 41.8 D482
Descriptors: llamas, alpacas, animal welfare, guidelines development, husbandry, feeding, lack of basic knowledge about requirements, veterinary care, education needed, Germany.
- Hunter, Robert P.; Isaza, Ramiro; Koch, David E.; Dodd, Charles C.; Goatley, Marie A. **Moxidectin plasma concentrations following topical administration to llamas (*Lama glama*) and alpacas (*Lama pacos*).** *Small Ruminant Research*. 2004; 52(3): 275-279. ISSN: 0921-4488.
URL: <http://www.sciencedirect.com/science/journal/09214488>
NAL call no.: SF380.I52
Descriptors: llamas, alpacas, extra label usage of pharmaceuticals, pharmacokinetic parameters between species, study of pour-on moxidectin, clipped along dorsal midline, serial blood sampling post dosing, variability in absorption, moxidectin not well absorbed, no adverse affects, pharmacokinetic parameters not determined.
- Hunter, R.P.; Isaza, R.; Koch, D.E.; Dodd, C.C.; Goatley, M.A. **The pharmacokinetics of topical doramectin in llamas (*Lama glama*) and alpacas (*Lama pacos*).** *Journal of Veterinary Pharmacology and Therapeutics*. 2004; 27(3): 187-189. ISSN: 0140-7783.
URL: <http://www.wiley.com/bw/journal.asp?ref=0140-7783&site=1>
NAL call no.: SF915.J63
Descriptors: llamas, alpacas, avermectin, doramectin, avermectin enectocide, milbecycin, moxidectin, plasma concentration, pharmacokinetics, topical treatments.
- Janmaat, A.; Choy, J.L.; Currie, B.J. **Melioidosis in an alpaca (*Lama pacos*).** *Australian Veterinary Journal*. 2004 Oct.; 82(10): 622-623. ISSN: 0005-0423.
URL: <http://vacms.eseries.hengsystems.com.au>

NAL call no.: 41.8 AU72

Descriptors: alpaca, *Lama pacos*, disease, *Burkholderia* species, bacterial disease similar to glanders.

Knight, A.P. **Plant poisoning of small ruminants.** In: *Proceedings of the Thirty-Seventh Annual Conference, American Association of Bovine Practitioners, Forth Worth, Texas, City, USA, 23-25 September, 2004.* 2004: 127-134. ISSN: 0743-0450.

NAL call no.: SF961.A5

Descriptors: sheep, goats, llamas, alpacas, grazing and browsing toxic plants, grazing behavior, toxic plant danger when overgrazing, drought, access to high levels of toxic plants, oxalates, nitrates, cyanogenic glycosides, photosensitizing compounds, *Halogeton glomeratus*, *Cicuta douglasii*, *Conium maculatum*, *Eupatorium rugosum*, *Xanthium*, *Karwinskia*, North America.

Kraus, M.S.; Calvert, C.A.; Spier, A.W.; Meurs, K.M.; Anderson, D.E. **Determination of electrocardiographic parameters in healthy llamas and alpacas.** *American Journal of Veterinary Research.* 2004 Dec.; 65(12): 1719-1723. ISSN: 0002-9645.

URL: <http://www.avma.org>

NAL call no.: 41.8 AM3A

Descriptors: llamas, alpacas, healthy animals, cardiac scanning, electrocardiographic parameters.

Kosal, M.E.; Anderson, D.E. **An unaddressed issue of agricultural terrorism: A case study on feed security.** *Journal of Animal Science.* 2004; 82(11): 3394-3400. ISSN: 0021-8812.

URL: <http://jas.fass.org/>

NAL call no.: 49 J82

Descriptors: alpacas, feed contamination, case study, potential biosecurity concerns, midwest, United States.

Kutzler, Michelle A.; Baker, Rocky J.; Mattson, Donald E. **Humoral response to West Nile virus vaccination in alpacas and llamas.** *Journal of the American Veterinary Medical Association.* 2004; 225(3): 414-416. ISSN: 0003-1488.

URL: <http://www.avma.org>

NAL call no.: 41.8 AM3

Descriptors: alpacas, llamas, horses, equine West Nile virus vaccine, humoral responses, clinical trial, vaccine intervals varied, results indicate the vaccine is safe.

Kutzler, M.A.; Bildfell, R.J.; Gardner-Graff, K.K.; Baker, R.J.; Delay, J.P.; Mattson, D.E. **West Nile virus infection in two alpacas.** *Journal of the American Veterinary Medical Association.* 2004 Sep. 15; 225(6): 921-924. ISSN: 0003-1488.

URL: <http://www.avma.org>

NAL call no.: 41.8 AM3

Descriptors: alpacas, viral diseases, West Nile virus, diagnosis, symptoms, case reports.

- Lenghaus, C.; O'Callaghan, M.G.; Rogers, C. **Coccidiosis and sudden death in an adult alpaca (*Lama pacos*)**. *Australian Veterinary Journal*. 2004 Nov.; 82(11): 711-712. ISSN: 0005-0423.
URL:<http://avacms.eseries.hengsystems.com.au>
NAL call no.: 41.8 AU72
Descriptors: adult alpaca, *Lama pacos*, coccidiosis, disease pathology, case report.
- Leroy, J.L.; Flahou, T.; Moerloose, K.; de Kruif, A. **De voortplanting bij de llama- en de alpacamerrie.** [The reproduction in llama and alpaca mares.] *Vlaams Diergeneeskundig Tijdschrift*. 2004; 73(5): 31 0-316. ISSN: 0303-9021. Note: In Dutch with an English summary.
Descriptors: llamas, alpacas, females, care in those imported into Europe, veterinary care, reproduction and breeding, assisted reproductive techniques, pregnancy, pregnancy diagnosis, reproductive efficiency, reproductive performance, Belgium.
- Long, P. **A practitioner approach to llama and alpaca nutrition.** In: *Selected Research on Camelid Physiology and Nutrition*. The Camelid Publishers, Bakaner, India. 2004; 747-749. ISBN: 8190114123.
NAL call no.: SF401.C2S46 2004
Descriptors: alpacas, llamas, animal husbandry, animal nutrition, body condition, nutrient requirements, wool producing animals, Arab countries.
- Majewska, M.; Panasiwicz, G.; Klisch, K.; Olivera, L.; Abd-Elnaeim, M.M.; Borkowski, K.; Szafranska, B. **Pregnancy-associated glycoproteins (PAG) in camelids.** *Reproduction in Domestic Animals*. 2004; 39(4): 282-283. ISSN: 0936-6768. Note: 8th Annual Conference of the European Society for Domestic Animal Reproduction (ESDAR), Warsaw, Poland; September 23-25, 2004.
URL: <http://www.wiley.com/bw/journal.asp?ref=0936-6768&site=1>
NAL call no.: SF105.A1Z8
Descriptors: camelids, camels, llamas, alpaca, reproductive biochemistry, glycoproteins, pregnancy, PAG gene.
- Mate, M.L.; Di Rocco, F.; Zambelli, A.; Vidal-Rioja, L. **Mitochondrial DNA structure and organization of the control region of South American camelids.** *Molecular Ecology Notes*. 2004; 4(4): 765-767. ISSN: 1471-8278.
URL: <http://www.wiley.com/bw/journal.asp?ref=1755-098X&site=1>
NAL call no.: QH541.15.M632
Descriptors: llamas, alpacas, vicunas, guanaco, mitochondrial DNA molecular organization of control region, conserved sequence blocks, potential as a molecular marker to infer data for camelid genetic relationships, population diversity tool.
- McGregor, B.A.; Butler, K.L. **Sources of variation in fibre diameter attributes of Australian alpacas and implications for fleece evaluation and animal selection.** *Australian Journal of Agricultural Research*. 2004; 55(4): 433-442. ISSN: 0004-9409.
URL:<http://www.publish.csiro.au/nid/40.htm>

NAL call no.: 23 AU783

Descriptors: *Lamapacos*, alpacas, breeds, individual variations, fleece fiber quality, gender, age, body weight, selection criteria, repeatability, geographical variation, regression analysis, multivariate analysis, correlation, algo rithms, restricted maximum likelihood method, prediction, models, Australia.

Medina, Mirta A.; Fernandez, Francisco; Saad, Silvia; Rebuffi, Gustavo; Yapur, Jose. **Inmunoglobulinas G de Cadenas pesadas en la leche de los camelidos sudamericanos. [Heavy-chain IgG in the milk of South American camelids.]***Mastozoologia Neotropical*. 2004; 11(1): 19-26. ISSN: 0327-9383. Note: In Spanish with an English and Spanish summary.

Descriptors: camelids, llama, vicuna, alpaca, guanaco, conventional IgG, IgG with two heavy chains, identify types of IgG in milk, PAGE-SDS, immunoblotting, immunoblotting assays, both types of IgG found.

Middleton, J.R.; Moody, M.M.; Parish, S.M. **Diabetes mellitus in an adult alpaca (*Lama pacos*).** *Veterinary Record*-- London. 2005; 157(17): 520-522. ISSN: 0042-4900

URL: <http://veterinaryrecord.bvapublications.com/archive/>

NAL Call no.: 41.8 V641

Descriptors: alpacas, blood chemistry, blood sugar, case reports, clinical aspects, diabetes mellitus, diagnosis, hyperglycaemia, insulin, blood glucose, clinical picture, glucose in blood, glucose metabolism, high blood glucose, hyperglycemia, Washington State, US.

Middleton, J.R. **Haematology of South American camelidae.** In: *Selected Research on Camelid Physiology and Nutrition*. The Camelid Publishers, Bakaner, India. 2004: 400-408. ISBN: 8190114123.

NAL call no.: SF401.C2S46 2004

Descriptors: Bactrian camels, alpacas, vicunas, guanacos, llamas, blood chemistry, blood disorders, hematocrit, anemia, blood cells morphology, basophils, bone marrow, dissolved oxygen, eosinophilia, eosinophils, erythrocyte count, erythrocytes, erythropoietin, transferring, hematology, hemoglobin, iron deficiency anemia, leukocyte count, lymphocytes, monocytes, morphology, neutrophils, normal values, platelets, South America.

Nawrocki, M.A.; Lincoln, J.D.; Tibary, A. **Surgical management of unilateral ectopic hydroureter and hydronephrosis in a juvenile alpaca.***Journal of Camel Practice and Research*. 2004; 11(2): 119-123. ISSN: 0971-6777.

NAL call no.: SF997.5.C3J68

Descriptors: female alpaca, 9 months old, ectopic ureter and hydronephrosis, incontinence, ultrasonographic examination, intravenous pyelogram, excretory urogram, left nephrectomy and ureterectomy surgical procedures, uneventful recovery.

O'Rourke, Jennifer L.; Callan, Robert J.; Van Metre, David C. **West Nile virus meningoencephalomyelitis in alpacas.***Journal of Veterinary Internal Medicine*. 2004; 18(3): 396. ISSN: 0891-6640. Note: 22nd Annual American College of Veterinary Internal Medicine (ACVIM) Forum, Minneapolis, MN, USA; June 9-12, 2004.

URL: <http://www.wiley.com/bw/journal.asp?ref=0891-6640&site=1>

NAL call no.: SF601.J65

Descriptors: alpacas, West Nile virus infection, neural affects, meningoencephalomyelitis, neural coordination effects.

Otazu, D.A. **Alpaca and vicuna: general perspectives.** In: Cardellino, R.; Rosati, A; Mosconi, C. [Editors] *ICAR Technical Series*. 2004; (11): 31-36. ISSN: 1563-2504. ISBN: 9295014065. Note: conference proceedings: "Current Status of Genetic Resources, Recording and Production Systems in African, Asian and American Camelids, Sousse, Tunisia, 30 May 2004."

URL:http://www.icar.org/DOCS/technical_series_11_sousse.pdf

Abstract: In the landscapes of the high plains at over 4 000 meters above sea level, thousands of years ago the Incas domesticated two species of the South American camelids: Alpaca and Llama, using techniques that are a mystery to these days. The first one would later be used as a source of soft, fine and resistant fibre and the second one as a mean of transportation. From the two species that continued being wild: Guanaco and especially Vicuna, a fantastic and very fine fibre was obtained, which was reserved only for nobility. Its threads were mixed with gold threads to create varied work of art. It was the fibre of the gods. Reproduced with permission of CAB Abstracts.

Descriptors: alpacas, llamas, guanaco, vicunas, animal fibers, fiber quality, wool producing animals.

Rosati, A; Mosconi, C. [Editors] *ICAR-Technical Series*. 2004; (11): 159-163. ISSN: 1563-2504. ISBN: 9295014065. Note: conference proceedings: "Current Status of Genetic Resources, Recording and Production Systems in African, Asian and American Camelids, Sousse, Tunisia, 30 May 2004".

URL:http://www.icar.org/DOCS/technical_series_11_sousse.pdf

Abstract: The characteristics of the meat, fibre and skin production systems of alpacas and vicunas, primarily in South America, are presented, including income, conservation and management, captive and semi-captive production systems and sustainability. Reproduced with permission from CAB Abstract.

Descriptors: alpacas, vicunas, animal fibers, fleece, hides and skins, income, management, meat production, sustainability, wool producing animals, conservation, South America.

Renieri, C.; Antonini, M.; Frank, E. **Fibre recording systems in camelids.** In: Cardellino, R.; Rosati, A; Mosconi, C. [Editors] *ICAR Technical Series*. 2004; (11): 131-143. ISSN: 1563-2504. ISBN: 9295014065. Note: conference proceedings: "Current Status of Genetic Resources, Recording and Production Systems in African, Asian and American Camelids, Sousse, Tunisia, 30 May 2004."

URL:http://www.icar.org/DOCS/technical_series_11_sousse.pdf

Descriptors: llamas, alpacas, fiber production, animal fibers, selection and heritability, coat colors, heritable characteristics, methods.

Rojas, X.; Munoz, S.; Otto, B.; Perez, B.; Nielsen, K. **Utilizacion de los test de Fluorescencia Polarizada (FP) y Elisa de Competencia (C-Elisa) en el diagnostico de brucelosis de camelidos.** [The use of polarized fluorescence as say (PF) and competitive ELISA test (C-ELISA) for the diagnosis of brucellosis in South American camelids.] *Archivos de*

Medicina Veterinaria. 2004; 36(1): 59-64. ISSN: 0301-732X. Note: In Spanish with an English summary.

URL: <http://www.scielo.cl>

NAL call no.: SF604.A75

Descriptors: alpacas, llamas, *Brucella*, bacterial disease, diagnostic techniques, detection of antibodies, assays, camelid sera, fluorescence polarization assay (PF), competitive ELISA (C-ELISA), rose Bengal (RB), seroagglutination (SAT), complement fixation (CF) tests.

Sartin, E.A.; Crowe, D.R.; Whitley, E.M.; Treat, R.E., Jr.; Purdy, S.R.; Belknap, E.B. **Malignant neoplasia in four alpacas.** *Journal of Veterinary Diagnostic Investigation*. 2004; 16(3): 226-229. ISSN: 1040-6387.

URL: <http://jvdi.org/>

NAL call no.: SF774.J68

Descriptors: alpacas, B-cell lymphosarcoma, neuroendocrine neoplasm, clinical picture, postmortem examination, abdominal mass, thoracic masses, diagnosis with immunohistochemical stains, case reports.

Saulez, M.N.; Cebra, C.K.; Valentine, B.A. **Necrotizing hepatitis associated with enteric salmonellosis in an alpaca.** *Canadian Veterinary Journal*. 2004; 45(4): 321-323. ISSN: 0008-5286. In English with a French summary.

URL: <http://www.pubmedcentral.nih.gov/articlerender.fcgi?artid=548619>

NAL call no.: 41.8 R3224

Descriptors: 1 year old alpaca, *Salmonella typhimurium*, isolated from feces, salmonellosis, clinical aspects, anorexia, weight loss, liver biopsies, hepatitis, differential diagnosis, disease control, antibiotic treatment, fluid therapy, blood chemistry, case report, hematology, histopathology.

Serrano Martinez, E.; Collantes Fernandez, E.; Rodriguez Bertos, A.; Casas Astos, E.; Alvarez Garcia, G.; Chavez Velasquez, A.; Ortega Mora, L.M. ***Neospora* species-associated abortion in alpacas (*Vicugna pacos*) and llamas (*Lama glama*).** *Veterinary Record* (London). 2004 Dec 4; 155(23): 748-749. ISSN: 0042-4900.

URL: <http://www.bva.co.uk>

NAL call no.: 41.8 V641

Descriptors: alpacas, *Vicugna pacos*, llamas, *Lama glama*, abortion associated with *Neospora* sp.

Teague, L. **Arriving with alpacas.** *AgVentures*. 2004 Apr-May; 8(2): 6-8.

NAL call no.: S441.A475

Descriptors: alpacas, transport, care, handling, personal story.

Tichit, M.; Ingrand, S.; Moulin, C.H.; Cournut, S.; Lasseur, J.; Dedieu, B. **Analyser la diversite des trajectoires productives des femelles reproductrices: interets pour modeliser le fonctionnement du troupeau en élevage allaitant.** [Analysis of the diversity of breeding female productive trajectories: interest for modelling the functioning of suckling herds.] *Pro-*

ductions Animales (Paris). 2004; 17(2): 123-132. ISSN: 0990-0632. Note: In French.

URL: <http://www.inra.fr/internet/Produits/PA/spip.php?article556>

Descriptors: cattle, sheep, llamas, variable animal productivity, production trajectory herd model, based on 6 case studies, breeding and replacement practices, decreasing or increasing within herd diversity of female productive trajectories, consequences for modelling herd functioning are reviewed.

Ueda, J.; Cebra, C.K.; Tornquist, S.J. **Assessment of the effects of exogenous long-acting insulin on glucose tolerance in alpacas.** *American Journal of Veterinary Research*. 2004 Dec; 65(12): 1688-1691. ISSN: 0002-9645.

URL: <http://www.avma.org>

NAL call no.: 41.8 AM3A

Descriptors: alpacas, glucose metabolism, glucose tolerance, effects of exogenous long-acting insulin.

Van Hoogmoed, L.M.; Drake, C.M.; Snyder, J.R. **In vitro investigation of the effects of nonsteroidal anti-inflammatory drugs, prostaglandin E2, and prostaglandin F2 alpha on contractile activity of the third compartment of the stomach of llamas.** *American Journal of Research*. 2004 Feb.; 65(2): 220-224. ISSN: 0002-9645.

