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# Housing, Husbandry, Care & Welfare of Selected Birds (Quails, Pheasants, Finches, Ostriches, Doves, Parrots & Others)



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May 2008

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*Compiled by:*

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# About this Document

*This publication updates and revises the AWIC publication *Housing, Husbandry, Care & Welfare of Selected Birds (Quail, Pheasant, Finches, Ostrich, Parrot & Others)*, AWIC Resource Series No. 26, February 2004, available online at <http://www.nal.usda.gov/awic/pubs/Birds/birds.htm>.*

The citations in this bibliography pertain to the health, care and housing of selected wild/exotic birds owned as pets, raised as farm animals, or used for exhibition or research. Production birds such as chickens are not included but there are a few citations on ducks and turkeys which may have application to other birds in general. Birds bred and raised for research as well as all birds used for exhibition or sold by dealers are being brought under regulation by USDA, APHIS, Animal Care. It is hoped this updated publication provides a useful reference source for anyone handling or caring for birds.

Multiple sources were searched for citations published between the years 2004 to 2007. The sources of information include peer-reviewed journals, conference proceedings, theses, annual reports, dissertations, books, monographs, reviews, and patents.

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## **Acknowledgements**

The author wishes to acknowledge Kristina Adams for her participation in the final editing of this document. Her support is greatly appreciated.



# Anatomy

Abbate, F., C. Pfarrer, C.J. Jones, E. Ciriaco, G. Germana, and R. Leiser (2007). **Age-dependent changes in the pigeon bursa of Fabricius vasculature: a comparative study using light microscopy and scanning electron microscopy of vessel casts.** *Journal of Anatomy* 211(3): 387-98. ISSN: 0021-8782.

**Abstract:** The present study was carried out to analyse the vascularization of the pigeon bursa cloacalis of Fabricius and to determine whether it undergoes age-dependent changes during its functionally most important growth period after hatching of the pigeon. Morphological assessment of vascular corrosion casts, studied qualitatively and quantitatively, was applied for the first time to investigate the vascularization of the pigeon bursa of Fabricius. This also allowed us to analyse the microvasculature and morphological aspects of the vessel interrelationships as occurring in the natural state. The casts were compared with histological sections stained by haematoxylin-eosin and by binding of the lectin e-PHA (*Phaseolus vulgaris*, erythroagglutinin) to blood vessels. The vascular architecture of the bursa of Fabricius of the pigeon revealed that the organ is irrigated via two pathways, first through the terminal capillary system of lymphoid follicles arising from the internal pudendal artery, and secondly through arteries originating from the cloacal vasculature of the collum of the organ supplying the periluminal capillary system of the pigeon bursa of Fabricius. Both systems are drained by a venous system which is collateral to the system of the internal pudendal artery and clearly functions as a direct link between the lumen and vasculature of the cloaca or gut, respectively, and the bursa fabricii. This could allow the lymphocytes to be confronted with antigens from the contents of the gut, and their subsequent transport into the secondary lymphoid organs of the organism. Our results demonstrate that the blood vessels, as major and supplying part of the lymphoid system of the bursa Fabricii, clearly reflect three different phases of development: the evolution phase from about day 20 until day 50 post-hatching, the mature phase from days 50 to 90, and the involution phase after day 90. During the evolution phase the density of the vessel system rapidly increases, while in the mature phase the vascular architecture is maintained. The involution phase is dominated by vascular degeneration combined with shrinkage of the whole organ. Therefore, the morphology of the vasculature distinctly reflects the functional status of this primary lymphoid organ during its lifespan.

**Descriptors:** pigeon, bursa of Fabricius, vasculature, changes, age dependent, light microscopy, scanning electron microscopy, blood vessel casts.

Abdalla, K.E.H., A.M. Salma, and M.A. Sabour (2004). **Stifle joint in the ostrich**. *Assiut Veterinary Medical Journal* 50(103): 1-19. ISSN: 1012-5973.

**Descriptors:** ostrich, anatomy, stifle joint, femur , ligaments, tibia.

**Language of Text:** Arabic.

Altunay, H. (2004). **Fine structure of the retinal pigment epithelium, Bruch's membrane and choriocapillaris in the ostrich (*Struthio camelus*)**. *Anatomia, Histologia, Embryologia* 33(1): 38-41. ISSN: 0340-2096.

**Abstract:** The fine structure of the retinal pigment epithelium (RPE), Bruch's membrane and choriocapillaris in the ostrich (*Struthio camelus*) was investigated by using light microscopy and transmission electron microscopy. In this species, the RPE consisted of a single layer of low columnar cells. The epithelial cells were joined laterally by two type junctions, zonulae occludentes and zonulae adherentes located in the midregion of the cells. These cells displayed numerous deep basal infoldings and thick extensive apical processes, which enclosed the outer segments of the rods. The epithelial cell nuclei were large, vesicular and located basally within the epithelial cells. Smooth endoplasmic reticulum was very abundant, while rough endoplasmic reticulum was scarce. Mitochondria of various shapes were abundant basally while polysomes were plentiful and widespread. In the light-adapted state melanosomes were located in the apical region and in apical processes of the epithelial cells. Myeloid bodies were large, numerous and often showed ribosomes on their outer surface. Bruch's membrane (complexus basalis) was typical pentalaminar throughout the retina, as noted in the majority of other vertebrates. The endothelium of the choriocapillaris facing Bruch's membrane was extremely thin but only moderately fenestrated. Some of the fenestrations displayed a double-layered diaphragm while the majority showed the more typical single-layered diaphragm noted in most species.

**Descriptors:** ostrich, pigment epithelium , retinal, eye ultrastructure, struthioniformes anatomy, histology, capillaries ultrastructure, endoplasmic reticulum ultrastructure, electron microscopy, mitochondria ultrastructure, Bruch's membrane.

Altunay, H. and T. Kozlu (2004). **The fine structure of the Harderian gland in the ostrich (*Struthio camelus*)**. *Anatomia, Histologia, Embryologia* 33(3): 141-5. ISSN: 0340-2096.

**Abstract:** The Harderian gland of the ostrich (*Struthio camelus*) is a tubuloalveolar gland containing holocrine secreting epithelial cells. The gland epithelium is composed of two different cell types, which can be classified as type I and type II. These cells contain dense secretory vesicles in their cytoplasm and they are connected laterally with desmosomes. At the basal site of these cells, myoepithelial cells are present. Plasma cells are observed in the subepithelial region of the gland. In the interlobular trabeculae, forming the gland stroma, fibroblasts, blood vessels and nerve fibres are included. Another important finding in the ostrich Harderian gland is the presence

of homogeneous material.

**Descriptors:** ostrich, Harderian gland ultrastructure, Struthioniformes anatomy, histology, cell differentiation, harderian gland cytology, electron microscopy.

Ando, K., Y. Nakajima, T. Yamagishi, S. Yamamoto, and H. Nakamura (2004). **Development of proximal coronary arteries in quail embryonic heart: multiple capillaries penetrating the aortic sinus fuse to form main coronary trunk.** *Circulation Research* 94(3): 346-52. ISSN: 0009-7330.

**Abstract:** Studies have shown that the proximal coronary artery (PCA) develops via endothelial ingrowth from the peritruncal ring (PR) of the coronary vasculature. However, the details of PCA formation remain unclear. We examined the development of PCAs in quail embryonic hearts from 5 to 9 days of incubation (embryonic day [ED]) using double-immunostaining for QH1 (quail endothelial marker) and smooth muscle alpha-actin. At 6 to 7 ED, several QH1-positive endothelial strands from the PR penetrated the facing sinuses, and in some embryos, several endothelial strands penetrated the posterior (noncoronary) sinus. At 7 to 8 ED, the endothelial strands penetrating the facing sinuses seemed to fuse, forming a proximal coronary stem that was demarcated from the aortic wall by the nascent smooth muscle layer of the coronary artery. By 9 ED, two coronary stems were completely formed, and the endothelial strands previously penetrating the noncoronary sinus had disappeared. Confocal microscopy at 6 ED revealed discontinuous QH1-positive endothelial progenitors in the aortic wall at sites where the endothelial strands would later develop. Observations demonstrate that during the formation of the PCA, endothelial strands from the PR penetrate the facing sinuses and then fuse, whereas those strands penetrating the noncoronary sinus disappear. Thereafter, the coronary artery tunica media demarcates the definitive PCA from the aortic media.

**Descriptors:** quail, embryonic heart, coronary arteries, embryology, blood supply, heart embryology, capillaries embryology, embryonic development, capillaries, aortic sinus fuse, coronary trunk.

Babic, K., T.T. Vukievic, D. Mihelic, and V.G. Kantura (2004). **The anatomy of the female and male ostrich (*Struthio camelus*) genital system as a base of reproductive physiology.** *Proceedings of the 11th Ostrich World Congress, Island Great Brijun, Croatia, 15-17 October 2004:* 70-73.

**Descriptors:** ostrich, male, female, genital system, anatomy, reproductive physiology, conference proceedings.

**Notes:** Meeting Information: Proceedings of the 11th Ostrich World Congress, Island Great Brijun, Croatia, 15-17 October 2004.

Basha, S.H., C. Vijayaragavan, and Geetha Ramesh (2004). **Light and electron microscopic studies on the interrenal tissue of the adrenal gland in the Japanese quail (*Coturnix coturnix japonica*)**. *Indian Journal of Animal Sciences* 74(10): 1021-1023. ISSN: 0367-8318.

**Descriptors:** Japanese quail, adrenal gland, interrenal tissue, light studies, electron microscopic studies.

Basha, S.H., M. Sivakumar, and G. Ramesh (2007). **Histogenesis of the adrenal gland in japanese quail (*Coturnix coturnix japonica*)**. *Indian Journal of Animal Sciences* 77(3): 222-224. ISSN: 0367-8318.

**Descriptors:** Japanese quail, adrenal gland, histogenesis, *Coturnix coturnix japonica*.

Cevik Demirkan, A., R. Haziro lu, and Kcortcol (2007). **Gross morphological and histological features of larynx, trachea and syrinx in Japanese quail**. *Anatomia Histologia, Embryologia* 36(3): 215-219. ISSN: 0340-2096.

**Abstract:** This study aimed at observing gross morphological and histological characteristics of the larynx, trachea and syrinx in *Coturnix coturnix japonicum* (Japanese quail). Sixteen mature quails were divided into two groups. Eight animals were stained with 0.1% methylene blue for 15 min, followed by 50% and 70% ethyl alcohol solution for gross morphological examination. For the observation of histological characteristics the larynx, trachea and syrinx were fixed in 10% formaldehyde and embedded in paraffin. Six-micron sections were stained with haematoxylin and eosin. There were three rows of papillae which were located oral (one row) and aboral (two rows) aspects of the mound. The cricoid cartilage was triangular in shape. Only the inlet of the larynx was covered by the olfactory mucosa whereas the rest was covered by the respiratory mucosa. There were 83-91 tracheal rings which were gradually narrowed from the cranial to the caudal direction. No overlapping occurred between the rings. The last few tracheal rings did not fuse dorsally and formed the tympanium. The pessulus possessed connection with the last tracheal ring and the first bronchial ring. Moreover, it was like a semiprism in shape at the region of bifurcation being vertical in direction. The syrinx was formed by the paired, C-shaped and incomplete bronchial syringeal cartilages. The mucosa of the syrinx was lined with a pseudo-stratified layer of prism-shaped epithelium. There were nine or 14 C-shaped cartilaginous primary bronchi.

**Descriptors:** Japaneses quail, larynx, trachea, syrinx, gross morphological, histological, features, anatomy.

Chen WenQin, Liu HuaZhen, Luo GuanZhong, and Peng KeMei (2005). **Cytoarchitecture of 5 nerve nuclei in the medulla oblongata of ostrich**. *Journal of Huazhong Agricultural University* 24(2): 185-188. ISSN: 1000-2421.

**Descriptors:** ostrich, nerve nuclei, medulla oblongata, cytoarchitecture, anatomy,

brain, morphology.

**Language of Text:** Chinese, summary in English.

Cooper, R.G. and K.M. Mahroze (2004). **Anatomy and physiology of the gastro-intestinal tract and growth curves of the ostrich (*Struthio camelus*)**. *Animal Science Journal* 75(6): 491-498. ISSN: 1344-3941.

**Descriptors:** ostrich, anatomy, physiology, gastrointestinal tract, growth curves, digestive system.

Cooper, R.G. and K.M. Mahroze (2004). **Anatomy and physiology and growth curves of the of the gastro-intestinal tract ostrich (*Struthio camelus*)**. *Animal Science Journal* 75(6): 491-498. ISSN: 1344-3941.

**Descriptors:** ostrich, anatomy, physiology, growth curves, gastrointestinal tract, digestive system.

Cooper, R.G. and K.M. Mahroze (2004). **Anatomy and physiology of the gastro-intestinal tract and growth curves of the ostrich (*Struthio camelus*)**. *Animal Science Journal* 75(6): 491-498. ISSN: 1344-3941.

**Descriptors:** ostrich, growth curves, anatomy, physiology, gastro-intestinal tract, *Struthio camelus*, digestive system.

Dickman, J.D., D. Huss, and M. Lowe (2004). **Morphometry of otoconia in the utricle and saccule of developing Japanese quail**. *Hearing Research* 188(1-2): 89-103. ISSN: 0378-5955.

**Abstract:** The development of otoconia in the utricular and saccular maculae from initial embryonic formation to adult stages was examined in Japanese quails. Both the morphology and size of the otoconia were quantified at different developmental stages. It was observed that the otoconia were initially formed on embryologic stage E5 in the saccule and E6 in the utricle. Otolith mass areas increased in a sigmoidal growth pattern, with saccular otolith areas being smaller than the utricular mass areas. Saccular otolith masses reached adult values at embryonic stage E12 and utricular areas reached adult values at post-hatch day 7. Mature individual otoconia were characterized by a barrel shape with two trihedral faceted ends. However, initial formation of otoconia at E5 (saccular) and E6 (utricular) maculae was characterized by a double fluted morphology that consisted of an hourglass shape with extended fins forming trihedral angles of 120 degrees. Double fluted otoconia rapidly filled, so that by embryonic day 8 mature otoconia dominated the maculae for the remainder of development through adulthood. Thus, a progression from double fluted to mature forms was noted. Mature utricular otoconia in adult quails averaged 11 microm in length and 5 microm in width, with length/width ratios of approximately 2.5:1, for all size ranges. Saccular otoconia were smaller, having about 70% the size of utricular

otoconia in both length and width. During development, the average size and range of individual otoconia increased nearly linearly for both otolith organs. In the utricular macula, large otoconia were concentrated in the lateral regions of the epithelium. In contrast, otoconia of various sizes were distributed uniformly across the surface of the saccular macula.

**Descriptors:** Japanese quail, *Coturnix*, otolithic membrane embryology, otolithic membrane ultrastructure, saccule and utricle embryology, acoustic maculae embryology, electron microscopy, scanning, animal models, saccule and utricle ultrastructure, morphometry.

Dzemeski, G. and A. Christian (2007). **Flexibility along the neck of the ostrich (*Struthio camelus*) and consequences for the reconstruction of dinosaurs with extreme neck length.** *Journal of Morphology* 268(8): 701-14. ISSN: 0362-2525.

**Descriptors:** ostrich, neck, flexibility, reconstruction, extreme neck length, giraffe, camel, relevance to dinosaurs.

Elias, M.Z., T.A. Aire, and J.T. Soley (2007). **Macroscopic features of the arterial supply to the reproductive system of the male ostrich (*Struthio camelus*).** *Anatomia, Histologia, Embryologia* 36(4): 255-62. ISSN: 0340-2096.

**Abstract:** The macroscopic features of the arterial supply to the reproductive system of the male ostrich was studied in 16 pre-pubertal and eight sexually mature and active birds. The left and right cranial renal arteries arise from the aorta, between the cranial divisions of the kidneys. These vessels supply the cranial divisions of the kidneys, the testes, the epididymides and the cranial segments of the ducti deferentia. Accessory testicular arteries which arise directly from the aorta are present in 45.8% of the specimens. They supply the testes and cranial parts of the ducti deferentia. They are variable in number and origin, and four variants are identified. A cranial ureterodeferential branch originates from the cranial renal artery, supplies the cranial portion of the ductus deferens and ureter, and runs caudally to anastomose with the middle renal artery. The sciatic artery arises laterally from the aorta, just caudal to the acetabulum, and gives rise, ventrally, to a common trunk, the common renal artery, which divides into the middle and caudal renal arteries. The middle renal artery gives rise to the middle ureterodeferential branch which supplies the middle part of the ductus deferens and ureter. A few centimetres caudal to the kidney, the aorta terminates in three branches, namely, the left and right internal iliac arteries and the median caudal artery. The internal iliac artery divides into the lateral caudal artery and the pudendal artery; the latter gives off caudal ureterodeferential branches that supply the caudal segments of the ductus deferens and ureter. In addition, the pudendal artery gives off vessels that supply the cloaca, some of which continue to the base of the phallus, where they form an arterial network. In conclusion, the pattern of the blood supply to the reproductive organs of the male ostrich is, in general, similar to

that of the domestic fowl and pigeon, although there are a few highlighted distinctive features.

**Descriptors:** ostrich, male, arteries, anatomy, histology, Struthioniformes, testis, blood supply, epididymis, regional blood flow, sexual maturation, physiology, vas deferens, blood supply.

Elias, M.Z.J., J.T. Soley, and T.A. Aire (2005). **The microvasculature of the testis, epididymis and proximal ductus deferens of the ostrich (*Struthio camelus*) as revealed by India ink injection.** *Microscopy Society of Southern Africa Proceedings* 35: 75. ISSN: 1028-3455.

**Descriptors:** ostrich, microvasculature, testis, epididymis, proximal ductus deferens, India ink injection, *Struthio camelus*.

Flores, M.L., R.P. Fontoura, C.L.B. Godoy, and S.D. Segabinazi (2006). [www.ahoraveterinaria.com.br](http://www.ahoraveterinaria.com.br) **Anatomia radiografica de ema (*Rhea americana*) - resultados preliminares. [Great rhea (*Rhea americana*) radiographic anatomy - preliminary results].** *A Hora Veterinaria* 26(152): 64-66. ISSN: 0101-9163.

**Descriptors:** greater rhea, radiographic anatomy, abdomen, image analysis, pelvis, preliminary results, *Rhea*.

**Language of Text:** Portuguese, summary in English.

Gangl, D., G.E. Weissengruber, M. Egerbacher, and G. Forstenpointner (2004). **Anatomical description of the muscles of the pelvic limb in the ostrich (*Struthio camelus*).** *Anatomia, Histologia, Embryologia* 33(2): 100-14. ISSN: 0340-2096.

**Abstract:** Dissections of 12 formalin-fixed ostriches were performed to give anatomical descriptions of the muscles and tendons of the pelvic, femoral, tibiotarsal, tarsometatarsal and digital regions. In the pelvic limb of the ostrich, 36 muscles can be determined. The ostrich lacks those muscles to the first and second toes (with exception of the M. flexor hallucis longus), which can be found in birds with four toes. The Mm. ilioprochantericus medius, plantaris, extensor proprius digiti IV and adductor digiti IV, which are present in other birds, are also absent, whereas the Mm. pectineus and femorotibialis accessorius additionally occur in the ostrich. The Pars supramedialis is a tendineous part of the M. gastrocnemius, on which the Mm. flexor cruris lateralis and flexor cruris medialis insert by means of a fascial sheet. The caudal part of the M. iliofibularis terminates within the caudal aspect of the superficial fascia cruris. The caudal heads of the Mm. flexor perforatus digiti III and flexor perforatus digiti IV as well as the M. flexor hallucis longus have a common origin on the Fossa poplitea of the femur. The lateral head of the M. flexor perforatus digiti IV and the femoral head of the M. flexor perforans et perforatus digiti III originate on the tendon of origin of the Caput laterale of the M. flexor perforatus digiti III. Furthermore, the last named tendon fuses with the tendon of insertion of the M. ambiens.

The M. extensor proprius digiti III originates on a plate-like fascial sheet part of the dorsal joint capsule of the intertarsal joint.

**Descriptors:** ostrich, hindlimb anatomy, histology, muscle, skeletal anatomy, histology, Struthioniformes anatomy, histology, pelvic limb, anatomical description.

Imam, H.M.E. and O.M. El Mahdy (2004). **Some anatomical studies on the quadratmandibular articulation of ostrich (*Struthio camelus*) and flamingo (*Phoenicopterus ruber*)**. *Assiut Veterinary Medical Journal* 50(102): 1-21. ISSN: 1012-5973.

**Descriptors:** ostrich, flamingo, quadratmandibular articulation, anatomical studies, joint, morphological features.

**Language of Text:** Arabic.

Kurtul, I. and R.M. Hazroglu (2004). **Horoz, erkek ordek ve guvercinde aorta descendens'in seyri ve dallanmas uzerinde karstlastrmal makroanatomik arastirmalar. [Comparative macroanatomical investigations on the pattern and branches of the descending aorta among the rooster, drake and pigeon]**. *Ankara Universitesi Veteriner Fakultesi Dergisi* 51(1): 1-6. ISSN: 1300-0861.

**Descriptors:** pigeon, anatomy, aorta, blood circulation, species differences, rooster, drake.

**Language of Text:** Turkish, summary in English.

Madekurozwa, M.C. (2005). **Morphological features of the luminal surface of the magnum in the sexually immature ostrich (*Struthio camelus*)**. *Anatomia, Histologia, Embryologia* 34(6): 350-3. ISSN: 0340-2096.

**Abstract:** Observations were made, using scanning electron microscopy, of the surface features of the magnum in the immature ostrich during periods of ovarian inactivity, activity and regression. In birds with inactive ovaries the luminal surface of the magnum was lined with non-ciliated cells, which were densely covered by microvilli. In contrast, the magnum in birds with active ovaries was composed of ciliated and non-ciliated cells. The distribution of ciliated cells was not uniform, with clumps of cilia occurring next to non-ciliated areas. Samples collected from birds with regressing ovaries, during periods of decreasing daylength, revealed that the magnum was undergoing involution. The deciliation of ciliated cells and the presence of short microvilli on non-ciliated cells characterized magnum regression. These results suggest that ovarian activity and changes in daylength have a profound effect on the surface features of the magnum in the immature ostrich.

**Descriptors:** ostrich, sexually immature, magnum, morphological features, ovarian activity, daylength, ciliated cells, non ciliated cells.

- Madekurozwa, M.C. and W.H. Kimaro (2006). **Ultrastructural features of the follicular wall in developing follicles of the sexually immature ostrich (*Struthio camelus*).** *Onderstepoort Journal of Veterinary Research* 73(3): 199-205. ISSN: 0030-2465.  
**Descriptors:** ostrich, reproductive system, sexually immature, follicular wall, developing follicles, ultrastructure features, *Struthio camelus*.
- Maxwell, E., A. Michel, H. Larsson, and A. Heppleston (2006). **The anatomy of the emu wing: an example of primary digital reduction in archosaurs.** *Journal of Vertebrate Paleontology* 26(3, Suppl. S): 97A. ISSN: 0272-4634.  
**Descriptors:** emu wing anatomy, primary digital reduction, archosaurs, example, meeting.  
**Notes:** 66th Annual Meeting of the Society of Vertebrate Paleontology, Ottawa, Canada; October 18 -21, 2006.
- Mazzullo, G., G. Montalbano, A. Augello, A. Germana, and B. Macri (2007). **A case of conjoined cephalopagus twinning in an ostrich (*Struthio camelus*).** *Anatomia, Histologia, Embryologia* 36(4): 263-5. ISSN: 0340-2096.  
**Abstract:** Conjoined twinnings have been reported in most domestic animal species and in some avian species. Cases of conjoined twins have not been reported in the ostrich so far. A hybrid Blue neck x African black male ostrich conjoined twinning was born at the end of artificial egg incubation and died spontaneously 24 h after the hatching. It was frozen and sent to the Unit of Veterinary Pathology of the University of Messina for gross examination. The most important gross findings involved the external body and most of the internal organs. On the basis of the duplication, the conjoined twins were classified as a cephalopagus. Radiological features included: development of one head containing a single brain, two spinal cords, deviated vertebral columnae with fusion of the two first cervical vertebrae. In one twin, the synsacrum was absent as well as portions of the vertebral column. Grossly, both twins showed two upper and lower limbs each. The gastro-enteric apparatuses of the twins were not completely developed and fused at different levels. One liver and one heart localized in the centre of the conjoined twins were observed. The authors conclude that the possible causes of the malformation could be related to a genetic factor.  
**Descriptors:** ostrich, twinning, conjoined cephalopagus, male, gross examination, artificial egg incubation, pathology, malformation, genetic.
- Nasu, T. (2005). **Scanning electron microscopic study on the microarchitecture of the vascular system in the pigeon lung.** *Journal of Veterinary Medical Science the Japanese Society of Veterinary Science* 67(10): 1071-4. ISSN: 0916-7250.  
**Abstract:** The resin casts of the respiratory and vascular systems in pigeon lung were examined using a scanning electron microscope. The primary bronchi branched to form many secondary bronchi that anastomosed with each other via the parabronchi.

Numerous infundibula protruded from the parabronchi via the atria and ramified into the air capillaries. The pulmonary artery entered into the lung and branched into three vessels that coursed the interparabronchial parts. The intraprabronchial arterioles penetrated the gas-exchange tissue to form the anastomosing networks of blood capillaries. The observation of the double casts of the respiratory and vascular systems revealed three-dimensional complicated networks of air capillaries and blood capillaries.

**Descriptors:** pigeon lung, resin casts, vascular system, microarchitecture, capillaries ultrastructure, columbidae anatomy, histology, lung blood supply, lung ultrastructure, microscopy.

Ozegbe, P.C., T.A. Aire, and J.T. Soley (2006). **The morphology of the efferent ducts of the testis of the ostrich, a primitive bird.** *Anatomy and Embryology* 211(5): 559-65. ISSN: 0340-2061.

**Abstract:** The efferent duct of the ostrich consists of two segments, the proximal efferent duct (PED) and the distal efferent duct (DED) that are continuous, as in some other birds. Both segments of the duct possess an epithelium comprising non-ciliated and ciliated cells in varying proportions between the two segments. The non-ciliated cell (type I) of the PED contains a well-developed, subapical endocytic apparatus of apical tubules and endocytic vacuoles, a solitary, large, heterogeneous lipid droplet, and numerous, oval, dense bodies in the supranuclear region of the cell. Mitochondria tend to concentrate in the basal part of the cell. Intercellular spaces between the non-ciliated cells are enlarged, especially in the basal half of the epithelium. Together, these morphological features confer on the PED an efficient fluid absorption capability. The DED epithelium displays the type II non-ciliated cell whose poorly developed subapical endocytic apparatus as well as the absence of dilated basal intercellular spaces indicate its limited fluid absorptive capacity.

**Descriptors:** epididymis cytology, Struthioniformes, anatomy, histology, epithelial cells, ultrastructure, microscopy electron, microvilli ultrastructure, transport vesicles, vacuoles.

Ozkan, Z.-E. (2004). **Macro-anatomical and osteometric investigations on ossa cinguli membri thoracici in quails.** *Indian Veterinary Journal* 81(5): 549-552. ISSN: 0019-6479.

**Descriptors:** quails, macro anatomical, osteometric, investigations, ossa cinguli membri thoracici bones.

Ozkan, Z.E. (2004). **Gross-anatomical and osteometric investigations on sternum in quails.** *Indian Veterinary Journal* 81(3): 312-315. ISSN: 0019-6479.

**Descriptors:** quails, gross anatomical, osteometric, investigations, sternum.

Ozkan, Z.E. (2004). **Macro-anatomical and osteometric investigations on apparatus hyobranchialis in quails.** *Indian Veterinary Journal* 81(6): 691-694. ISSN: 0019-6479.

**Descriptors:** quail, apparatus hyobranchialis, macro anatomical, osteometric, investigations, male, female, *Coturnix coturnix*.

Palmieri, G., A.A. Dessole, L.B. Minelli, M. Botti, F. Gazza, A. Corriero, S. Desantis, and F. Acone (2004). **The sensitive innervation of the ostrich nasal mucosa.** *Archivio Italiano Di Anatomia Ed Embriologia. [Italian Journal of Anatomy and Embryology]*. 109(4): 239-48. ISSN: 0004-0223.

**Abstract:** The sensitive innervation of the ostrich's nasal mucosa, through impregnative gold chloride methods, was investigated. The autonomy innervation, constituted by ganglion cells placed along the course of nerve trunks was particularly represented in the respiratory tract of the nasal cavity. The somatic nerve component, composed by free and capsulated endings, was especially distributed in the vestibular district. The nerve corpuscles were morphologically classified as Pacini, Pacini-like, Golgi-Mazzoni and Herbst. Further investigations must be expected to attribute an effective functional role particularly to this last nerve component.

**Descriptors:** ostrich, nasal mucosa, sensitive innervation, ganglion cells, nerve trunks, nasal cavity, respiratory tract, somatic nerve, nerve corpuscles.

Palmieri, G., L.B. Minelli, M. Botti, F. Gazza, S. Desantis, M. Deflorio, G. Costa, M.G. Cappai, and F. Acone (2005). **Autonomic and sensitive somatic innervation of the ostrich elbow and knee joints articular capsule.** *Archivio Italiano Di Anatomia Ed Embriologia. [Italian Journal of Anatomy and Embryology]*. 110(2): 111-23. ISSN: 0004-0223.

**Abstract:** The present research was carried out on the fibrous layer of the ostrich's elbow and knee joints articular capsule, employing opportunely modified gold chloride Ruffini's method, to study the autonomic and sensitive somatic nerve components. The distribution of both nerve components followed frequently the vascular networks. The autonomic innervation was represented by isolated or grouped ganglion cells, frequently placed along the course of nerve trunks, close to the epineurium or located within the perineural connective tissue. The sensitive somatic innervation was constituted by free and encapsulated corpuscles. The last one, morphologically classified as Pacini, Pacini-like and Golgi-Mazzoni's corpuscles, were found isolated or grouped to constitute simple and complex flower sprays, "oppositopolar corpuscles" and "poichilomorphous fibres". The very few Golgi-Mazzoni's corpuscles were found only in the knee joint articular capsule. The two nerve components, found in the considered districts, did not shown significant quanti-qualitative and topographic differences. This datum, at least in appearance, seems to conflict with the ostrich functional aptitudes. In fact, the ostrich is a bird unable to fly but very able to run.

**Descriptors:** ostrich, elbow, knee joint, forelimb anatomy, histology, hindlimb anatomy, histology, joint capsule innervation, joints anatomy, histology, joints innervation, struthioniformes anatomy, afferent pathways anatomy, autonomic pathways anatomy, connective tissue innervation.

Rubenson, J., D.G. Lloyd, T.F. Besier, D.B. Heliamas, and P.A. Fournier (2007). **Running in ostriches (*Struthio camelus*): three-dimensional joint axes alignment and joint kinematics.** *Journal of Experimental Biology* 210(Pt 14): 2548-62. ISSN: 0022-0949.

**Abstract:** Although locomotor kinematics in walking and running birds have been examined in studies exploring many biological aspects of bipedalism, these studies have been largely limited to two-dimensional analyses. Incorporating a five-segment, 17 degree-of-freedom (d.f.) kinematic model of the ostrich hind limb developed from anatomical specimens, we quantified the three-dimensional (3-D) joint axis alignment and joint kinematics during running (at approximately 3.3 m s<sup>-1</sup>) in the largest avian biped, the ostrich. Our analysis revealed that the majority of the segment motion during running in the ostrich occurs in flexion/extension. Importantly, however, the alignment of the average flexion/extension helical axes of the knee and ankle are rotated externally to the direction of travel (37 degrees and 21 degrees, respectively) so that pure flexion and extension at the knee will act to adduct and abduct the tibiotarsus relative to the plane of movement, and pure flexion and extension at the ankle will act to abduct and adduct the tarsometatarsus relative to the plane of movement. This feature of the limb anatomy appears to provide the major lateral (non-sagittal) displacement of the lower limb necessary for steering the swinging limb clear of the stance limb and replaces what would otherwise require greater adduction/abduction and/or internal/external rotation, allowing for less complex joints, musculoskeletal geometry and neuromuscular control. Significant rotation about the joints' non-flexion/extension axes nevertheless occurs over the running stride. In particular, hip abduction and knee internal/external and varus/valgus motion may further facilitate limb clearance during the swing phase, and substantial non-flexion/extension movement at the knee is also observed during stance. Measurement of 3-D segment and joint motion in birds will be aided by the use of functionally determined axes of rotation rather than assumed axes, proving important when interpreting the biomechanics and motor control of avian bipedalism.

**Descriptors:** ostrich, running, motion, joint axis, alignment, kinematics, locomotor, walking, joint motion, flexion, extension, limb anatomy.

Ruffins, S.W., M. Martin, L. Keough, S. Truong, S.E. Fraser, R.E. Jacobs, and R. Lansford (2007). **Digital three-dimensional atlas of quail development using high-resolution MRI.** *The Scientific World Journal* 7: 592-604. ISSN: 1537-744X.

**Abstract:** We present an archetypal set of three-dimensional digital atlases of the quail embryo based on microscopic magnetic resonance imaging (microMRI). The

atlases are composed of three modules: (1) images of fixed ex ovo quail, ranging in age from embryonic day 5 to 10 (e05 to e10); (2) a coarsely delineated anatomical atlas of the microMRI data; and (3) an organ system-based hierarchical graph linked to the anatomical delineations. The atlas is designed to be accessed using SHIVA, a free Java application. The atlas is extensible and can contain other types of information including anatomical, physiological, and functional descriptors. It can also be linked to online resources and references. This digital atlas provides a framework to place various data types, such as gene expression and cell migration data, within the normal three-dimensional anatomy of the developing quail embryo. This provides a method for the analysis and examination of the spatial relationships among the different types of information within the context of the entire embryo.

**Descriptors:** quail, development, three dimensional, high resolution MRI, embryo, anatomy, histology, embryology, magnetic resonance imaging.

Sathyamoorthy, O.R. and Geeta Ramesh (2006). **Gross anatomical studies on the sternum of the ostrich (*Struthio camelus*)**. *Indian Journal of Animal Health* 45(1): 83-86. ISSN: 0019-5057.

**Descriptors:** ostrich, sternum, gross anatomical studies, *Struthio camelus*.

Schaller, N., K. D'auot, P. Aerts, and B. Herkner (2007). **Phalangeal load and pressure distribution in walking and running ostriches (*Struthio camelus*)**. *Comparative Biochemistry and Physiology Part A Molecular and Integrative Physiology* 146(4, Suppl. S): S122. ISSN: 1095-6433.

**Descriptors:** ostriches feet, walking, running, phalangeal load, pressure distribution, skeletal system, *Struthio camelus*, meeting.

**Notes:** Meeting Information: Annual Meeting of the Society for Experimental Biology, Glasgow, UK; March 31-April 04, 2007.

Schulte, M., B. Diekamp, M. Manns, A. Schwarz, C. Valencia Alfonso, J.A. Kirsch, O. Gunturkun, and K. Folta (2006). **Visual responses and afferent connections of the n. ventrolateralis thalami (VLT) in the pigeon (*Columba livia*)**. *Brain Research Bulletin* 68(4): 285-292. ISSN: 0361-9230.

**Descriptors:** pigeon, visual responses, afferent connections, n. ventrolateralis thalami, VLT, retinal, forebrain.

Smith, N.C., R.C. Payne, K.J. Jespers, and A.M. Wilson (2007). **Muscle moment arms of pelvic limb muscles of the ostrich (*Struthio camelus*)**. *Journal of Anatomy* 211(3): 313-24. ISSN: 0021-8782.

**Abstract:** Muscle moment arms were measured for major muscles of the pelvic limb of the ostrich (*Struthio camelus*) in order to assess specific functional behaviour and to apply this to locomotor performance. Pelvic limbs of six juvenile ostriches were used

for this study. The tendon travel technique was used to measure moment arms of 21 muscles at the hip, knee, ankle and metatarsophalangeal joints throughout the ranges of motion observed during level running. Six of the 21 muscles measured were found to have moment arms that did not change with joint angle, whilst the remainder all demonstrated angle-dependent changes for at least one of the joints crossed. Moment arm lengths tended to be longest for the large proximal muscles, whilst the largest relative changes were found for the moment arms of the distal muscles. For muscles where moment arm varied with joint angle: all hip muscles were found to have increasing moment arms with extension of the joint, knee flexors were found to have moment arms that increased with extension, knee extensor moment arms were found to increase with flexion and ankle extensor moment arms increased with extension. The greatest relative changes were observed in the flexors of the metatarsophalangeal joint, for which a three-fold increase in moment arm was observed from flexion to full extension. Changes in muscle moment arm through the range of motion studied appear to optimize muscle function during stance phase, increasing the effective mechanical advantage of these muscles.

**Descriptors:** ostrich, muscle moment arms, pelvic limb muscles, functional behavior, locomotor performance, hip, knee, ankle, flexion, extension.

Smith, N.C., A.M. Wilson, K.J. Jespers, and R.C. Payne (2006). **Muscle architecture and functional anatomy of the pelvic limb of the ostrich (*Struthio camelus*)**. *Journal of Anatomy* 209(6): 765-79. ISSN: 0021-8782.

**Abstract:** The functional anatomy of the pelvic limb of the ostrich (*Struthio camelus*) was investigated in order to assess musculoskeletal specialization related to locomotor performance. The pelvic limbs of ten ostriches were dissected and detailed measurements of all muscle tendon units of the pelvic limb were made, including muscle mass, muscle length, fascicle length, pennation angle, tendon mass and tendon length. From these measurements other muscle properties such as muscle volume, physiological cross-sectional area (PCSA), tendon cross-sectional area, maximum isometric muscle force and tendon stress were derived, using standard relationships and published muscle data. Larger muscles tended to be located more proximally and had longer fascicle lengths and lower pennation angles. This led to an expected proximal to distal reduction in total muscle mass. An exception to this trend was the gastrocnemius muscle, which was found to have the largest volume and PCSA and also had the highest capacity for both force and power production. Generally high-power muscles were located more proximally in the limb, while some small distal muscles (tibialis cranialis and flexor perforatus digiti III), with short fibres, were found to have very high force generation capacities. The greatest proportion of pelvic muscle volume was for the hip extensors, while the highest capacity for force generation was observed in the extensors of the ankle, many of which were also in series with long tendons and thus were functionally suited to elastic energy storage.

**Descriptors:** ostrich, functional anatomy, pelvic limb, muscle architecture, locomotion physiology, muscle, skeletal anatomy, histology, biomechanics, hindlimb, muscle contraction, tendons anatomy, histology.

Song Hui, Peng KeMei, Tang WenHua, Liu HuaZhen, Wang Yan, Wei Lan, Du AnNa, and Tang Li (2007). **Relation between structure and function of oropharyngeal cavity in ostriches.** *Chinese Journal of Veterinary Science* 27(1): 77-80. ISSN: 1005-4545.

**Descriptors:** ostriches, oropharyngeal cavity, structure, function, relation, anatomy.

**Language of Text:** Chinese, summary in English.

Tomanek, R.J., H.K. Hansen, and E.I. Dedkov (2006). **Vascular patterning of the quail coronary system during development.** *Anatomical Record* 288A(9): 989-999. ISSN: 1552-4884.

**Descriptors:** quail, coronary system, development, vascular patterning.

Ushakumary, S. and Geetha Ramesh (2003). **Gross anatomy of pectoral girdle of ostrich (*Struthio camelus*).** *Cheiron* 32(3/4): 71-72. ISSN: 0379-543X.

**Descriptors:** ostrich, *Struthio camelus*, pectoral girdle, gross anatomy.

Venkatesan, S., S. Paramasivan, T.A. Kannan, S.H. Bashai, and G. Ramesh (2006). **A comparative anatomical study of the femur of domestic fowl, guinea fowl, turkey and ostrich.** *Indian Journal of Animal Sciences* 76(11): 925-926. ISSN: 0367-8318.

**Descriptors:** ostrich, turkey, guinea fowl, domestic fowl, femur, comparative anatomical study.

Vukievic, T.T., K. Babic, D. Mihelic, and V.G. Kantura (2004). **The anatomy of the digestive system of the ostrich (*Struthio camelus*).** *Proceedings of the 11th Ostrich World Congress, Island Great Brijun, Croatia, 15 17 October 2004* 66-69 ISSN: 1520-8052 (online).

**Descriptors:** ostrich, digestive system, anatomy, tongue, esophagus, proventriculus, jejunum, colon, duodenum, conference proceedings.

**Notes:** Meeting Information: Proceedings of the 11th Ostrich World Congress, Island Great Brijun, Croatia, 15-17 October 2004.

Weir, K.A. and C.A. Lunam (2006). **Immunohistochemical study of cutaneous nerves in the emu.** *Cell and Tissue Research* 326(3): 697-705. ISSN: 0302-766X.

**Abstract:** The distribution and chemical content of cutaneous nerves in 3- to 13-day-old emu chicks (*Dromaius novaehollandiae*) were examined by using double-labelling immunohistochemistry. Seven different subpopulations of cutaneous nerves were identified based on their neurochemistry. No intraepidermal nerve fibres were found. However, axons were located within the dermis and were often associated with

blood vessels, pennamotor muscles and feather follicles or innervated Herbst corpuscles. Both similarities and differences exist between subpopulations of cutaneous nerves in the emu and volant birds. As in volant birds, a subpopulation of cutaneous axons innervates the superficial skin layers and contains immunoreactivity to both substance P and calcitonin gene-related peptide (CGRP). This suggests that the neuropeptide content of these presumptive free nerve endings is conserved throughout the evolution of birds. In contrast, Herbst corpuscles in the emu are innervated by axons that contain immunoreactivity for CGRP or neuropeptide Y (NPY) but that lack the calbindin D-28k immunoreactivity found in fibres innervating Herbst corpuscles of volant birds. Herbst corpuscles therefore may have a different chemical content in a flightless species from that in volant birds.

**Descriptors:** emu, anatomy, histology, cutaneous nerves, immunohistochemistry study, nerve tissue metabolism, skin innervation, axons metabolism, blood vessels innervation, nerve fibers metabolism, skin blood supply.

Wustinger, J., D. Jasko, D. Drozd, M. Basinska, and N. Pospieszny (2006). **Muscles of thoracic limb of African ostrich (*Struthio camelus* L.).** *Electronic Journal of Polish Agricultural Universities* 9(2): 6pp. ISSN: 1505-0297.

**Descriptors:** African ostrich, muscles, thoracic limb, *Struthio camelus*, anatomy.

Yin YanBo, Li FangZheng, Tan JinShan, Song XueXiong, Dong WuZi, and Ji YaJie (2006). <http://jjdwxw.periodicals.net.cn> **Ultrastructure of the ostrich spermatozoa.** *Journal of Economic Animal* 10(4): 198-202. ISSN: 1007-7448.

**Descriptors:** ostrich, spermatozoa, ultrastructure, anatomy, reproduction.

**Language of Text:** Chinese, summary in English.

# Anesthesia and Analgesia

Dehghani, S., M. Mohammadi, and H. Nadda (2005). **Anaesthetic protocol for pigeon undergoing orthopaedic operation.** *Indian Journal of Veterinary Surgery* 26(1): 47. ISSN: 0254-4105.

**Descriptors:** pigeon, orthopedic operation, anesthetic protocol.

DeLucas, J.J., C. Rodriguez, M. Marin, F. Gonzalez, C. Ballesteros, and M.I. SanAndres (2007). **Pharmacokinetics of Intramuscular Ketamine in Young Ostriches Premedicated with Romifidine.** *Zentralblatt Fur Veterinarmedizin, Journal of Veterinary Medicine Series A Physiology Pathology Clinical Medicine Reihe A* 54(1): 48-50. ISSN: 0514-7158.

**Abstract:** Ketamine is a short-acting dissociative anaesthetic for chemical restraint and surgical anaesthesia in domestic and non-domestic animals. The present study was designed to determine the pharmacokinetics of a single dose of ketamine (10 mg/kg) after intramuscular (i.m.) administration to young ostriches premedicated with romifidine. Ketamine was rapidly absorbed after i.m. administration. Maximal ketamine concentration (C<sub>max</sub>) of 2.93 +/- 0.61 (So(Bg/ml) was reached at 12.5 +/- 2.50 min and thereafter ketamine concentrations decreased rapidly. The elimination half-life (t<sub>subscript 1(B/ subscript 2(Bz)</sub>) obtained was 62.37 +/- 17.37 min and mean residence time (MRT) was 77.33 +/- 19.12 min. The area under the curve (AUC) was 114.19 +/- 15.76 (So(Bg.min/ml).

**Descriptors:** ostriches, ketamine, intramuscular, pharmacokinetics, premedication, romifidine, chemical restraint, surgical anesthesia.

Durrani, U.F., M. Ashraf, and A. Khalid (2005). **Comparative efficacy of detomidine and detomidine - ketamine cocktail in quails.** *Pakistan Veterinary Journal* 25(4): 197-199. ISSN: 0253-8318.

**Abstract:** Twenty adult healthy quails (*Coturnix coturnix*) were divided into two equal groups. One group was administered detomidine (2.4 mg/kg, 1/M) and other group was administered detomidine-ketamine cocktail (1.2 mg/kg + 30 mg/kg, 1/M). Detomidine slowly and smoothly induced a light sedation accompanied by superficial analgesia, hypoventilation, hypothermia and bradycardia in all birds. Detomidine-ketamine cocktail rapidly and smoothly induced a deep anaesthesia accompanied by deep analgesia, hypoventilation, hypothermia and bradycardia and complete loss of all reflexes in all birds. In both groups, recovery from sedation and anaesthesia was smooth and of short duration. From this study it was concluded that for minor and least painful procedures in quails detomidine can be used alone, while

for major and painful surgical procedures detomidine- ketamine combination should be preferred.

**Descriptors:** Japanese quails, anesthetics, analgesics, anesthesia, birds, domestic animals, drugs, Galliformes, livestock, neurotropic drugs, poultry.

**Language of Text:** Summary in English.

Jimenez Baigorria, M.V.L. (2004). **Balanced anesthesia in rhea for abdominal surgery.** *Internet Journal of Veterinary Medicine* 1(1): unpaginated. ISSN: d000-1004.

**Descriptors:** rhea, abdominal surgery, anesthesia balanced, veterinary.

Klaphake, E., J. Schumacher, C. Greenacre, M.P. Jones, and N. Zagaya (2006). **Comparative anesthetic and cardiopulmonary effects of pre-versus postoperative butorphanol administration in Hispaniolan amazon parrots (*Amazona ventralis*) anesthetized with sevoflurane.** *Journal of Avian Medicine and Surgery* 20(1): 2-7. ISSN: 1082-6742.

**Descriptors:** Amzon parrots, butorphanol, sevoflurane, anesthetic, postoperative, cardiopulmonary effects, comparative.

Lucas, J.J.d., C. Rodriguez, M. Marin, F. Gonzalez, C. Ballesteros, and M.I. San Andres (2007). **Pharmacokinetics of intramuscular ketamine in young ostriches premedicated with romifidine.** *Journal of Veterinary Medicine Series A* 54(1): 48-50. ISSN: 0931-184X.

**Descriptors:** ostriches, ketamine, intramuscular, premedicated, romifidine, pharmacokinetics, young birds.

Nilson, P.C., I. Teramitsu, and S.A. White (2005). **Caudal thoracic air sac cannulation in zebra finches for isoflurane anesthesia.** *Journal of Neuroscience Methods* 143(2): 107-15. ISSN: 0165-0270.

**Abstract:** Small songbirds such as the zebra finch are commonly used for studies on the neural mechanisms that underlie vocal learning. For these studies, survival surgeries are often performed that involve animal anesthesia and stereotaxic stabilization for localization of specific brain regions. Here we describe air sac cannulation as a novel method for delivering isoflurane gas to zebra finches for anesthesia during neurosurgery. Advantages of this method include that it leaves the bird's head free for stereotaxic targeting and does not interfere with the beak clamps that are often used to position and stabilize the head. It additionally allows for the use of the inhalant anesthetic, isoflurane, which is an appealing alternative to injectable anesthetics because it provides fast, minimally stressful induction, and low subject and personnel toxicity. The use of isoflurane also prevents overdosing and lengthy postoperative recovery times.

**Descriptors:** zebra finches, isoflurane anesthesia, caudal thoracic air sac, canulation, neurosurgery, inhalant anesthesia, injectable, recovery.

Paul Murphy, J. and J.P. Fialkowski (2004). **Pharmacokinetic properties of a single intramuscular dose of buprenorphine in African grey parrots (*Psittacus erithacus erithacus*)**. *Journal of Avian Medicine and Surgery* 18(4): 224-228. ISSN: 1082-6742.

**Descriptors:** African grey parrots, buprenorphine, single I.M dose, pharmacokinetic properties, analgesic, dose, plasma concentration.

Pettifer, G.R., J. Cornick Seahorn, J.A. Smith, G. Hosgood, and T.N.J. Tully (2002). **The comparative cardiopulmonary effects of spontaneous and controlled ventilation by using the Hallowell EMC Anesthesia WorkStation in Hispaniolan Amazon parrots (*Amazona ventralis*)**. *Journal of Avian Medicine and Surgery* 16(4): 268-276. ISSN: 1082-6742.

**Descriptors:** Amazon parrots, cardiopulmonary effects, ventilation, spontaneous, controlled, anesthesia, work station, anesthetic.

Sladky, K.K., L. Krugner Higby, E. Meek Walker, T.D. Heath, and J. Paul Murphy (2006). **Serum concentrations and analgesic effects of liposome-encapsulated and standard butorphanol tartrate in parrots**. *American Journal of Veterinary Research* 67(5): 775-81. ISSN: 0002-9645.

**Abstract:** OBJECTIVE: To compare serum concentrations of liposome-encapsulated butorphanol tartrate (LEBT) and standard butorphanol tartrate (STDBT) following SC and IM administration, respectively, and to evaluate analgesic effects of LEBT and STDBT after parenteral administration to Hispaniolan parrots. ANIMALS: 11 adult Hispaniolan parrots. PROCEDURE: The ability of LEBT to prolong the duration of analgesia in an avian species was tested. Blood samples were collected at serial time points after SC administration of LEBT (10 mg/kg or 15 mg/kg) or IM administration of STDBT (5 mg/kg). Serum concentrations of butorphanol tartrate were determined by use of a commercial immunoassay that measured parent drug and metabolites. Analgesic efficacy was evaluated in parrots exposed to electrical and thermal stimuli. Foot withdrawal thresholds were recorded at baseline and at serial time points after LEBT (15 mg/kg), liposome vehicle, STDBT (2 mg/kg), or physiologic saline (0.9% NaCl) solution administration. RESULTS: LEBT had a prolonged in vivo release for up to 5 days. Negligible serum butorphanol and butorphanol metabolite concentrations were obtained at 24 hours after IM administration of STDBT. Analgesic efficacy of LEBT as measured by foot withdrawal threshold to noxious thermal and electrical stimuli persisted for 3 to 5 days following SC administration of LEBT. CONCLUSIONS AND CLINICAL RELEVANCE: SC administration of LEBT provided analgesia and detectable serum butorphanol concentrations in Hispaniolan parrots for up to 5 days. The use of LEBT may allow

for substantial improvement in long-term pain relief without subjecting birds to the stress of handling and multiple daily injections.

**Descriptors:** parrots, analgesia, butorphanol, therapeutic use, liposomes, administration, dosage, pain, drug therapy, analgesics, opioid, serum concentrations, analgesic effects, pharmacokinetics, therapeutic use, butorphanol administration, dosage, dose response relationship.

Stanford, M. (2002). **Clinical assessment of sevoflurane use in African grey parrots.** *Exotic DVM* 4(6): 9. ISSN: 1521-1363.

**Descriptors:** African grey parrots, anesthesia, anesthetics, dosage effects, sevoflurane, clinical assessment.

# Auditory

Dooling, R.J. and B. Lohr (2006). **Auditory temporal resolution in the zebra finch (*Taeniopygia guttata*): a model of enhanced temporal acuity.** *Ornithological Science* 5(1): 15-22. ISSN: 1347-0558.

**Descriptors:** zebra finch, auditory temporal resolution, model, enhanced temporal acuity, *Taeniopygia guttata*.

MacLeod, K.M., D. Soares, and C.E. Carr (2006). **Interaural timing difference circuits in the auditory brainstem of the emu (*Dromaius novaehollandiae*).** *Journal of Comparative Neurology* 495(2): 185-201. ISSN: 0021-9967.

**Descriptors:** emu, auditory brainstem, interaural timing difference, circuits, sound localization, birds, anatomy, physiology.

Uplisova, K.O. (2006). **The acoustic and auditor analysis of vowel-like sounds of gray parrot (*Psittacus erithacus*) and budgerigar (*Melopsittacus undulatus*).** *Sensornye Sistemy* 20(3): 229-237. ISSN: 0235-0092.

**Descriptors:** grey parrot, budgerigar, vowel-like sounds, acoustic, auditor, analysis, *Melopsittacus undulatus*, *Psittacus erithacus*.

**Language of Text:** Russian, summary in English.



# Behavior and Care

Barri, F.R., J.L. Navarro, N.O. Maceira, and M.B. Martella (2005). **Rearing greater rhea (*Rhea americana*) chicks: is adoption more effective than the artificial intensive system?** *British Poultry Science* 46(1): 22-5. ISSN: 0007-1668.

**Abstract:** (1) Survival and weight gain of farmed Greater Rhea (*Rhea americana*) chicks reared by the adult males that adopted them were compared with those of chicks reared under an artificial intensive system. (2) Both variables were periodically recorded up to the age of 3 months. Gompertz growth curves were fitted to individual growth data using the average adult weight of this population as asymptote. (3) No significant differences in survival rate were detected between systems (adoption=47%, intensive=43%). However, during the first half of the breeding season (mid-spring to mid-summer), the growth rate of adopted chicks (0.01481) was higher than that of intensively reared chicks (0.01296). (4) The adoption system may be more effective in terms of growth, and is probably more efficient in cost/effectiveness than the artificial intensive technique most frequently used. Adoption by males has additional advantages, such as a correct imprinting of the chicks and the selection of more capable individuals. Therefore, it should be used not only commercially but also in conservation projects where individuals are released to the wild.

**Descriptors:** animal husbandry methods, behavior, animal, *Rheiformes* physiology, aging, rhea, adoption, rearing chicks, artificial intensive.

Bassett, S.M. and C.E. Travers (2006). **The role of captive rearing in kiwi conservation.** *Journal of Ornithology* 147(5, Suppl. 1): 115-116. ISSN: 0021-8375.

**Descriptors:** kiwi conservation, captive rearing, role, meeting.

**Notes:** Meeting Information: 24th International Ornithological Congress, Hamburg, Germany; 2006.

Csermely, D., G. Gaibani, and E. Dardani (2007). **Year-round behavioural sequences in captive ostrich (*Struthio camelus domesticus*) pairs.** *Applied Animal Behaviour Science* 103(1-2): 156-166. ISSN: 0168-1591.