URL: <http://www.avma.org>

NAL call no.: 41.8 AM3A

Descriptors: NSAIDS, prostaglandin E3, prostaglandin F2 alpha, in vitro testing, effects on contractile activity, third stomach.

Varney, K. **Quarterly review of diagnostic cases - October to December 2003.** *Surveillance Wellington*. 2004; 31(1): 21-25. ISSN: 0112-4927.

Descriptors: alpacas, cats, cattle, deer, dogs, horses, pigs, rabbits, sheep, protozoa, bacteria, viruses, various types of animal diseases, clinical aspects, diagnosis, diagnostic techniques, case reports.

Vaughan, J.L. **Eradication of the camelid biting louse, *Bovicola breviceps*.** *Australian Veterinary Journal*. 2004; 82(4): 218-219. ISSN: 0005-0423.

URL: <http://www.publish.csiro.au/nid/40.htm>

NAL call no.: 41.8 AU72

Descriptors: alpaca, llama, sheep, camelid biting louse, *Bovicola breviceps*, common parasite, pesticide, egg counts, shearing, treatment, Extinosad (spinosad 25 g/l spinosad suspension concentrate) with wetting agent, efficacy of treatment.

Vaughan, J.L.; Macmillan, K.L.; D'Occhio, M.J. **Ovarian follicular wave characteristics in alpacas.** *Animal Reproduction Science*. 2004; 80(3-4): 353-361. ISSN: 0378-4320.

URL: <http://www.sciencedirect.com/science/journal/03784320>

NAL call no.: QP251.A5

Descriptors: alpacas, study of ovarian follicular growth characteristics, intervals between, successive large follicles in unmated females, non-pregnant and non-lactating adult alpacas,

ultrasound 46-100 days, wave pattern, diameters measured, possible use for optimal mating times.

- Wauters, J.J.M.; Duchi, N.; Guevara, P.; Onate, W.; Castillo, P.; Lopez, J.; de Wilde, R. **Comparison of the digestibility of paja de paramo and barley straw between sheep (*Ovis aries*), llamas (*Lama glama*) and alpacas (*Lama paco*).** In: *Selected Research on Camelid Physiology and Nutrition*. The Camelid Publishers, Bakaner, India. 2004: 766-769. ISBN: 8190114123.
NAL call no.: SF401.C2S46 2004
Descriptors: sheep, llamas, alpacas, animal nutrition, forage, feed digestibility study, barley straw, *Hordeum vulgare*, lignin, nutritive value, species differences, *Calamagrostis rigida*, *Festuca dolichophylla*, *Festuca humilior*, *Muhlenbergia angustata*.
- Webb, A.I.; Baynes, R.E.; Craigmill, A.L.; Riviere, J.E.; Haskell, S.R.R. **Drugs approved for small ruminants.** *Journal of the American Veterinary Medical Association*. 2004; 224(4): 520-523. ISSN: 0003-1488.
URL:<http://www.avma.org>
NAL call no.: 41.8 AM3A
Descriptors: alpacas, deer, goats, llamas, sheep, drugs for small ruminants, pharmacology, regulations.
- Yaeger, M.; Yoon, K.J.; Schwartz, K.; Berkland, L. **West Nile virus meningoencephalitis in a Suri alpaca and Suffolk ewe.** *Journal of Veterinary Diagnostic Investigation*. 2004; 16(1): 64-66. ISSN: 1040-6387.
URL:<http://jvdi.org/>
NAL call no.: SF774.J68
Descriptors: alpacas; Suffolk ewe sheep, clinical signs, llama symptoms, torticollis, hyperesthesia, ataxia, recumbency, altered mentation, ewe symptoms, rapidly progressive illness of ataxia and convulsions, diffuse, lymphoplas macytic meningoencephalitis with focal gliosis meningoencephalitis, microscopic brain lesions, diagnosis, diagnostic techniques, West Nile virus, immunohistochemistry, polymerase chain reaction, PCR, first confirmed case in camelids, New Hampshire, United States.
- Zhang, Qiao Ling; Dong, Chang Sheng; He, Jun Ping; He, Xiao Yan. **[Research progress on the study of the chromosomes of alpacas.]** *Journal of Economic Animal*. 2004; 8(2): 115-121. ISSN 1007-7448. Note: In Chinese with an English summary.
Descriptors: alpacas, animal breeding, sex determination, chromosomes, genetic variance, inheritance, physiology, reviews.

Guanacos

2008

Marin, Juan C.; Spotorno, Angel E; Gonzalez, Benito A.; Bonacic, Cristian; Wheeler, Jane C.; Casey, Ciara S.; Bruford, Michael W.; Palma, R. Eduardo; Poulin, Elie. **Mitochondrial DNA variation and systematics of the guanaco (*Lama guanicoe*, Artiodactyla : Camelidae).** *Journal of Mammalogy*. 2008; 89(2): 269-281. ISSN: 0022-2372

URL: <http://www.bioone.org>

Descriptors: guanacos (*Lama guanicoe*), 2 and 4 subspecies, mitochondrial DNA variation, analyzed complete cytochrome-b and partial control region mitochondrial DNA sequences, analysis supports monophyly, did not distinguish subspecies, some differentiation in northernmost compared to more southern populations, demographic history, recent population expansion suggested, 22 localities in Peru, Bolivia, Argentina, and Chile.

Marino, Andrea; Baldi, Ricardo. **Vigilance patterns of territorial guanacos (*Lama guanicoe*): The role of reproductive interests and predation risk.** *Ethology*. 2008 Apr; 114(4): 413-423. ISSN: 0179-1613

URL: <http://www3.interscience.wiley.com/journal/117987136/home>

DOI: <http://dx.doi.org/10.1111/j.1439-0310.2008.01485>

Abstract: We conducted focal observations of territorial guanacos, a highly polygynous and social mammal, to compare time budgets between sexes and test the hypothesis that the differences in reproductive interests are associated with differential group size effects on male and female time allocation patterns. In addition, we used group instantaneous sampling to test the hypothesis that grouping improves detection capacity through increased collective vigilance. We fit GLM to assess how group size and group composition (i.e., presence or absence of calves) affected individual time allocation of males and females, and collective vigilance. As expected from differences in reproductive interests, males in family groups devoted more time to scan the surroundings and less to feeding activities compared to females. Both sexes benefited from grouping by reducing the time invested in vigilance and increased foraging effort, according to predation risk theory, but the factors affecting time allocation differed between males and females. Group size effects were significant when females were at less than five body-lengths from their nearest neighbour, suggesting that grouping benefits arise when females are close to each other. Female time budgets were also affected by season, topography and vegetation structure. In contrast to our expectation, males reduced the time invested in vigilance as the number of females in the group increased, supporting the predation risk theory rather the intrasexual competition hypothesis. The presence of calves was associated with an increase in male individual vigilance; and vegetation type also affected the intensity of the group size effect over male time allocation. In closed habitats, collective vigilance increased with the number of adults but decreased with the number of calves present. Although male and female guanacos differed in their time allocation patterns, our results

support the hypothesis that both sexes perceive significant antipredator benefits of group living.

Descriptors: guanacos (*Lama guanicoe*), males, females, calves, territorial members, time budgets, sex differences, effects of group size and composition on detecting predators, foraging efforts, predation risk theory, effects of topography and vegetation structure on predation, collective vigilance, South America.

Puig, Silvia; Videla, Fernando; Cona, Monica I.; Roig, Virgilio G. **Habitat use-by guanacos (*Lama guanicoe*, Camelidae) in northern Patagonia (Mendoza, Argentina).** *Studies on Neotropical Fauna and Environment*. 2008; 43(1): 1-9. ISSN: 0165-0521

URL:<http://www.informaworld.com/smpp/title-content=g789736874-db=all>

Descriptors: *Lama guanicoe* ; guanacos; spatial patterns; seasonal habitat use; early and late summer; parturition and lactation nutritional needs; predation risks; daily distribution; scan sampling; habitat factors: relief, soil, vegetation by point quadrant method; terrain preferences: gentle terrain, grasslands, low hiding cover; population density associated with grass *Panicum urvilleanum*, avoided: rocky soils, high shrublands and avoided plants, high populations changed avoidance patterns, Patagonia, South America.

Sarno, Ronald J.; Grigione, Melissa M.; Arvidson, Lance D. **Lack of response of an open-habitat ungulate to the presence of predator urine.** *Revista Chilena de Historia Natural*. 2008; 81(2): 179-183. ISSN: 0716-078X

URL: <http://www.scielo.cl>

Descriptors: *Lama guanicoe*, guanacos, behavioral responses, odors of dangerous predators, open habitat, exposure to urine of various predators, only reacted to mountain lion urine (*Puma concolor*), may use vision for predator detection.

Zapata, B.; GonzcLlez, B.A.; Marin, J.C.; Cabello, J.L.; Johnson, W.E.; Skewes, O. **Finding of polydactyly in a free-ranging guanaco (*Lama guanicoe*).** *Small Ruminant Research*. 2008 May; 76(3): 220-222. ISSN: 0921-4488

URL:<http://www.sciencedirect.com/science/journal/09214488>

DOI:<http://dx.doi.org/10.1016/j.smallrumres.2008.01.004>

NAL call no.: SF380.I52

Abstract: Polydactylism, a genetic defect characterized by partial or complete duplication of the digit, has been described in a wide range of vertebrates. Among ungulates, polydactyly appears to be relatively common in domestic camelids, with reports in dromedary camels (*Camelus dromedarius*), llama (*Lama glama*) and alpaca (*Vicugna pacos*). However, in wild South American camelids polydactyly has been reported only in a vicuna kept in a zoo (*Vicugna vicugna*), but not in wild populations. Here a finding of polydactyly in a free-ranging guanaco is described. We propose the hypothesis that this malformation has an atavistic-genetic origin.

Descriptors: guanaco, free ranging animal, genetic mutation, polydactyly, domestic camelids, camels, llamas, alpacas, vicunas.

Balmus, Gabriel; Trifonov, Vladimir A.; Biltueva, Larisa.S.; O' Brien, Patricia.C.M.; Alkalaeva, Elena.S.; Fu, Beiyuan; Skidmore, Julian.A.; Allen, Twink; Graphodatsky, Alexander S.; Yang, Fengtang; Ferguson-Smith, Malcolm A. **Cross-species chromosome painting among camel, cattle, pig and human: further insights into the putative Cetartiodactyla ancestral karyotype.** *Chromosome Research*. 2007 June; 15(4): 499-514. ISSN: 0967-3849

URL:<http://dx.doi.org/10.1007/s10577-007-1154-x>

NAL call no.: QH600 .C47

Abstract: The great karyotypic differences between camel, cattle and pig, three important domestic animals, have been a challenge for comparative cytogenetic studies based on conventional cytogenetic approaches. To construct a genome-wide comparative chromosome map among these artiodactyls, we made a set of chromosome painting probes from the dromedary camel (*Camelus dromedarius*) by flow sorting and degenerate oligonucleotide primed-PCR. The painting probes were first used to characterize the karyotypes of the dromedary camel (*C. dromedarius*), the Bactrian camel (*C. bactrianus*), the guanaco (*Lama guanicoe*), the alpaca (*L. pacos*) and dromedary x guanaco hybrid karyotypes (all with $2n = 74$). These FISH experiments enabled the establishment of a high-resolution GTG-banded karyotype, together with chromosome nomenclature and idiogram for *C. dromedarius*, and revealed that these camelid species have almost identical karyotypes, with only slight variations in the amount and distribution patterns of heterochromatin. Further cross-species chromosome painting between camel, cattle, pig and human with painting probes from the camel and human led to the establishment of genome-wide comparative maps. Between human and camel, pig and camel, and cattle and camel 47, 53 and 53 autosomal conserved segments were detected, respectively. Integrated analysis with previously published comparative maps of human/pig/cattle enabled us to propose a Cetartiodactyla ancestral karyotype and to discuss the early karyotype evolution of Cetartiodactyla. Furthermore, these maps will facilitate the positional cloning of genes by aiding the cross-species transfer of mapping information.

Descriptors: camels, alpacas, guanacos, cattle, pigs, cytogenetics, evolution, Cetartiodactyla, chromosome painting, karyotype.

Llanos, Anibal J.; Riquelme, Raquel A.; Herrera, Emilio A.; Ebensperger, German; Krause, Bernardo; Reyes, Roberto V.; Sanhueza, Emilia A.; Pulgar, Victor M.; Behn, Claus; Cabello, Gertrudis; Parer, Julian T.; Giussani, Dino A.; Blanco, Carlos E.; Hanson, Mark A. **Evolving in thin air - Lessons from the llama fetus in the altiplano.** *Respiratory Physiology and Neurobiology*. 2007; 158(2-3): 298-306. ISSN: 1569-9048

Descriptors: llamas, alpacas, vicunas, guanacos, fetal life, high altitude animals, fetal response to acute hypoxia, peripheral vasoconstriction mediated by alpha adrenergic mechanisms, high plasma concentration of catecholamines, high plasma concentration of neuropeptide Y, NO and endothelin 1, local blood flows, cerebral hypometabolic response, reduced oxygen consumption, Na-K-ATPase activity, temperature, absence of seizures and apoptosis of neural cells, Andean altiplano.

Marai, I.F.M.; Zeidan, A.E.B. **Artificial insemination in Camelidae.** *Tropical and Subtropical Agroecosystems*. 2007; 7(1): 1-13. Note: In English with a Spanish summary. Literature review.

URL:<http://www.veterinaria.uady.mx/publicaciones/journal/2007-1/128-camels2.pdf>

Abstract: The most important problems of Artificial Insemination (AI) in Camelidae is its timing in relation to ovulation in the she-camel. The present article reviewed collection of semen, processing of semen, manipulation of the female and semen deposition technique in Camelidae species. Commonly, semen is collected by electroejaculation, artificial vagina (AV), flushing of the epididymus with saline solution, while the more accepted methods are the former two methods. Semen is usually used in raw condition or after extension, depending on the method of semen processing. In the fresh raw method, whole semen is used within minutes or after few hours. Extension of the semen ejaculate is carried out by adding extenders and it is required in more efficient use of AI, in short-term preservation or liquid semen (within a few hours or days) and long-term preservation or frozen semen (months or years). In short-term preservation, semen is used extended under different temperatures (30, 25 or 4 degrees C). Long-term preservation is carried out by cryopreservation. Packaging methods such as pellets, ampoules or in plastic straws with different volumes (0.25, 0.5 or 4 ml) represent different freezing procedures. The quality and survival of spermatozoa of post-thaw semen are highly variable from one male to the other, even after using the same freezing technique. To ensure that the inseminated females ovulate, hormonal manipulation of ovarian activity is used such as the induction of follicular activity and ovulation, as well as, synchronization of these phases in a group of females. The best time for insemination can only be determined by ultrasonography and/or rectal palpation of the ovaries. The other alternative is to inseminate at known intervals following induction of ovulation by hormonal treatment with human-chorionic gonadotropin (hCG) or gonadotropin-releasing hormone (Gn-RH).

Descriptors: alpacas, llamas, dromedaries, Bactrian camels, guanacos, vicunas, artificial insemination, cryopreservation, deposition site, freezing, frozen semen, GnRH, HCG, estrus, ovulation, reproduction, semen, semen diluent additives, semen preservation, spermatozoa, synchronization, synchronized females, gonadoliberin, gonadotropin releasing hormone, techniques.

Marin, Juan C.; Zapata, Beatriz.; Gonzalez, Benito A.; Bonacic, Cristian; Wheeler, Jane C. ; Casey, Ciara; Bruford, Michael W.; Palma, R. Eduardo; Poulin, Elie; Alliende, M. Angelica; Sportorno, Angel E. **Sistematica, taxonomia y domesticacion de alpacas y llamas: nueva evidencia cromosomica y molecular.** [Systematics, taxonomy and domestication of alpaca and llama: new chromosomal and molecular evidence.] *Revista Chilena de Historia Natural*. 2007; 80(2): 121-140. ISSN: 0716-078X. Note: In Spanish with an English summary.

URL:<http://www.scielo.cl>

Abstract: Four camelid species exist in South America: two wild, the guanaco (*Lama guanicoe*) and the vicuna (*Vicugna vicugna*), and two domestic, the alpaca (*Lama pacos*) and the llama (*Lama glama*). However, the origin of the domestic species has been a matter of debate. In the present study, variations in chromosome G banding patterns and in two mitochondrial gene sequences have been used to study the origin and classification of the llama and

alpaca. Similar patterns in chromosome G band structure were observed in all four Lamini species, and these in turn were similar to the bands described for camels, *Camelus bactrianus*. However, fine and consistent differences were found in the short arms of chromosome 1, separating camels, guanacos and llamas from vicunas and alpacas. This pattern was consistent even in a hybrid guanaco x alpaca. Equivalent relationship showed the complete cytochrome b gene sequences, and the minimum expansion tree of the partial control region sequence, grouping guanaco with llama and vicuna with alpaca. Phylogenetic analyses showed *V. vicugna* and *L. guanicoe* as monophyletic groups. Analysis of both gene sequences revealed two clades within vicuna, concordant with the two described subspecies, but the results for guanaco did not confirm existence of the four previously proposed subspecies. The combined analysis of chromosomal and molecular variation showed close genetic similarity between alpacas and vicunas, as well as between llamas and guanacos. Although directional hybridization was revealed, our results strongly support the hypothesis that the llama would have derived from *L. guanicoe* and the alpaca from *V. vicugna*, supporting reclassification as *V. pacos*. Reproduced with permission from CAB Abstracts.

Descriptors: camelids, Bactrian camels, 2 wild species, guanacos (*Lama guanicoe*) and vicunas (*Vicugna vicugna*), 2 domesticated species, alpacas (*Lama pacos*) and llamas (*Lama glama*), classification of species, chromosome G banding pattern variations, 2 mitochondrial gene sequences variations, analysis showed close genetic similarity of alpacas and vicunas and of llamas and guanacos, hypothesize llama derived from *L. guanicoe*, alpaca derived from *V. vicugna*, supporting reclassification as *V. pacos*, genetic variability, South American camelids.