**Descriptors:** ostriches, animal behavior, gender differences, seasonal variation, pair housing, farmed animal species, ostrich pairs, farmed ostriches, behavior transitions, behavior repertoire.

Fox, R.A. and J.R. Millam (2004). **The effect of early environment on neophobia in orange-winged Amazon parrots (*Amazona amazonica*).** *Applied Animal Behaviour Science* 89(1-2): 117-129. ISSN: 0168-1591.

**Descriptors:** orange winged Amazon parrots, early environment, effect, neophobia, *Amazona amazonica*.

Gajdon, G.K., N. Fijn, and L. Huber (2004). **Testing social learning in a wild mountain parrot, the kea (*Nestor notabilis*)**. *Learning and Behavior a Psychonomic Society Publication* 32(1): 62-71. ISSN: 1543-4494.

**Abstract:** Huber, Taborsky, and Rechberger (2001) reported an experiment in which the efficiency with which captive keas opened a complex food container was increased by observation of a skilled conspecific. However, only testing social learning in free-ranging animals can demonstrate social learning in natural conditions. For that purpose, a tube-lifting paradigm was developed and tested on keas both in captivity and in Mount Cook National Park, New Zealand. The task was to remove a tube from an upright pole in order to gain access to a reward inside the tube. The top of the pole was higher than a standing kea, so that, to remove the tube, an individual had to simultaneously climb onto the pole and manipulate the tube up the pole with its bill. Because only 1 naive bird managed to remove a tube twice in 25 half-hour sessions and disappeared after success, another bird was trained to solve the task and to provide demonstrations for others. Even under such conditions, only 2 of at least 15 birds learned to remove the tube in 28 sessions. There was no indication that observer birds' use of bill and feet when exploring the tube changed as the number of observations of tube removal increased in a way that would, in principle, increase the likelihood of tube removal. The results suggest a dissociation of social learning potential as assessed in laboratory animals, and social transmission of foraging techniques in natural populations.

**Descriptors:** parrot, social learning, testing, imitative behavior, problem solving, social environment, social facilitation, adaptation, behavior, feeding behavior, imprinting psychology, reinforcement psychology.

Galef, B.G.J., S.J. Watkins, and P. Salehi (2006). **Effects of enclosure size on sexual behavior of Japanese quail (*Coturnix japonica*)**. *Journal of Comparative Psychology* 120(4): 433-7. ISSN: 0735-7036.

**Abstract:** The authors determined whether results of experiments on copulatory and affiliative behavior of pairs of Japanese quail (*Coturnix japonica*) conducted in a closely confining apparatus would predict behavior in a large enclosure in which female quail could avoid contact with male quail. As found previously in studies of closely confined quail, in a large enclosure containing numerous barriers, both unmated female quail and mated female quail laying unfertilized eggs were more likely to remain near a confined male quail than were mated female quail laying fertilized eggs. Furthermore, the number of copulations that a pair engaged in when closely confined predicted the number of copulations that they engaged in when they were in the large enclosure. Patterns of affiliation and of mating in a confining labo-

ratory apparatus thus predicted behavior in a larger enclosure that provided female quail with opportunity to avoid contact with male quail.

**Descriptors:** Japanese quail, copulation, sexual behavior, social behavior, Coturnix, habituation, enclosure size, effects.

Garner, J.P., C.L. Meehan, T.R. Famula, and J.A. Mench (2006). **Genetic, environmental, and neighbor effects on the severity of stereotypies and feather picking in Orange-winged Amazon parrots (*Amazona amazonica*): an epidemiological study.** *Applied Animal Behaviour Science* 96(1-2): 153-168. ISSN: 0168-1591.

**Descriptors:** Amazon parrots, abnormal behavior, stereotyped behavior, animal stress, genetic resistance, epidemiological studies, feather pecking, heritability, animal welfare.

Garner, J.P., C.L. Meehan, and J.A. Mench (2003). **Stereotypies in caged parrots, schizophrenia and autism: evidence for a common mechanism.** *Behavioural Brain Research* 145(1/2): 125-134. ISSN: 0166-4328.

**Descriptors:** parrots, behavior, abnormal, caged, autism, schizophrenia, stereotypies.

Harcourt Brown, N. (2004). **Development of the skeleton and feathers of dusky parrots (*Pionus fuscus*) in relation to their behaviour.** *Veterinary Record* 154(2): 42-8. ISSN: 0042-4900.

**Abstract:** A clutch of five dusky parrots (*Pionus fuscus*) was observed from hatching to fully grown. They were examined radiographically from 16 to 45 days of age, a few days before the cessation of bone growth, and the development of their feathers and their behaviour were also studied. It was observed that when growing birds were removed from the nest and placed singly on a flat surface they would stand up and walk about until restrained; normally these birds would move very little and lie in an intertwined huddle that supported their relatively weak growing skeletons. At 50 days old they would climb to the nest entrance, retreating if scared. From day 51 the parrots flapped their wings vigorously inside the nest box, and they emerged at 53 days old when nearly all their large feathers had finished growing. These findings may help to explain the high rate of juvenile osteodystrophy in hand-reared parrots; premature exercise could lead to pathological deformity of the long bones, especially the major weight-bearing bone, the tibiotarsus.

**Descriptors:** dusky parrots, *Pionus fuscus*, behavior, feathers growth, development, tarsus, tibia growth, development, husbandry, feathers anatomy, histology, feathers radiography, parrots anatomy, histology.

Kelly, D.J. and N.M. Marples (2004). **The effects of novel odour and colour cues on food acceptance by the zebra finch, *Taeniopygia guttata*.** *Animal Behaviour* 68(5): 1049-1054. ISSN: 0003-3472.

**Descriptors:** zebra finch, food acceptance, color cues, novel odor, effects, eating behavior.

Kingston, R. (2006). **The painted firetail finch *Emblema pictum***. *Australian Aviculture* 60(6): 119-124. ISSN: 1030-5440.

**Descriptors:** painted firetail finch, *Emblema pictum*, captivity care, husbandry, reproductive techniques, Australia.

Kummerfeld, N. (2006). **Verhalten, Verhaltensstörungen und Verhaltenstherapie von Papageien und Sittichen. [Behavior, behavioral disturbances and behavioral therapy of parrots and parakeets.]**. *Tieraerztliche Praxis Ausgabe K Kleintiere Heimtiere* 34(3): 211-219. ISSN: 1434-1239.

**Descriptors:** parrots, parakeets, behavior, behavioral disturbances, therapy.

**Language of Text:** German, summary in German.

Luescher, A. (2006). **Manual of Parrot Behavior**, Blackwell Publishing: ISBN: 9780813827490.

**Descriptors:** parrot behavior, manual, social behavior, reproductive behavior, captive behavior.

**Notes:** Includes bibliographical references and index. Contents: The classification and the status of wild populations of parrots / Dominique G. Homberger -- Behavior of wild Amazona and rhynchopsitta parrots, with comparative insight from other psittacids / Ernesto C. Enkerlin-Hoeflich, Noel F.R. Snyder, James W. Wiley -- Parrot conservation, trade, and reintroduction / Charles A. Munn -- Sensory capacities of parrots / Jennifer Graham .. [et al.] -- Social behavior of psittacine birds / Lynne M. Seibert -- Captive parrot nutrition : interactions with anatomy, physiology, and behavior / Kevin David Matson, Elizabeth A. Koutsos -- Comfort behavior and sleep / Laurie Bergman, Ulrike S. Reinisch -- Parrot reproductive behavior, or, who associates, who mates, and who cares / Tracey R. Spoon -- Nest box preferences / Scott George Martin, April Romagnano -- Hand-rearing : behavioral impacts and implications for captive parrot welfare / Rebecca Fox -- Behavioral development of psittacine companions : neonates, neophytes, and fledglings / Phoebe Greene Linden, with Andrew U. Luescher -- Handler attitude and chick development / Brenda Cramton -- Grey parrot cognition and communication / Irene M. Pepperberg -- How parrots learn / S.G. Friedman, Steve Martin, Bobbi Brinker -- Behavior classes in the veterinary hospital : preventing problems before they start / Kenneth R. Welle -- Diagnostic workup of suspected behavioral problems / Susan E. Orosz -- Aggressive behavior in pet birds / Kenneth R. Welle, Andrew U. Luescher -- Parrot vocalization / Laurie Bergman, Ulrike S. Reinisch -- Parrots and fear / Liz Wilson, Andrew U. Luescher -- Problem sexual behaviors of companion parrots / Fern Van Sant -- Mate trauma / April Romagnano -- Feather picking disorder in pet birds / Lynne M.

Seibert -- Psittacine behavioral pharmacotherapy / Kenneth M. Martin -- Behavior of captive psittacids in the breeding aviary / G. Heather Wilson -- Housing and management considerations for problem prevention / Andrew U. Luescher, Liz Wilson -- Captive parrot welfare / Cheryl Meehan, Joy Mench.

Meade, J., D. Biro, and T. Guilford (2006). **Route recognition in the homing pigeon, *Columba livia***. *Animal Behaviour* 72(Part 5): 975-980. ISSN: 0003-3472.

**Descriptors:** homing pigeon, route recognition, landmarks, homing behavior.

Meehan, C. and J. Mench (2006). **Captive parrot welfare**. *Manual of Parrot Behavior*. Blackwell Publishing: 9600 Garsington Rd, Oxford OX4 2DQ, Oxen, UK, p. 301-318. ISBN: 0813827493.

**Descriptors:** captive parrot, welfare, behavior, manual, care.

Miller, K.A., J.P. Garner, and J.A. Mench (2006). **Is fearfulness a trait that can be measured with behavioural tests? A validation of four fear tests for Japanese quail**. *Animal Behaviour* 71(6): 1323-1334. ISSN: 0003-3472.

**Descriptors:** Japanese quail, fear tests, validation, behavioral tests, fearfulness, measured.

Owen, D.J. and J.M. Lane (2006). **High levels of corticosterone in feather-plucking parrots (*Psittacus erithacus*)**. *Veterinary Record Journal of the British Veterinary Association* 158(23): 804-805. ISSN: 0042-4900.

**Descriptors:** *Psittacus*, corticosterone levels, animal stress, parrots, feather plucking, high levels.

Pepperberg-I (2006). **Behavioral differences in grey parrots: studies on cognition and communication**. *Journal of Ornithology* 147(5, Suppl. 1): 6. ISSN: 0021-8375.

**Descriptors:** grey parrots, behavioral differences, cognition, communication, studies, meeting.

**Notes:** Meeting Information: 24th International Ornithological Congress, Hamburg, Germany; 2006.

Pepperberg, I.M. (2006). **Cognitive and communicative abilities of Grey parrots**. *Applied Animal Behaviour Science* 100(1-2): 77-86. ISSN: 0168-1591.

**Descriptors:** grey parrots, abilities, cognitive, communicative, behavior, intelligence.

Pepperberg, I.M. (2004). **Cognitive and communicative capacities of Grey parrots--implications for the enrichment of many species**. *Animal Welfare* 13s203-S208. ISSN: 0962-7286.

**Descriptors:** *Psittacus*, Grey parrots, environmental enrichment, human animal relations, animal communication, animal behavior, training, animal welfare.

Pepperberg, I.M. (2006). **Grey parrot numerical competence: A review.** *Animal Cognition* 9(4): 377-91. ISSN: 1435-9448.

**Abstract:** The extent to which humans and nonhumans share numerical competency is a matter of debate. Some researchers argue that nonhumans, lacking human language, possess only a simple understanding of small quantities, generally less than four. Animals that have, however, received some training in human communication systems might demonstrate abilities intermediate between those of untrained nonhumans and humans. Here I review data for a Grey parrot (*Psittacus erithacus*) that has been shown to quantify sets of up to and including six items (including heterogeneous subsets) using vocal English labels, to comprehend these labels fully, and to have a zero-like concept. Recent research demonstrates that he can also sum small quantities. His success shows that he understands number symbols as abstract representations of real-world collections, and that his sense of number compares favorably to that of chimpanzees and young human children.

**Descriptors:** grey parrot, behavior, cognition, comprehension, concept formation, mathematics, symbols, numbers, counting ability.

Rosenwax, A. (2007). **Manual of parrot behaviour, 1st edn - Editor by Luescher AU.** *Australian Veterinary Journal* 85(3): 97. ISSN: 0005-0423.

**Descriptors:** parrot behavior, manual.

Santilli, F., R.M. Stella della, P. Mani, B. Fronte, G. Paci, and M. Bagliacca (2004). **Differenze comportamentali fra fagiani di ceppo selvatico e di allevamento. [Behavioural differences between pheasants artificially hatched from wild parents or from farm parents].** *Annali Della Facolta Di Medicina Veterinaria Di Pisa* 57: 317-326. ISSN: 0365-4729.

**Descriptors:** pheasants, wild parents, artificially hatched, behavioral differences, farm parents.

**Language of Text:** Italian, summary in English.

Sarasqueta, D.V. (2005). **Aspects of rearing, reproduction and hybridization of Darwin's Rhea or Choique (*Rhea pennata* syn. *Pterocnemia pennata*, spp. pennata).** E. Carbajo *Proceedings of the 3rd International Ratite Science Symposium of the World's Poultry Science Association WPSA and 12th World Ostrich Congress, Madrid, Spain, 14th 16th October, 2005*, World Poultry Science Association (WPSA): Beekbergen, Netherlands, p. 35-44. ISBN: 8460963535.

**Descriptors:** Darwin's rhea, rearing, reproduction, hybridization, choique, aspects, conference proceedings, book chapter.

**Notes:** Meeting Information: Proceedings of the 3rd International Ratite Science Symposium of the World's Poultry Science Association (WPSA) and 12th World Ostrich Congress, Madrid, Spain, 14th-16th October, 2005.

Schmid, R., M.G. Doherr, and A. Steiger (2006). **The influence of the breeding method on the behaviour of adult African grey parrots (*Psittacus erithacus*).** *Applied Animal Behaviour Science* 98(3-4): 293-307. ISSN: 0168-1591.

**Descriptors:** *Psittacus*, African grey parrots, rearing, wild birds, aggression, parrot behavior, stereotyped behavior, pets, abnormal behavior, animal handling, young animals, imprinting behavior, human animal relations, hand rearing.

Smith, E.L., V.J. Greenwood, A.R. Goldsmith, and I.C. Cuthill (2005). **Effect of supplementary ultraviolet lighting on the behaviour and corticosterone levels of Japanese quail chicks.** *Animal Welfare* 14(2): 103-109. ISSN: 0962-7286.

**Descriptors:** Japanese quails, animal stress, animal behavior, animal welfare, ultraviolet lighting, effect, corticosterone levels.

Watanabe, S. and H.J. Bischof (2004). **Effects of hippocampal lesions on acquisition and retention of spatial learning in zebra finches.** *Behavioural Brain Research* 155(1): 147-52. ISSN: 0166-4328.

**Abstract:** We tested the role of the hippocampus in spatial memory of zebra finches. The birds were trained to find the location of a food site among four identical feeders arranged on the aviary floor. Extra-maze cues were present. The birds had to perform the task from four different starting points. Successful visits and the time to find the food were recorded. Hippocampal lesions made before acquisition led to a decrease in correct choices. Hippocampal lesions following training disrupted the retention of the spatial memory. Surprisingly, birds with hippocampal damage reached the food as quickly as intact birds, but they needed more visits to find the correct feeder. Therefore, the birds with hippocampal damage used an alternative, nonspatial memory-based strategy to find the food.

**Descriptors:** zebra finches, spatial learning, hippocampal lesions, effects, acquisition, retention, spatial memory, nonspatial memory-based strategy, food finding.

Watanabe, S. and N.F. Troje (2006). **Towards a "virtual pigeon": a new technique for investigating avian social perception.** *Animal Cognition* 9(4): 271-9. ISSN: 1435-9448.

**Abstract:** The purpose of the present study is to examine the applicability of a computer-generated, virtual animal to study animal cognition. Pigeons were trained to discriminate between movies of a real pigeon and a rat. Then, they were tested with movies of the computer-generated (CG) pigeon. Subjects showed generalization to the CG pigeon, however, they also responded to modified versions in which the CG

pigeon was showing impossible movement, namely hopping and walking without its head bobbing. Hence, the pigeons did not attend to these particular details of the display. When they were trained to discriminate between the normal and the modified version of the CG pigeon, they were able to learn the discrimination. The results of an additional partial occlusion test suggest that the subjects used head movement as a cue for the usual vs. unusual CG pigeon discrimination.

**Descriptors:** pigeon, cognition, avian social perception, investigating technique, computer generated virtual pigeon.

Wittig, W. (2004). **Aufzuchtprobleme beim Mohrengimpel. [Rearing problems with the gold-headed finch.]**. *Gefiederte Welt* 128(11): 332-335. ISSN: 0016-5816.

**Descriptors:** gold-headed finch, rearing problems.

**Language of Text:** German.

# Circulatory

Abbate, F., C. Pfarrer, C.J. Jones, E. Ciriaco, G. Germana, and R. Leiser (2007). **Age-dependent changes in the pigeon bursa of Fabricius vasculature: a comparative study using light microscopy and scanning electron microscopy of vessel casts.** *Journal of Anatomy* 211(3): 387-98. ISSN: 0021-8782.

**Abstract:** The present study was carried out to analyse the vascularization of the pigeon bursa cloacalis of Fabricius and to determine whether it undergoes age-dependent changes during its functionally most important growth period after hatching of the pigeon. Morphological assessment of vascular corrosion casts, studied qualitatively and quantitatively, was applied for the first time to investigate the vascularization of the pigeon bursa of Fabricius. This also allowed us to analyse the microvasculature and morphological aspects of the vessel interrelationships as occurring in the natural state. The casts were compared with histological sections stained by haematoxylin-eosin and by binding of the lectin e-PHA (*Phaseolus vulgaris*, erythroagglutinin) to blood vessels. The vascular architecture of the bursa of Fabricius of the pigeon revealed that the organ is irrigated via two pathways, first through the terminal capillary system of lymphoid follicles arising from the internal pudendal artery, and secondly through arteries originating from the cloacal vasculature of the collum of the organ supplying the periluminal capillary system of the pigeon bursa of Fabricius. Both systems are drained by a venous system which is collateral to the system of the internal pudendal artery and clearly functions as a direct link between the lumen and vasculature of the cloaca or gut, respectively, and the bursa fabricii. This could allow the lymphocytes to be confronted with antigens from the contents of the gut, and their subsequent transport into the secondary lymphoid organs of the organism. Our results demonstrate that the blood vessels, as major and supplying part of the lymphoid system of the bursa Fabricii, clearly reflect three different phases of development: the evolution phase from about day 20 until day 50 post-hatching, the mature phase from days 50 to 90, and the involution phase after day 90. During the evolution phase the density of the vessel system rapidly increases, while in the mature phase the vascular architecture is maintained. The involution phase is dominated by vascular degeneration combined with shrinkage of the whole organ. Therefore, the morphology of the vasculature distinctly reflects the functional status of this primary lymphoid organ during its lifespan.

**Descriptors:** pigeon, bursa of Fabricius, vasculature, changes, age dependent, light microscopy, scanning electron microscopy, blood vessel casts.

Ando, K., T. Hiruma, Y. Nakajima, T. Yamagishi, R. Kobayashi, and H. Nakamura (2004). **Morphological and immunohistochemical studies of the aortic wall during coronary artery development in quail embryonic heart.** *Anatomical Science International* 79(August): 370. ISSN: 1447-6959.

**Descriptors:** quail, aortic wall, coronary artery development, embryonic heart, studies, morphological, immunohistochemical, meeting.

**Notes:** 16th International Congress of the IFAA (International Federation of Associations of Anatomists) and the 109th Annual Meeting of the Japanese Association of Anatomists, Kyoto, Japan; August 22-27, 2004.

Ando, K., Y. Nakajima, T. Yamagishi, S. Yamamoto, and H. Nakamura (2004). **Development of proximal coronary arteries in quail embryonic heart: multiple capillaries penetrating the aortic sinus fuse to form main coronary trunk.** *Circulation Research* 94(3): 346-52. ISSN: 0009-7330.

**Abstract:** Studies have shown that the proximal coronary artery (PCA) develops via endothelial ingrowth from the peritruncal ring (PR) of the coronary vasculature. However, the details of PCA formation remain unclear. We examined the development of PCAs in quail embryonic hearts from 5 to 9 days of incubation (embryonic day [ED]) using double-immunostaining for QH1 (quail endothelial marker) and smooth muscle alpha-actin. At 6 to 7 ED, several QH1-positive endothelial strands from the PR penetrated the facing sinuses, and in some embryos, several endothelial strands penetrated the posterior (noncoronary) sinus. At 7 to 8 ED, the endothelial strands penetrating the facing sinuses seemed to fuse, forming a proximal coronary stem that was demarcated from the aortic wall by the nascent smooth muscle layer of the coronary artery. By 9 ED, two coronary stems were completely formed, and the endothelial strands previously penetrating the noncoronary sinus had disappeared. Confocal microscopy at 6 ED revealed discontinuous QH1-positive endothelial progenitors in the aortic wall at sites where the endothelial strands would later develop. Observations demonstrate that during the formation of the PCA, endothelial strands from the PR penetrate the facing sinuses and then fuse, whereas those strands penetrating the noncoronary sinus disappear. Thereafter, the coronary artery tunica media demarcates the definitive PCA from the aortic media.

**Descriptors:** quail, embryonic heart, coronary arteries, embryology, blood supply, heart embryology, capillaries embryology, embryonic development, capillaries, aortic sinus fuse, coronary trunk.

Ando, K., H. Kusaba, T. Soh, and H. Iwamoto (2007). **Different patterns of vasoactive intestinal polypeptide (vip)-immunoreactive and acetylcholinesterase (ache)-positive innervation in the internal carotid artery and cerebral arterial tree of the quail.** *Journal of Veterinary Medical Science* 69(2): 177-183. ISSN: 0916-7250.

**Descriptors:** quail, vasoactive intestinal polypeptide, vip, immunoreactive and ace-

tylcholinesterase, ache, different patterns, positive innervation, internal carotid artery, cerebral arterial tree.

Baszczyk, B., Z. Tarasewicz, J. Udaa, D. Gaczarzewicz, T. Stankiewicz, D. Szczerbinska, K. Romaniszyn, and J. Jasieniecka (2006). **Changes in the blood plasma testosterone and cholesterol concentrations during sexual maturation of Pharaoh quails.**

*Animal Science Papers and Reports* 24(3): 259-266. ISSN: 0860-4037.

**Descriptors:** pharaoh quails, blood plasma testosterone, cholesterol concentrations, changes, during sexual maturation.

**Language of Text:** Polish.

Blaszczyk, B., Z. Tarasewicz, J. Udala, D. Gaczarzewicz, T. Stankiewicz, D. Szczerbinska, K. Romaniszyn, and J. Jasieniecka (2006). **Changes in the blood plasma testosterone and cholesterol concentrations during sexual maturation of pharaoh quails.**

*Animal Science Papers and Reports* 24(3): 259-266. ISSN: 0860-4037.

**Descriptors:** pharaoh quails, changes, blood plasma testosterone, cholesterol concentrations, sexual maturation.

Bouda, J., G.F. Quiroz Rocha, E. Sanchez Ramirez , J. Esquivel Pena, and J.L. Davalos Flores (2004). **Selected biochemical values in blood plasma of ostriches of different age and sex.** *Veterinaria Mexico* 35(1): 45-54. ISSN: 0301-5092.

**Descriptors:** ostriches, different age and sex, selected biochemical values, blood plasma, reference data, disease diagnosis.

**Language of Text:** Spanish.

Bouda, J., G.F. Quiroz Rocha, E. Sanchez Ramirez , J. Esquivel Pena, and J.L. Davalos Flores (2004). **Valores bioquimicos selectos en plasma sanguineo de avestruces de diferentes edades y sexo. [Selected biochemical values in blood plasma of ostriches of different age and sex].** *Veterinaria Mexico* 35(1): 45-54. ISSN: 0301-5092.

**Descriptors:** ostriches, *Struthio camelus*, selected blood plasma values, age, sex, venous blood plasma, reference data, disease diagnosis.

**Language of Text:** Spanish, summaries in English and Spanish.

Chadman, K.K. and J.H. Woods (2004). **Cardiovascular effects of nicotine, chlorisondamine, and mecamlamine in the pigeon.** *Journal of Pharmacology and Experimental Therapeutics* 308(1): 73-78. ISSN: 0022-3565.

**Descriptors:** pigeon, cardiovascular effects, nicotine, chlorisondamine, mecamlamine.

Chen YiengHow, Feng ChingWang, Kuo MingJung, Lin DerTyan, Shiau JongRong, and Tsang ChauLoong (2003). **The changes in haematology of ostrich from 4 to 12 weeks of age.** *Taiwan Veterinary Journal* 29(4): 347-352. ISSN: 1682-6485.

**Descriptors:** ostrich, age, 4 to 12 weeks, hematology changes, normal values, white blood cells, blood samples.

**Language of Text:** Chinese, summary in English.

Durgun, Z., E. Keskin, R. Col, and B. Atalay (2005). **Selected haematological and biochemical values in ostrich chicks and growers.** *Archiv Fur Geflugelkunde* 69(2): 62-66. ISSN: 0003-9098.

**Descriptors:** ostrich, chicks, growers, hematological values, biochemical values, selected.

**Language of Text:** German.

Eklom, K. and A. Lill (2006). **Development of parameters influencing blood oxygen-carrying capacity in nestling doves.** *Emu* 106(4): 283-288. ISSN: 0158-4197.

**Descriptors:** nestling doves, blood oxygen carrying capacity, influencing parameters, development.

Elias, M.Z., T.A. Aire, and J.T. Soley (2007). **Macroscopic features of the arterial supply to the reproductive system of the male ostrich (*Struthio camelus*).** *Anatomia, Histologia, Embryologia* 36(4): 255-62. ISSN: 0340-2096.

**Abstract:** The macroscopic features of the arterial supply to the reproductive system of the male ostrich was studied in 16 pre-pubertal and eight sexually mature and active birds. The left and right cranial renal arteries arise from the aorta, between the cranial divisions of the kidneys. These vessels supply the cranial divisions of the kidneys, the testes, the epididymides and the cranial segments of the ducti deferentia. Accessory testicular arteries which arise directly from the aorta are present in 45.8% of the specimens. They supply the testes and cranial parts of the ducti deferentia. They are variable in number and origin, and four variants are identified. A cranial ureterodeferential branch originates from the cranial renal artery, supplies the cranial portion of the ductus deferens and ureter, and runs caudally to anastomose with the middle renal artery. The sciatic artery arises laterally from the aorta, just caudal to the acetabulum, and gives rise, ventrally, to a common trunk, the common renal artery, which divides into the middle and caudal renal arteries. The middle renal artery gives rise to the middle ureterodeferential branch which supplies the middle part of the ductus deferens and ureter. A few centimetres caudal to the kidney, the aorta terminates in three branches, namely, the left and right internal iliac arteries and the median caudal artery. The internal iliac artery divides into the lateral caudal artery and the pudendal artery; the latter gives off caudal ureterodeferential branches that supply the caudal segments of the ductus deferens and ureter. In addition, the puden-

dal artery gives off vessels that supply the cloaca, some of which continue to the base of the phallus, where they form an arterial network. In conclusion, the pattern of the blood supply to the reproductive organs of the male ostrich is, in general, similar to that of the domestic fowl and pigeon, although there are a few highlighted distinctive features.

**Descriptors:** ostrich, male, arteries, anatomy, histology, Struthioniformes, testis, blood supply, epididymis, epididymis, regional blood flow, sexual maturation, physiology, vas deferens, blood supply.

Elias, M.Z.J., J.T. Soley, and T.A. Aire (2005). **The microvasculature of the testis, epididymis and proximal ductus deferens of the ostrich (*Struthio camelus*) as revealed by India ink injection.** *Microscopy Society of Southern Africa Proceedings* 35: 75. ISSN: 1028-3455.

**Descriptors:** ostrich, microvasculature, testis, epididymis, proximal ductus deferens, India ink injection, *Struthio camelus*.

Kurtul, I. and R.M. Hazroglu (2004). **Horoz, erkek ordek ve guvercinde aorta descendens'in seyri ve dallanmas uzerinde karslastirmal makroanatomik arastirmalar. [Comparative macroanatomical investigations on the pattern and branches of the descending aorta among the rooster, drake and pigeon].** *Ankara Universitesi Veteriner Fakultesi Dergisi* 51(1): 1-6. ISSN: 1300-0861.

**Descriptors:** pigeon, anatomy, aorta, blood circulation, species differences, rooster, drake.

**Language of Text:** Turkish, summary in English.

Lloyd, S. and J.S. Gibson (2006). **Haematology and biochemistry in healthy young pheasants and red-legged partridges and effects of spironucleosis on these parameters.** *Avian Pathology* 35(4): 335-340. ISSN: 0307-9457.

**Abstract:** Plasma biochemical and haematological parameters were examined in 4-week-old to 12-week-old game birds. Healthy, uninfected pheasants and partridges had similar levels of total protein, albumin, osmolality, Na<sup>+</sup>, Cl<sup>-</sup>, K<sup>+</sup>, Mg<sup>2+</sup> and glucose. Triglyceride, globulin and Ca<sup>2+</sup> were significantly higher and PO<sub>4</sub><sup>3-</sup> was lower in the partridges. Pheasants carrying a light to moderate infection with *Spiro-nucleus* had significantly lower total protein, albumin, osmolality, Na<sup>+</sup>, Cl<sup>-</sup>, Ca<sup>2+</sup> and PO<sub>4</sub><sup>3-</sup>. In severely affected pheasants, the osmolality, Na<sup>+</sup> and Cl<sup>-</sup> fell further. Triglyceride and glucose were significantly lower than in healthy birds, and Mg<sup>2+</sup> was higher. Similar data were obtained from infected partridges. Red cell parameters rose significantly in pheasants severely affected by spironucleosis, and the percent of heterophils was significantly higher and lymphocytes and basophils lower in their blood smears. The breast and leg muscle wet weight from severely affected pheasants was 22.2 and 37.7% that of uninfected birds, although the water content of the breast

muscle was significantly higher.

**Descriptors:** *pheasants, Phasianus colchicus, Alectoris rufa*, game birds, hematologic tests, blood chemistry, *Spironucleus*, bird diseases, blood glucose, blood lipids, disease severity, infection, blood proteins, albumins, osmolarity, sodium, chlorides, potassium, magnesium, calcium, phosphates, heterophils, lymphocytes, basophils, protozoal infections.

Maestro, M.M., J. Turnay, N. Olmo, P. Fernandez, D. Suarez, J.M. Garcia Paez, S. Urillo, M.A. Lizarbe, and E. Jorge Herrero (2006). **Biochemical and mechanical behavior of ostrich pericardium as a new biomaterial.** *Acta Biomaterialia* 2(2): 213-9. ISSN: 1742-7061.

**Abstract:** We have performed a comparative analysis of glutaraldehyde-preserved ostrich pericardium, as a novel biomaterial, with bovine pericardium. The biochemical characteristics (histology, water content, amino acid composition, and collagen and elastin contents), mechanical properties, and in vivo calcification in a subcutaneous rat model were examined. Ostrich pericardium is slightly thinner and shows a higher water content (70+/-2% vs. 62+/-2%) than bovine pericardium. Additionally, ostrich pericardium presents 1.6-fold lower elastin content and a lower percentage of collagen in reference to the total protein content (68+/-2% vs. 76+/-2%). However, ostrich pericardium shows better mechanical properties, with higher tensile stress at rupture (32.4+/-7.5 vs. 11.5+/-4.6) than calf pericardium. In vivo calcification studies in a rat subcutaneous model show that ostrich pericardium is significantly less calcified than bovine pericardium (23.95+/-13.30 vs. 100.10+/-37.36 mg/g tissue) after 60 days of implantation. In conclusion, glutaraldehyde-stabilized ostrich pericardium tissue shows better mechanical properties than calf tissue. However, calcium accumulation in implanted ostrich tissue is still too high to consider it a much better alternative to bovine pericardium, and anticalcification treatments should be considered.

**Descriptors:** ostrich, pericardium, biochemical, mechanical, behavior, biomaterial, comparative analysis, bovine, rat model.

Morrissey, J.K., J. Paul Murphy, J.P. Fialkowski, A. Hart, and B.J. Darien (2003). **Estimation of prothrombin times of Hispaniolan Amazon parrots (*Amazona ventralis*) and umbrella cockatoos (*Cacatua alba*).** *Journal of Avian Medicine and Surgery* 17(2): 72-77. ISSN: 1082-6742.

**Descriptors:** Amazon parrot, umbrella cockatoos, prothombin times, estimation, plasma samples, non-domestic avian species.

Murakami, T., K. Uchida, H. Naito, and S. Shinohara (2000). **Ventricular septal defects in an ostrich (*Struthio camelus*) and a Chinese goose (*Cygnopsis cygnoid* var. *orientalis*).** *Advances in Animal Cardiology* 33(1): 33-37. ISSN: 0910-6537.

**Online:** [http://www.jstage.jst.go.jp/article/jsvc/33/1/33\\_33/\\_article](http://www.jstage.jst.go.jp/article/jsvc/33/1/33_33/_article)

**Descriptors:** ostrich, Chinese goose, ventricular septal defects.

**Language of Text:** Japanese, summary in English.

Nasu, T. (2005). **Scanning electron microscopic study on the microarchitecture of the vascular system in the pigeon lung.** *Journal of Veterinary Medical Science the Japanese Society of Veterinary Science* 67(10): 1071-4. ISSN: 0916-7250.

**Abstract:** The resin casts of the respiratory and vascular systems in pigeon lung were examined using a scanning electron microscope. The primary bronchi branched to form many secondary bronchi that anastomosed with each other via the parabronchi. Numerous infundibula protruded from the parabronchi via the atria and ramified into the air capillaries. The pulmonary artery entered into the lung and branched into three vessels that coursed the interparabronchial parts. The intraprabronchial arterioles penetrated the gas-exchange tissue to form the anastomosing networks of blood capillaries. The observation of the double casts of the respiratory and vascular systems revealed three-dimensional complicated networks of air capillaries and blood capillaries.

**Descriptors:** pigeon lung, resin casts, vascular system, microarchitecture, capillaries ultrastructure, columbidae anatomy, histology, lung blood supply, lung ultrastructure, microscopy.

Papahn, A.A., H. Naddaf, A. Rezakhani, and M. Mayahi (2006). **Electrocardiogram of homing pigeon.** *Journal of Applied Animal Research* 30(2): 129-132. ISSN: 0971-2119.

**Descriptors:** homing pigeon, electrocardiogram, normal baseline data, clinical use.

Pettifer, G.R., J. Cornick Seahorn, J.A. Smith, G. Hosgood, and T.N.J. Tully (2002). **The comparative cardiopulmonary effects of spontaneous and controlled ventilation by using the Hallowell EMC Anesthesia WorkStation in Hispaniolan Amazon parrots (*Amazona ventralis*).** *Journal of Avian Medicine and Surgery* 16(4): 268-276. ISSN: 1082-6742.

**Descriptors:** Amazon parrots, cardiopulmonary effects, ventilation, spontaneous, controlled, anesthesia, work station, anesthetic.

Raukar, J. (2004). **Hematoloski pokazatelji u nojeva (*Struthio camelus*).** [Hematological parameters of the ostrich (*Struthio camelus*)]. *Veterinarska Stanica* 35(1): 33-41. ISSN: 0350-7149.

**Descriptors:** ostrich, hematological parameters, clinically healthy, blood counts, sex and age related.

**Language of Text:** Croatian, summary in English.

Raukar, J. (2003). **Dijagnosticka vrijednost biokemijskih pokazatelja u krvi nojeva.** [Diagnostic value of biochemical indices in the blood in ostriches]. *Veterinarska Stanica* 34(6): 333-339. ISSN: 0350-7149.

**Descriptors:** ostriches, blood, biochemical indices, diagnostic value.

**Language of Text:** Croatian, summary in English.

Raukar, J. and M. Simpraga (2005). **Haematological parameters in the blood of one day old ostriches.** *Israel Journal of Veterinary Medicine* 60(4): 112-116. ISSN: 0334-9152.

**Descriptors:** ostriches, one day old, blood, hematological parameters, hemoglobin, erythrocyte count, leukocyte count, hematocrit, newly hatched.

Reddy, Y.R., S.T.V. Rao, K. Veerabrahmaiah, K.S. Kumar, and S. Shakila (2003). **Haematological parameters of emu.** *Indian Veterinary Journal* 80(12): 1308-1309. ISSN: 0019-6479.

**Descriptors:** emu, hematological parameters, blood count, white cells, red cells, hemoglobin.

Rezakhani, A., H. Komali, M.R. Mokhber Dezfoul, M. Zarifi, M. Ghabi, N. Alidadi, and M.G. Nadalian (2007). **A preliminary study on normal electrocardiographic parameters of ostriches (*Struthio camelus*).** *Journal of the South African Veterinary Association* 78(1): 46-8. ISSN: 0038-2809.

**Abstract:** Electrocardiograms were taken from 100 normal healthy male and female ostriches which were 1 to 15 months old using a base apex lead. The heart rate of those less than 3 months old ranged from 107 to 250 beats per minute with a mean of 171.47 +/- 9.03 and that of ostriches of more than 3 months old ranged from 43 to 167 with a mean of 90.52 +/- 2.64 beats/minute. The P-waves were positive in all cases except in 1 ostrich which it was isoelectric. The ORS complexes were mainly negative and either monophasic (QS) or biphasic (rS or RS). The T-wave showed more variation than other waves. The durations of P P-R, QRS, Q-T and T-waves of chicks and of those more than 3 months of age (4-15-month-old) were 0.04 +/- 0.00, 0.06 +/- 0.00; 0.14 +/- 0.04, 0.16 +/- 0.00; 0.04 +/- 0.00, 0.06 +/- 0.00; 0.18 +/- 0.00, 0.27 +/- 0.00 and 0.06 +/- 0.00, 0.09 +/- 0.01 s, respectively, and amplitudes of the main direction of P-, QRS and T- waves of 2 groups were 0.29 +/- 0.02, 0.26 +/- 0.01; 1.87 +/- 0.17, 2.21 +/- 0.08; and 0.34 +/- 0.06, 0.37 +/- 0.02 mV, respectively. Ten cases showed cardiac dysrhythmias of which 9 showed sinus arrhythmia and 1 showed premature atrial contractions (PAC). This study showed that the base apex lead can be a suitable monitoring lead for electrocardiographic examination of ostriches.

**Descriptors:** ostriches, electrocardiography, heart physiology, Struthioniformes, age factors, heart rate, reference values, sex factors.

- Roy, P., S. Vairamuthu, S.M. Sakthivelan, and V. Purushothaman (2004). **Hydropericardium syndrome in Japanese quail (*Coturnix coturnix japonica*)**. *Veterinary Record Journal of the British Veterinary Association* 155(9): 273-274. ISSN: 0042-4900.  
**Descriptors:** Japanese quail, hydropericardium syndrome, *Coturnix coturnix japonica*.
- Small, M.F., J.T. Baccus, J.N. Mink, and J.A. Roberson (2005). **Hematologic responses in captive white-winged doves (*Zenaida asiatica*), induced by various radiotransmitter attachments**. *Journal of Wildlife Diseases* 41(2): 387-94. ISSN: 0090-3558.  
**Abstract:** White blood cell counts, heterophil-lymphocyte ratios, and leukocyte differentials of captive white-winged doves (*Zenaida asiatica*) from Texas equipped with different radiotransmitter attachment packages were monitored. Doves were segregated by gender and age by males, females, and hatching year; individuals housed in 30 large outdoor pens in groups of seven. Treatments consisted of controls, glue-on transmitters, body loop harnesses, surgically implanted intracoelomic transmitters, surgically implanted subcutaneous transmitters, intracoelomic surgery without implants, and subcutaneous surgery without implants. We used multivariate analysis of variance with pen as a blocking variable and gender nested and repeated measures analysis of variance to identify differences among any of the transmitter attachment techniques and the control for dependent variables. We found no difference in blood parameters between transmitter attachment technique versus a control.  
**Descriptors:** white-winged doves, *Zenaida asiatica*, Columbidae blood, leukocyte count, prostheses, telemetry, multivariate analysis, sentinel surveillance, telemetry methods, radiotransmitter, blood cell counts.
- Tomanek, R.J., H.K. Hansen, and E.I. Dedkov (2006). **Vascular patterning of the quail coronary system during development**. *Anatomical Record* 288A(9): 989-999. ISSN: 1552-4884.  
**Descriptors:** quail, coronary system, development, vascular patterning.
- Tully, T.N.J., A. Osofsky, P.L.H. Jowett, and G. Hosgood (2003). **Acetylcholinesterase concentrations in heparinized blood of Hispaniolan Amazon parrots (*Amazona ventralis*)**. *Journal of Zoo and Wildlife Medicine* 34(4): 411-413. ISSN: 1042-7260.  
**Descriptors:** Amazon parrots, heparinized blood, acetylcholinesterase concentrations, levels, reference range, pesticides.
- Voslarova, E., Bedanova I, V. Vecerek, Pistekova V, P. Chloupek, and P. Suchy (2006). **Changes in haematological profile of common pheasant (*Phasianus colchicus*) induced by transit to pheasantry**. *DTW (Deutsche Tierärztliche Wochenschrift)* 113(10): 375-378. ISSN: 0341-6593.

**Descriptors:** common pheasant, hematological profile, changes, transit to pheasantry, induced.

# Diseases

- Aarestrup, F.M., H. Hasman, and L.B. Jensen (2005). **Resistant *Salmonella virchow* in quail products.** *Emerging Infectious Diseases* 11(12): 1984-1985. ISSN: 1080-6059. **Descriptors:** quail, drug resistance, bacterial, food microbiology, quail microbiology, *Salmonella virchow*, drug effects, isolation, purification, quail products.
- Abolnik, C., S. Bisschop, T. Gerdes, A. Olivier, and R. Horner (2007). **Outbreaks of avian influenza H6N2 viruses in chickens arose by a reassortment of H6N8 and H9N2 ostrich viruses.** *Virus Genes* 34(1): 37-45. ISSN: 0920-8569. **Abstract:** The first recorded outbreak of avian influenza (AI) in South African chickens (low pathogenicity H6N2) occurred at Camperdown, KwaZulu/Natal Province (KZN) in June 2002. To determine the source of the outbreak, we defined the phylogenetic relationships between various H6N2 isolates, and the previously unpublished gene sequences of an H6N8 virus isolated in 1998 from ostriches in the Leeu Gamka region (A/Ostrich/South Africa/KK98/98). We demonstrated that two distinct genetic H6N2 lineages (sub-lineages I and II) circulated in the Camperdown area, which later spread to other regions. Sub-lineages I and II shared a recent common H6N2 ancestor, which arose from a reassortment event between two South African ostrich isolates A/Ostrich/South Africa/9508103/95 and (H9N2) A/Ostrich/South Africa/KK98/98 (H6N8). Furthermore, the H6N2 sub-lineage I viruses had several molecular genetic markers including a 22-amino acid stalk deletion in the neuraminidase (NA) protein gene, a predicted increased N-glycosylation, and a D144 mutation of the HA protein gene, all of which are associated with the adaptation of AI viruses to chickens. The H6N2 NS1 and PB1 genes shared recent common ancestors with those of contemporary Asian HPAI H5N1 viruses. Our results suggest that ostriches are potential mixing vessels for avian influenza viruses (AIV) outbreak strains and support other reports that H6 viruses are capable of forming stable lineages in chickens. **Descriptors:** chickens virology, ostrich viruses, influenza a virus, H9N2 subtype genetics, influenza a virus genetics, isolation, purification, influenza in birds, epidemiology, virology, reassortant viruses genetics, Struthioniformes, virology, disease outbreaks, epidemiology.
- Abolnik, C., S.P. Bisschop, G.H. Gerdes, A.J. Olivier, and R.F. Horner (2007). **Phylogenetic analysis of low-pathogenicity avian influenza H6N2 viruses from chicken outbreaks (2001-2005) suggest that they are reassortants of historic ostrich low-pathogenicity avian influenza H9N2 and H6N8 viruses.** *Avian Diseases*

51(1Suppl): 279-84. ISSN: 0005-2086.

**Abstract:** Low-pathogenicity (LPAI) and high-pathogenicity (HPAI) avian influenza viruses are periodically isolated from South African ostriches, but during 2002 the first recorded outbreak of LPAI (H6N2) in South African chickens occurred on commercial farms in the Camperdown area of KwaZulu/Natal (KZN) Province. Sequence analysis of all eight genes were performed and phylogenetic analysis was done based on the hemagglutinin and neuraminidase sequences. Results from phylogenetic analyses indicated that the H6N2 chicken viruses most likely arose from a reassortment between two South African LPAI ostrich isolates: an H9N2 virus isolated in 1995 and an H6N8 virus isolated in 1998. Two cocirculating sublineages of H6N2 viruses were detected, both sharing a recent common ancestor. One of these sublineages was restricted to the KZN province. The neuraminidase gene contained a 22-amino acid deletion in the NA-stalk region, which is associated with adaptation to growth in chickens, whereas the other group, although lacking the NA-stalk deletion, spread to commercial farms in other provinces. The persistence of particular H6N2 types in some regions for at least 2 yr supports reports from Asia and southern California suggesting that H6N2 viruses can form stable lineages in chickens. It is probable that the ostrich H6N8 and H9N2 progenitors of the chicken H6N2 viruses were introduced to ostriches by wild birds. Ostriches, in which AI infections are often subclinical, may serve as mixing vessels for LPAI strains that occasionally spill over into other poultry.

**Descriptors:** chickens virology, disease outbreaks veterinary, influenza a virus genetics, influenza a virus pathogenicity, influenza in birds virology, reassortant viruses genetics, base sequence, hemagglutinins genetics, influenza in birds epidemiology, phylogeny, south africa epidemiology, struthioniformes virology.

Al Mulhim, I.A., E.M.E. Abu Elzein, A.A. Gameel, A.I. Al Afaleq, R. Manvell, and D.J. Alexander (2006). **Comparative study on the clinico-pathological response of the collared dove (*Streptopelia roseogrisea arabica*) and pigeons (*Columba livia*) to experimental infection with the pigeon paramyxovirus-1.** *Journal of Animal and Veterinary Advances* 5(5): 395-400. ISSN: 1680-5593.

**Descriptors:** collard dove, *Streptopelia roseogrisea arabica*, pigeons, *Columba livia*, viral diseases, pigeon paramyxovirus-1, clinico-pathological response, comparative study.

Albuquerque, G.R., A.D. Munhoz, F.C.R. Oliveira, A.R.S. Pinto, and C.W.G. Lopes (2002). **Alteracoes patologicas na infeccao experimental de codornas (*Coturnix japonica*) com taquizoitas de *Toxoplasma gondii* (Apicomplexa: Toxoplasmatinae). [Pathological alterations in the Japanese quails (*Coturnix japonica*) by experimental infection with *Toxoplasma gondii* tachyzoites (Apicomplexa: Toxoplasmatinae)]. *Revista Brasileira De Parasitologia Veterinaria* 11(1): 43-46. ISSN: 0103-846X.**

**Descriptors:** Japanese quail, *Toxoplasma gondii*, experimental infection, pathological

alterations.

**Language of Text:** Portuguese, summary in English.

Aldous, E.W., R.J. Manvell, W.J. Cox, V. Ceeraz, D.G. Harwood, W. Shell, D.J. Alexander, and I.H. Brown (2007). **Outbreak of Newcastle disease in pheasants (*Phasianus colchicus*) in south-east England in July 2005.** *Veterinary Record* 160(14): 482-4. ISSN: 0042-4900.

**Descriptors:** bird diseases, epidemiology, newcastle disease, epidemiology, newcastle disease virus classification, base sequence, bird diseases pathology, birds, disease outbreaks veterinary, molecular sequence data, newcastle disease pathology, phylogeny, sequence homology.

Altizer, S., A.K. Davis, K.C. Cook, and J.J. Cherry (2004). **Age, sex and season affect the risk of mycoplasmal conjunctivitis in a southeastern house finch population.** *Canadian Journal of Zoology* 82(5): 755-763. ISSN: 0008-4301.

**Descriptors:** house finch, age, sex, season, affect, seasonal risk, mycoplasmal conjunctivitis, southeastern population.

**Language of Text:** English and French.

Altizer, S., W.M. Hochachka, and A.A. Dhondt (2004). **Seasonal dynamics of mycoplasmal conjunctivitis in eastern North American house finches.** *Journal of Animal Ecology* 73(2): 309-322. ISSN: 0021-8790.

**Descriptors:** house finches, North American, mycoplasmal conjunctivitis, seasonal dynamics.

Amann, O., M.J.L. Kik, M.H.A.C. Passon Vastenburger, I. Westerhof, J.T. Lumeij, and N.J. Schoemaker (2007). **Chronic pulmonary interstitial fibrosis in a blue-fronted Amazon Parrot (*Amazona aestiva aestiva*).** *Avian Diseases* 51(1): 150-153. ISSN: 0005-2086.

**Abstract:** A 30-yr-old blue-fronted Amazon parrot (*Amazona aestiva aestiva*) was presented to the clinic with a history of sneezing more often during the last 2 mo. Physical examination revealed only a mild nasal discharge. Complete hematologic and plasma biochemical examination showed no abnormalities. Computerized tomography (CT) of the complete bird showed generalized lung alterations consistent with lung fibrosis. Two lung biopsies were taken. The results of the histologic examination of the biopsies confirmed the tentative CT diagnosis of pulmonary interstitial fibrosis. To our knowledge this is the first reported case of chronic pulmonary interstitial fibrosis diagnosed by means of a lung biopsy in an avian species. The histologic characteristics are discussed and compared with those of human idiopathic pulmonary fibrosis.

**Descriptors:** Amazon parrot, disease, chronic pulmonary interstitial fibrosis, first

reported case, sneezing, biopsies, lung biopsy, case study, compared to human disease.  
**Language of Text:** Summary in Spanish.

Antarasena, C., R. Sirimujalin, P. Prommuang, S.D. Blacksell, N. Promkuntod, and P. Prommuang (2006). **Tissue tropism of a Thailand strain of high-pathogenicity avian influenza virus (H5N1) in tissues of naturally infected native chickens (*Gallus gallus*), Japanese quail (*Coturnix coturnix japonica*) and ducks (*Anas* spp.).** *Avian Pathology* 35(3): 250-253. ISSN: 0307-9457.

**Abstract:** The tropism of a Thailand strain of highly pathogenic avian influenza H5N1 virus was demonstrated on tissues (lung, trachea, heart, liver, spleen, pancreas, rectum, kidney, brain, skeletal muscle, duodenum, and oviduct) from naturally infected native chickens (*Gallus gallus*), Japanese quail (*Coturnix coturnix japonica*) and ducks (*Anas* spp.) by indirect immunofluorescence assay. In chickens and quail, the distribution and localization of nucleoprotein viral antigen was similar and detected at the highest level in cardiac myocytes, at 88% (chickens) and 89% (quail), and respiratory, digestive and urinary systems all showed high levels of antigen. Antigen in duck tissues were detected at significantly lower levels ( $P < 0.05$ ) with the exception of brain and skeletal muscle samples. In most cases, antigen in duck tissue was absent in the digestive organs but present in respiratory organs, which supports the hypothesis that aerosol and oral-oral transmission are the main method of highly pathogenic avian influenza virus transmission from this species.

**Descriptors:** chickens, ducks, Japanese quails, Influenza A virus, avian influenza, strain H5N1, pathogenicity, tissue tropism, nucleoproteins, viral antigens, vertebrate viruses, disease transmission, epidemiology, disease carrier state, Thailand.

Antarasena, C., R. Sirimujalin, P. Prommuang, N. Promkuntod, P. Prommuang, and S. Blacksell (2007). **The indirect immunofluorescence assay using cardiac tissue from chickens, quails and ducks for identification of influenza A virus during an outbreak of highly pathogenic avian influenza virus (H5N1): a rapid and simple screening tool for limited resource settings.** *Research in Veterinary Science* 83(2): 279-81. ISSN: 0034-5288.

**Abstract:** Here we describe the diagnostic utility of the indirect immunofluorescence assay (IFA) during a recent outbreak of highly pathogenic avian influenza (HPAI) subtype H5N1 virus in southern Thailand and demonstrate the usefulness of the cardiac tissue from infected chickens, quail, and ducks for diagnosis. The most reliable sample for IFA diagnosis of influenza A virus was cardiac tissue (83.0%; 44/53) which when divided by species (chicken, quail and duck cardiac tissues) gave respective positivity rates of 88% (22/25), 88.9% (16/18) and 60.0% (6/10). Cardiac tissue also gave the highest IFA intensity for the three species. We believe that the IFA method has wide applicability in developing countries or remote settings where clinically similar avian diseases with high morbidity and mortality such as Newcastle

disease and fowl cholera are common and could be rapidly excluded thereby conserving valuable reference laboratory capacity for true HPAI outbreaks.

**Descriptors:** chickens, quail, ducks, influenza A virus H5N1, immunofluorescence assay, cardiac tissue, avian flu virus, screening tool, outbreaks.

Barbosa, T., G. Zavala, S. Cheng, T. Lourenco, and P. Villegas (2006). **Effects of reticuloendotheliosis virus on the viability and reproductive performance of Japanese quail.** *Journal of Applied Poultry Research* 15(4): 558-563. ISSN: 1056-6171.

**Descriptors:** Japanese quail, reticuloendotheliosis virus, effects, viability, reproductive performance.

Bavelaar, F.J. and A.C. Beynen (2004). **Atherosclerosis in parrots. A review.** *Veterinary Quarterly* 26(2): 50-60. ISSN: 0165-2176.

**Abstract:** Atherosclerosis is a common disease in parrots. The disease is found in all common parrot species, but especially in African Grey parrots and Amazons. It is a disease of older birds that is seen in both males and females. The most common sign is sudden death, but clinical symptoms that can be found include dyspnea, lethargy and nervous signs, such as paresis and collapses. Because the clinical signs are seldomly seen, it is difficult to diagnose atherosclerosis and therefore it is mostly an unexpected finding at necropsy. Age and species are determinants of atherosclerosis in parrots. Suggested risk factors include an elevated plasma cholesterol level, diet composition, social stress and inactivity, but research is needed to confirm this.

**Descriptors:** parrots, arteriosclerosis, bird diseases physiopathology, animal feed, arteriosclerosis physiopathology, blood, bird diseases diagnosis, prevention, control, plasma cholesterol, diet composition, social stress.

Bavelaar, F.J. and A.C. Beynen (2004). **The relationship between diet, plasma cholesterol and atherosclerosis in pigeons, quails and chickens.** *International Journal of Poultry Science* 3(11): 671-684. ISSN: 1682-8356.

**Descriptors:** quails, pigeons, chickens, diet effects, plasma, cholesterol, atherosclerosis.

Bavelaar, F.J., J. van der Kuilen, R. Hovenier, A.G. Lemmens, and A.C. Beynen (2005).

**Plasma lipids and fatty acid composition in parrots in relation to the intake of alpha-linolenic acid from two feed mixtures.** *Journal of Animal Physiology and Animal Nutrition* 89(9-10): 359-66. ISSN: 0931-2439.