Mate, M.L.; Di Rocco, F.; Zambelli, A.; Vidal-Rioja, L. **Mitochondrial heteroplasmy in Control Region DNA of Small Ruminant Research.** *South American camelids*. 2007 Aug; 71(1-3): 123-129. ISSN: 0921-4488

URL:<http://www.sciencedirect.com/science/journal/09214488>

DOI:<http://dx.doi.org/10.1016/j.smallrumres.2006.04.016>

NAL call No.: SF380.I52

Abstract: In the present work, polymerase chain reaction-single strand conformation polymorphism and sequencing were used to investigate the length and nucleotide variability in the Control Region mitochondrial DNA of the four South American camelid species from Argentina. To assess these the complete Control Region of 20 animals, 5 each of guanaco, llama, alpaca and vicuna species were cloned. Seventy-three clones corresponding to the 20 animals were screened and 7 different SSCP patterns were identified. Sequencing of all clones showed 9 different haplotypes contained in the 350 bp hypervariable segment of the Control Region. Interestingly, 3 guanacos, 3 vicunas, 3 alpacas and 1 llama were heteroplasmic for different nucleotide positions. The screening of the Control Region mitochondrial DNA in blood samples from about 200 wild guanacos from Argentine Patagonia supported the above results. After comparison with other vertebrate species, we concluded that nucleotide substitutions are the main cause of heteroplasmy found in Control Region mitochondrial DNA of these taxa.

Descriptors: Lama; llamas, alpacas, vicunas, *Lama guanicoe*, phylogeny, genetic variation, genetic-markers, mitochondrial DNA, molecular cloning, clones, nucleotide sequences, polymerase chain reaction, single stranded conformational polymorphism, mutation, single

nucleotide polymorphism, genome, genomics, heteroplasmy, molecular sequence data, Argentina.

Merriwether, D.A. **Domestication of alpacas: Genetics of the North American herd.** *American Journal of Physical Anthropology*. 2007; (Suppl. 44): 171. ISSN: 0002-9483. Note: 76th Annual Meeting of the American Association of Physical Anthropologists, Philadelphia, PA, USA; March 28 -31, 2007.

Descriptors: vicunas, llamas, alpacas, guanacos, domesticated animals, breeding, genetics, North America.

2006

Ansaloni, F.; Pyszny, F.; Claros, A.L.; Marquina, R.; Zapana-Pineda, J.; Claros, A.J.; Quispe-Huanca, J.L. **DECAMA-project: Analysis of farm income from South American camelids meat production in Latin American countries: Preliminary results of a comparison between case studies.** *4th European Symposium on South American Camelids/DECAMA European Seminar, Gottingen, Germany; October 07-09, 2004*. 2006. ISBN: 9076998981

Nal Call no.: SF401.L35 E97 2004

Descriptors: camelid meat production, economic development, hygiene status and quality of animal based products, income and production costs of camelid meat production, homogeneous questionnaire, visits and direct interviews with agricultural entrepreneurs, Andean rural areas, Peru, Bolivia, South America.

Ayala, J.E. **Size and growth of the guanaco (*Lama guanicoe*) population at the Calipuy National Reserve.** In: M. Gerken and C. Renueri [Editors]. *The 4th European Symposium on South American Camelids/DECAMA European Seminar, Gottingen, Germany; October 07-09, 2004*. 2006. ISBN: 9076998981

NAL call no.: SF401.L35 E97 2004

Descriptors: guanaco population; census data; 462 counted in June of 2002; 484 counted in 2003; 436 counted in July 2004; growth of 4.5%; average population: 40% adults, 6% juveniles, 5% crias, 19% single males, 30% male bachelor groups; females 4-5X higher than adult males; wild life management; Calipuy National Reserve, Peru, South America.

Cajal, Jorge L.; Tonni, Eduardo P. **Re-wilding in South America: Is it possible?** *Mastozoologia Neotropical*. 2006; 13(2): 281-282. ISSN: 0327-9383

URL: <http://redalyc.uaemex.mx/redalyc/src/inicio/HomRevRed.jsp?iCveEntRev=457>

Descriptors: guanacos, vicunas, horses, conservation policy, trophic structure, re-wilding animals, fauna conservation, Argentina.

D'Alterio, G.L.; Bazeley, K.J. **Referral service for South American camelids at the University of Bristol Veterinary School: A review of cases from 1999 to 2002.** *4th European Symposium on South American Camelids/DECAMA European Seminar, Gottingen, Germany; October 07*

-09, 2004. 2006. ISBN: 9076998981

NAL call no.: SF601.I4

Descriptors: vicunas, llamas, alpaca, guanaco, veterinary medicine, clinical and surgical camelid cases, Farm Animal Practice & Hospital of the University of Bristol, Britain, UK.

De Simone, Emilio; Saccodossi, Natalia; Ferrari, Alejandro; Leoni,-Lucrecia; Leoni, Juliana. **Immunochemical analysis of IgG subclasses and IgM in south American camelids.** *Small Ruminant Research*. 2006; 64(1-2): 2-9. ISSN: 0921-4488

URL:<http://www.sciencedirect.com/science/journal/09214488>

Abstract: Antibodies are glycoproteins comprising two heavy and two light chains. Surprisingly, all members of the family Camelidae possess a fraction of antibodies devoid of both light chains and the first constant domain (CH1). These kinds of antibodies are known as heavy chain antibodies (HCABs). There are three subclasses of IgG in dromedaries, namely IgG(1), IgG(2) and IgG(3) Of which, IgG(2) and IgG(3) are of the HCABs type. In the present work, the different IgG isotypes from guanaco (*Lama guanicoe*), llama (*Lama glama*) and vicuna (*Vicugna vicugna*) were purified and characterized. Interestingly, it was found that IgM was capable of binding to protein A. The different subclasses of immunoglobulins were also assayed for their ability to fix complement. Both IgG(1) and the total serum were able to fix complement, whereas IgG(2) and IgG(3) fixed complement even in the absence of antigen. (c) 2005 Elsevier B.V. All rights reserved.

Descriptors: vicunas; guanacos; llamas; IgM immunoglobulin M G1, G2, and G3; immunologic techniques.

Di Rocco, Florencia; Parisi, Gustavo; Zambelli, Andres; Vida-Rioja, Lidia. **Rapid evolution of cytochrome c oxidase subunit II in camelids (Tylopoda, Camelidae)** *Journal of Bioenergetics and Biomembranes*. 2006; 38(5-6): 293-297. ISSN: 0145-479X

URL:<http://www.springerlink.com/content/102584/>

Descriptors: new and old camelids, mitochondrial aerobic energy production, mitochondrial DNA, cytochrome c oxidase subunits I, II, III, replacement of amino acids inferred, transmembrane helices of proteins, hot dry adaption for camels, high altitude cold hypoxic environment of the Andean region.

Donadio, Emiliano; Buskirk, Steven W. **Flight behavior in guanacos and vicunas in areas with and without poaching in western Argentina.** *Biological Conservation*. 2006; 127(2): 139-145. ISSN: 0006-3207

Descriptors: wild South American camelids, guanacos, vicunas, effects on populations, flight behavior, surveys of 299 groups form a vehicle, flight distance, time of first flight, flight distance, species, groups size, presence or absence of juveniles, 70% ran where poaching was common, 30% when reserve without poaching, inside and outside preserves, poaching from roads common, recommend some road closures as conservation measure, Argentina.

Finucane, Brian; Agurto, Patricia Maita; Isbell, William H. **Human and animal diet at Conchopata, Peru: stable isotope evidence for maize agriculture and animal management practices during the Middle Horizon.** *Journal of Archaeological Science*. 2006; 33(12): 1766-1776. ISSN: 0305-4403

URL:<http://www.sciencedirect.com/science/journal/03054403>

Descriptors: humans, plant species, alpacas, llamas, guanacos, vicuna, *Avaiia porcellus*, maize, various grasses, nitrogen 15, delta C 13, analysis of skeletal remains, Middle Horizon period (AD550-1000) Conchopata, Peruvian highlands, animal management strategies, no sex differences in diet, ancient times, Peru.

Gerken, M.; Renieri, C. [Editors]. *South American Camelids Research, Volume 1. Proceedings of the 4th European Symposium on South American Camelids and DECAMA European seminar*. Wageningen Academic Publishers. Wageningen, Netherlands: 2006; 308p. ISBN: 9076998981

NAL call no.: SF402.L35 E97 2004

Abstract: A series of papers on the current trends in reproduction, animal breeding, genetics, nutrition, health (including bacterial and parasitic infections) and fibre morphology of South American camelids, viz. llamas, alpacas, vicunas and guanaco (*Lama guanicoe*) is presented, including discussions on the potential of these camelids for meat production and commercialization in South America. The particular advantages of South American camelids for the sustainable use of fragile ecosystems with native pastures are outlined, and discussions on the interaction between wild and domestic species, management of alpaca populations outside South America and aspects of camelid health under European conditions are presented as well.

Descriptors: llamas, guanacos, vicunas, breeding, genetics, nutrition, bacterial diseases, bacterinections, helminthoses, protozoal diseases, meat production, nature conservation, protozoal infections, reproduction, wildlife management, wool producing animals, South America.

Gunsser, I.; Haenichen, T.; Kiesling, C. **Breeding and/or Handling Problems? Causes of Death in Camelids**. In: M. Gerken and C. Renueri [Editors]. *The 4th European Symposium on South American Camelids/DECAMA European Seminar, Gottingen, Germany; October 07 -09, 2004*. 2006. ISBN: 9076998981

NAL call no.: SF401.L35 E97 2004

Descriptors: 179 camelids; 63 alpacas; 5 guanacos; 1 guanaco-llama mix; 5 dromedary camels; 3 Bactrian camels; 1 vicuna; post mortem sampling; causes of death; most common problems: pulmonary edema; next most common: liver, digestive system, abdomen, endoparasites, chronic feeding mistakes; pathology of other organs: urinary tract, head, spleen, skin, degeneration of parenchymas, teeth problems, spleen reactions, mites or other infections; less frequent pathology: genitals, neck, bones, limbs; general causes of death: infectious diseases (22.5%), euthanasia (17.1%), emaciation (9.5%), fatty degeneration of parenchyma (9.0%), diagnosis inconclusive (14.4%).

Jensen, J M. *Camelid Drug Formulary*. Published by Game Ranch Health. San Antonio, USA: 2006, 405 p. ISBN: 9781424312177

NAL call no.: SF916.5.J46 2006

Abstract: The book is divided into two main sections, the first dealing with South American Camelids (SAC), llama (*Lama glama*), alpaca (*Lama pacos*), guanaco (*Lama guanicoe*), and vicuna (*Vicugna vicugna*), and the second with dromedaries (*Camelus dromedaries*) and

Bactrian camels (*C. bactrianus*). The drugs are grouped in the book according to clinical application (for example, Analgesia, Anaesthesia, Gastrointestinal, Immunization, Reproductive, Vitamins-Minerals). The information consists of a table with five columns entitled Drug, Species, Dosage, Comments, and Reference. For example the information for penicillin in the Reproduction - SAC section is: Drug: penicillin, Species: SAC, Dosage: 22,000 mg/kg, SC, q24h for 3 treatments, Comments: prevention of uterine infection, References: Johnson, L. 1989 [the full references are listed at the end of each of the SAC and Camel sections]. This book will be extremely useful to all veterinarians who come across camelids in their work.

Descriptors: llamas, alpacas, dromedaries, Bactrian camels, vicunas, guanacos, drug formulary, pharmaceuticals, antibiotics, anti-infective agents, anti-inflammatory agents, anti-parasitic agents, drug therapy; gastrointestinal agents, pharmacology.

Leotta, Gerardo A.; Deza, Natalia; Origlia, Javier; Toma, Claudia; Chinen, Isabel; Miliwebsky, Elizabeth; Iyoda, Sunao; Sosa-Estani, Sergio; Rivas, Marta. **Detection and characterization of Shiga toxin-producing *Escherichia coli* in captive non-domestic mammals.** *Veterinary Microbiology*. 2006; 118(1-2): 151-157. ISSN: 0378-1135

URL:<http://www.sciencedirect.com/science/journal/03781135>

DOI:<http://dx.doi.org/10.1016/j.vetmic.2006.08.019>

NAL call no.: SF601.V44

Descriptors: ruminants, goats, giraffes, *Taurotragus oryx*, elands, *Antilope cervicapra*, blackbuck antelopes, *Ovis musimon*, mouflon sheep, *Ovis aries somalicus*, Somali sheep, *Bos grunniensis*, yaks, *Lama pacos*, alpacas, *Lama guanicoe*, guanacos, *Lama guanico glama*, llamas, *Hydrochoerus hydrochaeris*, capybaras, *Dolichotis patagonus*, Patagonian cavy, *Cervus elaphus*, red deer, *Ozotoceros bezoarticus*, pampas deer, *Axis axis*, axis deer, *Mazama gouazoubira*, fallow deer, *Dama dama*, paint deer, *Elaphrus davidianus* (Coleoptera), pere david deer, *Escherichia coli*, serovar-O12:H25, serovar-O13:H6, strain 25 strains, strain 27 strains, strain O146:H28; Shiga toxin producing-*Escherichia coli*, 7 different serotypes, testing fecal samples, PCR, Shiga toxin gene sequences, natural reservoir, frequency in non-domestic animals, zoo habitat, living in a pit, Zoo and Botanical Garden, La Plata City, Argentina.

Montes, M.C.; Carmanchahi, P.D.; Rey, A.; Funes, M.C. **Live shearing free-ranging guanacos (*Lama guanicoe*) in Patagonia for sustainable use.** *Journal of Arid Environments*. 2006 Mar; 64(4): 616-625. ISSN: 0140-1963

URL : <http://www.sciencedirect.com/science/journal/01401963>

DOI: <http://dx.doi.org/10.1016/j.jaridenv.2005.05.008>

Descriptors: *Lama guanicoe*, 55 guanacos (13 females, 38 males, and 4 calves) captured, live-sheared 30 animals, shearing, shearing machines, no mortalities, animal injuries, sustainable agriculture, applied and field techniques, mobile corral traps, trapping, field equipment, fleece weight of 307.15g for females and 338.12 g for males, population levels, management scheme, sheep ranching, overhunting, management implications, Patagonia, South America.

Rosati, Victoria R. **Selección de Dieta de Mamíferos Herbívoros Silvestres de Regiones Áridas y Semiáridas.** [Diet Selection of Wild Herbivore Mammals in Arid and Semi-arid Regions.] Cid M.S.; Bonino N.; Cassini M.; Anchorena J.; DeSbriller A.P.; Arriaga M.

[Editors]Macn-Museo Argentino Ciencias Naturales, Buenos Aires, Argentina. 2006. ISSN: 1666-5503. ISBN: 9879640837. Note: In Spanish.

Descriptors: vicunas, guanacos, *Pediolagus salincola*, *Mazama gouazoubira*, *Lagostomus maximus*, *Ctenomys opimus*, *Hydrochaeris hydrochaeris*, *Lepus europaeus*, semi arid zones, diet selection of wild herbivores, South America.

Sacchero, D.; Maurino, M.J.; Lanari, M.R. **Diferencias de calidad y proporción de down en muestras individuales de vellones de guanaco (*Lama guanicoe*) en distintas ecoregiones de Argentina.** [Differences on quality and proportion of down in individual fleece samples of guanaco (*Lama guanicoe*) from different ecoregions of Argentina.] *Revista Argentina de Produccion Animal*. 2006; 26(3): 211-216. Note: In Spanish with an English summary.

Descriptors: guanacos, animal fibers, fiber quality, fiber diameter, fleece quality, down levels, individual variance in fiber quality, Argentina.

Sarno, Ronald J.; Bank, Michael S.; Stern, Hal S.; Franklin, William L. **Effects of age, sex, season, and social dynamics on juvenile guanaco subordinate behavior.** *Journal of Mammalogy*. 2006; 87(1): 41-47. ISSN: 0022-2372

URL: <http://www.bioone.org>

Descriptors: guanacos, crias and juveniles, conflict resolution behaviors, age effect—birth to 9 months, sex effects, group size effect, seasonal effects, appearance, ontogenetic differences, subordinate behaviors; submissive crouch behaviors, body postures, Torres del Paine National Park, Chile.

Simone, E. de; Saccodossi, N.; Ferrari, A.; Leoni, L.; Leoni, J. **Immunochemical analysis of IgG subclasses and IgM in South American camelids.** *Small Ruminant Research*. 2006 July; 64(1-2): 2-9. ISSN: 0921-4488

URL: <http://www.sciencedirect.com/science/journal/09214488>

DOI: <http://dx.doi.org/10.1016/j.smallrumres.2005.03.009>

NAL call no.: SF380.I52

Abstract: Antibodies are glycoproteins comprising two heavy and two light chains. Surprisingly, all members of the family Camelidae possess a fraction of antibodies devoid of both light chains and the first constant domain (CH1). These kinds of antibodies are known as heavy chain antibodies (HCABs). There are three subclasses of IgG in dromedaries, namely IgG1, IgG2 and IgG3 of which, IgG2 and IgG3 are of the HCABs type. In the present work, the different IgG isotypes from guanaco (*Lama guanicoe*), llama (*Lama glama*) and vicuña (*Vicugna vicugna*) were purified and characterized. Interestingly, it was found that IgM was capable of binding to protein A. The different subclasses of immunoglobulins were also assayed for their ability to fix complement. Both IgG1 and the total serum were able to fix complement, whereas IgG2 and IgG3 fixed complement even in the absence of antigen.

Descriptors: llamas, *Lama guanicoe*, vicunas, immunoglobulin G, immunoglobulin M, antibodies, chemical structure, complement, complement fixation tests, antigens, heavy chain antibodies, light chain antibodies.