**Abstract:** The main objective of this study was to find out whether the content of alpha-linolenic acid (ALA) in plasma cholesteryl-esters (CE) or triglycerides (TG) in parrots might serve as an index of ALA intake. The intake of ALA might be a risk factor for atherosclerosis, but on the basis of the fatty acid composition of seed mixtures the intake is difficult to assess due to selective eating of seeds. Parrots were fed

two seed mixtures that differed in ALA content according to a cross over design. The macronutrient composition of the diets supplied differed from that of the diets consumed. The diets consumed had higher levels of dry matter, crude protein, crude fat and energy, and lower levels of crude fibre and crude ash. The ALA content, expressed as g/kg diet, was similar for the diet supplied and that consumed, irrespective of the type of diet. The diets had no systematic effect on plasma lipid concentrations. There were marked differences in plasma cholesterol concentrations between parrot species. When the diet with the low ALA content was fed (0.8% ALA of total fatty acids consumed, 1.1 g ALA/kg of diet consumed), the plasma CE and TG did not contain detectable ALA amounts. When the diet with the high ALA content was fed (4.2% ALA of total fatty acids consumed, 6.1 g ALA/kg of diet consumed), the plasma CE and TG contained about 1% ALA of total fatty acids. It is suggested that the content of ALA in plasma CE and TG might be used as an indicator of ALA intake.

**Descriptors:** parrots, cholesterol esters chemistry, parrots metabolism, triglycerides chemistry, alpha linolenic acid administration, dosage, parrot feed, diet consumed, physiology, biological markers blood, cholesterol esters blood, parrots blood, species specificity, triglycerides blood, alpha linolenic acid metabolism, alpha linolenic acid pharmacology.

Boris, M. and F. Huchzermeyer (2002). **Megabacteriosis como causa de alta mortalidad en charabones de nandu (*Rhea americana*): primer diagnostico en Uruguay.** [Megabacteriosis as cause of high mortality of chicks of nandu (*Rhea americana*): first diagnosis in Uruguay]. *Veterinaria Montevideo* 37(149): 9-12. ISSN: 0376-4362.

**Descriptors:** rhea, *Rhea americana* chicks, megabacteriosis, high mortality, bacteria, diagnosis, Uruguay .

**Language of Text:** Spanish, summary in English.

Boris, M., A. Sanmartin, G. Solari, and P. Zunino (2005). **Diagnostico de aspergilosis en charabones de *Rhea americana* (nandu).** [Diagnosis of aspergillosis in *Rhea americana* (nandu) chicks]. *Veterinaria Montevideo* 40(158): 13-17. ISSN: 0376-4362.

**Descriptors:** rhea, *Rhea americana*, aspergillosis, chicks, diagnosis, air sacs, infected.

**Language of Text:** Spanish, summary in English.

Botes, A., B.M. Peyrot, A.J. Olivier, W.P. Burger, and D.U. Bellstedt (2005). **Identification of three novel mycoplasma species from ostriches in South Africa.** *Veterinary Microbiology* 111(3-4): 159-69. ISSN: 0378-1135.

**Abstract:** Mycoplasmas have been implicated in certain clinical syndromes in ostriches and are associated with upper respiratory tract infections. As these infections result in production losses, they are of considerable economic importance to the

South African ostrich industry. Although poultry mycoplasmas have been shown to infect ostriches, the existence of unique ostrich-specific mycoplasmas has been suggested. In this study, mycoplasmas were isolated from ostriches in the Klein Karoo, Central Karoo and Garden Route areas of the Western and Northern Cape Provinces of South Africa and identified using 16S rRNA gene sequencing. These sequences indicated that ostriches in these areas carry three unique mycoplasmas and were not infected with chicken mycoplasmas. Phylogenetic analysis of the 16S rRNA sequences of the three isolated ostrich mycoplasmas showed them to be quite divergent and to fall into two distinct phylogenetic groupings. Unique sequences within the 16S rRNA gene of the ostrich mycoplasmas were subsequently used for the development of specific primers for the detection and diagnosis of mycoplasma infections in ostriches. Chickens kept in close proximity to infected ostriches were not infected with these ostrich mycoplasmas.

**Descriptors:** ostriches, bird diseases, microbiology, mycoplasma classification, isolation, purification, infections, struthioniformes microbiology, bird diseases transmission, DNA, bacterial analysis, bacterial isolation, purification, mycoplasma infections, epidemiology, microbiology, transmission.

Bougiouklis, P.A. (2007). **Avian circoviruses of the genus *Circovirus*: A potential trigger in Pigeon breeder's lung (PBL)/bird fancier's lung (BFL).** *Medical Hypotheses* 68(2): 320-3. ISSN: 0306-9877.

**Abstract:** Pigeon breeder's lung (PBL) or bird fancier's lung (BFL) is one of the most common extrinsic allergic alveolitis or hypersensitivity pneumonitis. It is caused after prolonged inhalation of avian antigens and provokes a hypersensitivity reaction in the lungs of sensitised people. Although the pathogenic mechanism is unclear, the epidemiology of BFL shows that it occurs worldwide, and has been described in adults keeping birds and also in their children. Laboratory findings associated with the disease classified as a type III immunologic reaction that produces blood precipitin antibodies against birds' serum, feathers, intestinal mucin and/or faeces. In particular, the fine dust from pigeon feathers has strong antigenic properties. There is an interaction between host and antigen that seems to be influenced by both genetic and environmental factors. Avian circoviruses (ACV) of the genus *Circovirus*, has been detected in free-ranging and captive birds worldwide, such as pigeons, canaries, psittacines, Senegal doves, finches, gulls, Australian ravens and geese. T lymphocytes are the main target cells of the ACV and in the above avian species circovirus-like particles were detected in blood, macrophages, feathers, crop secretions, intestinal contents and/or faeces. Most of the ACV was demonstrated that are pantropic and viral antigen in pigeon tissues was most commonly detected in respiratory organs, including the trachea, pharynx and lung. The transmission of the circovirus between the birds usually occurs through inhalation of feathers dust. There is evidence that

animal circoviruses may originate when vertebrates become “infected” with DNA from a plant nanovirus. So, it seems that further investigation for the avian circoviruses is needed to determine if they are host specific or not. This study attempts to demonstrate ACV or ACV-like particles as potential triggers in the BFL aetiology, and the possible involvement in BFL’s pathogenic mechanism.

**Descriptors:** pigeon diseases virology, Circoviridae infections, human immunological disease allergies, agricultural workers’ diseases, Circovirus, Columbidae, allergic alveolitis.

Bunbury, N., D. Bell, C. Jones, A. Greenwood, and P. Hunter (2005). **Comparison of the InPouch TF culture system and wet-mount microscopy for diagnosis of *Trichomonas gallinae* infections in the pink pigeon *Columba mayeri*.** *Journal of Clinical Microbiology* 43(2): 1005-6. ISSN: 0095-1137.

**Descriptors:** pink pigeon, *Columba mayeri*, bird diseases, diagnosis, Columbidae microbiology, *Trichomonas gallinae* isolation, purification, *Trichomonas* infections, bird diseases microbiology, culture media, microscopy methods, sensitivity, specificity, *Trichomonas* growth, development.

Cabassi, C.S., S. Taddei, G. Predari, G. Galvani, F. Ghidini, E. Schiano, and S. Cavirani (2004). **Bacteriologic findings in ostrich (*Struthio camelus*) eggs from farms with reproductive failures.** *Avian Diseases* 48(3): 716-722. ISSN: 0005-2086.

**Abstract:** From January 2001 to December 2002, 543 ostrich eggs were submitted for bacteriologic investigation. The eggs were laid by 387 domesticated ostriches that suffered fertility disorders and that came from 44 farms located in different areas of Northern and Central Italy. Microbiologic investigations showed bacterial isolation in 105 (19.3%) of 543 eggs examined, with a high prevalence of enterobacteria from albumen and yolk. In only a few cases did bacterial isolation result from yolk or albumen alone. An antibiotic sensitivity test was conducted on isolates by the Kirby-Bauer disc diffusion method. This is the first report regarding the microbiologic status of eggs from ostrich farms located in different Italian regions.

**Descriptors:** ostriches, food animals, reproductive efficiency, ova, microbial contamination, animal pathogenic bacteria, ovalbumin, egg yolk, geographical variation, disease diagnosis, animal performance, reproductive failure, Italy.

Cermeno, J.R., I. Hernandez, I. Cabello, Y. Orellan, J.J. Cermeno, R. Albornoz, E. Padron, and G. Godoy (2006). ***Cryptococcus neoformans* and *Histoplasma capsulatum* in dove’s (*Columbia livia*) excreta in Bolivar state, Venezuela.** *Revista Latinoamericana De Microbiologia* 48(1): 6-9. ISSN: 0034-9771.

**Abstract:** Dove’s excreta samples from state Bolivar several places in Venezuela, were evaluated to determine the presence of primary pathogen fungi in dove’s excreta. Filamentous fungi such as: *Aspergillus* spp (31.1%), *Mucor* spp (20.2%), *Penicillium* spp

(9.5%) and *Fusarium* spp (6.7%) were the most frequently isolated strains. Species such as *Candida albicans* (4.1%), *Cryptococcus albidus* and *Rhodotorula* spp (2.7%), *C. neoformans var neoformans* (1.4%), *Trichosporum asahii* (1.4%), *Curvularia*, *Microsporium* and *Phoma* as well as *Histoplasma capsulatum* (1.3%) were less frequently isolated. This study shows the presence of *C. neoformans* and *H. capsulatum* in dove's excreta from Bolivar state, it remarks infection risk with these pathogens fungi and the necessity to avoid accumulation of dove's excreta.

**Descriptors:** bird diseases epidemiology, Columbidae microbiology, *Cryptococcus neoformans*, isolation, purification, feces microbiology, *Histoplasma* isolation, purification, Histoplasmosis, bird diseases, microbiology, cryptococcosis epidemiology, disease reservoirs, fungi isolation, purification, epidemiology, mycoses.

Circella, E., A. Camarda, V. Martella, G. Bruni, A. Lavazza, and C. Buonavoglia (2007).

**Coronavirus associated with an enteric syndrome on a quail farm.** *Avian Pathology* 36(3): 251-258. ISSN: 0307-9457.

**Abstract:** An enteric syndrome was observed in quail (*Coturnix coturnix*) semi-intensively reared for restocking in Apulia (southern Italy). The birds showed depression, severe diarrhoea, dehydration and reduced growth. Mortality occurred particularly in young birds. At necropsy the prominent lesion was enteritis. A coronavirus was detected by electron microscopy and reverse transcriptase-polymerase chain reaction in the faeces and in the intestinal content of the dead quails. The virus could not be cultivated in chicken embryos. By sequence analyses of a fragment (409 nucleotides) of region 1b of the polymerase gene, the quail coronavirus displayed <or=93% nucleotide identity to avian coronaviruses (group 3 coronaviruses)--whereas by analysis of the S1 portion of the spike protein-encoding gene, the quail coronavirus displayed 16% to 18% amino acid identity with infectious bronchitis virus, and 79% to 81% identity with turkey coronavirus. Altogether, the findings suggest the existence of a novel coronavirus genetically related to turkey coronavirus.

**Descriptors:** Japanese quail, quail farm, coronavirus, enteric syndrome, electron microscopy, reverse transcriptase polymerase chain reaction, Italy.

Cooper, R.G. (2005). **Bacterial, fungal and parasitic infections in the ostrich (*Struthio camelus var. domesticus*).** *Animal Science Journal* 76(2): 97-106. ISSN: 1344-3941.

**Descriptors:** ostrich, *Struthio camelus*, infections, bacterial, fungal, parasitic, veterinary, diseases, parasites.

Cooper, R.G., J.O. Horbanczuk, and N. Fujihara (2004). **Viral diseases of the ostrich (*Struthio camelus var. domesticus*).** *Animal Science Journal* 75(2): 89-95. ISSN: 1344-3941.

**Descriptors:** ostrich, viral diseases, infection, avian influenza, Borna virus, ticks, health management.

- Cooper, R.G. (2005). **Bacterial, fungal and parasitic infections in the ostrich (*Struthio camelus var. domesticus*)**. *Animal Science Journal* 76(2): 97-106. ISSN: 1344-3941.  
**Descriptors:** ostrich, infections, bacterial, fungal, parasitic, *Struthio camelus*, anthrax, *Salmonella*, *Pasteurella*, tuberculosis, tick, mite, tapeworm, fluke.
- Cooper, R.G., J.O. Horbanczuk, and N. Fujihara (2004). **Viral diseases of the ostrich (*Struthio camelus var. domesticus*)**. *Animal Science Journal* 75(2): 89-95. ISSN: 1344-3941.  
**Descriptors:** ostrich, viral diseases, *Struthio camelus var. domesticus*, Newcastle, avian influenza, Borna, ticks, mosquitoes.
- Copetti, M.V., S.D. Segabinazi, M.L. Flores, S.H. Alves, and J.M. Santurio (2004). **Pulmonary aspergillosis outbreak in *Rhea americana* in southern Brazil**. *Mycopathologia* 157(3): 269-71. ISSN: 0301-486X.  
**Abstract:** Commercial raising of rheas is currently in expansion in the south of Brazil, and many diseases previously restricted to other avian species are currently emerging on rhea farms, especially as a result of careless management of these animals. The objective of the present article is to report a pulmonary aspergillosis outbreak that occurred in great rhea (*Rhea americana*) in the south of Brazil. About 50 birds aged 30 to 60 days died suddenly and one of them was submitted to autopsy which revealed the presence of white caseous nodules 0.5 mm in diameter occupying 95% of the lung area. One lung was sent to the Federal University of Santa Maria for histopathological and mycological analyses. Histopathological analysis revealed multifocal areas with necrosis and inflammatory infiltrates and the presence of fungal hyphae, giant cells and fibrous tissue proliferation at the periphery. *Aspergillus fumigatus* was recovered as pure culture from all culture media. This appears to be the first report of aspergillosis among great rhea in Brazil and the second in the world.  
**Descriptors:** rhea, aspergillosis, *Aspergillus fumigatus*, growth, development, bird diseases microbiology, fungal lung diseases, Rheiformes, commercial farm, Brazil.
- Cousquer, G. (2005). **Ingluvitis and oesophagitis in wild finches**. *Veterinary Record* 157(15): 455. ISSN: 0042-4900.  
**Descriptors:** wild finches, ingluvitis, esophagitis, bird diseases, epidemiology, columbidae, crop, avian pathology, bird diseases pathology, sentinel surveillance.  
**Notes:** Comment On: Vet Rec. 2005 Sep 17;157(12):360.
- Cousquer, G.O., E.J. Dankoski, and J.C. Patterson Kane (2007). **Metabolic bone disease in wild collared doves (*Streptopelia decaocto*)**. *Veterinary Record* 160(3): 78-84. ISSN: 0042-4900.  
**Abstract:** The records of 666 casualty collared doves examined at a wildlife hospital in south-west England over a period of five years were reviewed. Signs of metabolic

bone disease were recorded in 51.2 per cent of the juvenile birds but in only 9.6 per cent of the adults. The incidence of the condition was highest between December and February and decreased almost to zero between June and August. Histological lesions in 11 of the juvenile doves were consistent with vitamin D deficiency, possibly as a result of inadequate exposure to uvb light during the short winter days.

**Descriptors:** bird diseases epidemiology, bone diseases, metabolic, Columbidae, vitamin D deficiency, age factors, wild bird diseases, pathology, epidemiology, pathology, incidence, retrospective studies, seasons, sunlight, complications, England.

Dadras, H. and R. Jafari (2002). **Pathogenicity of *Salmonella pullorum* in Japanese quail chicks.** *Iranian Journal of Veterinary Research* 3(1): 26-36. ISSN: 1728-1997.

**Descriptors:** Japanese quail, chicks, *Salmonella pullorum*, pathogenicity, disease.

**Language of Text:** Arabic, summary in English.

Darbro, J.M., A.A. Dhondt, F.M. Vermeylen, and L.C. Harrington (2007). ***Mycoplasma gallisepticum* infection in House Finches (*Carpodacus mexicanus*) affects mosquito blood feeding patterns.** *American Journal of Tropical Medicine and Hygiene* 77(3): 488-94. ISSN: 0002-9637.

**Abstract:** Disease-induced lethargy can diminish host capacity to repel or kill biting mosquitoes. We exposed house finches (*Carpodacus mexicanus*) to mosquitoes (*Culex pipiens pipiens*), repeated the experiment after inoculating finches with *Mycoplasma gallisepticum*, and then repeated the experiment with the same birds after curing their infections. We videotaped avian behaviors before and during mosquito exposure, identifying hosts through blood meal DNA fingerprinting. Results revealed heterogeneity in mosquito preference regardless of infection. Mosquitoes choosing between two healthy finches were more likely to feed upon the same individual bird consistently. When one bird was sick, mosquitoes exhibited no preference. Sick birds made fewer total defensive behaviors than healthy birds, but only foot stomps were associated with reduced mosquito feeding success. Our results suggest that *Mycoplasma* and other avian infections that alter bird defensive behavior may influence mosquito feeding patterns and transmission of arthropod-borne pathogens such as West Nile virus.

**Descriptors:** house finches, mosquitoes, blood feeding patterns, *Mycoplasma gallisepticum*, diseases, lethargy, host capacity.

Das, S.K., S. Baksi, B.K. Biswas, and R. Das (2005). **Epidemiological studies on pigeon pox.** *Indian Veterinary Journal* 82(6): 689-690 . ISSN: 0019-6479.

**Descriptors:** pigeon pox, disease prevalence, epidemiology, mortality, outbreaks, pigeons.

de Freitas Raso, T., G.H. Seixas, N.M. Guedes, and A.A. Pinto (2006). *Chlamydophila psittaci* in free-living Blue-fronted Amazon parrots (*Amazona aestiva*) and Hyacinth macaws (*Anodorhynchus hyacinthinus*) in the Pantanal of Mato Grosso do Sul, Brazil. *Veterinary Microbiology* 117(2-4): 235-41. ISSN: 0378-1135.

**Abstract:** *Chlamydophila psittaci* (*C. psittaci*) infection was evaluated in 77 free-living nestlings of Blue-fronted Amazon parrots (*Amazona aestiva*) and Hyacinth macaws (*Anodorhynchus hyacinthinus*) in the Pantanal of Mato Grosso do Sul, Brazil. Tracheal and cloacal swab samples from 32 wild parrot and 45 macaw nestlings were submitted to semi-nested PCR, while serum samples were submitted to complement fixation test (CFT). Although all 32 Amazon parrot serum samples were negative by CFT, cloacal swabs from two birds were positive for *Chlamydophila* DNA by semi-nested PCR (6.3%); these positive birds were 32 and 45 days old. In macaws, tracheal and cloacal swabs were positive in 8.9% and 26.7% of the samples, respectively. Complement-fixing antibodies were detected in 4.8% of the macaw nestlings; macaw nestlings with positive findings were between 33 and 88 days old. These results indicate widespread dissemination of this pathogen in the two evaluated psittacine populations. No birds had clinical signs suggestive of chlamydiosis. To the best of our knowledge, this is the first report on *C. psittaci* in free-living Blue-fronted Amazon parrots and Hyacinth macaws in Brazil.

**Descriptors:** Blue-fronted amazon parrots, Hyacinth macaws, *Chlamydophila psittaci*, first report, free living nestlings, cloacal swabs, complement fixation test, DNA, Brazil.

Deegan, C.S., J.E. Burns, M. Huguenin, E.Y. Steinhaus, N.A. Panella, S. Beckett, and N. Komar (2005). **Sentinel pigeon surveillance for West Nile virus by using lard-can traps at differing elevations and canopy cover classes.** *Journal of Medical Entomology* 42(6): 1039-44. ISSN: 0022-2585.

**Abstract:** Sentinel pigeons, *Columba livia*, were installed in lard-can traps at heights of 1.5 m and 7.6-9.1 m within differing canopy cover classes in New York City. Adult mosquitoes were collected weekly from July to October 2002, as were serum samples from each pigeon. *Culex pipiens* L. and *Culex restuans* Theobald comprised 97% of mosquitoes collected and were most numerous in canopy-level, forested traps. The West Nile virus (family Flaviviridae, genus Flavivirus, WNV) seroconversion rate was significantly greater for pigeons in canopy-level traps, although seroconversions occurred concurrently with human cases in the city and were of little prognostic value to public health agencies. Our results indicate that sentinel pigeons were most effective for monitoring enzootic transmission of WNV when placed in single-sentinel caging 7.6-9.1 m above ground level.

**Descriptors:** pigeon sentinel, West Nile virus, surveillance, lard can traps, differing

levels in canopy, mosquitoes, seroconversion rate, monitoring enzootic transmission, New York, USA.

Deshmukh, S., R.K. Asrani, N. Jindal, D.R. Ledoux, G.E. Rottinghaus, M. Sharma, and S.P. Singh (2005). **Effects of *Fusarium moniliforme* culture material containing known levels of fumonisin B1 on progress of *Salmonella gallinarum* infection in Japanese quail: clinical signs and hematologic studies.** *Avian Diseases* 49(2): 274-280. ISSN: 0005-2086.

**Abstract:** To study the individual and combined effects of fumonisin B1 (FB1) toxicity and *Salmonella* serotype *Gallinarum* infection, Japanese quail (*Coturnix coturnix japonica*) were fed *Fusarium moniliforme* culture material (2.5%), 150 mg FB1/kg ration, and were subsequently challenged orally with *Salmonella Gallinarum* organisms ( $2 \times 10^4$ ) colony-forming units) at 21 days of age. The chicks were fed culture material containing FB1 from day 5 till the end of the experiment. After being infected with *Salmonella Gallinarum*, observations were made 1, 2, 3, 5, 7, 10, 14, and 21 days postinfection. The clinical signs of diarrhea with bloody discharges were more pronounced in the *Salmonella*-infected birds on the FB1 diet. Mortality caused by *Salmonella Gallinarum* increased by 12% in the presence of FB1. Mean body weights in both the *Salmonella*-infected and FB1-fed groups were significantly lower than those of the controls at almost all intervals. Mean values of hemoglobin, packed cell volume, and total erythrocyte count were slightly higher in birds fed FB1 but were lower in the *Salmonella Gallinarum* groups fed FB1 and plain chick mash. Anemia was evident, between 5 and 10 days postinfection, in quail chicks infected with *Salmonella Gallinarum* alone. Total leukocyte counts were higher in *Salmonella*-infected and FB1-fed groups because of an increase in the number of heterophils and lymphocytes. However, the increase in lymphocyte response to infection was lower by 4.27%-30.09% between 3 and 21 days postinfection in the FB1-fed chicks compared with chicks infected with *Salmonella Gallinarum*. Alanine transaminase and total serum protein were slightly higher in both the infected and FB1-fed groups. This study revealed that the continuous presence of fumonisins in the diets of quail chicks might increase the susceptibility to or the severity of *Salmonella Gallinarum* infection.

**Descriptors:** Japanese quails, *Salmonella enterica* subsp. *Enterica* serovar *Gallinarum*, salmonellosis, animal pathogenic bacteria, fumonisin B1, *Gibberella fujikuroi*, disease course, symptoms, diarrhea, mortality, hematocrit, hemoglobin, erythrocyte count, leukocyte count, lymphocytes, heterophils, blood proteins, alanine transaminase.

**Language of Text:** Summary in Spanish.

Deshmukh, S., R.K. Asrani, D.R. Ledoux, N. Jindal, A.J. Bermudez, G.E. Rottinghaus, M. Sharma, and S.P. Singh (2005). **Individual and combined effects of *Fusarium moniliforme* culture material, containing known levels of fumonisin B1, and *Salmonella gallinarum* infection on liver of Japanese quail.** *Avian Diseases* 49(4):

**Abstract:** Three hundred day-old Japanese quail (*Coturnix coturnix japonica*) were divided into two groups with 150 quail in each group. One group was maintained on quail mash alone, while *Fusarium moniliforme* culture material was added to quail mash in the second group from day 5 of age and was supplied at a rate of 150 ppm fumonisin B1 (FB1)/kg mash. At day 21, each group was further subdivided into two groups, yielding four groups with 75 birds apiece, which served as the control (group CX), the *Salmonella Gallinarum* alone group (group CS), the FB1 alone group (group FX), and the group fed FB1 and infected with *Salmonella Gallinarum* (group FS). An oral challenge with *Salmonella Gallinarum* organisms ( $2 \times 10^4$  colony-forming units/ml) was given to groups CS and FS at 21 days of age. Three quail each were necropsied on day 21 (0 day interval) from groups CX and FX only. At subsequent intervals (i.e., 1, 2, 3, 5, 7, 10, 14, and 21 days postinfection [DPI]), three quail were euthanatized from all four groups (CX, CS, FX, and FS). The gross and microscopic lesions were recorded in both mortality and euthanatized birds at the above intervals. The ultrastructural studies were done at 5 DPI. Mild to moderate hepatomegaly and pale discoloration of liver were observed in group FX, while congestion, hemorrhages, necrosis, and mild to severe hepatomegaly were the predominant gross lesions in both infected groups (CS and FS). The gross lesions in quail inoculated with *Salmonella Gallinarum* alone (group CS) generally developed slowly, appeared more widely scattered, and involved comparatively less surface area in contrast to the rapidly progressive and frequently confluent lesions in the combination group (FS), especially in the first 5 days of infection. Mild to marked hepatocellular swelling, multifocal hepatic necrosis, and hepatocellular and bile duct hyperplasia were the characteristic microscopic changes in the FX group. Microscopic lesions in quail of group CS comprised congestion, vacuolar changes, and focal necrosis in early stages, followed by granulomatous lesions at later intervals. Similar but more severe lesions were observed in the combination group (FS). Based on transmission electron microscopy, the maximum effect of FB1 toxicity was observed on mitochondria and endoplasmic reticulum. In general, the mitochondriae showed diverse form and structure, some of which appeared to lose their intact outer membrane, and the mitochondrial cristae were disoriented. The deformity in the cisternae structure of rough endoplasmic reticulum, with their rearrangement into round or tubular forms either bearing granular surface or leading to accumulation of smooth endoplasmic reticulum, was evident only in groups FX and FS. We conclude that the continuous presence of fumonisins in the diets of young quail might increase their susceptibility to or the severity of *Salmonella Gallinarum* infection.

**Descriptors:** Japanese quails, liver, *Salmonella enterica* subsp. *Enterica* serovar *Gallinarum*, salmonellosis, *Gibberella fujikuroi*, fumonisin B1, mycotoxicosis, feed contamination, poultry diseases, mortality, symptoms, histopathology, mitochondria,

endoplasmic reticulum, disease resistance, disease severity, experimental infections , cytopathology.

**Language of Text:** Summary in Spanish.

Deshmukh, S.K. (2004). **Keratinophilic fungi on feathers of pigeon in Maharashtra, India.** *Mycoses* 47(5-6): 213-5. ISSN: 0933-7407.

**Abstract:** Results of a preliminary survey of keratinophilic fungi associated with feathers of pigeon on high rise buildings in Thane district of Maharashtra (India) are reported. A total of 100 samples were examined, of which 67 samples were positive for keratinophilic fungi. Altogether 67 fungal strains belonging to 10 species of seven genera were isolated viz. *Chrysosporium indicum* (24%), *Chrysosporium* sp. (2%), *Chr. tropicum* (8%), *Chrysosporium* state of *Arthroderma tuberculatum* (3%), *Chrysosporium* state of *Ctenomyces serratus* (15%), *Malbranchea pulchella* (3%), *Malbranchea* sp. (1%), *Microsporium gypseum* (5%), *Myriodontium keratinophilum* (2%) and *Trichophyton terrestre* (4%).