2005

- Bulgarella, Mariana; de Lamo, Daniel. **Thermal conductance of guanaco (*Lama guanicoe*) pelage.** *Journal of Thermal Biology.* 2005; 30(8): 569-573. ISSN: 0306-4565
URL:<http://www.sciencedirect.com/science/journal/03064565>
Descriptors: *Lama guanicoe*, guanacos, comparison of winter and summer sheared pelts, thermal conductance, guarded hot plate technique was used, winter was 1.64W/m(2) degrees C, summer 1.79W/m(2) degrees C, mean heat loss free convective conditions, natural pelage 1.74 W/m(2) degrees C, sheared pelts 2.3W/m(2) degrees C. indications of a seasonal molt (moult), Patagonia, South America.
- Bulgarella, M.; Lamo, D.A. de. **Datos de esquila de guanacos (*Lama guanicoe*) en el sudeste de Chubut, Argentina.** [Shearing of guanacos (*Lama guanicoe*) in south east of Chubut, Argentina.] *Revista Argentina de Produccion Animal.* 2005; 25(Supl. 1): F1. Note: 28 Congreso Argentino de Produccion Animal "Hacia un Incremento en la Demanda global de Productos de Origen Animal", Bahia Blanca, Argentina, 19-21 October 2005. In Spanish.
Descriptors: *Lama guanicoe*, animal fibers, shearing, fiber producing animal production, Argentina.
- Cavieres, L.A.; Fajardo, A. **Browsing by guanaco (*Lama guanicoe*) on *Nothofagus pumilio* forest gaps in Tierra del Fuego, Chile.** *Forest Ecology and Management.* 2005 Jan. 17; 204(2-3): 237-248. ISSN: 0378-1127
URL : <http://www.sciencedirect.com/science/journal/03781127>
NAL call no.: SD1.F73
Descriptors: guanacos, *Lama guanicoe*, feeding behavior, *Nothofagus pumilio*, browsing behavior, forest gap environments, Tierra del Fuego, Chile.
- Daley, L.P.; Gagliardo, L.F.; Duffy, M.S.; Smith, M.C.; Appleton, J.A. **Application of monoclonal antibodies in functional and comparative investigations of heavy-chain immunoglobulins in New World camelids.** *Clinical and Diagnostic Laboratory Immunology.* 2005; 12(3): 380-386. ISSN: 1071-412X
URL:<http://cvi.asm.org/cgi/content/abstract/12/3/380>
DOI:<http://dx.doi.org/10.1128/CDLI.12.3.380-386.2005>
Abstract: Of the three immunoglobulin G (IgG) isotypes described to occur in camelids, IgG2 and IgG3 are distinct in that they do not incorporate light chains. These heavy-chain antibodies (HCABs) constitute approximately 50% of the IgG in llama serum and as much as 75% of the IgG in camel serum. We have produced isotype-specific mouse monoclonal antibodies (MABs) in order to investigate the roles of HCABs in camelid immunity. Seventeen stable hybridomas were cloned, and three MABs that were specific for epitopes on the gamma chains of llama IgG1, IgG2, or IgG3 were characterized in detail. Affinity chromatography revealed that each MAB bound its isotype in solution in llama serum. The antibodies bound to the corresponding alpaca IgGs, to guanaco IgG1 and IgG2, and to camel IgG1. Interestingly, anti-IgG2 MABs bound three heavy-chain species in llama serum, confirming the presence of three IgG2 subisotypes. Two IgG2 subisotypes were detected in alpaca and guanaco sera. The MABs detected llama serum IgGs when they were bound to

antigen in enzyme-linked immunosorbent assays and were used to discern among isotypes induced during infection with a parasitic nematode. Diseased animals, infected with *Parelaphostrongylus tenuis*, did not produce antigen-specific HCABs; rather, they produced the conventional isotype, IgG1, exclusively. Our data document the utility of these MAbs in functional and physiologic investigations of the immune systems of New World camelids. **Descriptors:** alpacas, llamas, guanacos, camels, Bactrian camels, antigens, epitopes, hybridomas, IgG, immune response, immune system, immunity, immunoglobulins, isotypes, monoclonal antibodies, *Parelaphostrongylus tenuis*, antigenic determinants, antigenicity, gamma globulins, immune globulins, immunity reactions, immunogens, immunological reactions, Secernentea.

Franklin, William L.; Grigione, Melissa M. **The enigma of guanacos in the Falkland Islands: the legacy of John Hamilton**. *Journal of Biogeography*. 2005 Apr; 32(4): 661-675. ISSN: 0305-0270.

URL: <http://www.blackwellpublishing.com/journal.asp?ref=0305-0270&site=1>

NAL call no.: QH1.J62

Descriptors: guanacos, success of transplanted/relocated animals, conservation measures, genetics, inbreeding, population dynamics, social behavior, zoogeography, introduced from Rio Gallegos, Argentina, restricted genetic pool, inbreeding, historical research, John Hamilton, Falkland Islands Government Archives, personal interviews, herd size, distribution on islands, behaviors, animals social structure, Falkland Islands.

Franklin, W.L.; Poncet, S.; Poncet, J. **The history of Staats Island in the West Falkland Islands: its guanacos, foxes, shanty, and sojourners**. *The Falkland Islands Journal*. 2005; 8(4): 21-64 + front cover.

URL: <http://www.t.mcadam.btinternet.co.uk>

Descriptors: guanacos, foxes, introduced wildlife, historical perspective, John Hamilton, Staats Island, West Falkland Islands.

Izeta, Andres D. **South American camelid bone structural density: what are we measuring? Comments on data sets, values, their interpretation and application**. *Journal of Archaeological Science*. 2005; 32(8): 1159-1168. ISSN: 0305-4403

URL: <http://www.elsevier.com>

Descriptors: llama, vicuna, guanaco, bone density sets, five archaeofaunal assemblages, Formative Period archaeological sites, southern Calchaquies valleys, Catamarca, Argentina.

Mate, M.L.; Bustamante, A.; Giovambattista, G.; Lamo, D. de; Thungen, J. von; Zambelli, A.; Vidal-Rioja, L. **Genetic diversity and differentiation of guanaco populations from Argentina inferred from microsatellite data**. *Animals Genetics*. 2005 Aug; 36(4): 316-321. ISSN: 0268-9146

URL: <http://www.blackwellpublishing.com/submit.asp?ref=0268-9146>

NAL call no.: QP98.A1A5

Abstracts: Genotype data from 14 microsatellite markers were used to assess the genetic diversity and differentiation of four guanaco populations from Argentine Patagonia. These animals were recently captured in the wild and maintained in semi-captivity for fibre pro-

duction. Considerable genetic diversity in these populations was suggested by the finding of a total of 162 alleles, an average mean number of alleles per locus ranging from 6.50 to 8.19, and H(e) values ranging from 0.66 to 0.74. Assessment of population differentiation showed moderate but significant values of F(ST) = 0.071 (P = 0.000) and R(ST) = 0.083 (P = 0.000). An AMOVA test showed that the genetic variation among populations was 5.6% while within populations it was 94.4%. A number of 6.6 migrants per generation may support these results. Unambiguous individual assignment to original populations was obtained for the Pilcaniyeu, Las Heras and La Esperanza populations. The erroneous assignment of 18.75% Rio Mayo individuals to the Las Heras population can be explained by the low genetic differentiation found between these two populations. Thirty-nine of 56 loci per population combinations were in Hardy-Weinberg disequilibrium because of guanaco heterozygote deficiency, which may be explained by population subdivision. The high level of genetic diversity of the guanacos analysed here indicates that the Patagonian guanaco constitutes an important genetic resource for conservation or economic utilization programmes.

Descriptors: *Lama guanicoe*, guanacos, genetic variation, geographical variation, microsatellite repeats, genetic markers, alleles, loci, population genetics, heterozygosity, Argentina.

Novaro, Andres J.; Walker, R.Susan. **Human-induced changes in the effect of top carnivores on biodiversity in the Patagonian Steppe.** In: Ray, Justina C. Ray; Kent H. Redford; Robert S. Steneck; Joel Berger [Editors]. *Large Carnivores and the Conservation of Biodiversity*. Island Press, Washington. 2005. 2005: 268-288. ISBN: 1559630809

NAL call no.: QL737.C2 L34

Descriptors: loss of native camelids, habitat losses, human competition, livestock and exotic species competition, European hares, red deer, habitat degradation, overgrazing by sheep, after 20 years of reduced hunting and sheep number, native guanacos, choiques, mountain viz-cachas have not recovered, puma and the culpeo numbers have increased, introduced species replaced natural prey, puma keeping guanacos populations low, top predator adaption and changes, Patagonia.

Sarno, R.J.; Bank, M.S.; Stern, H.A.; Franklin W.L. **Forced dispersal of juvenile guanacos (*Lama guanicoe*): causes, variation, and fates of individuals dispersing at different times.** 2005 (in press). Submitted to *Journal of Mammalogy*. ISSN: 1545-1542

URL:<http://www.mammalsociety.org/pubjom/index.html>

NAL call no.: 410 J823

Descriptors: guanacos, forced dispersal of young animals, causes, outcomes, seasonal differences.

Sosa, Ramon Alberto; Sarasola, Jose Herna. **Habitat use and social structure of an isolated population of guanacos (*Lama guanicoe*) in the Monte Desert, Argentina.** *European Journal of Wildlife Research*. 2005; 51(3): 207-209. ISSN: 1612-4642

NAL call no.: <http://www.springerlink.com/content/110828/>

Descriptors: wild guanacos; abundance; habitat use; social structure; foot surveys during 1998-2000; habitat: hills, valleys and piedmonts, and lowlands; types of social groups: solitary males, family groups and male groups; hills used preferentially, followed by valley and

piedmont; lowlands avoided; predator avoidance behavior; Lihue Calel National Park, central Argentina.

Wernery, U.; Joseph, M.; Johnson, B.; Kinne, J. **Wry-neck - a form of tetanus in camelids.** *Journal of Camel Practice and Research*. 2005; 12(2): 75-79. ISSN: 0971-6777

NAL call no.: SF997.5.C3 J68

Descriptors: *Clostridium tetani*, *Lama guanicoe*, bacterial-toxins, lockjaw, clinical aspects. experimental infections, tetanus toxicity.

2004

Al Ani, F.K. **Classification and breeds.** In: *Camel: Management and Diseases*. Faculty of Veterinary Medicine, Baghdad University, Baghdad, Iraq. 2004; 61-68.

Descriptors: alpacas, guanacos, llamas, vicunas, dromedaries, Bactrian camels, taxonomy, draft animals, riding animals, dual purpose animals, hybrids, breeds, adaptation, anatomy, physiology, milk and meat production.

Al Ani, F.K.; Ababneh, M.M. **South American camelids (SAC).** In: *Camel: Management and Diseases*. Faculty of Veterinary Medicine, Baghdad University, Baghdad, Iraq. 2004; 121-136.

Descriptors: alpacas, guanacos, llamas, vicunas, draft animals, riding animals, breeding, crossbreeding, diseases, husbandry, hematology, meat and milk production, reproduction, pregnancy diagnosis, parturition, physiology, surgery, wool producing animals, South America.

Baldi, Ricardo; Pelliza-Sbriller, Alicia; Elston, David; Albon, Steve. **High potential for competition between guanacos and sheep in Patagonia.** *Journal of Wildlife Management*. 2004; 68(4): 924-938. ISSN: 0022-541X.

NAL call no.: 410 J827

Descriptors: guanacos, sheep, diets in sympatric conditions, interspecific competition, fecal sampling, potential species comparison of diet at 9 sites and 2 seasons, diet plants overlap, competition with sheep may have played a role in guanaco populations, arid zones, impact on current management practices, Patagonia.

Campero, J.R. **Lama (*Lama glama* L.) and Guanaco (*Lama guanicoe* M.): general perspective.** In: Cardellino, R.; Rosati, A; Mosconi, C. [Editors] *ICAR Technical Series*. 2004; (11): 11-18. ISSN: 1563-2504. ISBN: 9295014065. Note: conference proceedings: Current Status of Genetic Resources, Recording and Production Systems in African, Asian and American Camelids, Sousse, Tunisia, 30 May 2004.

URL:http://www.icar.org/DOCS/technical_series_11_sousse.pdf

Abstract: The highlands of South America form a special ecosystem with an important biodiversity. Since 4 000 or 5 000 years ago, two species of domesticated camelids have developed in this region: the llama and the alpaca, as well as two non-domesticated ones, the guanaco

and the vicuna. During the Incas period, these genetic resources played an important role in the development of this ancient culture, but the protagonistic role of Camelids ended abruptly with the Spanish conquest of that South American region five centuries ago. The Spaniards initiated their colonization with the systematic elimination of the camelids and replaced them with their own domestic species, principally sheep and cattle. Along with the Spanish conquest, the mines period begins in these highlands as well; the mines' development requested not only an important quantity of camelids' meat, vegetables and natural energy but also large llama caravans, in order to transport the mines products from highlands to the coast. However, the pastoral communities in those high-risk environments have played a major role in conserving the llama, alpaca, guanaco and vicuna species. The mining activity along with human pressure on the fragile ecosystem resulted not only in an important loss of biodiversity but also, and most importantly, in the reproduction of poverty. Consequently, today like five centuries ago, the highlands of South America are characterized by three elements: poverty, soils of low quality and camelids. And it is through these elements that they try to resolve their main problem, that is poverty. The analysis of market trends, the review of the historical context of the use of native breeds, and the efforts of highlands people suggest that the rational use of South American Camelids, both domestic and wild ones, can be an economic alternative in many production systems in the South American highlands, on the condition that the regional governments in co-operation with the producers are able to find new markets with fair prices and improve the quality of camelids' products. Reproduced with permission from CAB Abstracts.

Descriptors: alpacas, llamas, vicunas, guanacos, animal production, biodiversity, ecosystems, socioeconomics, socioeconomic aspects, South America.

Cardellino, R.; Rosati, A; Mosconi, C. [Editors]. **Current Status of Genetic Resources, Recording and Production Systems in African, Asian and American Camelids, Sousse, Tunisia, 30 May 2004.** *ICAR-Technical Series*. 2004; (11): 163 pp. ISSN: 1563-2504. ISBN: 9295014065. Note: conference proceedings: "Current Status of Genetic Resources, Recording and Production Systems in African, Asian and American Camelids, Sousse, Tunisia, 30 May 2004."

URL:http://www.icar.org/DOCS/technical_series_11_sousse.pdf

Abstract: This proceedings contains 14 conference papers on the breeding, handling systems and milk, meat and fibre production of Bactrian and dromedary camels, llamas, guanacos, alpacas and vicunas in Asia, Africa, Arab Gulf countries and South America. Reproduced with permission from CAB Abstracts.

Descriptors: alpacas, dromedaries, Bactrian camels, guanacos, llamas, vicunas, fiber producing animals, animal breeding, animal fibers; meat production, milk production, wool production, Africa, Arab Countries, Asia, South America.

De Nigris, Mariana E. **Guanaco and huemul in Patagonian hunter-gatherers diet.** *BAR International Series*. 2004; 1298: 11-37. Note: In English with an English and Spanish summary.

Descriptors: guanacos, huemul, *Hippocamelus bisulcus*, hunter gathers, food animals, South America.

Gonzalez, F.; Smulders, F.J.M.; Paulsen, P.; Skewes, O.; Konig, H.E. **Anatomical investigations on meat cuts of guanacos (*Lama guanicoe*, Muller, 1776) and chemical composition of selected muscles.** *Wiener Tierarztliche Monatsschrift*. 2004; 91(3): 77-84. ISSN: 0043-535X. Note: In English with a German summary.

NAL call no.: 41.8 T345

Descriptors: 70 young male guanacos, wild animals, animal anatomy, body fat, carcass composition and weight, carcass yield, chemical composition, longissimus dorsi muscle, meat composition, meat cuts, meat quality, meat yield, saturated fatty acids, Tierra del Fuego, Chile.

Mate, M.L.; Di Rocco, F.; Zambelli, A.; Vidal-Rioja, L. **Mitochondrial DNA structure and organization of the control region of South American camelids.** *Molecular Ecology Notes*. 2004; 4(4): 765-767. ISSN: 1471-8278

URL: <http://www.wiley.com/bw/journal.asp?ref=1755-098X&site=1>

NAL call no.: QH541.15.M632

Descriptors: llamas, alpacas, vicunas, guanaco, mitochondrial DNA molecular organization of control region, conserved sequence blocks, potential as a molecular marker to infer data for camelid genetic relationships, population diversity tool.

Medina, Mirta A.; Fernandez, Francisco; Saad, Silvia; Rebuffi, Gustavo; Yapur, Jose. **Immunoglobulinas G de Cadenas pesadas en la leche de los camelidos sudamericanos. [Heavy-chain IgG in the milk of South American camelids.]** *Mastozoologia Neotropical*. 2004; 11(1): 19-26. ISSN: 0327-9383. Note: In Spanish with an English and Spanish summary.

URL: <http://www.sarem.org.ar>

Descriptors: camelids, llama, vicuna, alpaca, guanaco, conventional IgG, IgG with two heavy chains, identify types of IgG in milk, PAGE-SDS, immunoblotting, immunoblotting assays, both types of IgG found.

Mercado, E.C.; Rodriguez, S.M.; Elizondo, A.M.; Marcoppido, G.; Parreno, V. **Isolation of shiga toxin-producing *Escherichia coli* from a South American camelid (*Lama guanicoe*) with diarrhea.** *Journal of Clinical Microbiology*. 2004; 42(10): 4809-4811 ISSN: 0095-1137

UR: <http://jcm.asm.org/cgi/content/abstract/42/10/4809>

NAL call no.: QR46.J6

Descriptors: 2 year old guanaco, bacterial infection, clinical picture, case report, bacterial toxins, diagnosis, diarrhea, genes, hemolysins, lipopolysaccharides, PCR, *Escherichia coli*, O26:H11 serotype, toxicity, Argentina.

Middleton, J.R. **Haematology of South American camelidae.** In: *Selected Research on Camelid Physiology and Nutrition* The Camelid Publishers, Bakaner, India. 2004: 400-408. ISBN 8190114123

NAL call no.: SF401.C2S46 2004

Descriptors: Bactrian camels, alpacas, vicunas, guanacos, llamas, blood chemistry, blood disorders, hematocrit, anemia, blood cells morphology, basophils, bone marrow, dissolved oxygen, eosinophilia, eosinophils, erythrocyte count, erythrocytes, erythropoietin, trans-

ferring, hematology, hemoglobin, iron deficiency anemia, leukocyte count, lymphocytes, monocytes, morphology, neutrophils, normal values, platelets, South America.