**Descriptors:** columbidae microbiology, feathers microbiology, fungi isolation and purification, keratins metabolism, fungi metabolism, ten species, seven genera, India.

Dhondt, A.A., S. Altizer, E.G. Cooch, A.K. Davis, A. Dobson, M.J. Driscoll, B.K. Hartup, D.M. Hawley, W.M. Hochachka, P.R. Hosseini, C.S. Jennelle, G.V. Kollias, D.H. Ley, E.C. Swarthout, and K.V. Sydenstricker (2005). **Dynamics of a novel pathogen in an avian host: Mycoplasmal conjunctivitis in house finches.** *Acta Tropica* 94(1): 77-93. ISSN: 0001-706X.

**Abstract:** In early 1994, a novel strain of *Mycoplasma gallisepticum* (MG)--a poultry pathogen with a world-wide distribution--emerged in wild house finches and within 3 years had reached epidemic proportions across their eastern North American range. The ensuing epizootic resulted in a rapid decline of the host population coupled with considerable seasonal fluctuations in prevalence. To understand the dynamics of this disease system, a multi-disciplinary team composed of biologists, veterinarians, microbiologists and mathematical modelers set forth to determine factors driving and influenced by this host-pathogen system. On a broad geographic scale, volunteer observers ("citizen scientists") collected and reported data used for calculating both host abundance and disease prevalence. The scale at which this monitoring initiative was conducted is unprecedented and it has been an invaluable source of data for researchers at the Cornell Laboratory of Ornithology to track the spread and magnitude of disease both spatially and temporally. At a finer scale, localized and intensive field studies provided data used to quantify the effects of disease on host demographic parameters via capture-mark-recapture modeling, effects of host behavior on disease and vice-versa, and the biological and genetic profiles of birds with known phenotypic characteristics. To balance the field-based component of the study, experiments were conducted with finches held in captivity to describe and quantify the effects

of experimental infections on hosts in both individual and social settings. The confluence of these various elements of the investigation provided the foundation for construction of a general compartmentalized epidemiological model of the dynamics of the house finch-MG system. This paper serves several purposes including (i) a basic review of the pathogen, host, and epidemic cycle; (ii) an explanation of our research strategy; (iii) a basic review of results from the diverse multi-disciplinary approaches employed; and (iv) pertinent questions relevant to this and other wildlife disease studies that require further investigation.

**Descriptors:** bird diseases microbiology, conjunctivitis, bacterial, disease outbreaks, house finches, mycoplasma infections, *Mycoplasma gallisepticum*, growth, development, bird diseases epidemiology, bacterial epidemiology, microbiology, prevalence, seasons, United States.

Dhondt, A.A., K.V. Dhondt, D.M. Hawley, and C.S. Jennelle (2007). **Experimental evidence for transmission of *Mycoplasma gallisepticum* in house finches by fomites.** *Avian Pathology* 36(3): 205-8. ISSN: 0307-9457.

**Abstract:** Ever since *Mycoplasma gallisepticum* emerged among house finches in North America, it has been suggested that bird aggregations at feeders are an important cause of the epidemic of mycoplasmal conjunctivitis because diseased birds could deposit droplets of pathogen onto the feeders and thereby promote indirect transmission by fomites. In this paper we bring the first experimental evidence that such transmission (bird-to-feeder-to-bird) does actually take place. House finches infected via this route, however, developed only mild disease and recovered much more rapidly than birds infected from the same source birds but directly into the conjunctiva. While it is certainly probable that house finch aggregations at artificial feeders enhance pathogen transmission, to some degree transmission of *M. gallisepticum* by fomites may serve to immunize birds against developing more severe infections. Some such birds develop *M. gallisepticum* antibodies, providing indication of an immune response, although no direct evidence of protection.

**Descriptors:** house finches bird diseases, transmission, finches microbiology, fomites, mycoplasma infections, *Mycoplasma gallisepticum*, isolation, purification, antibodies, bacterial blood, conjunctivitis, bacterial microbiology, bacterial transmission, epidemiology.

Diaz Figueroa, O., T.N.J. Tully, J. Williams, and D. Evans (2006). **Squamous cell carcinoma of the infraorbital sinus with fungal tracheitis and ingluvitis in an adult solomon eclectus parrot (*Eclectus roratus solomonensis*).** *Journal of Avian Medicine and Surgery* 20(2): 113-119. ISSN: 1082-6742.

**Descriptors:** eclectus parrot, squamous cell carcinoma, infraorbital sinus, fungal tracheitis, ingluvitis.

Doneley, B. (2002). **Acute pancreatitis in parrots.** *Exotic DVM* 4(3): 13-16. ISSN: 1521-1363.

**Descriptors:** parrots, acute pancreatitis, conference, symptoms, treatment.

**Notes:** Meeting Information: 4th Annual International Conference on Exotics (ICE2002), Key West, Florida, USA, 2002.

Doneley, R.J.T., R.I. Miller, and T.E. Fanning ( 2007). **Proventricular dilatation disease: an emerging exotic disease of parrots in Australia.** *Australian Veterinary Journal* 85(3): 119-123. ISSN: 0005-0423.

**Descriptors:** parrots, proventricular dilatation disease, emerging exotic disease, Australia.

Duchatel, J.P., D. Todd, A. Curry, J.A. Smyth, J.C. Bustin, and H. Vindevogel (2005). **New data on the transmission of pigeon circovirus.** *Veterinary Record* 157(14): 413-5. ISSN: 0042-4900.

**Abstract:** Nineteen racing pigeons aged from one to five years were examined post-mortem. pcr tests showed that the spleens of 16 of them were positive for pigeon circovirus, the livers of six were positive, and blood from one of them was positive for the virus. Five of 44 embryos in embryonated eggs collected from three lofts were positive by pcr, but swabs taken from the crops of 64 adult birds which were feeding one- to 10-day-old squabs in these three lofts were negative for the viral dna.

**Descriptors:** pigeon circovirus, transmission, new data, PCV tests , spleens, livers, blood, viral DNA.

Duchatel, J.P., D. Todd, J.A. Smyth, J.C. Bustin, and H. Vindevogel (2006). **Observations on detection, excretion and transmission of pigeon circovirus in adult, young and embryonic pigeons.** *Avian Pathology.* 35(1): 30-34. ISSN: 0307-9457.

**Abstract:** Infections with pigeon circovirus (PiCV) occur in young racing pigeons and pigeons raised for meat production and have been reported worldwide, but relatively little is known about the disease induced by PiCV infection. The aim of this study was to investigate how PiCV is transmitted. Using a sensitive polymerase chain reaction (PCR) test, the presence of PiCV was investigated in a wide range of samples from adult pigeons, embryos, breeders and young birds, which were derived from a racing loft that had a clinical history of “young pigeon sickness” and in which PiCV had been previously been diagnosed. Using PCR, PiCV DNA was detected in tissues of 13/20 apparently healthy older birds, aged from 1 to 9 years. Viral DNA was most commonly detected in the respiratory organs, including the trachea, pharynx and lung, followed by tissues such as the spleen, kidney and liver. It was also detected in the ovary and/or testes of some birds. This finding, and the detection of viral DNA in tissues from 8/22 embryos, suggested that PiCV may be vertically transmitted. Testing of pharyngeal and cloacal swabs, and blood samples, collected immediately

before the death of the adult pigeons, failed to detect all birds found to be infected at necropsy, suggesting that testing of potential breeding birds would not enable exclusion of infected birds from breeding programmes. Additional PCR testing of cloacal swab samples obtained sequentially from 19 young pigeons showed that while four were excreting virus when 15 days old, only one bird was excreting at the time of weaning (28 days old). The detection of viral DNA in cloacal swab samples from 15.8% of the birds when 37 days old and 100% of birds when 51 days old suggested that most young pigeons probably became infected in the rearing loft.

**Descriptors:** pigeons, pigeon circovirus, PiCV viral diseases, animals, humans, poultry diseases, disease transmission, racing pigeons, polymerase chain reaction, PCR disease diagnosis, disease detection.

Ebrahimi, A., A. Halajian, and F. Nikookhah (2004). **Isolation of *Cryptococcus neoformans* from pigeon droppings in Shahrekord, Iran.** *Indian Veterinary Journal* 81(11): 1293-1294. ISSN: 0019-6479.

**Descriptors:** pigeons, cryptococcosis, droppings, isolation, *Cryptococcus neoformans*, Iran.

El Shabiny, L.M., M.M. Shaker, and S.E. Ouda (2005). **The application of a recent technique for diagnosis of *Mycoplasma gallisepticum* infection from migratory quail.** *Veterinary Medical Journal Giza* 53(1): 143-152. ISSN: 1110-1423.

**Descriptors:** migratory quail, *Mycoplasma gallisepticum*, diagnosis, recent technique, application.

Fang, Y. and W.K. Reisen (2006). **Previous infection with West Nile or St. Louis encephalitis viruses provides cross protection during reinfection in house finches.** *American Journal of Tropical Medicine and Hygiene* 75(3): 480-5. ISSN: 0002-9637.

**Abstract:** House finches are competent hosts for both West Nile and St. Louis encephalitis viruses and frequently become infected during outbreaks. In the current study, house finches were infected initially with either West Nile or St. Louis encephalitis viruses and then challenged 6 weeks post infection with either homologous or heterologous viruses. Although mortality rates were high during initial infection with West Nile virus, prior infection with either virus prevented mortality upon challenge with West Nile virus. Prior infection with West Nile virus provided sterilizing immunity against both viruses, whereas prior infection with St. Louis encephalitis virus prevented viremia from St. Louis encephalitis virus, but only reduced West Nile virus viremia titers. Immunologic responses were measured by enzyme immunoassay and plaque reduction neutralization tests. Heterologous challenge with West Nile virus in birds previously infected with St. Louis encephalitis virus produced the greatest immunologic response, markedly boosting antibody levels against St. Louis encephalitis virus. Our data have broad implications for free-ranging avian serological

diagnostics and possibly for the recent disappearance of St. Louis encephalitis virus from California.

**Descriptors:** house finches, St. Louis encephalitis virus, physiology, finches virology, West Nile virus, physiology, immunology, recurrence, viremia.

Farmer, K.L., G.E. Hill, and S.R. Roberts (2005). **Susceptibility of wild songbirds to the house finch strain of *Mycoplasma gallisepticum*.** *Journal of Wildlife Diseases* 41(2): 317-25. ISSN: 0090-3558.

**Abstract:** Conjunctivitis in house finches (*Carpodacus mexicanus*), caused by *Mycoplasma gallisepticum* (MG), was first reported in 1994 and, since this time, has become endemic in house finch populations throughout eastern North America. Although the house finch is most commonly associated with MG-related conjunctivitis, MG has been reported from other wild bird species, and conjunctivitis (not confirmed as MG related) has been reported in over 30 species. To help define the host range of the house finch strain of MG and to better understand the effect of MG on other host species, we monitored a community of wild birds for exposure to MG and conducted experimental infections on nine avian species. For the field portion of our study, we conducted a 9-mo survey (August 2001 to April 2002) of wild avian species in a peri-urban environment on the campus of Auburn University. During this time 358 birds, representing 13 different families, were sampled. No clinical signs of mycoplasmosis were observed in any bird. Thirteen species from nine families had positive agglutination reactions for antibodies to MG, but all birds tested negative by polymerase chain reaction (PCR). Three mourning doves were PCR-positive for MG, but antibodies to MG were not detected. In the experimental infections, we exposed seven native avian species and two cage-bird species to MG (May 2000 to June 2002). After exposure, clinical disease was seen in all four species from the family Fringillidae and in eastern tufted titmice (*Baeolophus bicolor*). In addition, three other species were infected without clinical signs, suggesting that they may represent potential MG reservoirs.

**Descriptors:** house finch, wild song birds, *Mycoplasma gallisepticum*, susceptibility, bird diseases epidemiology, conjunctivitis, bacterial, immunology, antibodies, conjunctivitis, USA.

Faustino, C.R., C.S. Jennelle, V. Connolly, A.K. Davis, E.C. Swarthout, A.A. Dhondt, and E.G. Cooch (2004). ***Mycoplasma gallisepticum* infection dynamics in a house finch population: seasonal variation in survival, encounter and transmission rate.** *Journal of Animal Ecology* 73(4): 651-669. ISSN: 0021-8790.

**Descriptors:** house finch, population, *Mycoplasma gallisepticum*, infection dynamics, seasonal variation, survival, transmission rate.

Ferrazzi, V., G. Grilli, A. Piccirillo, and D. Gallazzi (2004). **La coccidiosi nel fagiano. [Coccidiosis in pheasants]**. *Praxis Veterinaria Milano* 25(3): 2-6. ISSN: 0350-4441.

**Descriptors:** pheasants, disease, coccidiosis, transmission, treatment, anticoccidial drugs.

**Language of Text:** Italian, summary in English.

Ferrell, S.T. (2004). **Mycoplasmosis of house finches**. *Small Animal and Exotics Book Two: Pain Management-Zoonosis Proceedings of the North American Veterinary Conference, Volume 18, Orlando, Florida, USA, 17-21 January 2004*, Eastern States Veterinary Association: Gainesville, USA, p. 1449-1450.

**Descriptors:** house finches, mycoplasmosis, book chapter, conference.

**Notes:** Meeting Information: Small Animal and Exotics. Book two: Pain Management - Zoonosis. Proceedings of the North American Veterinary Conference, Volume 18, Orlando, Florida, USA, 17-21 January 2004.

Franciosini, M.P., E. Fringuelli, O. Tarhuni, G. Guelfi, D. Todd, P. Casagrande Proietti, N. Falocci, and G. Asdrubali (2005). **Development of a polymerase chain reaction-based in vivo method in the diagnosis of subclinical pigeon circovirus infection**. *Avian Diseases*. 49(3): 340-343. ISSN: 0005-2086.

**Abstract:** This paper describes a polymerase chain reaction (PCR)-based method performed on blood samples and intestinal content to detect subclinical pigeon circovirus (PiCV) infection in live pigeons. In addition, two sets of primers (primer set 1 and 2), designed in two different regions of the viral genome, were used to provide evidence of possible differences in PCR responses. Blood and intestinal content samples were randomly collected from a total of 50 apparently healthy meat pigeons, aged 1 to 5 wk, which came from central Italy. Samples of primary lymphoid organs were also collected. Results showed a high level of PiCV infection, although clinical signs were not present. The results obtained with the two sets of primers showed that primer set 2 was able to detect a higher number of PCR-positive pigeons (45 of 50 pigeons) than primer set 1 (11 of 50 pigeons). In both cases an increase in positive results with pigeon age indicates that the major direction of transmission is likely horizontal. In these circumstances feces can play an important epidemiologic role, as supported by the consistent circovirus detection in intestinal content. The high sensitivity of this PCR test, which is able to detect very low amounts of viral DNA ( $5.5 \times 10^{-3}$  fg of plasmid containing the cloned PiCV genome), makes it suitable for possible application as an epidemiologic tool for identifying virus carriers for subsequent removal from lofts.

**Descriptors:** pigeons, pigeon circovirus, PiCV polymerase chain reaction, PCR early diagnosis, diagnostic techniques, disease detection, poultry diseases, viral diseases, blood sampling, tissue analysis, virus transmission, feces.

**Language of Text:** Summary in Spanish.

Gancz, A.Y., L. Sandmeyer, M. Cannon, and D.A. Smith (2005). **Horner's syndrome in a red-bellied parrot (*Poicephalus rufiventris*)**. *Journal of Avian Medicine and Surgery* 19(1): 30-34. ISSN: 1082-6742.

**Descriptors:** red bellied parrot, Horner's syndrome, ptosis, feathers behavior, smooth muscles, clinical signs, diagnosis, trauma.

Gartrell, B.D., S.R. Raidal, and S.M. Jones (2003). **Renal disease in captive swift parrots (*Lathamus discolor*): clinical findings and disease management**. *Journal of Avian Medicine and Surgery* 17(4): 213-223. ISSN: 1082-6742.

**Descriptors:** swift parrots, captive, renal disease, clinical findings, disease management, *Lathamus discolor*, neurologic signs, gout, nephropathy.

George, V.T., N. Pazhanivel, and B.M. Manohar (2005). **Bacterial septicaemia in an African grey parrot**. *Indian Veterinary Journal* 82(11): 1227. ISSN: 0019-6479.

**Descriptors:** African grey parrot, bacterial septicemia, disease, case study.

Gerhold, R.W., C.M. Tate, S.E. Gibbs, D.G. Mead, A.B. Allison, and J.R. Fischer (2007). **Necropsy findings and arbovirus surveillance in mourning doves from the south-eastern United States**. *Journal of Wildlife Diseases* 43(1): 129-35. ISSN: 0090-3558.

**Abstract:** Mourning doves (*Zenaidura macroura*) are the most abundant and widespread native member of the columbid family, as well as a major migratory game species, in the United States. However, there is little information on mortality factors in mourning doves. Records of necropsy accessions at the Southeastern Cooperative Wildlife Disease Study (SCWDS) from 15 southeastern states, from 1971 through 2005, were reviewed. One hundred thirty-five mourning doves were submitted from nine states during the 35-yr period. Trichomonosis constituted 40% (n = 54) of all diagnoses and was the most frequent diagnosis. Toxicoses and avian pox constituted 18.5% (n = 25) and 14.8% (n = 20) of all diagnoses, respectively. Remaining diagnoses included trauma, suspected toxicosis, *Ascaridia columbae* infection, suspected tick paralysis, and undetermined. Adults were observed more frequently with trichomonosis (94.1%) and toxicoses (68%) as compared to juveniles, but a gender predisposition was not apparent for either disease. Age and gender predilections were not apparent for cases of avian pox. The majority of the trichomonosis and avian pox cases were observed in the spring-summer, whereas the majority of the toxicosis cases were observed in the winter-spring. Additionally, the Georgia Department of Human Resources-Division of Public Health and West Virginia Department of Health and Human Resources submitted 809 mourning doves to SCWDS from 2001 through 2005 for West Nile virus surveillance efforts. West Nile virus was isolated from 2.1% (n = 17) and eastern equine encephalitis virus (EEEV) was isolated from 0.2% (n = 2) of the submitted birds.

**Descriptors:** mourning doves, arbovirus surveillance, necropsy findings, columbid family, diseases, parasites, viruses, southeastern USA.

Gough, R.E., S.E. Drury, F. Culver, P. Britton, and D. Cavanagh (2006). **Isolation of a coronavirus from a green-cheeked Amazon parrot (*Amazona viridigenalis* Cassin).** *Avian Pathology* 35(2): 122-126. ISSN: 0307-9457.

**Abstract:** A virus (AV71/99) was isolated from a green-cheeked Amazon parrot by propagation and passage in both primary embryo liver cells derived from blue and yellow macaw (*Ara ararauna*) embryos and chicken embryo liver cells. Electron microscopic examination of cytopathic agents derived from both types of cell cultures suggested that it was a coronavirus. This was confirmed using a pan-coronavirus reverse transcriptase polymerase chain reaction that amplified part of gene 1 that encodes the RNA-dependent RNA polymerase. The deduced sequence of 66 amino acids had 66 to 74% amino acid identity with the corresponding sequence of coronaviruses in groups 1, 2 and 3. Several other oligonucleotide primer pairs that give PCR products corresponding to genes 3, 5, N and the 3'-untranslated region of infectious bronchitis virus, turkey coronavirus and pheasant coronavirus (all in group 3) failed to do so with RNA from the parrot coronavirus. This is the first demonstration of a coronavirus in a psittacine species.

**Descriptors:** Amazon, parrots, *Amazona viridigenalis*, Coronavirus, viral diseases of animals and humans, bird diseases, pathogen identification, embryo (animal), cultured cells, reverse transcriptase polymerase chain reaction, nucleotide sequences, microbial genetics, amino acid sequences, RNA directed RNA polymerase, new host records, in vitro virus passaging, molecular sequence data.

Grizzle, J.M., D.B. Kersten, M.D. McCracken, A.E. Houston, and A.M. Saxton (2004). **Determination of the acute 50% lethal dose T-2 toxin in adult bobwhite quail: additional studies on the effect of T-2 mycotoxin on blood chemistry and the morphology of internal organs.** *Avian Diseases* 48(2): 392-9. ISSN: 0005-2086.

**Abstract:** Three experiments were conducted to assess mortality rate, blood chemistry, and histologic changes associated with acute exposure to T-2 mycotoxin in adult bobwhite quail. In Experiment 1, adult quail were orally dosed with T-2 toxin to determine the lethal dose that resulted in 50% mortality of the affected population (LD50), and that dose was determined to be 14.7 mg of T-2 toxin per kilogram of body weight (BW). A second experiment was performed to study the effects of 12-18 mg/kg BW T-2 toxin on blood chemistry and liver enzyme profiles. Post-treatment uric acid, aspartate aminotransferase, lactic dehydrogenase, and gamma glutamyltransferase increased as compared with pretreatment values. In contrast, posttreatment plasma total protein, cholesterol, and triglyceride levels numerically decreased as compared with pretreatment values. Changes in blood chemistry values were consistent with liver and kidney damage after T-2 toxin exposure. In Experi-

ment 3, histologic analyses of bone marrow, spleen, liver, small intestine, kidney, and heart were conducted on birds dosed in Experiment 2. Marked lymphocyte necrosis and depletion throughout the spleen, thymus, bursa, and gut-associated lymphoid tissue in the small intestine were observed in birds dosed with 15 and 18 mg/kg BW T-2 toxin. Necrosis of liver and lipid accumulation as a result of malfunctioning hepatocytes were also observed. Little or no morphologic change was observed in bone marrow and heart tissue. The LD50 for adult bobwhite quail as found in this study is two to three times higher than that reported for other species of commercial poultry. Results from these data confirm previous reports of immunosuppressive and/or cytotoxic effects of T-2 toxin in other mammalian and avian species. T-2 toxin may have a negative impact on the viability of wild quail populations.

**Descriptors:** bobwhite quail, *Colinus*, blood, T-2 toxin toxicity, blood chemical analysis, enzyme tests, heart drug effects, intestines drug effects, kidney drug effects, lethal dose 50, liver drug effects, lymphocytes pathology, mortality.

Gumussoy, K.S., F. Uyanik, A. Atasever, and Y. Cam (2004). **Experimental *Aspergillus fumigatus* infection in quails and results of treatment with itraconazole.** *Journal of Veterinary Medicine. B, Infectious Diseases and Veterinary Public Health* 51(1): 34-8. ISSN: 0931-1793.

**Abstract:** This study was performed to investigate (i). the clinical, histopathological and biochemical changes in quails (*Coturnix coturnix japonica*) with experimentally induced aspergillosis; and (ii). the efficiency of itraconazole treatment on these infected birds. A total of 18021-day-old male quails was randomly divided into three groups (control, infected untreated and infected treated), each containing 60. The experimental infection was set by intratracheal inoculation of 0.2 ml inoculum of *Aspergillus fumigatus* (CBS 113.26 strain) consisting of approximately  $2.7 \times 10^6$  spores/ml. Two days after the inoculation, general clinical signs of aspergillosis in the respiratory tract were observed. In the histopathological examination, caseous foci were found in lungs, trachea and on airsacs. All quails died in the infected untreated group. *Aspergillus fumigatus* was isolated from the various organs of all dead quails. There was no significant change in serum aspartate aminotransferase (AST) and gamma-glutamyltransferase (GGT) activities in infected untreated birds compared with controls. However, alanine aminotransferase (ALT) activity, albumin and calcium levels, and albumin/globulin (A/G) ratio were lower while phosphorus and globulin levels were higher in the infected untreated group than in controls. Each quail in the infected treated group was given 10 mg/kg/day itraconazole via drinking water for 7 days immediately after the first clinical findings. Although all quails died in the infected untreated group, 41 quails survived in the itraconazole treatment group. Biochemical values also returned approximately to the control levels after the treatment. The conclusion was drawn that aspergillosis in the quails might cause eco-

nomical losses because of high mortality. Oral itraconazole treatment of aspergillosis might lower the mortality rate in quails.

**Descriptors:** Japanese quail, *Coturnix coturnix japonica*, antifungal agents, therapeutic use, aspergillosis, bird diseases, *Aspergillus fumigatus*, drug therapy, coturnix, itraconazole therapeutic use, oral administration, administration and dosage, drug therapy, pathogenicity, treatment outcome.

Gurel, A., A. Gulcubuk, and N. Turan (2004). **A granulomatous conjunctivitis associated with *Morexella phenylpyruvica* in an ostrich (*Struthio camelus*)**. *Avian Pathology* 33(2): 196-199. ISSN: 0307-9457.

**Abstract:** The aim of study was to evaluate a case of granulomatous conjunctivitis, clinically and pathologically, in the right eye of a 2-year-old, female ostrich. A mass measuring 5 cm x 3 cm x 4 cm was removed surgically from the eye of the ostrich. *Morexella phenylpyruvica* was recovered from the mass. On histopathological examination, hyperplasia or squamous metaplasia in some area of conjunctival palpebra, and a granulomatous inflammation in the submucosa were observed. The lesion was described as a granulomatous conjunctivitis caused by *M. phenylpyruvica*. The lesion was located in the lower eyelid conjunctiva and was not only restricted to the gl. lacrimalis, but also present in the connective tissue. After excision of the mass, the ostrich was treated with topical and systemic antibiotics and corticosteroid. The ostrich recovered fully and the function of the eye appeared to be normal.

**Descriptors:** ostriches, conjunctivitis, bacterial infections, *Morexella phenylpyruvica*, granulomatous conjunctivitis, lower eyelid, case study.

Hanley, C.S., G.H. Wilson, K.S. Latimer, P. Frank, Hernandez Divers, and Stephen J (2005). **Interclavicular hemangiosarcoma in a double yellow-headed Amazon parrot (*Amazona ochrocephala oratrix*)**. *Journal of Avian Medicine and Surgery* 19(2): 130-137. ISSN: 1082-6742.

**Descriptors:** yellow headed Amazon parrot, hemangiosarcoma, interclavicular, anorexia, respiratory distress, right carotid artery, diagnostic samples.

Harkinezhad, T., K. Verminnen, C. Van Droogenbroeck, and D. Vanrompay (2007). ***Chlamydophila psittaci* genotype E/B transmission from African grey parrots to humans**. *Journal of Medical Microbiology* 56(Pt 8): 1097-100. ISSN: 0022-2615.

**Abstract:** Thirty-six birds from a parrot relief and breeding centre, as well as the manager, were examined for the presence of *Chlamydophila psittaci*. In the relief unit, 5 of 20 African grey parrots showed depression, ruffled feathers, loss of weight and mild dyspnoea. The birds received no antibiotic treatment. Birds of the breeding unit, 14 blue and gold macaws and 2 green-winged macaws, were healthy. They received doxycycline at the start of each breeding season. The manager complained of shortness of breath but took no medication. Using a nested PCR enzyme immunoassay

(EIA), *Cp. psittaci* was detected in the faeces of all five sick birds, as well as in a nasal and pharyngeal swab from the manager. The veterinarian and her assistant became infected while sampling the parrots, as pharyngeal and nasal swabs from both were positive by nested PCR/EIA after visiting the parrot relief and breeding centre, but they showed no clinical signs of infection. Bacteria could be isolated from three of five nested PCR/EIA-positive birds, the manager and the veterinarian, but not from the veterinary assistant. Using an ompA genotype-specific real-time PCR, *Cp. psittaci* genotype E/B was identified as the transmitted strain. All breeding birds tested negative for *Cp. psittaci*. This is believed to be the first report on *Cp. psittaci* genotype E/B transmission from parrots to humans. In contradiction to genotype A strains, which are thought to be highly virulent to both birds and men, the currently described genotype E/B strain apparently caused no severe clinical symptoms in either parrots or humans.