Otazu, D.A. **Alpaca and vicuna: general perspectives.** In: Cardellino, R.; Rosati, A; Mosconi, C. [Editors] *ICAR Technical Series*. 2004; (11): 31-36. ISSN: 1563-2504. ISBN: 9295014065. Note: conference proceedings: "Current Status of Genetic Resources, Recording and Production Systems in African, Asian and American Camelids, Sousse, Tunisia, 30 May 2004."

URL:http://www.icar.org/DOCS/technical_series_11_sousse.pdf

Abstract: In the landscapes of the high plains at over 4 000 meters above sea level, thousands of years ago the Incas domesticated two species of the South American camelids: Alpaca and Llama, using techniques that are a mystery to these days. The first one would later be used as a source of soft, fine and resistant fibre and the second one as a mean of transportation. From the two species that continued being wild: Guanaco and especially Vicuna, a fantastic and very fine fibre was obtained, which was reserved only for nobility. Its threads were mixed with gold threads to create varied work of art. It was the fibre of the gods. Reproduced with permission of CAB Abstracts.

Descriptors: alpacas, llamas, guanacos, vicunas, animal fibers, fiber quality, wool producing animals.

URL: <http://www.springer.com/springerwiennewyork/medicine/journal/705>

Parreno, V.; Bok, K.; Fernandez, F.; Gomez, J. **Molecular characterization of the first isolation of rotavirus in guanacos (*Lama guanicoe*).** *Archives of Virology*. 2004 Dec; 149(12): 2465-2471. ISSN: 0304-8608

NAL call no.: 448.3 AR23

Descriptors: guanacos, phylogeny, neonates, rotavirus causing diarrhea, molecular structure of virus, first record of guanco pathogen, strain G8, strain GRV Arg-RioNegro 98, strain GRV Arg-Chubut 99, strain P (14-), strain P (1-) Argentina.

Wernery, U.; Kaaden, O.R. **Foot-and-mouth disease in camelids: a review.** *Veterinary Journal*. 2004; 168(2): 134-142. ISSN: 1090-0233

URL:<http://www.elsevier.com>

NAL call no.: SF601.V484

Descriptors: South American camelids, dromedaries, Bactrian camels, foot and mouth diseases, infectability, disease transmission risks, dromedaries may contact the disease in experimental infection and close contact with infected animals, camels not FMDV carriers, llamas and alpacas infected by direct contact, not very susceptible and no risk of transmitting to susceptible species, Bactrians have similar lesions, but no samples have been positive, recommend further research in camelids.

Young, Julie K.; Franklin, William L. [**Activity budget patterns in family-group and solitary territorial male guanacos.**] *Revista Chilena de Historia Natural*. 2004; 77(4): 617-625. ISSN: 0716-078X. Note: In Spanish with an English and Spanish summary.

URL: http://www.scielo.cl/scielo.php?pid=0716-078x&script=sci_serial

NAL call no.: QH119.R48

Descriptors: male guanacos, behavioral patterns, aggressive and miscellaneous, territorial, mata barrosa, *Mulinum spinosum*, resources defended, Torres del Paine National Park, Chile.

Young, Julie K.; Franklin, William L. **Territorial fidelity of male guanacos in the patagonia of southern Chile.** *Journal of Mammalogy*. 2004; 85(1): 72-78. ISSN: 0022-2372. Note: In English with an English and Spanish summary.

URL:<http://www.mammalsociety.org/pubjom/>

Descriptors: territorial male guanacos, 10 year study, resource defense polygyny, fluid movement of females between male territories, data on various territory parameters, type, location, size, usage, known age males, solo males, family group males, patterns relevant to management and conservation, Torres del Paine National Park, Chile.

Zapata, B.; Gimpel, J.; Bonacic, C.; Gonzalez, B.A.; Riveros, J.L.; Ramirez, A.M.; Bas, F.; Macdonald, D.W. **The effect of transport on cortisol, glucose, heart rate, leukocytes and body weight in captive-reared guanacos (*Lama guanicoe*).** *Animal Welfare*. 2004 Nov; 13(4): 439-444. ISSN: 0962-7286

URL:<http://www.ufaw.org.uk/animal.php>

NAL call no.: HV4701.A557

Descriptors: captive animal transport, guanacos, *Lama guanicoe*, travel stress factors tested, cortisol, glucose, heart rate, leukocytes, body weight, animal welfare concerns.

Vicunas

2008

Siguas, O.; Olazabal, J. **Perfil sanguíneo de vicunas del Cidcs Lachocc Huancavelica. [Serum profile of vicunas from the South American Camelids Research Center of Lachocc-Huancavelica.]** *Archivos de Zootecnia*. 2008; 57(217): 87-90. ISSN: 0004-0592. Note: In Spanish.

URL: <http://www.uco.es/organiza/servicios/publica/az/az.htm>

Descriptors: vicunas, adult males and females, serum profile, hematocrit, hemoglobin, glucose, total protein, cholesterol, 37.00 +/- 3.02% and 37.40 +/- 3.84%; 11.94 +/- 0.98 and 12.06 +/- 1.24 g/dl and 4.30 +/- 3.37 and 5.59 +/- 3.15 g/dl, 211.43 +/- 90.23 and 116.24 +/- 77.44 mg/dl and 230.89 +/- 74.76 and 144.25 +/- 92.63 mg/dl respectively, South American Camelids Research Center of Lachocc Huancavelica National University.

Stirling, J.; Griffith, M.; Blair, I.; Cormican, M.; Dooley, J.S.G.; Goldsmith, C.E.; Glover, S.G.; Loughrey, A.; Lowery, C.J.; Matsuda, M.; McClurg, R.; McCorry, K.; McDowell, D.; McMahan, A.; Millar, B.C.; Nagano, Y.; Rao, J.R.; Rooney, P.J.; Smyth, M.; Snelling, W.J.; Xu, J.; Moore, J.E. **Prevalence of gastrointestinal bacterial pathogens in a population of zoo animals.** *Zoonoses and Public Health*. 2008; 55(3): 166-172. ISSN: 1863-1959

URL: <http://www.blackwell-synergy.com/loi/jvb>

DOI : <http://dx.doi.org/10.1111/j.1863-2378.2007.01099.x>

Abstract: Faecal prevalence of gastrointestinal bacterial pathogens, including *Campylobacter*, *Escherichia coli* O157:H7, *Salmonella*, *Shigella*, *Yersinia*, as well as *Arcobacter*, were examined in 317 faecal specimens from 44 animal species in Belfast Zoological Gardens, during July-September 2006. Thermophilic campylobacters including *Campylobacter jejuni*, *Campylobacter coli* and *Campylobacter lari*, were the most frequently isolated pathogens, where members of this genus were isolated from 11 animal species (11 of 44; 25%). *Yersinia* spp. were isolated from seven animal species (seven of 44; 15.9%) and included, *Yersinia enterocolitica* (five of seven isolates; 71.4%) and one isolate each of *Yersinia frederiksenii* and *Yersinia kristensenii*. Only one isolate of *Salmonella* was obtained throughout the entire study, which was an isolate of *Salmonella dublin* (O 1,9,12: H g, p), originating from tiger faeces after enrichment. None of the animal species found in public contact areas of the zoo were positive for any gastrointestinal bacterial pathogens. Also, water from the lake in the centre of the grounds, was examined for the same bacterial pathogens and was found to contain *C. jejuni*. This study is the first report on the isolation of a number of important bacterial pathogens from a variety of novel host species, *C. jejuni* from the red kangaroo (*Macropus rufus*), *C. lari* from a maned wolf (*Chrysocyon brachyurus*), *Y. kristensenii* from a vicugna (*Vicugna vicugna*) and *Y. enterocolitica* from a maned wolf and red panda (*Ailurus fulgens*). In conclusion, this study demonstrated that the faeces of animals in public contact areas of the zoo were not positive for the bacterial gastrointestinal pathogens examined. This

is reassuring for the public health of visitors, particularly children, who enjoy this educational and recreational resource.

Descriptors: zoo animals, many species including vicuna, *Campylobacter*, *Escherichia coli* O157:H7, *Salmonella*, *Shigella*, *Yersinia*, *Arcobacter*, bacterial diseases, gastrointestinal pathogens, intestines, Belfast Zoological Gardens, *Ailurus fulgens*, *Campylobacter coli*, *Campylobacter jejuni*, *Campylobacter lari*, *Chrysocyon brachyurus*, *Escherichia coli*, *Salmonella*, *Salmonella Dublin*, *Vicugna vicugna*, *Yersinia enterocolitica*, *Yersinia frederiksenii*, *Yersinia kristensenii*.

Zapata, B.; GonzLlez, B.A.; Marin, J.C.; Cabello, J.L.; Johnson, W.E.; Skewes, O. **Finding of polydactyly in a free-ranging guanaco (*Lama guanicoe*)**. *Small Ruminant Research*. 2008 May; 76(3): 220-222. ISSN: 0921-4488

URL:<http://www.sciencedirect.com/science/journal/09214488>

DOI:<http://dx.doi.org/10.1016/j.smallrumres.2008.01.004>

NAL call no.: SF380.I52

Abstract: Polydactylism, a genetic defect characterized by partial or complete duplication of the digit, has been described in a wide range of vertebrates. Among ungulates, polydactyly appears to be relatively common in domestic camelids, with reports in dromedary camels (*Camelus dromedarius*), llama (*Lama glama*) and alpaca (*Vicugna pacos*). However, in wild South American camelids polydactyly has been reported only in a vicuna kept in a zoo (*Vicugna vicugna*), but not in wild populations. Here a finding of polydactyly in a free-ranging guanaco is described. We propose the hypothesis that this malformation has an atavistic-genetic origin.

Descriptors: guanaco, free ranging animal, genetic mutation, polydactyly, domestic camelids, camels, llamas, alpacas, vicunas.

2007

Keen, James E.; Durso, Lisa M.; Meehan, Thomas P. **Isolation of *Salmonella enterica* and Shiga-toxigenic *Escherichia coli* O157 from feces of animals in public contact areas of United States zoological parks**. *Applied and Environmental Microbiology*. 2007; 73(1): 362-365. ISSN: 0099-2240

URL: <http://www.pubmedcentral.nih.gov/tocrender.fcgi?action=archive&journal=83>

NAL call no.: 448.3 AP5

Descriptors: cattle, sheep, goats, yaks, antelopes, camels, llamas, vicunas, deer, reindeer, pigeons, horses, donkeys, giraffes, okapis, rabbits, parrots, swine, fecal sampling, *Salmonella enterica*, serovar *Typhimurium*, serovar *Enteriditis*, *Escherichia coli*, strain O157, zoological park, pathogens in zoos, public health risks, risk assessment, US.

Llanos, Anibal J.; Riquelme, Raquel A.; Herrera, Emilio A.; Ebensperger, German; Krause, Bernardo; Reyes, Roberto V.; Sanhueza, Emilia A.; Pulgar, Victor M.; Behn, Claus; Cabello, Gertrudis; Parer, Julian T.; Giussani, Dino A.; Blanco, Carlos E.; Hanson, Mark A. **Evolving in thin**

air - Lessons from the llama fetus in the altiplano. *Respiratory Physiology and Neurobiology*. 2007; 158(2-3): 298-306. ISSN: 1569-9048

Descriptors: llamas, alpacas, vicunas, guanacos, fetal life, high altitude animals, fetal response to acute hypoxia, peripheral vasoconstriction mediated by alpha adrenergic mechanisms, high plasma concentration of catecholamines, high plasma concentration of neuropeptide Y, NO and endothelin 1, local blood flows, cerebral hypometabolic response, reduced oxygen consumption, Na-K-ATPase activity, temperature, absence of seizures and apoptosis of neural cells, Andean altiplano.

Marai, I.F.M.; Zeidan, A.E.B. **Artificial insemination in Camelidae.** *Tropical and Subtropical Agroecosystems*. 2007; 7(1): 1-13. Note: In English with a Spanish summary. Literature review.

URL:<http://www.veterinaria.uady.mx/publicaciones/journal/2007-1/128-camels2.pdf>

Abstract: The most important problems of Artificial Insemination (AI) in Camelidae is its timing in relation to ovulation in the she-camel. The present article reviewed collection of semen, processing of semen, manipulation of the female and semen deposition technique in Camelidae species. Commonly, semen is collected by electroejaculation, artificial vagina (AV), flushing of the epididymus with saline solution, while the more accepted methods are the former two methods. Semen is usually used in raw condition or after extension, depending on the method of semen processing. In the fresh raw method, whole semen is used within minutes or after few hours. Extension of the semen ejaculate is carried out by adding extenders and it is required in more efficient use of AI, in short-term preservation or liquid semen (within a few hours or days) and long-term preservation or frozen semen (months or years). In short-term preservation, semen is used extended under different temperatures (30, 25 or 4 degrees C). Long-term preservation is carried out by cryopreservation. Packaging methods such as pellets, ampoules or in plastic straws with different volumes (0.25, 0.5 or 4 ml) represent different freezing procedures. The quality and survival of spermatozoa of post-thaw semen are highly variable from one male to the other, even after using the same freezing technique. To ensure that the inseminated females ovulate, hormonal manipulation of ovarian activity is used such as the induction of follicular activity and ovulation, as well as, synchronization of these phases in a group of females. The best time for insemination can only be determined by ultrasonography and/or rectal palpation of the ovaries. The other alternative is to inseminate at known intervals following induction of ovulation by hormonal treatment with human-chorionic gonadotropin (hCG) or gonadotropin-releasing hormone (Gn-RH).

Descriptors: alpacas, llamas, dromedaries, Bactrian camels, guanacos, vicunas, artificial insemination, cryopreservation, deposition site, freezing, frozen semen, GnRH, HCG, estrus, ovulation, reproduction, semen, semen diluent additives, semen preservation, spermatozoa, synchronization, synchronized females, gonadoliberin, gonadotropin releasing hormone, insemination techniques.

Marin, Juan C.; Zapata, Beatriz.; Gonzalez, Benito A.; Bonacic, Cristian; Wheeler, Jane C. ; Casey, Ciara; Bruford, Michael W.; Palma, R. Eduardo; Poulin, Elie; Alliende, M. Angelica; Sportorno, Angel E. **Sistematica, taxonomia y domesticacion de alpacas y llamas: nueva evidencia cromosomica y molecular.** [Systematics, taxonomy and domestication of

alpaca and llama: new chromosomal and molecular evidence.] *Revista Chilena de Historia Natural*. 2007; 80(2): 121-140. ISSN: 0716-078X. Note: In Spanish with an English summary.

URL:<http://www.scielo.cl>

Abstract: Four camelid species exist in South America: two wild, the guanaco (*Lama guanicoe*) and the vicuna (*Vicugna vicugna*), and two domestic, the alpaca (*Lama pacos*) and the llama (*Lama glama*). However, the origin of the domestic species has been a matter of debate. In the present study, variations in chromosome G banding patterns and in two mitochondrial gene sequences have been used to study the origin and classification of the llama and alpaca. Similar patterns in chromosome G band structure were observed in all four Lamini species, and these in turn were similar to the bands described for camels, *Camelus bactrianus*. However, fine and consistent differences were found in the short arms of chromosome 1, separating camels, guanacos and llamas from vicunas and alpacas. This pattern was consistent even in a hybrid guanaco x alpaca. Equivalent relationship showed the complete cytochrome b gene sequences, and the minimum expansion tree of the partial control region sequence, grouping guanaco with llama and vicuna with alpaca. Phylogenetic analyses showed *V. vicugna* and *L. guanicoe* as monophyletic groups. Analysis of both gene sequences revealed two clades within vicuna, concordant with the two described subspecies, but the results for guanaco did not confirm existence of the four previously proposed subspecies. The combined analysis of chromosomal and molecular variation showed close genetic similarity between alpacas and vicunas, as well as between llamas and guanacos. Although directional hybridization was revealed, our results strongly support the hypothesis that the llama would have derived from *L. guanicoe* and the alpaca from *V. vicugna*, supporting reclassification as *V. pacos*. Reproduced with permission from CAB Abstracts.

Descriptors: camelids, Bactrian camels, 2 wild species, guanacos (*Lama guanicoe*) and vicunas (*Vicugna vicugna*), 2 domesticated species, alpacas (*Lama pacos*) and llamas (*Lama glama*), classification of species, chromosome G banding pattern variations, 2 mitochondrial gene sequences variations, analysis showed close genetic similarity of alpacas and vicunas and of llamas and guanacos, hypothesize llama derived from *L. guanicoe*, alpaca derived from *V. vicugna*, supporting reclassification as *V. pacos*, genetic variability, South American camelids.

Marin, J.C.; Casey, C.S.; Kadwell, M.; Yaya, K.; Hoces, D.; Olazabal, J.; Rosadio, R; Rodriguez, J.; Spotorno, A.; Bruford, M.W.; Wheeler, J.C. **Mitochondrial phylogeography and demographic history of the vicuna: implications for conservation.** *Heredity*. 2007; 99(1): 70-80. ISSN: 0018-067X

URL:<http://www.nature.com/hdy>

Abstract: The vicuna (*Vicugna vicugna*; Miller, 1924) is a conservation success story, having recovered from near extinction in the 1960s to current population levels estimated at 275 000. However, lack of information about its demographic history and genetic diversity has limited both our understanding of its recovery and the development of science-based conservation measures. To examine the evolution and recent demographic history of the vicuna across its current range and to assess its genetic variation and population structure, we sequenced mitochondrial DNA from the control region (CR) for 261 individuals from 29 populations across Peru, Chile and Argentina. Our results suggest that populations currently

designated as *Vicugna vicugna vicugna* and *Vicugna vicugna mensalis* comprise separate mitochondrial lineages. The current population distribution appears to be the result of a recent demographic expansion associated with the last major glacial event of the Pleistocene in the northern (18 to 22 degrees S) dry Andes 14-12 000 years ago and the establishment of an extremely arid belt known as the 'Dry Diagonal' to 29 degrees S. Within the Dry Diagonal, small populations of *V. v. vicugna* appear to have survived showing the genetic signature of demographic isolation, whereas to the north *V. v. mensalis* populations underwent a rapid demographic expansion before recent anthropogenic impacts. Reproduced with permission from CAB Abstracts.

Descriptors: vicunas, conservation, evolution, genetic variation, geographical distribution, mitochondria, mitochondrial DNA, nucleotide sequences, phylogeny, genetic variability, genotypic variability, genotypic variation, Argentina, Chile, Peru.