**Descriptors:** African grey parrots, *Chlamydophila psittaci*, genotype E, B, transmission, humans, diagnosis, strain, symptoms, treatment, doxycycline, zoonotic disease, case study.

Haruna, E.S., M. Usman, S. Ahmed, J.S. Shaibu, A.A. Makinde, L.H. Lombin, and M.M. Henton (2004). **Isolation of *Citrobacter murlinae* from clinically ill and dead quail, ducks and chickens.** *Veterinary Record Journal of the British Veterinary Association* 154(4): 119-120. ISSN: 0042-4900.

**Descriptors:** quail, ducks, chickens, dead birds, *Citrobacter murlinae*, isolation, post mortem sampling.

Hawkins, M.G., B.M. Crossley, A. Osofsky, R.J. Webby, C.W. Lee, D.L. Suarez, and S.K. Hietala (2006). **Avian influenza A virus subtype H5N2 in a red-lore Amazon parrot.** *Journal of the American Veterinary Medical Association* 228(2): 236-41. ISSN: 0003-1488.

**Abstract:** CASE DESCRIPTION: A 3-month-old red-lore Amazon parrot (*Amazona autumnalis autumnalis*) was evaluated for severe lethargy. CLINICAL FINDINGS: Avian influenza virus hemagglutinin subtype H5N2 with low pathogenicity was characterized by virus isolation, real-time reverse transcriptase PCR assay, chicken intravenous pathogenicity index, and reference sera. The virus was also determined to be closely related to a virus lineage that had been reported only in Mexico and Central America. TREATMENT AND OUTCOME: The chick was admitted to the hospital and placed in quarantine. Supportive care treatment was administered. Although detection of H5 avian influenza virus in birds in the United States typically results in euthanasia of infected birds, an alternative strategy with strict quarantine measures and repeated diagnostic testing was used. The chick recovered from the initial clinical signs after 4 days and was released from quarantine 9 weeks after initial evaluation after 2 consecutive negative virus isolation and real-time reverse tran-

scriptase PCR assay results. **CLINICAL RELEVANCE:** To the authors' knowledge, this is the first report of H5N2 avian influenza A virus isolated from a psittacine bird and represents the first introduction of this virus into the United States, most likely by illegal importation of psittacine birds. Avian influenza A virus should be considered as a differential diagnosis for clinical signs of gastrointestinal tract disease in psittacine birds, especially in birds with an unknown history of origin. Although infection with avian influenza virus subtype H5 is reportable, destruction of birds is not always required.

**Descriptors:** Amazon parrot, Avian influenza type A, H5N2, virus isolation, pathogenicity, differential diagnosis, introduction, United States Department of Agriculture.

Headley, S.A. (2005). **Intrathoracic haemangiosarcoma in an ostrich (*Struthio camelus*).** *Veterinary Record Journal of the British Veterinary Association* 156(11): 353-354.

**Descriptors:** ostriches, *Struthio camelus*, hemangiosarcoma, intrathoracic.

Hemalatha, S., R. Govindarajan, B.M. Manohar, N. Vengadabady, and Purushothaman (2006). **Omphalitis in ostrich chicks.** *Indian Veterinary Journal* 83(4): 452-453. ISSN: 0019-6479.

**Descriptors:** ostrich chicks, omphalitis, infection, disease.

Herraez, P., F. Rodriguez, A. Espinosa de los Monteros, B. Acosta, J.R. Jaber, J. Castellano, and A. Castro (2005). **Fibrino-necrotic typhlitis caused by *Escherichia fergusonii* in ostriches (*Struthio camelus*).** *Avian Diseases* 49(1): 167-169. ISSN: 0005-2086.

**Abstract:** Two adult ostriches developed anorexia, prostration, and severe hemorrhagic diarrhea, dying 24 hr after the onset of clinical signs. On postmortem examination, the cecal mucosa showed locally extensive areas of hemorrhages and fibrino-necrotic typhlitis with a white-yellowish material covering the mucosal surface. Multiple serosal petequeal hemorrhages and fibrinous peritonitis were present. Histologic examination revealed an intense mononuclear infiltration in the lamina propria and submucosa of the cecum and extensive superficial necrosis associated with fibrin and serocellular deposits. Several gram-negative bacterial colonies were observed within the necrotic areas. Samples from intestinal lesions were collected, and pure growth of *Escherichia fergusonii* was obtained. *Escherichia fergusonii* is a member of Enterobacteriaceae, closely related to *Escherichia coli* and *Shigella* sp., established as a new species of the genus *Escherichia* in 1985. In veterinary medicine, *E. fergusonii* has been reported in calves and sheep from clinical cases suggestive of salmonellosis. To our knowledge, this report represents the first description of *E. fergusonii* associated with enteritis in ostrich.

**Descriptors:** ostriches, alternative livestock, *Escherichia fergusonii*, animal pathogenic bacteria, bird diseases, symptoms, cecum, case studies, *Escherichia* infections, intesti-

nal mucosa, histopathology, necrosis, new host records, enteritis, case study.

**Language of Text:** Summary in Spanish.

Heryford, A.G. and S.A. Seys (2004). **Outbreak of occupational campylobacteriosis associated with a pheasant farm.** *Journal of Agricultural Safety and Health* 10(2): 127-32. ISSN: 1074-7583.

**Abstract:** A cluster of campylobacteriosis cases occurred at a pheasant farm in rural Wyoming during the summer of 2000. This study examined the potential causes of the outbreak. A cohort study of all farm workers was conducted to assess foodborne and occupational exposures at the facility. Eight of fifteen workers (53%) became ill, and four were stool-culture positive for *Campylobacter jejuni*. High attack rates were noted among workers who had direct contact with pheasant feces and first-time workers at the farm. This investigation suggests an association between campylobacteriosis and occupational animal exposure to pheasants. Enhanced educational efforts targeting occupations with direct animal contact are critical, particularly in rural communities.

**Descriptors:** pheasant, campylobacteriosis, agricultural workers' diseases, epidemiology, bird diseases, epidemiology, *campylobacter* infections, disease outbreaks, transmission, feces microbiology, occupational exposure, zoonoses.

Hill, G.E., K.L. Farmer, and M.L. Beck (2004). **The effect of mycoplasmosis on carotenoid plumage coloration in male house finches.** *Journal of Experimental Biology* 207(Pt 12): 2095-9. ISSN: 0022-0949.

**Abstract:** Parasites are widely assumed to cause reduced expression of ornamental plumage coloration, but few experimental studies have tested this hypothesis. We captured young male house finches *Carpodacus mexicanus* in Alabama before fall molt and randomly divided them into two groups. One group was infected with the bacterial pathogen *Mycoplasma gallicepticum* (MG) and the other group was maintained free of MG infection. All birds were maintained through molt on a diet of seeds with tangerine juice added to their water as a source of beta-cryptoxanthin, the natural precursor to the primary red carotenoid pigment in house finch plumage. All males grew drab plumage, but males with MG infection grew feathers that were significantly less red (more yellow), less saturated, and less bright than males that were not infected. MG targets upper respiratory and ocular tissue. Our observations show that a pathogen that does not directly disrupt carotenoid absorption or transportation can still have a significant effect on carotenoid utilization.

**Descriptors:** house finches, bird diseases microbiology, physiopathology, mycoplasma infections, *Mycoplasma gallisepticum*, pigmentation physiology, beta carotene analogs and derivatives, Alabama, carotenoids metabolism, songbirds, xanthophylls.

Holmes, P. and P. Duff (2005). **Ingluvitis and oesophagitis in wild finches.** *Veterinary Record* 157(15): 455.

**Descriptors:** bird diseases etiology, wild finches, trichomonas infections, epidemiology, pathology, transmission, crop, avian pathology, esophagitis etiology, pathology, trichomonas infections epidemiology, pathology, transmission.

**Notes:** Comment On: Vet Rec. 2005 Sep 17;157(12):360 Library: National-Library-of-Medicine.

Hosseini, P.R., A.A. Dhondt, and A. Dobson (2004). **Seasonality and wildlife disease: how seasonal birth, aggregation and variation in immunity affect the dynamics of *Mycoplasma gallisepticum* in house finches.** *Proceedings. Biological Sciences The Royal Society* 271(1557): 2569-77. ISSN: 0080-4649.

**Abstract:** We examine the role of host seasonal breeding, host seasonal social aggregation and partial immunity in affecting wildlife disease dynamics, focusing on the dynamics of house finch conjunctivitis (*Mycoplasma gallisepticum* (MG) in *Carpodacus mexicanus*). This case study of an unmanaged emerging infectious disease provides useful insight into the important role of seasonal factors in driving ongoing disease dynamics. Seasonal breeding can force recurrent epidemics through the input of fresh susceptibles, which will clearly affect a wide variety of wildlife disease dynamics. Seasonal patterns of social aggregation and foraging behaviour could change transmission dynamics. We use latitudinal variation in the timing of breeding, and social systems to model seasonal dynamics of house finch conjunctivitis across eastern North America. We quantify the patterns of seasonal breeding, and social aggregation across a latitudinal gradient in the eastern range of the house finch, supplemented with known field and laboratory information on immunity to MG in finches. We then examine the interactions of these factors in a theoretical model of disease dynamics. We find that both forms of seasonality could explain the dynamics of the house finch-MG system, and that these factors could have important effects on the dynamics of wildlife diseases generally. In particular, while either alone is sufficient to create recurrent cycles of prevalence in a population with an endemic disease, both are required to produce the specific semi-annual pattern of disease prevalence seen in the house finch conjunctivitis system.

**Descriptors:** house finches, *Mycoplasma gallisepticum*, wildlife disease, seasonality, immunity variation, dynamics, seasonal birth, aggregation, conjunctivitis.

Hosseini, P.R., A.A. Dhondt, and A.P. Dobson (2006). **Spatial spread of an emerging infectious disease: conjunctivitis in house finches.** *Ecology* 87(12): 3037-46. ISSN: 0012-9658.

**Abstract:** In this paper we quantify the rate of spread of the newly emerged pathogen *Mycoplasma gallisepticum* of the House Finch, *Carpodacus mexicanus*, in its introduced range. We compare and contrast the rapid, yet decelerating, rate of spread

of the pathogen with the slower, yet accelerating rate of spread of the introduced host. Comparing the rate of spread of this pathogen to pathogens in terrestrial mammalian hosts, we see that elevation and factors relating to host abundance restrict disease spread, rather than finding any major effects of discrete barriers or anthropogenic movement. We examine the role of seasonality in the rate of spread, finding that the rate and direction of disease spread relates more to seasonality in host movement than to seasonality in disease prevalence. We conclude that asymptomatic carriers are major transmitters of *Mycoplasma gallisepticum* into novel locations, a finding which may also be true for many other diseases, such as West Nile Virus and avian influenza.

**Descriptors:** house finches, conjunctivitis, emerging infectious disease, spatial spread, *Mycoplasma gallisepticum*, asymptomatic carriers.

Humberd, J., K. Boyd, and R.G. Webster (2007). **Emergence of influenza A virus variants after prolonged shedding from pheasants.** *Journal of Virology* 81(8): 4044-51. ISSN: 0022-538X.

**Abstract:** We previously demonstrated the susceptibility of pheasants to infection with influenza A viruses of 15 hemagglutinin (HA) subtypes: 13/23 viruses tested were isolated for  $\geq 14$  days, all in the presence of serum-neutralizing antibodies; one virus (H10) was shed for 45 days postinfection. Here we confirmed that 20% of pheasants shed low-pathogenic influenza viruses for prolonged periods. We aimed to determine why the antibody response did not clear the virus in the usual 3 to 10 days, because pheasants serve as a long-term source of influenza viruses in poultry markets. We found evidence of virus replication and histological changes in the large intestine, bursa of Fabricius, and cecal tonsil. The virus isolated 41 days postinfection was antigenically distinct from the parental H10 virus, with corresponding changes in the HA and neuraminidase. Ten amino acid differences were found between the parental H10 and the pheasant H10 virus; four were in potential antigenic sites of the HA molecule. Prolonged shedding of virus by pheasants results from a complex interplay between the diversity of virus variants and the host response. It is often argued that vaccination pressure is a mechanism that contributes to the generation of antigenic-drift variants in poultry. This study provided evidence that drift variants can occur naturally in pheasants after prolonged shedding of virus, thus strengthening our argument for the removal of pheasants from live-bird retail markets.

**Descriptors:** pheasants, influenza A, emergence, shedding, variants, antibody response, virus replication, vaccination, live bird retail markets.

Ibrahim, R.S., R. Hassanein, and F.A. Moustafa (2005). ***Campylobacter jejuni* infection in Japanese quail (*Coturnix coturnix*) “isolation, pathogenicity and public health implications”.** *Assiut Veterinary Medical Journal* 51(104): 212-226. ISSN: 1012-5973.

**Descriptors:** Japanese quail, infection, *Campylobacter jejunii*, gastrointestinal tract, pathogenicity, public health, implications.

**Language of Text:** Arabic.

Inafuku, M., T. Toda, T. Okabe, A. Shinjo, H. Iwasaki, and H. Oku (2007). **Expression of cell-cycle-regulating genes in the development of atherosclerosis in Japanese quail (*Coturnix japonica*)**. *Poultry Science* 86(6): 1166-73. ISSN: 0032-5791.

**Abstract:** The levels of mRNA expression in regulatory genes that are involved in the pathological changes of aortic atherosclerotic and fibroblastic intimal thickening was investigated in Japanese quail. The quail were divided into a control diet group and an atherogenic diet group. The quail were euthanized at 2, 4, 8, and 12 wk after consuming either a control diet or an atherogenic diet. Thereafter, both histological and immunohistochemical studies and mRNA expression analysis of the cell-cycle-regulating genes in aortic atherosclerotic lesions were performed on selected ascending aortas and their large branches. In the atherogenic diet group, aortic lipid-containing intimal and atheromatous lesions were seen mainly at 8 and 12 wk, respectively. Semiquantitative reverse-transcription PCR was used to analyze the alterations of mRNA expression on the development of atherosclerotic lesions. Messenger RNA expression of the c-fos and c-src genes showed peak levels at 8 wk in the atherogenic diet group. However, no significant alteration of c-jun mRNA expression was noted during the entire experimental period. According to the progression of aortic atherosclerotic lesions, c-myc mRNA expression in the atherogenic diet group increased chronologically, and the highest level was observed at 12 wk. Alterations in mRNA expression of proliferating cell nuclear antigen and the p27 gene were similar to that of c-myc. The levels of c-myc, proliferating cell nuclear antigen, and p27 mRNA expression was significantly correlated with the degree of aortic atherosclerotic lesion development at 12 wk in our experiment.

**Descriptors:** Japanese quail, atherosclerosis, *Coturnix* genetics, cell cycle regulating genes, development, expression, pathologic changes, diet.

Irizarry Rovira, A.R., A.M. Lennox, and J.A. Ramos Vara (2007). **Malignant melanoma in a zebra finch (*Taeniopygia guttata*): cytologic, histologic, and ultrastructural characteristics**. *Veterinary Clinical Pathology American Society for Veterinary Clinical Pathology* 36(3): 297-302. ISSN: 0275-6382.

**Abstract:** An approximately 3-year-old adult male zebra finch (*Taeniopygia guttata*) was diagnosed with malignant melanoma. The large darkly pigmented tumor was located in the coelom, extended from the apex of the heart to the cloaca, and was adherent to the intestines and the ventriculus. Dark small masses (likely metastases) were observed in the lungs. Cytologically, the neoplasm consisted mainly of round to oval cells with brown or pale blue to blue-brown pigment. Lesser numbers of cells were stellate to dendritic with abundant amounts of brown pigment granules or were

markedly pleomorphic with variable amounts of pigment. Histologically, the tumor consisted of dense sheets and aggregates of infiltrative melanocytes that were negative for S-100 and Melan A. A few cells were consistent with “signet-ring” melanocytes. Melanocytes examined by electron microscopy contained typical structures, mainly premelanosomes and melanosomes, of this cell type. However, melanocytes with marked pleomorphism also contained intracytoplasmic aggregates of filaments, consistent with previously reported ultrastructural findings in signet-ring or rhabdoid melanoma of nonavian species.

**Descriptors:** zebra finch, malignant melanoma, cytologic, histologic, ultrastructural characteristics, coelom, lungs, metastases.

Johnston, M.S., T.T. Son, and K.L. Rosenthal (2007). **Immune-mediated hemolytic anemia in an eclectus parrot.** *Journal of the American Veterinary Medical Association* 230(7): 1028-31. ISSN: 0003-1488.

**Abstract:** CASE DESCRIPTION: A 2-year-old female Solomon Island eclectus parrot (*Eclectus roratus*) was evaluated by a veterinarian because of a 4-day history of progressive lethargy, weakness, poor appetite, and inactivity. The bird was referred to a veterinary teaching hospital for further examination. CLINICAL FINDINGS: Clinicopathologic analyses revealed that the parrot had marked regenerative anemia, autoagglutination, and biliverdinuria. Small, rounded RBCs (thought to be spherocytes) were detected in blood smears. The abnormal findings met the diagnostic criteria for dogs with primary immune-mediated hemolytic anemia. However, analyses of blood samples for lead and zinc concentrations and plasma bile acids concentrations; the use of PCR assays for *Chlamydoiphila psittaci*, psittacine circovirus 1 (causative agent of beak and feather disease), and polyomavirus; and microbial culture and Gram staining of feces did not reveal a cause for the hemolytic anemia. TREATMENT AND OUTCOME: Although administration of immunosuppressive doses of cyclosporine was initiated, there was a rapid progression of disease, which led to death of the parrot before this treatment could be continued long-term. Lack of an identifiable underlying disease (confirmed by complete histologic examinations at necropsy) supported the diagnosis of primary immune-mediated hemolytic anemia. CLINICAL RELEVANCE: Primary immune-mediated hemolytic anemia has not been widely reported in psittacine birds. A comprehensive evaluation and complete histologic examination of tissues to rule out underlying disease processes are required to definitively establish a diagnosis of primary immune-mediated hemolytic anemia in parrots. Primary immune-mediated hemolytic anemia should be considered as a differential diagnosis for regenerative anemia in a parrot.

**Descriptors:** eclectus parrot, immune mediated hemolytic anemia, symptoms, diagnostic criteria, differential diagnosis, regenerative anemia., case study.

Klaphake, E., S.L. Beazley Keane, M. Jones, and A. Shoieb (2006). **Multisite integumentary squamous cell carcinoma in an African grey parrot (*Psittacus erithacus erithacus*)**. *Veterinary Record* 158(17): 593-6. ISSN: 0042-4900.

**Abstract:** A 22-year-old male African grey parrot (*Psittacus erithacus erithacus*) had had episodes of chronic feather picking and self-mutilation for 10 years; it had a 5 cm diameter right axillary wound and a 2 cm left dorsal patagial wound. Initial treatment with azithromycin and wound management was unsuccessful. Biopsies of both masses indicated squamous cell carcinoma. The left patagial tumour was removed completely by electrocautery. Cisplatin was administered weekly into multiple sites on the right axillary tumour and it initially appeared to regress; however, the bird's condition deteriorated after a month of treatment, and it was euthanased. The tumour was confirmed postmortem to be squamous cell carcinoma, which had invaded local tissues. The aetiology of the carcinoma may have been secondary to chronic focal trauma.

**Descriptors:** African grey parrot, integumentary squamous cell carcinoma, multisite, self-mutilization, biopsies, postmortem., chronic focal trauma.

Kollias, G.V., K.V. Sydenstricker, H.W. Kollias, D.H. Ley, P.R. Hosseini, V. Connolly, and A.A. Dhondt (2004). **Experimental infection of house finches with *Mycoplasma gallisepticum***. *Journal of Wildlife Diseases* 40(1): 79-86. ISSN: 0090-3558.

**Abstract:** *Mycoplasma gallisepticum* (MG) has caused an endemic upper respiratory and ocular infection in the eastern house finch (*Carpodacus mexicanus*) after the epidemic first described in 1994. The disease has been studied by a number of investigators at a population level and reports describe experimental infection in group-housed MG-free house finches. Because detailed observation and evaluation of individual birds in group-housed passerines is problematic, we studied individually housed house finches that were experimentally inoculated with the finch strain of MG in a controlled environment. To accomplish this, a study was conducted spanning the period of November 2001-April 2002 with 20 MG-free (confirmed by the rapid plate agglutination assay and polymerase chain reaction [PCR] assay) eastern house finches captured in the Cayuga Basin area of central New York (USA) in the summer of 2001. After a period of acclimatization and observation (12 wk), 20 finches were inoculated with a 0.05-ml aliquot of MG ( $3.24 \times 10^5$  colony-forming units/ml) via bilateral conjunctival sac instillations. Two additional finches acted as controls and were inoculated in the same manner with preservative-free sterile saline solution. After inoculation, all finches except the controls exhibited clinical signs of conjunctivitis within 2-6 days. The progression of the disease was evaluated by several methods, including PCR, behavioral observations, and physical examination including eye scoring, body weight, and body condition index. Over a period of 21 wk, MG-infected finches developed signs of disease and recovered (80%), developed signs

of disease and progressed to become chronically infected (15%), or died (5%). We hypothesize that the high survival rate and recovery of these finches after infection was associated with the use of controlled environmental conditions, acclimatization, a high plane of nutrition, and low stocking (housing) density, all of which are factors documented to be important in the outcome of MG infections in domestic poultry and other species.

**Descriptors:** house finches, experimental infection, *Mycoplasma gallisepticum*, bird diseases, immunology, conjunctivitis, mycoplasma infections, pathogenicity, song-birds, epidemiology, pathology, disease susceptibility, population density, New York state, USA.

Kondiah, K., J. Albertyn, and R.R. Bragg (2005). **Beak and feather disease virus haemagglutinating activity using erythrocytes from African Grey parrots and Brown-headed parrots.** *Onderstepoort Journal of Veterinary Research* 72(3): 263-5. ISSN: 0030-2465.

**Abstract:** Psittacine beak and feather disease (Pbfd) is a common viral disease of wild and captive psittacine birds characterized by symmetric feather loss and beak deformities. The causative agent, beak and feather disease virus (BFDV), is a small, circular single-stranded DNA virus that belongs to the genus Circovirus. BFDV can be detected by PCR or the use of haemagglutination (HA) and haemagglutination inhibition (HI) assays that detect antigen and antibodies respectively. Erythrocytes from a limited number of psittacine species of Australian origin can be used in these tests. In South Africa, the high cost of these birds makes them difficult to obtain for experimental purposes. Investigation into the use of erythrocytes from African Grey parrots and Brown-headed parrots yielded positive results showing the haemagglutinating activity of their erythrocytes with purified BFDV obtained from confirmed clinical cases of the disease. The HA activity was further confirmed by the demonstration of HI using BFDV antiserum from three different African Grey parrots previously exposed to the virus and not showing clinical signs of the disease.

**Descriptors:** grey parrots, brown-headed parrots, beak and feather diseases, diagnosis, Circoviridae infections, parrots virology, antibodies, viral blood, diagnosis, erythrocytes virology, hemagglutination inhibition tests methods, hemagglutination, sensitivity, specificity.

Kwon, Y.K., Y.J. Lee, and I.P. Mo (2004). **An outbreak of necrotic enteritis in the ostrich farm in Korea.** *Journal of Veterinary Medical Science the Japanese Society of Veterinary Science* 66(12): 1613-5. ISSN: 0916-7250.

**Abstract:** An acute disease with high mortality occurred in the ostrich farm and characterized by depression, severe diarrhea and sternal recumbency. Four dead ostriches of the farm were submitted to the National Veterinary Research & Quarantine Service, and diagnosed as necrotic enteritis. In the gross and histopathological

examination, extensive diffuse fibrinonecrotic enteritis was found in the small intestine, especially jejunum. *Clostridium perfringens* was isolated from a pure culture from the duodenum and jejunum of these birds. Based on our current knowledge, this is the first report of an outbreak of necrotic enteritis in the ostrich in Korea.

**Descriptors:** ostriches, farm, necrotic enteritis, outbreak, depression, diarrhea, sternal recombency, *Clostridium perfringens*, duodenum, jejunum, Korea.

Latshaw, J.D., T.Y. Morishita, C.F. Sarver, and J. Thilsted (2004). **Selenium toxicity in breeding ring-necked pheasants (*Phasianus colchicus*)**. *Avian Diseases* 48(4): 935-939. ISSN: 0005-2086.

**Abstract:** A flock of breeding ring-necked pheasants received feed with a high selenium content. Within 4 days of eating the toxic feed, the rate of egg production began to decrease, and bird aggression increased. Approximately 12% of the hens died within a week. Necropsy of the hens revealed colorless fluid around the heart and a friable, but otherwise normal, liver. The rapid onset of the problem and signs noted at necropsy suggested toxicosis. Based on analysis, the feed contained 9.3 ppm of selenium. Selenium toxicity was consistent with the histologic diagnosis of degenerative cardiomyopathy, vacuolar degeneration of hepatocytes, and centrilobular hepatic necrosis. After 8 days, the toxic feed was removed and replaced with fresh feed. Egg production, which had dropped to 50%, returned to normal within 10 days of feed replacement. Hatchability of eggs laid from days 8 to 14 after delivery of the toxic feed was 35%. Approximately 10% of the chicks that hatched had deformed beaks and abnormal eyes. Many of the chicks that died in the shell had deformities, bringing the total to more than 50% of all embryos that developed. The selenium content of eggs that had no embryonic development was 2.05 ppm. Hatchability of eggs laid from days 21 to 28 after the toxic feed was delivered was almost 80%, which was slightly lower than normal. The selenium content of these eggs was 0.30 ppm. These results show the rapid onset and correction of selenium toxicity and suggest that specific embryologic defects are diagnostic for selenium toxicity.

**Descriptors:** Pheasants, *Phasianus colchicus*, ring-necked pheasants, game birds, breeding stock, selenium toxicity, selenosis, feeds, fecundity, animal fertility, animal behavior, aggression, liver, heart, symptoms, egg hatchability, embryogenesis, embryonic mortality, deformed embryos.

**Language of Text:** Summary in Spanish.

Lavoie, E.T., E.M. Sorrell, D.R. Perez, and M.A. Ottinger (2007). **Immunosenescence and age-related susceptibility to influenza virus in Japanese quail**. *Developmental and Comparative Immunology* 31(4): 407-14. ISSN: 0145-305X.

**Abstract:** We evaluated juvenile, pubescent, reproductive adult, and aged Japanese quail (*Coturnix coturnix japonica*) to determine if there were age-related differences in immune function with the hypothesis that aged birds would have weaker immune

responses. Immune responses were measured using phytohemagglutinin (PHA) skin test, antibody response to foreign red blood cells and exposure to an H9N2 influenza virus. Adult birds consistently had stronger immune responses than young and aged birds. Aged quail had skin responses 38% lower than adults. Pubescent birds' mean anti-red blood cell response was four-fold lower than adult birds. Adults had greater increase in total anti-viral antibody between primary and secondary infections than all other groups. Our data demonstrate an age-related difference in immune function in Japanese quail that has similarities to age-related immunity in humans; younger and older animals had weaker immune responses compared to young adults.

**Descriptors:** Japanese quail, immunosenescence, age related susceptibility, avian influenza, immune responses, young birds, aged birds.

Ley, D.H., D.S. Sheaffer, and A.A. Dhondt (2006). **Further western spread of *Mycoplasma gallisepticum* infection of house finches.** *Journal of Wildlife Diseases* 42(2): 429-31. ISSN: 0090-3558.