Mate, M.L.; Di Rocco, F.; Zambelli, A.; Vidal-Rioja, L. **Mitochondrial heteroplasmy in Control Region DNA of Small Ruminant Research.** *South American camelids*. 2007 Aug; 71(1-3): 123-129. ISSN: 0921-4488

URL:<http://www.sciencedirect.com/science/journal/09214488>

DOI:<http://dx.doi.org/10.1016/j.smallrumres.2006.04.016>

NAL call No.: SF380.152

Abstract: In the present work, polymerase chain reaction-single strand conformation polymorphism and sequencing were used to investigate the length and nucleotide variability in the Control Region mitochondrial DNA of the four South American camelid species from Argentina. To assess these the complete Control Region of 20 animals, 5 each of guanaco, llama, alpaca and vicuna species were cloned. Seventy-three clones corresponding to the 20 animals were screened and 7 different SSCP patterns were identified. Sequencing of all clones showed 9 different haplotypes contained in the 350 bp hypervariable segment of the Control Region. Interestingly, 3 guanacos, 3 vicunas, 3 alpacas and 1 llama were heteroplasmic for different nucleotide positions. The screening of the Control Region mitochondrial DNA in blood samples from about 200 wild guanacos from Argentine Patagonia supported the above results. After comparison with other vertebrate species, we concluded that nucleotide substitutions are the main cause of heteroplasmy found in Control Region mitochondrial DNA of these taxa.

Descriptors: *Lama*; llamas, alpacas, vicunas, *Lama guanicoe*, phylogeny, genetic variation, genetic-markers, mitochondrial DNA, molecular cloning, clones, nucleotide sequences, polymerase chain reaction, single stranded conformational polymorphism, mutation, single nucleotide polymorphism, genome, genomics, heteroplasmy, molecular sequence data, Argentina.

Merriwether, D.A. **Domestication of alpacas: Genetics of the North American herd.** *American Journal of Physical Anthropology*. 2007; (Suppl. 44): 171. ISSN: 0002-9483. Note: 76th Annual Meeting of the American Association of Physical Anthropologists, Philadelphia, PA, USA; March 28 -31, 2007.

Descriptors: vicunas, llamas, alpacas, guanacos, domesticated animals, breeding, genetics, North America.

Sahley, Catherine Teresa; Vargas, Jorge Torres; Valdivia, Jesus Sanchez. **Biological sustainability of live shearing of vicuna in Peru.** *Conservation Biology*. 2007 Feb; 21(1): 98-105. ISSN: 0888-8892

DOI:<http://dx.doi.org/10.1111/j.1523-1739.2006.00558.x>

NAL call no.: QH75.A1C5

Abstract: The vicuna's (*Vicugna vicugna*) fiber is highly valued as an export product that is made into luxury fabric and clothing. The price of fiber in 2004 was \$566/kg, which makes the fiber a potentially important source of income for Andean agropastoral communities and serves as an incentive to allow vicuna grazing on high-elevation Andean landscapes. It is presumed that a shorn vicuna has little value for poachers, so shearing vicunas could serve as a disincentive to poaching. Thus, the supply of vicuna fiber may be sustainable if it is procured through live shearing, which should serve as a powerful conservation tool. We evaluated the effects of capture and shearing on the demography of vicuna in one site located in the Salinas Aguada Blanca Reserve, Arequipa, Peru, where vicunas were captured and shorn in spring and then returned to the wild. We conducted fixed-width line-transect censuses from 1997 to 2003 of this population. We compared the proportion of young born to females that were shorn versus females that were unshorn for the 3 years in which shearing occurred. We evaluated the effect of capture and shearing on proportion of young born to shorn and unshorn females at a second site, Picotani, Puno. The wild population in Arequipa that underwent capture and shearing showed a steady increase in total population and average density between 1997 and 2003. No significant difference was found between the proportion of young per female for shorn and unshorn females at either site. We conclude that in spring, capture and live shearing of vicunas can be biologically sustainable. Further research is needed to determine whether shearing during winter months is biologically sustainable.

Descriptors: vicunas, effects of shearing on reproduction of females, spring capture and release, community-based conservation, Andes.

Serrano-Martinez, E.; Collantes-Fernandez, E.; Chavez-Velasquez, A.; Rodriguez-Bertos, A; Casas-Astos, E.; Risco-Castillo, V.; Rosadio-Alcantara, R.; Ortega-Mora, L.M. **Evaluation of *Neospora caninum* and *Toxoplasma gondii* infections in alpaca (*Vicugna pacos*) and llama (*Lama glama*) aborted foetuses from Peru.** *Veterinary parasitology*. 2007 Nov 30; 150(1-2): 39-45. ISSN: 0304-4017

URL: <http://www.sciencedirect.com/science/journal/03044017>

DOI:<http://dx.doi.org/10.1016/j.vetpar.2007.08.048>

NAL call no.: SF810.V4

Abstract: The aim of this study was to investigate the participation of *Neospora caninum* and *Toxoplasma gondii* in abortion cases of Peruvian llamas and alpacas. Fifteen aborted foetuses were recovered from two main rearing areas of camelids in Peru (Central or South Andean region). Foetal histopathology was used to detect the presence of protozoal-associated lesions in target organs. *N. caninum* and *T. gondii* infections were confirmed by immunohistochemistry (IHC) combined with PCR and by PCR alone, respectively. The influence of the species (llama and alpaca), foetal age (first, second and third gestational periods) and geographical location (Central or South Andean region) of the foetuses was also studied. Thirteen of the samples (26%, 13/50) showed lesions suggestive of protozoal infection. *N. caninum* infection was detected by either IHC or specific PCR in 14 out of 50 foetuses (28%), of which 8 also

showed protozoal-associated lesions. *T. gondii* DNA was not detected in any of the foetuses analysed. Protozoal infection was more frequent in the foetuses from the second gestational period ($P < 0.05$, Fisher F-test). No significant association was observed between protozoal infection and species or geographical location ($P > 0.05$, chi 2 test). The results of the present study indicate that neosporosis should be included during the differential diagnosis of abortion in llamas and alpacas.

Descriptors: alpacas, llamas, vicuna, *Vicugna*, *Lama*, *Neospora caninum*, *Toxoplasma gondii*, neosporosis, toxoplasmosis, animal abortion, aborted fetuses, disease prevalence, disease detection, histopathology, immunohistochemistry, polymerase chain reaction, PCR, gestational age, Peru, Andes region.

2006

Ansalconi, F.; Pyszny, F.; Claros, A.L.; Marquina, R.; Zapana-Pineda, J.; Claros, A.J.; Quispe-Huanca, J.L. **DECAMA-project: Analysis of farm income from South American camelids meat production in Latin American countries: Preliminary results of a comparison between case studies.** *4th European Symposium on South American Camelids/DECAMA European Seminar, Göttingen, Germany; October 07-09, 2004.* 2006. ISBN: 9076998981
Nal Call no.: SF401.L35 E97 2004

Descriptors: camelid meat production, economic development, hygiene status and quality of animal-based products, income and production costs of camelid meat production, homogeneous questionnaire, visits and direct interviews with agricultural entrepreneurs, Andean rural areas, Peru, Bolivia, South America.

Apichela, S.; Jimenez-Diaz, M.; Schuster, S.; Sinowatz, F.; Miceli, D.C. **Vicuna oviduct mucosa: Ultrastructure and lectin affinity.** *Small Ruminant Research.* 2006 Nov; 66(1-3): 164-168. ISSN: 0921-4488

DOI:<http://dx.doi.org/10.1016/j.smallrumres.2005.09.023>

NAL call no.: SF380.I52

Abstract: The isthmus and uterotubal junction (UTJ) from oviducts of adult female vicunas (*Vicugna vicuna*) were used to study the epithelial cell ultrastructure. Scanning microphotographs revealed a mosaic pattern made up of ciliated and secretory cells with abundant microvilli. In the isthmus only a few secretory cells were present, scattered among numerous ciliated cells while in the UTJ the secretory cells prevail. The abundance of secretory cells suggests that the UTJ cells may possess special characteristics for sperm binding. No studies exist in either the vicuna or any of the other South American Camelids (SAC) concerning carbohydrates involved in sperm or embryo interactions on the oviductal surface. Identification of these sugars seems relevant to the mechanism involved in the sperm-oviduct interaction. As a first step in the determination of the molecular mechanism implicated in the formation of sperm reservoirs in the oviduct, lectin affinity for the oviductal mucosa was studied. High concentrations of glycosaminoglycans inside the two types of epithelial cells, and on their glycocalyx were observed with histochemical methods. The carbohydrates on the

epithelial surface were labeled with fluorescent by lectins and analyzed with confocal scanning microscopy. The cell surface showed abundant l-mannopyranosyl, l-glucopyranosyl, o-galactosyl, N-acetyl glucosamine, and N-acetylneuraminic acid residues and few l-linked N-acetyl galactosamine residues. Neither l-l-fucopyranosyl nor o-N-acetyl galactosamine residues were observed in any part of the oviduct. The distinct ultrastructural characteristic of the UTJ as well as the presence of high concentrations of sugar residues on the mucosa surface of this portion of the oviduct could be related to its function as a sperm reservoir.

Descriptors: vicunas, *Vicugna*, oviductal isthmus, epithelium, mucosa, epithelial cells, ultrastructure, histology, scanning electron microscopy, conception, viability, glycoproteins, lectins, protein secretion, histochemistry, binding capacity, binding sites, spermatozoa, utero-tubal junction, sperm binding, sperm reservoir.

Arzamendia, Y.; Cassini, M.H.; Vila, B. L. **Habitat use by vicuna *Vicugna vicugna* in Laguna Pozuelos Reserve, Jujuy, Argentina.** *Oryx*. 2006; 40(2): 198-203. ISSN: 0030-6053

URL:<http://journals.cambridge.org>

DOI : <http://dx.doi.org/10.1017/S0030605306000639>

Abstracts: Vicuna *Vicugna vicugna* are an emblematic species of one of the major arid ecosystems of the neotropics: the puna or altiplano. Excessive commercial hunting of vicuna for their valuable fleece in the past caused a severe decline in the population, with the vicuna almost becoming extinct by the mid 20th century. Effective protection resulted in the recovery of some populations and, recently, limited vicuna exploitation has been allowed. Research is urgently required to underpin the design of the management systems used for this exploitation. We present the results of a 2-year study on habitat utilization of vicuna in Laguna de Pozuelos UNESCO Biosphere Reserve in Argentina. Vicuna did not use the study area homogeneously but preferred vegetation communities dominated by grasses (known locally as pajonal and esporal) and with high overall plant cover. Vicuna were less selective in 2003, when overall habitat quality decreased, than in 2002. This change is predicted by habitat selection theory. We also found that members of family groups spend more time foraging than members of non-reproductive groups. Solitary vicuna spend more time standing up than members of groups, consistent with the observation that herding behaviour is related to protection against predators. Heterogeneous use and habitat selectivity suggest that exploitation of vicuna needs to take spatial behaviour into account in the establishment of the optimal location of capturing sites. Reproduced with permission from CAB Abstracts.

Descriptors: vicunas, animal behavior, foraging, grasslands, habitat selection, habitats, hunting, nature reserves, plant communities, population decrease, steppes, sustainability, vegetation types, wild animals, wildlife conservation, wildlife management, Argentina.

Ayala, J.; Lopez, M.; Chavez, J. **Variability of vicuna fibre diameter in two protected natural areas of Peru.** *4th European Symposium on South American Camelids/DECAMA European Seminar, Gottingen, Germany; October 07-09, 2004.* 2006. ISBN: 9076998981

NAL call no.: SF401.L35 E97 2004

Descriptors: vicunas, male and females, fiber characteristics, phenotypic variability of mean, standard deviation and coefficient of variation of the fiber diameter, within and between populations, Sirolan Laserscan method, corrected for sex and age effects, 13.37 microns (NRPG), and 13.82 microns (NRSAB), effects of genetic variance, permanent environ-

mental effects, National Reserve Pampa Galeras, National Reserve Salinas y Aguada Blanca (NRSAB).

Bonacic, C.; Feber, R.E.; Macdonald, D.W. **Capture of the vicuna (*Vicugna vicugna*) for sustainable use: animal welfare implications.** *Biological Conservation*. 2006; 129(4): 543-550.

ISSN: 0006-3207

URL:<http://www.sciencedirect.com/science/journal/00063207>

DOI:<http://dx.doi.org/10.1016/j.biocon.2005.11.021>

Abstract: The current program of vicuna conservation includes their live-capture for wool harvest in the Andes Region in northern Chile. Here, we describe studies that assess the impacts on the species of different variables relating to the capture process. The immediate physical and physiological effects on vicuna of contrasting capture methods, chase distances and restraint were measured. Comparisons between two methods of capture showed that cortisol concentrations were higher in animals herded using vehicles alone compared to those herded using a combination of vehicles and local people on foot. Blood glucose levels, heart rate and respiratory rate showed an immediate but ephemeral response to herding into a corral. The range of distances over which animals were herded caused less noticeable changes in blood and physical parameters. The most marked changes were associated with restraint, during which there were significant increases in creatine kinase, packed cell volume and rectal temperature. The implications of changes in these parameters on vicuna welfare and conservation are discussed.

Descriptors: vicunas, wildlife conservation, restraint, herding and moving herds, wool fiber producing animals, animal welfare, corralling, physiological responses to capture methods, body temperature, clinical examination, creatine kinase, glucose, heart rate, hydrocortisone, respiration, cortisol, creatine phosphokinase, dextrose, packed cell volume.

Cajal, Jorge L.; Tonni, Eduardo P. **Re-wilding in South America: Is it possible?** *Mastozoologia Neotropical*. 2006; 13(2): 281-282. ISSN: 0327-9383

URL :<http://redalyc.uaemex.mx/redalyc/src/inicio/HomRevRed.jsp?iCveEntRev=457>

Descriptors: guanacos, vicunas, horses, conservation policy, trophic structure, re-wilding animals, fauna conservation, Argentina.

D'Alterio, G.L.; Bazeley, K.J. **Referral service for South American camelids at the University of Bristol Veterinary School: A review of cases from 1999 to 2002.** *4th European Symposium on South American Camelids/DECAMA European Seminar, Gottingen, Germany; October 07-09, 2004*. 2006. ISBN: 9076998981

NAL call no.: SF601.I4

Descriptors: vicunas, llamas, alpacas, guanacos, veterinary medicine, clinical and surgical camelid cases, Farm Animal Practice & Hospital of the University of Bristol, Britain, UK.

d'Arc, Nadine Renaudeau. **Linking community aims with vicuna conservation: A Bolivian case study.** *4th European Symposium on South American Camelids/DECAMA European Seminar, Gottingen, Germany; October 07-09, 2004*. 2006. ISBN: 9076998981

NAL call no.: [SF401.L35 E97 2004](#)

Descriptors: vicunas, wildlife management, sustainable use, conservation policies, fiber

harvesting, communal custodianship, capture and shearing events, size and boundaries of communal management areas, and internal dynamics of local communities, Andean region, South America.

De Simone, Emilio; Saccodossi, Natalia; Ferrari, Alejandro; Leoni,-Lucrecia; Leoni, Juliana. **Immunochemical analysis of IgG subclasses and IgM in south American camelids.** *Small Ruminant Research*. 2006; 64(1-2): 2-9. ISSN: 0921-4488

URL:<http://www.sciencedirect.com/science/journal/09214488>

Abstract: Antibodies are glycoproteins comprising two heavy and two light chains. Surprisingly, all members of the family Camelidae possess a fraction of antibodies devoid of both light chains and the first constant domain (CH1). These kinds of antibodies are known as heavy chain antibodies (HCAbs). There are three subclasses of IgG in dromedaries, namely IgG(1), IgG(2) and IgG(3) Of which, IgG(2) and IgG(3) are of the HCAbs type. In the present work, the different IgG isotypes from guanaco (*Lama guanicoe*), llama (*Lama glama*) and vicuna (*Vicugna vicugna*) were purified and characterized. Interestingly, it was found that IgM was capable of binding to protein A. The different subclasses of immunoglobulins were also assayed for their ability to fix complement. Both IgG(1) and the total serum were able to fix complement, whereas IgG(2) and IgG(3) fixed complement even in the absence of antigen. (c) 2005 Elsevier B.V. All rights reserved.

Descriptors: vicunas; guanacos; llamas; IgM immunoglobulin M G1, G2, and G3; immunologic techniques.

Di Rocco, Florencia; Parisi, Gustavo; Zambelli, Andres; Vida-Rioja, Lidia. **Rapid evolution of cytochrome c oxidase subunit II in camelids (Tylopoda, Camelidae)** *Journal of Bioenergetics and Biomembranes*. 2006; 38(5-6): 293-297. ISSN: 0145-479X

URL:<http://www.springerlink.com/content/102584/>

Descriptors: new and old camelids, mitochondrial aerobic energy production, mitochondrial DNA, cytochrome c oxidase subunits I, II, III, replacement of amino acids inferred, transmembrane helices of proteins, hot dry adaption for camels, high altitude cold hypoxic environment of the Andean region.

Dodd, C.S.; Rodriguez, J.; Hoces, D.; Rosadio, R.; Wheeler, J.C.; Bruford, M.W. **Genetic diversity and management implications for vicuna populations in Peru.** *4th European Symposium on South American Camelids/DECAMA European Seminar, Gottingen, Germany; October 07-09, 2004*. 2006. ISBN: 9076998981

NAL call no.: [SF401.L35 E97 2004](#)

Descriptors: vicunas, 12 wild populations, demographically independent management units, genetic effect of past and future management strategies, Pampa Galeras reserve, blood and skin sampling, microsatellite DNA markers, heterozygosity values, should be 4 demographic units, North-western Junin, Southern Junin, Central Andes and Puno, free movement within localities, prevention of inbreeding and genetic drift, Peru.

Donadio, Emiliano; Buskirk, Steven W. **Flight behavior in guanacos and vicunas in areas with and without poaching in western Argentina.** *Biological Conservation*. 2006; 127(2): 139-145. ISSN: 0006-3207

Descriptors: wild South American camelids, guanacos, vicunas, effects on populations, flight behavior, surveys of 299 groups form a vehicle, flight distance, time of first flight, flight distance, species, groups size, presence or absence of juveniles, 70% ran where poaching was common, 30% when reserve without poaching, inside and outside preserves, poaching from roads common, recommend some road closures as conservation measure, Argentina.

Finucane, Brian; Agurto, Patricia Maita; Isbell, William H. **Human and animal diet at Conchopata, Peru: stable isotope evidence for maize agriculture and animal management practices during the Middle Horizon.** *Journal of Archaeological Science*. 2006; 33(12): 1766-1776. ISSN: 0305-4403

URL:<http://www.sciencedirect.com/science/journal/03054403>

Descriptors: humans, plant species, alpacas, llamas, guanacos, vicunas, *Avaia porcellus*, maize, various grasses, nitrogen 15, delta C 13, analysis of skeletal remains, Middle Horizon period (AD550-1000) Conchopata, Peruvian highlands, animal management strategies, no sex differences in diet, Peru.

Gerken, M.; Renieri, C. [Editors]. **South American Camelids Research, Volume 1. Proceedings of the 4th European Symposium on South American Camelids and DECAMA European seminar.** Wageningen Academic Publishers. Wageningen, Netherlands: 2006; 308p. ISBN: 9076998981

NAL call no.: SF402.L35 E97 2004

Abstract: A series of papers on the current trends in reproduction, animal breeding, genetics, nutrition, health (including bacterial and parasitic infections) and fibre morphology of South American camelids, viz. llamas, alpacas, vicunas and guanaco (*Lama guanicoe*) is presented, including discussions on the potential of these camelids for meat production and commercialization in South America. The particular advantages of South American camelids for the sustainable use of fragile ecosystems with native pastures are outlined, and discussions on the interaction between wild and domestic species, management of alpaca populations outside South America and aspects of camelid health under European conditions are presented as well.

Descriptors: llamas, guanacos, vicunas, breeding, genetics, nutrition, bacterial diseases, bacterial infections, helminthoses, protozoal diseases, meat production, nature conservation, protozoal infections, reproduction, wildlife management, wool producing animals, South America.

Gunsner, I.; Haenichen, T.; Kiesling, C. **Breeding and/or Handling Problems? Causes of Death in Camelids.** In: M. Gerken and C. Renueri [Editors]. *The 4th European Symposium on South American Camelids/DECAMA European Seminar, Göttingen, Germany; October 07 -09, 2004.* 2006. ISBN: 9076998981

NAL call no.: SF401.L35 E97 2004

Descriptors: 179 camelids; 63 alpacas; 5 guanacos; 1 guanaco-llama mix; 5 dromedary camels; 3 Bactrian camels; 1 vicuna; post mortem sampling; causes of death; most common problems: pulmonary edema; next most common: liver, digestive system, abdomen, endoparasites, chronic feeding mistakes; pathology of other organs: urinary tract, head, spleen, skin; degeneration of parenchymas, teeth problems, spleen reactions, mites or other infections;

less frequent pathology of: genitals, neck, bones, limbs; general causes of death: infectious diseases (22.5%), euthanasia (17.1%), emaciation (9.5%), fatty degeneration of parenchyma (9.0%), diagnosis inconclusive (14.4%).

Jensen, J M. **Camelid Drug Formulary**. Published by Game Ranch Health. San Antonio, USA: 2006, 405 p. ISBN: 9781424312177

NAL call no.: SF916.5.J46 2006

Abstract: The book is divided into two main sections, the first dealing with South American Camelids (SAC), llama (*Lama glama*), alpaca (*Lama pacos*), guanaco (*Lama guanicoe*), and vicuna (*Vicugna vicugna*), and the second with dromedaries (*Camelus dromedaries*) and Bactrian camels (*C. bactrianus*). The drugs are grouped in the book according to clinical application (for example, Analgesia, Anaesthesia, Gastrointestinal, Immunization, Reproductive, Vitamins-Minerals). The information consists of a table with five columns entitled Drug, Species, Dosage, Comments, and Reference. For example the information for penicillin in the Reproduction - SAC section is: Drug: penicillin, Species: SAC, Dosage: 22,000 mg/kg, SC, q24h for 3 treatments, Comments: prevention of uterine infection, References: Johnson, L. 1989 [the full references are listed at the end of each of the SAC and Camel sections]. This book will be extremely useful to all veterinarians who come across camelids in their work.

Descriptors: llamas, alpacas, dromedaries, Bactrian camels, vicunas, guanacos, drug formulary, pharmaceuticals, antibiotics, anti-infective agents, anti-inflammatory agents, anti-parasitic agents, drug therapy, gastrointestinal agents, pharmacology.

Laker, Jerry. **Wildlife or livestock? Divergent paths for the vicuna as priorities change in the pursuit of sustainable development**. 4th European Symposium on South American Camelids/DECAMA European Seminar, Göttingen, Germany; October 07-09, 2004. 2006. ISBN: 9076998981

NAL call no.: [SF401.L35 E97 2004](#)

Descriptors: vicuna, international conservation effort, pastoral altiplano communities, fiber harvesting, different models, live capture, shearing and release, Peru, Bolivia, Argentina, Chile.

Leotta, Gerardo A.; Deza, Natalia; Origlia, Javier; Toma, Claudia; Chinen, Isabel; Miliwebsky, Elizabeth; Iyoda, Sunao; Sosa-Estani, Sergio; Rivas, Marta. **Detection and characterization of Shiga toxin-producing *Escherichia coli* in captive non-domestic mammals**. *Veterinary Microbiology*. 2006; 118(1-2): 151-157. ISSN: 0378-1135

URL:<http://www.sciencedirect.com/science/journal/03781135>

DOI:<http://dx.doi.org/10.1016/j.vetmic.2006.08.019>

NAL call no.: SF601.V44

Descriptors: ruminants, goat, giraffe, *Taurotragus oryx*, eland, *Antilope cervicapra*, blackbuck antelope, *Ovis musimon*, mouflon sheep, *Ovis aries somalicus*, Somali sheep, *Bos grunniensis*, yak, *Lama pacos*, alpaca, *Lama guanicoe*, guanaco, *Lama guanico glama*, llama, *Hydrochoerus hydrochaeris*, capybara, *Dolichotis patagonus*, Patagonian cavy, *Cervus elaphus*, red deer, *Ozotoceros bezoarticus*, pampas deer, *Axis axis*, axis deer, *Mazama gouazoubira*, fallow deer, *Dama dama*, paint deer, *Elaphrus davidianus* (Coleoptera-), pere david deer, *Escherichia coli*, serovar-

O12:H25, serovar-O13:H6, strain 25 strains, strain 27 strains, strain O146:H28, *Shiga* toxin producing-*Escherichia coli*, 7 different sero-types, testing fecal samples, PCR, *Shiga* toxin gene sequences, natural reservoir, frequency in non-domestic animals, zoo habitat, living in a pit, Zoo and Botanical Garden, La Plata City, Argentina.

Montes, M.C.; Carmanchahi, P.D.; Rey, A.; Funes, M.C. **Live shearing free-ranging guanacos (*Lama guanicoe*) in Patagonia for sustainable use.** *Journal of Arid Environments*. 2006 Mar; 64(4): 616-625. ISSN: 0140-1963

URL : <http://www.sciencedirect.com/science/journal/01401963>

DOI: <http://dx.doi.org/10.1016/j.jaridenv.2005.05.008>

Descriptors: *Lama guanicoe*, 55 guanacos (13 females, 38 males, and 4 calves) captured, live-sheared 30 animals, shearing, shearing machines, no mortalities, animal injuries, sustainable agriculture, applied and field techniques, mobile corral traps, trapping, field equipment, fleece weight of 307.15g for females and 338.12 g for males, population levels, management scheme, sheep ranching, overhunting, management implications, Patagonia, South America.

Parker, M.; Goodwin, D.; Redhead, E.; Mitchell, H. **The effectiveness of environmental enrichment on reducing stereotypic behaviour in two captive vicugna (*Vicugna vicugna*).** *Animal welfare*. 2006 Feb; 15(1): 59-62. ISSN: 0962-7286

NAL call no.: HV4701.A557

Abstract: Environmental enrichment by increasing foraging behaviour and providing food item choice are widely practised and generally accepted as effective methods for reducing stereotypic behaviour in captive animals. In this study, the effectiveness of increasing foraging patch choice and food item choice on reducing motor stereotypy in two captive vicugna were examined. For the purposes of the study, first, browse was added to the vicugna's enclosure as an additional forage item and, second, the vicugna's normal feed was divided: half being provided in the indoor quarters and half in the outdoor yard. The results revealed that providing browse as an additional forage item increased the observed stereotypic behaviour; however, dividing the vicugna's feed, and therefore increasing forage patch choice, decreased stereotypy. This study was limited because of the small sample size and because the area in which the vicugna were performing stereotypic behaviour was partially visually obscured. However, this study has implications for animal welfare because it highlights the need to evaluate the suitability of foraging enrichment items, and suggests that more research into accommodating the adaptive foraging behaviour of this species in captivity may be necessary. Reproduced with permission from CAB Abstracts.

Descriptors: vicunas, stereotyped behavior, zoo animals, foraging, browsing, animal welfare.

Rosati, Victoria R. **Selección de Dieta de Mamíferos Herbívoros Silvestres de Regiones Áridas y Semiáridas.** [*Diet Selection of Wild Herbivore Mammals in Arid and Semi-arid Regions.*] Cid M.S.; Bonino N.; Cassini M.; Anchorena J.; DeSbriller A.P.; Arriaga M. [Editors] Macn-Museo Argentino Ciencias Naturales, Buenos Aires, Argentina. 2006. ISSN: 1666-5503. ISBN: 9879640837. Note: In Spanish.

Descriptors: vicunas, guanacos, *Pediolagus salinicola*, *Mazama gouazoubira*, *Lagostomus maximus*, *Ctenomys opimus*, *Hydrochaeris hydrochaeris*, *Lepus europaeus*, semi-arid zones, diet selection of wild herbivores, South America.

Sacchero, D.; Maurino, M.J.; Lanari, M.R. **Diferencias de calidad y proporción de down en muestras individuales de vellones de guanaco (*Lama guanicoe*) en distintas ecoregiones de Argentina.** [Differences on quality and proportion of down in individual fleece samples of guanaco (*Lama guanicoe*) from different ecoregions of Argentina.] *Revista Argentina de Produccion Animal*. 2006; 26(3): 211-216. Note: In Spanish with an English summary.
Descriptors: guanacos, animal fibers, fiber quality, fiber diameter, fleece quality, down levels, individual variance in fiber quality, Argentina.

Schmidt, C.R. **The European Endangered Species Programme (EEP) for vicunas.** *4th European Symposium on South American Camelids/DECAMA European Seminar, Gottingen, Germany; October 07-09, 2004*. 2006. ISBN: 9076998981
NAL call no.: [SF401.L35 E97 2004](#)
Descriptors: vicunas, International Studbook, includes all purebred outside 4 native countries since 1945, history of introductions, numbers of animals introduced at various times, 2002 had 163 animals in 34 European collections and 1 US collection, all from a Southern subspecies *Lama v. vicugna*, duplicating normal behaviors, gender pairings, bachelor groups, birthing season, Peru, Argentina, Bolivia.

Tibary, A.; Parish, S.M. [Editors] **South American camelids.** *Small Ruminant Research. The Journal of the International Goat Association*. 2006; 61(2/3): 221 pp
URL: <http://www.sciencedirect.com/science/journal/09214488>
NAL call no.: SF380.I52
Descriptors: alpacas, guanacos, *Lama guanicoe*, llamas, vicunas, etiology, anesthesia, anesthetics, analgesics, breeding, reproduction, diseases, feeding, nutrition, fibers, fleeces, wool production, genetics, disease diagnosis, immunity, immunology, pharmacodynamics, pharmacokinetics, surgery, therapy.

2005

Aba, M.A.; Miragaya, M.H.; Chaves, M.G.; Capdevielle, E.F.; Rutter, B.; Aguero, A. **Effect of exogenous progesterone and eCG treatment on ovarian follicular dynamics in vicunas (*Vicugna vicugna*).** *Animal Reproduction Science*. 2005; 86(1-2): 153-161. ISSN: 0378-4320.

NAL call no.: QP251.A5

Abstract: The aim of the present study was two-fold. First, to evaluate the effect of exogenous progesterone on ovarian follicular dynamics in order to assess its ability to synchronize ovarian activity in the vicuna. Secondly, to evaluate the ovarian response to the treatment with eCG through the observation of the structures developed in the ovaries. Follicular dynamics was monitored daily by transrectal ultrasonography in 12 adult, non-pregnant vicunas. Plasma progesterone and estradiol-17 beta concentrations were measured in blood samples collected daily. In experiment 1, intravaginal devices containing 0.33 g of progesterone were inserted into the vagina and kept in place for 5 days (treatment group, n=8). After

progesterone withdrawal, five animals were further monitored in order to evaluate the efficacy of the CIDRReg. to synchronize the emergence of a dominant follicle. In experiment 2, four females received 750 IU of eCG IM. Two were previously monitored ultrasonographically to confirm the absence of a dominant follicle at the beginning of the superstimulatory treatment (group A). The other two animals had a CIDRReg. inserted into the vagina for 5 days and the superstimulatory treatment was applied 24 h after device withdrawal (group B). Females from both groups were surgically explored 96 h after eCG injection; the ovaries were exposed and the number of newly formed structures produced by each ovary was counted. Peak progesterone concentrations (25.9+or-5.29 nmol l⁻¹, mean+or-S.E.M.) were attained on day 1 after device insertion, remained high until the day of device withdrawal (9.7+or-1.98 nmol l⁻¹) and decreased to 5.5+or-1.13 nmol l⁻¹ the day after. There was no follicle development to the state of dominance after device insertion. Moreover, mean follicle diameter steadily decreased after insertion of the device until the minimum mean value (1.85+or-0.17 mm) was recorded on day 5 (P=0.006). Similarly, plasma concentrations of estradiol-17 beta remained below 35 pmol l⁻¹ during the period of progesterone treatment in all animals and the mean estradiol-17 beta declined with the lowest value (22.1+or-2.19 pmol l⁻¹) being recorded on day 4 after device insertion. After superstimulation of follicular development with eCG, the total number of follicles that developed was 33 in group A and 58 in group B and the mean number of newly developed ovarian structures per female was 22.75+or-4.26. In conclusion, progesterone released by the CIDRReg. exerts a negative effect on ovarian follicular development and function suggesting intravaginal devices could be used to synchronize the beginning of follicular waves during a superstimulatory treatment. There was also a tendency for greater ovarian follicular development when the animals were previously treated with progesterone.

Descriptors: 12 adult non-pregnant females vicunas, follicular dynamics, exogenous progesterone, testing ability for synchronize ovarian activity, response to eCG treatment, trans-rectal ultrasonography, plasma progesterone and estradiol-17 beta concentrations monitored, CIDR® inserted vaginally, effects of various treatments, possibilities for synchronization.

Bruford, M.W. **Molecular approaches to understanding animal domestication: what have we learned so far?** *World Poultry Science Association, 4 th European Poultry Genetics Symposium, Dubrovnik, Croatia, 6-8-October, 2005.* 2005; No.10.

URL:<http://www.animalscience.com/uploads/additionalFiles/wpsa2.htm>

Descriptors: livestock, llamas, vicunas, buffalo, cattle, sheep, donkeys, asses, goats, guinea pigs, dogs, domestic animal ancestors, animal genetic resources, domestic animals, animal domestication, genetic analysis, genetic diversity, history, molecular genetics, biochemical genetics.

Chavez Velasquez, A.; Alvarez Garcia, G.; Gomez Bautista, A.; Casas Astos, E.; Serrano Martinez, E.; Ortega Mora, L.M. ***Toxoplasma gondii* infection in adult llamas (*Lama glama*) and vicunas (*Vicugna vicugna*) in the Peruvian Andean region.** *Veterinary Parasitology.* 2005; 130(1-2): 93-97. ISSN: 0304-4017.

URL:<http://www.sciencedirect.com/science/journal/03044017>

NAL call no.: SF810.4.V4

Descriptors: 43 adult llamas, 200 vicunas, *Toxoplasma gondii*, serum samples, IFAT to detect titers, western blot, first recorded detection, Peru.

Field, C.; Rushton, J.; Viscarra, R.; Urquieta, B.; Salem, H.B. **African camels and South American camelids.** In: E. Owen; A. Kitalyi; N. Jayasuriya; T. Smith [Editors] *Livestock and Wealth Creation: Improving the Husbandry of Animals Kept by Resource Poor People in Developing Countries.* 2005; 411-432. ISBN: 1904761321

NAL call no.: SF55.D44 L56 2005

Descriptors: alpacas, dromedaries, llamas, vicunas, meat production animals, animal diseases, animal feeding, animal health, animal physiology, animal products, geographical distribution, metabolism, milk-production, reproduction, Africa, South America.

Galaz-Leigh, J.L. **El futuro de la explotación de la Vicuna. [The future of the exploitation of vicunas.]** *Chile Forestal.* 2005; (315): 22-25. ISSN: 0716-1190 Note: In Spanish.

Abstract: The vicuna (*Vicugna vicugna*) is a rare species of the camel family that is related to the llama and is found only in the high Andes. It is exploited for its wool. This article discusses the future of the species in Chile, where it has been protected and managed for 30 years. The discussion is with reference to proposals for management of the animal for the commercialization of its wool in the Region of Tarapaca, under the aegis of the Ministry of Agriculture (MINAGRI) and CONAF. These bodies have put forward various strategic plans of action for the conservation and management of the species, both in the wild and in captivity and these are outlined, along with analyses of the market and demand for the animal's wool.

Descriptors: vicunas, wild animals, fiber producing animals, wool animal production, wildlife conservation, wildlife management, Chile.

Izeta, Andres D. **South American camelid bone structural density: what are we measuring? Comments on data sets, values, their interpretation and application.** *Journal of Archaeological Science.* 2005; 32(8): 1159-1168. ISSN: 0305-4403

URL:<http://www.elsevier.com>

Descriptors: llamas, vicunas, guanacos, bone density sets, five archaeofaunal assemblages, Formative Period archaeological sites, southern Calchaquies valleys, Catamarca, Argentina.

Sacchero, D.M.; Mueller, J.P. **Determinación de calidad de vellones de doble cobertura tomando el vellon de vicuna (*Vicugna vicugna*) como ejemplo. [Determination of quality of fleeces with heterogeneous fibers taking the vicuna (*Vicugna vicugna*) fleece as an example.]** *RIA, Revista de Investigaciones Agropecuarias.* 2005; 34(2): 143-159. ISSN: 0325-8718. Note: In Spanish with an English summary.

URL:<http://www.inta.gov.ar/ediciones/ria/index.htm>

Abstract: A method for the determination of clean down yield and quality (mean fiber diameter and distribution of down fibers) in fleece samples with heterogeneous fibers without its separation is described. The method is based on clean yield determination followed by subsampling using the Minicore equipment and automatic measurement of fiber diameter of a large number of fibers using the Laserscan equipment. Applying the criterion that down fibers have a fiber diameter equal or below 30 micro and hair fibers above that value and

using the resulting mean fiber diameter, standard deviation and density of both types of fibers in the Wildman formula it is possible to determine down yield accurately and quickly. Predicted down yield in vicuna fleece samples with known yield adjusted to 99%, independently of density of fibers assumed. Predictions which consider fiber length did not improve the adjustment. The method is proposed for routine analyses of South American Camelid individual fleece samples.

Descriptors: vicunas, analytical methods, animal fibers, diameter, equipment, fleece, wool, wool producing-animals, analytical techniques, animal fibers.

2004

Al Ani, F.K. **Classification and breeds.** In: *Camel: Management and Diseases*. Faculty of Veterinary Medicine, Baghdad University, Baghdad, Iraq. 2004; 61-68.

Descriptors: alpacas, guanacos, llamas, vicunas, dromedaries, Bactrian camels, taxonomy, draft animals, riding animals, dual purpose animals, hybrids, breeds, adaptation, anatomy, physiology, milk and meat production.

Al Ani, F.K. **Domestication, distribution and population.** In: *Camel: Management and Diseases*. 2004; 1-24. Faculty of Veterinary Medicine, Baghdad University, Baghdad, Iraq.

Descriptors: llamas, vicunas, dromedary camels, Bactrian camels, domestication, geographical distribution, livestock numbers, population dynamics, Africa, Asia, Australia, Europe, North and South America, Saudi Arabia, United Arab Emirates.

Al Ani, F.K.; Ababneh, M.M. **South American camelids (SAC).** In: *Camel: Management and Diseases*. Faculty of Veterinary Medicine, Baghdad University, Baghdad, Iraq. 2004; 121-136.

Descriptors: alpacas, guanacos, llamas, vicunas, draft animals, riding animals, breeding, crossbreeding, diseases, husbandry, hematology, meat and milk production, reproduction, pregnancy diagnosis, parturition, physiology, surgery, wool producing animals, South America.

Cafrune, M.M.; Aguirre, D.H.; Freytes, I. **Fasciolosis en vicunas (*Vicugna vicugna*) en semi-cautiverio de Molinos, Salta, Argentina, con no tas de otros helmintos en este hospedador. [Fasciolosis in semi-captive vicunas (*Vicugna vicugna*) from Molinos, Salta, Argentina, with notes of other helminths on this host.]** *Veterinaria Argentina*. 2004; 21(207): 513-520. ISSN: 0326-4629. Note: In Spanish with an English summary.

NAL call no.: 41.8 G112

Descriptors: semi-captive vicunas, liver flukes, *Fasciola hepatica*, *Trichuris* sp., concurrent infections, diagnosis, disease prevalence and control, fascioliasis, infectivity, outbreaks, consecutive treatments with closantel and triclabendazole, probable source of flukes, Molinos, Salta Province, Argentina.

Campero, J.R. **Lama (*Lama glama* L.) and Guanaco (*Lama guanicoe* M.): general perspective.** In: Cardellino, R.; Rosati, A; Mosconi, C. [Editors] *ICAR Technical Series*. 2004; (11): 11-18. ISSN: 1563-2504. ISBN: 9295014065. Note: conference proceedings: Current Status of Genetic Resources, Recording and Production Systems in African, Asian and American Camelids, Sousse, Tunisia, 30 May 2004.

URL:http://www.icar.org/DOCS/technical_series_11_sousse.pdf

Abstract: The highlands of South America form a special ecosystem with an important biodiversity. Since 4 000 or 5 000 years ago, two species of domesticated camelids have developed in this region: the llama and the alpaca, as well as two non-domesticated ones, the guanaco and the vicuna. During the Incas period, these genetic resources played an important role in the development of this ancient culture, but the protagonistic role of Camelids ended abruptly with the Spanish conquest of that South American region five centuries ago. The Spaniards initiated their colonization with the systematic elimination of the camelids and replaced them with their own domestic species, principally sheep and cattle. Along with the Spanish conquest, the mines period begins in these highlands as well; the mines' development requested not only an important quantity of camelids' meat, vegetables and natural energy but also large llama caravans, in order to transport the mines products from highlands to the coast. However, the pastoral communities in those high-risk environments have played a major role in conserving the llama, alpaca, guanaco and vicuna species. The mining activity along with human pressure on the fragile ecosystem resulted not only in an important loss of biodiversity but also, and most importantly, in the reproduction of poverty. Consequently, today like five centuries ago, the highlands of South America are characterized by three elements: poverty, soils of low quality and camelids. And it is through these elements that they try to resolve their main problem, that is poverty. The analysis of market trends, the review of the historical context of the use of native breeds, and the efforts of highlands people suggest that the rational use of South American Camelids, both domestic and wild ones, can be an economic alternative in many production systems in the South American highlands, on the condition that the regional governments in co-operation with the producers are able to find new markets with fair prices and improve the quality of camelids' products. Reproduced with permission from CAB Abstracts.

Descriptors: alpacas, llamas, vicunas, guanacos, animal production, biodiversity, ecosystems, socioeconomics, socioeconomic aspects, South America.

Cardellino, R.; Rosati, A; Mosconi, C. [Editors]. **Current Status of Genetic Resources, Recording and Production Systems in African, Asian and American Camelids, Sousse, Tunisia, 30 May 2004.** *ICAR Technical Series*. 2004; (11): 163 pp. ISSN: 1563-2504. ISBN: 9295014065. Note: conference proceedings: "Current Status of Genetic Resources, Recording and Production Systems in African, Asian and American Camelids, Sousse, Tunisia, 30 May 2004."

URL:http://www.icar.org/DOCS/technical_series_11_sousse.pdf

Abstract: This proceedings contains 14 conference papers on the breeding, handling systems and milk, meat and fibre production of Bactrian and dromedary camels, llamas, guanacos, alpacas and vicunas in Asia, Africa, Arab Gulf countries and South America. Reproduced with permission from CAB Abstracts.

Descriptors: alpacas, dromedaries, Bactrian camels, guanacos, llamas, vicunas, fiber pro-

ducing animals, animal breeding, animal fibers; meat production, milk production, wool production, Africa, Arab Countries, Asia, South America.

Mate, M.L.; Di Rocco, F.; Zambelli, A.; Vidal-Rioja, L. **Mitochondrial DNA structure and organization of the control region of South American camelids.** *Molecular Ecology Notes*. 2004; 4(4): 765-767. ISSN: 1471-8278.

NAL call no.: QH541.15.M632

Descriptors: llamas, alpacas, vicunas, guanaco, mitochondrial DNA molecular organization of control region, conserved sequence blocks, potential as a molecular marker to infer data for camelid genetic relationships, population diversity tool.

Medina, Mirta A.; Fernandez, Francisco; Saad, Silvia; Rebuffi, Gustavo; Yapur, Jose. **Inmunoglobulinas G de Cadenas pesadas en la leche de los camelidos sudamericanos. [Heavy-chain IgG in the milk of South American camelids.]** *Mastozoologia Neotropical*. 2004; 11(1): 19-26. ISSN: 0327-9383. Note: In Spanish with an English and Spanish summary.

Descriptors: camelids, llama, vicuna, alpaca, guanacos, conventional IgG, IgG with two heavy chains, identify types of IgG in milk, PAGE-SDS, immunoblotting, immunoblotting assays, both types of IgG found.

Middleton, J.R. **Haematology of South American camelidae.** In: *Selected Research on Camelid Physiology and Nutrition*. The Camelid Publishers, Bikaner, India. 2004: 400-408. ISBN: 8190114123.

NAL call no.: SF401.C2S46 2004

Descriptors: Bactrian camels, alpacas, vicunas, guanacos, llamas, blood chemistry, blood disorders, hematocrit, anemia, blood cells morphology, basophiles, bone marrow, dissolved oxygen, eosinophilia, eosinophils, erythrocyte count, erythrocytes, erythropoietin, transferring, hematology, hemoglobin, iron deficiency anemia, leukocyte count, lymphocytes, monocytes, morphology, neutrophils, normal values, platelets, South America.

Miragaya, M.H.; Aba, M.A.; Capdevielle, E.F.; Ferrer, M.S.; Chaves, M.G.; Rutter, B.; Aguero, A. **Follicular activity and hormonal secretory profile in vicuna (*Vicugna vicugna*).** *Theriogenology*. 2004 Feb.; 61(4): 663-671. ISSN: 0093-691X.

URL:<http://www.sciencedirect.com/science/journal/0093691X>

NAL call no.: QP251.A1T5

Abstract: The objective of the present study was to characterize ovarian activity in non-mated vicunas, relating ovarian structures (evaluated by transrectal ultrasonography, daily for 30 days) to changes in plasma concentrations of estradiol-17beta and progesterone. Ovarian follicular activity occurred in waves, characterized by the follicle emergence, growth and regression. The mean duration of follicular waves was 7.2 +/- 0.5 days (mean +/- S.E.M.), with a range of 4-11 days. The follicular growth phase averaged 3.0 +/- 0.2 days, the static phase 1.4 +/- 0.1, the regression phase 2.9 +/- 0.3 days, and the inter-wave interval was 4.2 +/- 0.3 days. The mean growth rate during the growing phase was 1.8 +/- 0.1 mm/day, while the duration of the interval from 6 mm to maximum diameter was 1.4 +/- 0.1 days. The mean maximum diameter of the dominant follicle was 8.4 +/- 0.3 mm (range: 6.2-11.2) and mean diameter of the largest subordinate follicle was 5.4 +/- 0.1 mm. There was an inverse

relationship between the size of the largest follicle and the total number of follicles ($r = -0.21$, $P = 0.002$). Follicle activity alternated between ovaries in 77% of the waves, with 40% of dominant follicles present in the left ovary and 60% in the right ovary. Plasma estradiol-17 β concentrations also had a wave-like pattern, varying between 12.0 and 62.8 pmol/l. Plasma progesterone concentrations remained below 5.0 nmol/l and there was no ultrasonographic evidence of ovulation during the study.

Descriptors: vicunas, *Vicugna vicugna*, ovarian follicles, follicular development, diameter, hormones, secretary profile.

Otazu, D.A. **Alpaca and vicuna: general perspectives.** In: Cardellino, R.; Rosati, A; Mosconi, C. [Editors] *ICAR Technical Series*. 2004; (11): 31-36. ISSN: 1563-2504. ISBN: 9295014065. Note: conference proceedings: "Current Status of Genetic Resources, Recording and Production Systems in African, Asian and American Camelids, Sousse, Tunisia, 30 May 2004."
URL:http://www.icar.org/DOCS/technical_series_11_sousse.pdf

Abstract: In the landscapes of the high plains at over 4 000 meters above sea level, thousands of years ago the Incas domesticated two species of the South American camelids: Alpaca and Llama, using techniques that are a mystery to these days. The first one would later be used as a source of soft, fine and resistant fibre and the second one as a mean of transportation. From the two species that continued being wild: Guanaco and especially Vicuna, a fantastic and very fine fibre was obtained, which was reserved only for nobility. Its threads were mixed with gold threads to create varied work of art. It was the fibre of the gods. Reproduced with permission of CAB Abstracts.

Descriptors: alpacas, llamas, guanacos, vicunas, animal fibers, fiber quality, wool producing animals.

Otazu, D.A. **Production and handling systems of alpaca and vicunas.** In: Cardellino, R.;

Pacheco, L.F.; Lucero, A.; Villca, M. **Dieta del puma (*Puma concolor*) en el Parque Nacional Sajama, Bolivia y su conflicto con la ganaderia.** [Diet of the puma (*Puma concolor*) in Sajama National Park, Bolivia and its conflict with livestock.] *Ecologia en Bolivia*. 2004; 39(1): 75-83. ISSN: 1605-2528. Note: In Spanish with an English summary.

URL: <http://dialnet.unirioja.es>

Abstract: Based on a sample of 53 faeces, the diet of *Puma concolor* [*Felis concolor*] was studied in a protected area of the Bolivian altiplano. The largest contribution to the diet in number of preys came from medium and small rodents (98%), but camelids made up the main contribution in biomass (53%), corresponding little more than half to domestic species and the rest to *Vicugna vicugna*. Our results disagree with the hypothesis that pumas feed mainly on those prey most available in its environment, because it seems to prefer vicunas over livestock. However, our estimate of the quantity of livestock consumed suggests that a program of control of puma predation should be started urgently, to avoid larger management problems between the protected area's administration and local inhabitants. Reproduced with permission of CAB Abstracts.

Descriptors: vicunas, livestock, rodents, carnivore prey, fecal sampling of *Puma concolor*, puma diet, livestock predation, vicuna predation, predator control, national parks, Bolivia.

Sahley, C.; Torres, J.; Sanchez, J. **Neoliberalism meets pre-Columbian tradition: campesino communities and vicuna management in Andean Peru.** *Culture and Agriculture*. 2004; 26(1/2): 60-68. ISSN: 1048-4876

URL:<http://cultureandagriculture.org/current.html>

Abstract: This paper first presents a brief history of vicuna conservation efforts in Andean Peru, and then focuses on tracing legal, biological, and social developments from the mid-1990s to the present. It also points out the importance of the vicuna as an ancient, as well as current, symbolic or archetypal species for Andean communities, and the importance of the human-vicuna interaction for the conservation of the vicuna. Finally, the paper makes recommendations for enhancing the conservation prospects for the vicuna. The paper places special emphasis on the importance of conserving the vicuna as a wild mammal, and argues that legislation to conserve it should prioritize the species' biological needs as well as the needs of Andean campesino communities whose land they inhabit. It is argued that because vicunas are a wild species, legislation should not address them as if they were domestic livestock, even though they now form part of Andean communities' livelihood strategies and "livestock portfolio". Reproduced with permission from CAB Abstracts.

Descriptors: vicunas, wild wool-producing animals, wildlife conservation, wildlife management, rural Andean communities, livelihood strategies, livestock management, Peru.

Sarno, Ronald J.; Villalba, Lilian; Bonacic, Cristian; Gonzalez, Benito; Zapata, Beatriz; Mac Donald, David W.; O'Brien, Stephen J.; Johnson, Warren E. **Phylogeography and subspecies assessment of vicunas in Chile and Bolivia utilizing mtDNA and microsatellite markers: Implications for vicuna conservation and management.** *Conservation Genetics*. 2004; 5(1): 89-102. ISSN: 1566-0621.

Descriptors: wild vicunas, semi-captivity in Peru, economic utilization, large scale rearing practices in Argentina, Bolivia and Chile, impact of systems on various aspects of the animals, distribution and validity of recognized subspecies, molecular genetic variation and diversity, restrict gene flow with isolation and distance, ensure gene flow in intensive rearing.

Wernery, U.; Kaaden, O.R. **Foot-and-mouth disease in camelids: a review.** *Veterinary Journal*. 2004; 168(2): 134-142. ISSN: 1090-0233.

NAL call no.: SF601.V484

Descriptors: South American camelids, dromedaries, Bactrian camels, foot and mouth diseases, infectability, disease transmission risks, dromedaries may contact the disease in experimental infection and close contact with infected animals, camels not FMDV carriers, llamas and alpacas infected by direct contact, not very susceptible and no risk of transmitting to susceptible species, Bactrians have similar lesions, but no samples have been positive, recommend further research in camelids.

Web Resources

All resources are accessible through the internet and are current as of April 2009. Readers are cautioned as to the dynamic nature of the internet and the fact that addresses and content are subject to change.

Information Resources on the South American Camelids: Llamas, Alpacas, Guanacos, and Vicunas 1943-2006. *USDA. NAL. Animal Welfare Information Center.*

Online: <http://www.nal.usda.gov/awic/pubs/llama.htm>

Description: This bibliography provides information on the Camelidae family and their characteristics, production, use and products and covers information published between 1943 and 2006.

Llama and Alpaca Farming. *National Center for Appropriate Technology. ATTRA - National Sustainable Agriculture Information Service.*

Online: <http://attra.ncat.org/attra-pub/llamaalpaca.html>

Description: Information for alpaca ranchers including husbandry, regulations, marketing, feeding, housing, handling, transport, health and reproduction.

Guard Llamas: A Part of Integrated Sheep Protection. *Iowa State University. University Extension.*

Online: <http://www.extension.iastate.edu/Publications/PM1527.pdf> (368 KB)

Description: Publication discussing the use of llamas to protect sheep from coyote predation.

Llama. *Sell, Randy. North Dakota State University. Department of Agricultural Economics.*

Online: <http://www.ag.ndsu.edu/pubs/alt-ag/llama.htm>

Description: General information on starting and operating a Llama operation; includes economic analysis and cash flow budgets.

International Lama Registry.

Online: <http://www.lamaregistry.com/>

Description: Membership organization provides genealogical registry system, reports and research services for owners of subspecies of the Lama, including llama (*Lama glama*), guanaco (*Lama guanicoe*), vicuna (*Lama vicugna*) and crossbreeds.

Alpaca Registry.

Online: <http://www.alpacaregistry.com/>

Description: Registry of alpaca (*Lama pacos*) breeds. Database houses the genealogy, blood typing/DNA and ownership records of alpacas primarily located in North America.

Alpaca Owners and Breeders Association.

Online: <http://www.alpacainfo.com/>

Description: Information for the commercial and home rancher of alpacas covering economics, marketing, husbandry, history of alpacas, list of farms and ranches, breeding and more.

Canadian Llama and Alpaca Association.

Online: <http://www.claacanada.com/>

Description: Identifies and registers llamas, alpacas, guanacos and vicunas in Canada. Site includes links to information and organizations in Canada and the United States.