**Abstract:** *Mycoplasma gallisepticum*, an important pathogen of poultry, especially chickens and turkeys, emerged in 1994 as the cause of conjunctivitis in house finches (*Carpodacus mexicanus*) in their eastern range of North America. The resulting epidemic of *M. gallisepticum* conjunctivitis severely decreased house finch abundance and the continuing endemic disease in the eastern range has been associated with repeating seasonal peaks of conjunctivitis and limitation of host populations. *Mycoplasma gallisepticum* conjunctivitis was first confirmed in the western native range of house finches in 2002 in a Missoula, Montana, population. Herein, we report further western expansion of *M. gallisepticum* conjunctivitis in the native range of house finches based on positive polymerase chain reaction results with samples from birds captured in 2004 and 2005 near Portland, Oregon.

**Descriptors:** house finches, *Mycoplasma gallisepticum*, infection, disease spread, endemic disease, conjunctivitis, seasonal peaks, host populations, Oregon, USA.

Li, X. and K.A. Schat (2004). **Quail cell lines supporting replication of Marek's disease virus serotype 1 and 2 and herpesvirus of turkeys.** *Avian Diseases* 48(4): 803-812. ISSN: 0005-2086.

**Abstract:** Marek's disease virus (MDV), a highly cell-associated alphaherpesvirus, can be isolated and propagated in chicken kidney cells (CKC) and chicken or duck embryo fibroblast cells (CEF or DEF, respectively). Two recently developed cell lines, CU447 and CU453, developed from methylcholanthrene-induced tumors in Japanese quail, were examined for their suitability to propagate the three serotypes of MDV. The MDV strain RB-1B (serotype 1) was passaged for more than 30 passages in CU447 without causing cytopathic effects (CPE). Polymerase chain reaction analysis of RB-1B-infected CU447 cells demonstrated the presence of MDV DNA using primers specific for ICP4, pp38, and gB. The 132-bp direct repeats within the

BamH1-H and -D fragments were amplified to the same level as RB-1B that was passaged in CKC or CEF. Different passages of RB-1B in CU447 were examined for expression of gB and pp38 transcripts, and pp38, gB, gE, and VP22 protein expression. Irrespective of the passage level, these transcripts and proteins were detected in the RB-1B-infected CU447 cells. Infectious virus was rescued by cocultivation of RB-1B-infected CU447 with CKC. Herpes virus of turkeys was propagated in CU447 and CU453 causing CPE in both cell lines. SB-1 did not cause CPE in either cell line but a few SB-1-infected cells could be detected using a monoclonal antibody specific for serotype 2 MDV.

**Descriptors:** turkeys, Marek's disease, Gallid herpesvirus 2, Gallid herpesvirus 3, serotypes, virus replication, cell lines, quails, cultured cells, polymerase chain reaction, microbial genetics, DNA, messenger RNA, viral proteins.

**Language of Text:** Summary in Spanish.

Lima, F.S., E. Santin, A.C. Paulillo, L. Doretto Junior, V.M.B.d. Moraes, and N.M.Q. Gama (2004). **Evaluation of different programmes of Newcastle disease vaccination in Japanese quail (*Coturnix coturnix japonica*)**. *International Journal of Poultry Science* 3(5): 354-356. ISSN: 1682-8356.

**Descriptors:** Japanese quail, Newcastle disease, vaccination, different programs, evaluation.

Lima, F.S., E. Santin, A.C. Paulillo, L. Doretto Junior, V.M.B.d. Moraes, and R.P. Schocken Iturrino (2004). **Japanese quail (*Coturnix coturnix japonica*) as a Newcastle disease virus carrier**. *International Journal of Poultry Science* 3(7): 483-484. ISSN: 1682-8356.

**Descriptors:** Japanese quail, Newcastle disease virus, carrier.

Lindstrom, K.M., D.M. Hawley, A.K. Davis, and M. Wikelski (2005). **Stress responses and disease in three wintering house finch (*Carpodacus mexicanus*) populations along a latitudinal gradient**. *General and Comparative Endocrinology* 143(3): 231-9. ISSN: 0016-6480.

**Abstract:** In laboratory studies, stress hormones have been shown to impair immune functions, and increase susceptibility to diseases. However, the interactions between stress hormones and disease have rarely been studied in free-ranging populations. In this study, we measured concentrations of the avian stress hormone corticosterone across four winter months (December-March) over two years in three eastern North American house finch populations (*Carpodacus mexicanus*) along a latitudinal gradient. Because *Mycoplasma gallisepticum* infections appear in these populations in late winter, we hypothesized that the timing of the disease outbreaks could be mediated by changes in corticosterone concentrations. We found a significant increase in baseline and stress-induced plasma corticosterone concentrations in house finches

without *Mycoplasma* symptoms in late winter; when the prevalence of *Mycoplasma* infection peaks. We also found that house finches with *Mycoplasma* symptoms had elevated stress-induced corticosterone concentrations. High baseline concentrations were associated with a low body condition and a high fat load. We found that the relationship between corticosterone concentrations and the latitude of the study population changed between years. The first year, corticosterone concentrations were lowest in the southern latitude, but became higher in the second year when average winter temperatures were low. A causal understanding of the implications for this variation in corticosterone concentrations for *Mycoplasma* disease dynamics awaits further studies.

**Descriptors:** house finch, stress response, diseases, winter, *Mycoplasma*, corticosterone, plasma, concentration, immune functions, impair, North America.

Madeiras, C.A. (2004). **Borna virus infection in ostriches.** *Proceedings of the 11th Ostrich World Congress, Island Great Brijun, Croatia, 15-17 October 2004*: 60-62. ISSN: 1520-8052 (Online).

**Descriptors:** ostriches, Borna virus, infection, clinical signs, pathology, transmission, diagnosis, conference proceedings.

**Notes:** Meeting Information: Proceedings of the 11th Ostrich World Congress, Island Great Brijun, Croatia, 15-17 October 2004.

Mahmood, F., R.E. Chiles, Y. Fang, C.M. Barker, and W.K. Reisen (2004). **Role of nestling mourning doves and house finches as amplifying hosts of St. Louis encephalitis virus.** *Journal of Medical Entomology* 41(5): 965-972. ISSN: 0022-2585.

**Abstract:** Nestling mourning doves and house finches produced elevated viremias after inoculation with 2-3 log<sub>10</sub> plaque-forming units (PFU) of St Louis encephalitis (SLE) virus and infected 67 and 70% of *Culex tarsalis* Coquillett that engorged upon them, respectively. Mosquito infection rates as well as the quantity of virus produced after extrinsic incubation increased as a function of the quantity of virus ingested and peaked during days 3-5 postinoculation in mourning doves and days 2-4 in house finches. Only female *Cx. tarsalis* with body titers > or = 4.6 log<sub>10</sub> PFU were capable of transmitting virus. Overall, 38% of females infected by feeding on mourning doves and 22% feeding on house finches were capable of transmission. The quantity of virus expectorated was variable, ranging from 0.8 to 3.4 log<sub>10</sub> PFU and was greatest during periods when avian viremias were elevated. Our data indicated that nestling mourning doves and house finches were competent hosts for SLE virus and that the quantity of virus ingested from a viremic avian host varies during the course of the infection and determines transmission rates by the mosquito vector.

**Descriptors:** Columbidae, Fringillidae, doves, disease reservoirs, host pathogen relationships, Saint Louis encephalitis virus, viremia, *Culex tarsalis*, mosquitoes, infec-

tion, virus transmission, insect vectors, vector competence, *Zenaida macroura*, house finches, *Carpodacus mexicanus*, virus amplification.

Marco, M.A.D., L. Campitelli, M. Delogu, E. Raffini, E. Foni, L. Di Trani, M. Scaffidi, and I. Donatelli (2005). **Dimostrazione su base sierologica del coinvolgimento di fagiani a vita libera nell'ecologia dell'influenza [Emilia-Romagna]. [Serological evidences showing the involvement of free-living pheasants in the influenza ecology [Emilia-Romagna].]** *Italian Journal of Animal Science*. 4(3): 287-291. ISSN: 1594-4077.

**Descriptors:** pheasants, game birds, protected areas, capture of animals, avian influenza virus, epidemiology, elisa, antibodies, haemagglutination tests, agglutination tests, birds, Europe, galliformes, game, immunoenzyme techniques, immunological factors, immunological techniques, influenza virus, Italy, orthomyxoviridae.

**Language of Text:** Summaries in English and Italian.

Martins, N.R.S., A.C. Horta, A.M. Siqueira, S.Q. Lopes, J.S. Resende, M.A. Jorge, R.A. Assis, N.E. Martins, A.A. Fernandes, P.R. Barrios, T.J.R. Costa, and L.M.C. Guimaraes (2006). **Macrorhabdus ornithogaster in ostrich, rhea, canary, zebra finch, free range chicken, turkey, guinea-fowl, columbina pigeon, toucan, chuckar partridge and experimental infection in chicken, Japanese quail and mice.** *Arquivo Brasileiro De Medicina Veterinaria e Zootecnia* 58(3): 291-298. ISSN: 0102-0935.

**Descriptors:** ostrich, rhea, canary, finch, chicken, turkey, guinea fowl, pigeon, toucan, partridge, infection, *Macrorhabdus ornithogaster*, fungal disease, experimental infection, megabacteriosis.

Nardi, A.R.M., M.R. Salvadori, L.T. Coswig, M.S.V. Gatti, D.S. Leite, G.F. Valadares, M.G. Neto, R.P. Shocken Iturrino, J.E. Blanco, and T. Yano (2005). **Type 2 heat-labile enterotoxin (LT-II)-producing Escherichia coli isolated from ostriches with diarrhea.** *Veterinary Microbiology* 105(3-4): 245-249. ISSN: 0378-1135.

**Descriptors:** bird diseases, ostriches, *Struthio*, digestive system diseases, *Escherichia* infections, feces, diarrhea, enterotoxins, isolation, heat stability, cytoplasm, vacuoles, cytotoxicity, cytotoxins, enteropathogenic *Escherichia coli*, pathogenicity, Type 2 heat labile enterotoxin.

Nielsen, K., A.L. De Obaldia, and J. Heitman (2007). **Cryptococcus neoformans mates on pigeon guano: implications for the realized ecological niche and globalization.** *Eukaryotic Cell* 6(6): 949-59. ISSN: 1535-9778.

**Abstract:** The ecological niche that a species can occupy is determined by its resource requirements and the physical conditions necessary for survival. The niche to which an organism is most highly adapted is the realized niche, whereas the complete

range of habitats that an organism can occupy represents the fundamental niche. The growth and development of *Cryptococcus neoformans* and *Cryptococcus gattii* on pigeon guano were examined to determine whether these two species occupy the same or different ecological niches. *C. neoformans* is a cosmopolitan pathogenic yeast that infects predominantly immunocompromised individuals, exists in two varieties (grubii [serotype A] and neoformans [serotype D]), and is commonly isolated from pigeon guano worldwide. By contrast, *C. gattii* often infects immunocompetent individuals and is associated with geographically restricted environments, most notably, eucalyptus trees. Pigeon guano supported the growth of both species, and a brown pigment related to melanin, a key virulence factor, was produced. *C. neoformans* exhibited prolific mating on pigeon guano, whereas *C. gattii* did not. The observations that *C. neoformans* completes the life cycle on pigeon guano but that *C. gattii* does not indicates that pigeon guano could represent the realized ecological niche for *C. neoformans*. Because *C. gattii* grows on pigeon guano but cannot sexually reproduce, pigeon guano represents a fundamental but not a realized niche for *C. gattii*. Based on these studies, we hypothesize that an ancestral *Cryptococcus* strain gained the ability to sexually reproduce in pigeon guano and then swept the globe.

**Descriptors:** pigeon, guano, *Cryptococcus*, growth, reproduction, ecological niche, mating, life cycle, sexually reproduce.

Nili, H., K. Asasi, H. Dadras, and M. Ebrahimi (2007). **Pathobiology of H9N2 avian influenza virus in Japanese quail (*Coturnix coturnix japonica*)**. *Avian Diseases* 51(1 Suppl): 390-2. ISSN: 0005-2086.

**Abstract:** Clinical signs, serologic response, viral contents of the trachea and intestine, and histopathological and ultrastructural changes of the tracheal epithelium of Japanese quail experimentally infected with field isolate of H9N2 avian influenza were studied. Vaccinated and unvaccinated quail were inoculated with 10(6.3) 50% embryo infectious dose/bird of A/ chicken/Iran/SH-110/99 (H9N2) virus via nasal inoculation. Clinical signs such as depression, ruffled feathers, diarrhea, and nasal and eye discharges were observed 6 days postinfection (PI). No mortality was observed; however, there was reduction in feed and water consumption and egg production. However, the serologic response of vaccinated challenged and unvaccinated challenged birds was not significantly different. Unvaccinated challenged quail showed more severe histopathologic reaction in their lungs and trachea. Hyperemia, edema, infiltration of inflammatory cells, and deciliation and sloughing of the tracheal epithelium were observed. Ultrastructural study showed dilatation of endoplasmic reticulum and degeneration of Golgi apparatus and cilia of the tracheal lining cells of respiratory epithelium.

**Descriptors:** Japanese quail, avian influenza, H9N2 strain, pathobiology, clinical signs, ultrastructural changes, serologic response.

Nolan, P.M., S.R. Roberts, and G.E. Hill (2004). **Effects of *Mycoplasma gallisepticum* on reproductive success in house finches.** *Avian Diseases* 48(4): 879-885. ISSN: 0005-2086.

**Abstract:** Long known as a pathogen of poultry, *Mycoplasma gallisepticum* (MG) was first detected in house finches in 1994. The disease rapidly spread throughout the eastern United States and Canada and was associated with debilitating disease and high mortality in house finches. However, in the late 1990s, the proportion of infected finches dying as a result of infection with MG decreased, and asymptomatic infection was more common among wild birds than in the past. We documented MG infections in breeding house finches and concluded that adults of both sexes transmit the infection to dependent young, probably after hatch. MG infections of breeding adults occurred late in the breeding season and were found in birds completing significantly more nests than birds that never tested positive for MG, implying that higher rates of reproduction carry a cost in the form of increased risk of infection. We found evidence of an MG-induced delay in dispersal of nestlings from their natal area and demonstrated a significant impact of infection on nestling growth.

**Descriptors:** Fringillidae, house finches, wild birds, *Mycoplasma gallisepticum*, bird diseases, mycoplasmosis, animal reproduction, fecundity, mortality, disease outbreaks, disease incidence, risk factors, nests, disease transmission, animal growth, *Carpodacus mexicanus*.

**Language of Text:** Summary in Spanish.

Odugbo, M.O., M. Muhammad, U. Musa, A.B. Suleiman, S.O. Ekundayo, and S.O. Ogunjumo (2004). **Pasteurellosis in Japanese quail (*Coturnix coturnix japonica*) caused by *Pasteurella multocida multocida* A:4.** *Veterinary Record Journal of the British Veterinary Association* 155(3): 90-91. ISSN: 0042-4900.

**Descriptors:** Japanese quail, pasteurellosis, disease, *Pasteurella multocida*.

Odugbo, M.O., U. Musa, S.O. Ekundayo, P.A. Okewole, and J. Esilonu (2006). ***Bordetella avium* Infection in Chickens and Quail in Nigeria: Preliminary Investigations.** *Veterinary Research Communications* 30(1): 1-5. ISSN: 0165-7380.

**Descriptors:** chickens, quails, poultry diseases, bacterial infections, *Bordetella avium*, disease outbreaks, flocks, morbidity, mortality, disease incidence, commercial farms, research facilities, Nigeria, avian bordetellosis.

**Language of Text:** Spanish.

Olivier, A.J. (2006). **Ecology and epidemiology of avian influenza in ostriches.** *Developments in Biologicals* 124: 51-7. ISSN: 1424-6074.

**Abstract:** Avian influenza is important because of its potential devastating effect on poultry health and trade. The ostrich industry of South Africa has not escaped the

consequences of control and export restrictions resulting from notifiable virus infections. Ostrich farmers first observed a syndrome of green urine in the early and mid 1980s. An H7N1 subtype, causing high mortality in young ostriches but with a low pathogenicity index for chickens, was first isolated in 1991. The first highly pathogenic subtype affecting ratites was reported during the 2000 epidemic of H7N1 in Italy. Low pathogenic subtypes were isolated in South Africa from 1991 to 2004, with one HPAI isolated in 2004. International research work on ostriches with both H5 and H7 subtypes, in both low and high pathogenic pathotypes, found the severity of clinical disease was not directly correlated to the pathotype. The ecology and epidemiology of infections in ostriches is not well understood. Surveys suggest local migratory water birds may play an important role. They have direct contact with ostrich flocks through the free-range production systems. Seasonal occurrence is seen, with the wet colder months more favourable for virus survival and detection. Management, population density, immune status and age are other important determinants of the severity of disease. Surveillance and monitoring must be implemented to understand the ecology and epidemiology, which extends to the validation and standardisation of diagnostic and serological methods for ostriches. Serious consideration should be given to vaccination, education and the use of separate production zones as part of a control programme.

**Descriptors:** ostriches, disease outbreaks, influenza a virus, pathogenicity, epidemiology, Struthioniformes, prevention, control, influenza in birds, diagnosis, transmission, South America.

Olivier, A.J. and B.W. Ganzevoort (2005). **Avian influenza in ostriches - sustainable management and control measures.** E. Carbajo *Proceedings of the 3rd International Ratite Science Symposium of the World's Poultry Science Association WPSA and 12th World Ostrich Congress, Madrid, Spain, 14th 16th October, 2005*, World Poultry Science Association (WPSA): Beekbergen, Netherlands, p. 217-221. ISBN: 8460963535.

**Descriptors:** ostriches, avian influenza, sustainable management, control measures, conference proceedings.

**Notes:** Meeting Information: Proceedings of the 3rd International Ratite Science Symposium of the World's Poultry Science Association (WPSA) and 12th World Ostrich Congress, Madrid, Spain, 14th-16th October, 2005.

Padilla, L.R., K. Flammer, and R.E. Miller (2005). **Doxycycline-medicated drinking water for treatment of *Chlamydophila psittaci* in exotic doves.** *Journal of Avian Medicine and Surgery* 19(2): 88-91. ISSN: 1082-6742.

**Descriptors:** exotic doves, *Chlamydophila psittaci*, treatment, drinking water, antibiotic treatment, Doxycycline medicated.

Pasmans, F., F. Van Immerseel, K. Hermans, M. Heyndrickx, J.M. Collard, R. Ducatelle, and F. Haesebrouck (2004). **Assessment of virulence of pigeon isolates of *Salmonella enterica* subsp. *enterica* serovar *typhimurium* variant Copenhagen for humans.** *Journal of Clinical Microbiology* 42(5): 2000-2. ISSN: 0095-1137.

**Abstract:** *Salmonella enterica* serovar *Typhimurium* variant Copenhagen was isolated from 5 of 152 (3.3%) feral pigeons from the city of Ghent (Belgium) and from 26 pooled fecal samples from 114 pigeon lofts (22.8%). These isolates belonged to phage type (PT) 99. Seven of the pigeon isolates were further compared in vitro to five human variant Copenhagen isolates, 2 isolates of PT 208, 1 isolate each of PT 120 and U302, and a nontypeable isolate. No differences in invasiveness in human intestinal epithelial Caco-2 cells were found. The human strains, however, were able to multiply significantly more inside human THP-1 macrophages than the pigeon strains. After inoculation of mice with a pigeon PT 99 strain, high numbers of *Salmonella* bacteria were shed with the feces, the internal organs were heavily colonized, and the animals showed severe clinical symptoms resulting in death. In conclusion, the less-pronounced ability of the pigeon variant Copenhagen strains to multiply inside human macrophages than human strains as well as the lack of human PT 99 isolates during 2002, despite the relatively high frequency of this PT in the pigeon population, suggest these strains to be of low virulence to humans. However, the high virulence for mice of the tested strain implies that rodents may act as reservoirs.

**Descriptors:** pigeon isolates, *Salmonella typhimurium* isolation, purification, pathogenicity, virulence, assessment, disease reservoirs, feces microbiology, mice, salmonella infections, transmission, species specificity, urban health, virulence, Belgium.

Paulman, A., C.A. Lichtensteiger, and L.J. Kohrt (2006). **Outbreak of herpesviral conjunctivitis and respiratory disease in Gouldian finches.** *Veterinary Pathology* 43(6): 963-970. ISSN: 0300-9858.

**Abstract:** An outbreak of tracheitis, sinusitis, and conjunctivitis, originating in recently imported birds, caused high morbidity and mortality in a flock of finches in Central Illinois. Although several species were present, Gouldian finches (*Erythrura [Chloebia] gouldiae*) were most commonly and severely affected. Birds submitted for necropsy displayed microscopic lesions characteristic of herpesviral infection, including epithelial cytomegaly and karyomegaly with basophilic, intranuclear inclusion bodies in the nasopharynx, sinuses, trachea, parabronchi, conjunctiva, and occasionally the lacrimal gland or proximal proventricular glands. Viral particles consistent with herpesvirus were visualized within affected epithelial cells with electron microscopy. Based on a partial sequence of the viral DNA polymerase gene, this virus was found to be identical to a herpesvirus previously implicated in a similar outbreak in Canada and is most likely an alphaherpesvirus.

**Descriptors:** Fringillidae, birds, disease outbreaks, Herpesviridae, viral diseases of animals and humans, conjunctivitis, respiratory tract diseases, tracheitis, sinusitis, histopathology, epithelial cells, pathogen identification, DNA directed DNA polymerase, nucleotide sequences, *Erythrura (Chloebia) gouldiae*, Alphaherpesvirus, Illinois.

Pereira, R.A., J.L. Maria, L.B. Moraes, L.C.B. Fallanena, N.C. Rodrigues, M.d.C. Allgayer, A.T. Esmeraldino, V.M. Pinto, and L.C.B. Fallavena (2003). **Carcinoma espinocelular em papagaio verdadeiro (*Amazona aestiva*): relato de caso. [Spindle cell carcinoma in a parrot (*Amazona aestiva*): case report].** *Veterinaria Em Foco* 1(1): 29-33. ISSN: 1679-5237.

**Descriptors:** Amazon parrot, spindle cell carcinoma, case report.

**Language of Text:** Portuguese, summary in English.

Perelman, B. (2004). **Control and prevention of hatchery related infectious diseases in ostriches.** *Proceedings of the 11th Ostrich World Congress, Island Great Brijun, Croatia, 15-17 October 2004* 63-65 ISSN: 1520-8052 (online).

**Descriptors:** ostriches, infectious diseases, hatchery related, control, prevention, incubator, bacteria, fungus, conference proceedings.

**Notes:** Meeting Information: Proceedings of the 11th Ostrich World Congress, Island Great Brijun, Croatia, 15-17 October 2004.

Peters, M., W.M. Prodinger, H. Gummer, H. Hotzel, P. Mobius, and I. Moser (2007). ***Mycobacterium tuberculosis* infection in a blue-fronted amazon parrot (*Amazona aestiva aestiva*).** *Veterinary Microbiology* 122(3-4): 381-383. ISSN: 0378-1135.

**Descriptors:** amazon parrot, infection, *Mycobacterium tuberculosis*, disease.

Phalen, D. (2004). **Steps to preventing avian polyomavirus in aviaries breeding non-budgerigar parrots.** *Exotic DVM* 5(6): 21-22. ISSN: 1521-1363.

**Descriptors:** non-budgerigar parrots, breeding, avian polyomavirus, preventing, steps, aviaries.

Pizarro, M., U. Hofle, A. Rodriguez Bertos, M. Gonzalez Huecas, and M. Castano (2005). **Ulcerative enteritis (quail disease) in lorries.** *Avian Diseases* 49(4): 606-608. ISSN: 0005-2086.

**Abstract:** Ulcerative enteritis is found in a wide range of avian hosts but has not been described in psittacine birds. This case report describes ulcerative enteritis in four lorries (two *Trichoglossus* sp. and two *Eos* sp.) that were found dead without any previous sign of disease. Macroscopically, all four birds showed good body condition. The only remarkable finding was a moderate dilatation of the small intestine with the presence of multiple yellow foci. Histologically, multiple ulcers extended into the

submucosa and were filled with necrotic debris; bacteria and fibrin were observed in the intestinal mucosa. The liver and spleen exhibited a multifocal fibrinoid necrosis associated with a very moderate inflammatory reaction. Microbiological isolation revealed colonies of *Clostridium colinum* and *Clostridium perfringens* in the intestinal tract of the investigated birds.

**Descriptors:** Psittacidae, ornamental birds, enteritis, bird diseases, mortality, case studies, symptoms, body condition, small intestine, lesions, *Clostridium colinum*, *Clostridium perfringens*, animal pathogenic bacteria, bacterial infections, hosts, new host records, liver, spleen, intestinal mucosa, ulcerative enteritis.

**Language of Text:** Summary in Spanish.

Pledger, A. (2005). **Avian pox virus infection in a mourning dove.** *La Revue Veterinaire Canadienne [Canadian Veterinary Journal]*. 46(12): 1143-1145. ISSN: 0008-5286.

**Abstract:** An adult mourning dove (*Zenaidura macroura*) was presented with dyspnea, poor body condition, and poor flight endurance. Nodular lesions were visible on the cere, both feet, and skin covering the pectoral region. Histopathological examination revealed epithelial hyperplasia with eosinophilic intracytoplasmic inclusion bodies consistent with Avipoxvirus infection.

**Descriptors:** wild birds, doves, bird diseases, symptoms, histopathology, Avipoxvirus, case studies, viral diseases of animals and humans, mourning doves, *Zenaidura macroura*.

**Language of Text:** Summary in French.

Promkuntod, N., C. Antarasena, P. Prommuang, and P. Prommuang (2006). **Isolation of avian influenza virus A subtype H5N1 from internal contents (albumen and allantoic fluid) of Japanese quail (*Coturnix coturnix japonica*) eggs and oviduct during a natural outbreak.** *Annals of the New York Academy of Sciences* 1081: 171-3. ISSN: 0077-8923.

**Abstract:** Avian influenza virus (AIV) was recovered from the internal contents of eggs, including mixture of albumen and allantoic fluid, and from the oviduct of naturally infected Japanese quail (*Coturnix coturnix japonica*) flocks in the southern part of Thailand. The virus titers of 10(4.6)-10(6.2) ELD(50)/mL were directly measured from the internal content of infected eggs. The virus was isolated by chorioallantoic sac inoculation of embryonating chicken eggs. Infected allantoic fluid was identified as hemagglutinating virus and then was indicated the presence of H5 hemagglutinin. The virus was confirmed to be H5N1 subtype influenza A virus by reverse transcriptase-polymerase chain reaction. Additionally, real-time reverse transcriptase-polymerase chain reaction assay could specifically detect influenza virus subtype H5. Furthermore, indirect fluorescent antibody (IFA) test by using specific anti-influenza A monoclonal antibody indicated that virus antigens were detected in the parenchyma of multiple tissues. Systemic localization of viral antigen detected was certainly

considered to be viremic stage. In addition, influenza virus antigen was also detected by IFA in allantoic fluid sediments isolated from internal content of egg or oviduct. The conclusion of isolated AIV type A subtype H5N1 from these two infected materials was correlated to the viremic stage of infection because the virus antigens could be observed in almost all tissues. Conclusively, the need for adequate safeguards to prevent contamination and spread of the virus to the environment during movement of eggs--including hatching eggs, cracked eggs, and other relevant infected materials--or egg consumption from area of outbreak is emphasized and must not be ignored for the reasons of animal, public, and environmental health.

**Descriptors:** Japanese quail, *coturnix*, eggs virology, influenza a virus, H5N1 subtype, isolation, purification, influenza in birds, epidemiology, disease outbreaks, egg proteins, fluorescent antibody technique, influenza transmission, oviducts virology, public health, reverse transcriptase polymerase chain reaction.

Radi, Z.A. (2004). **An epizootic of combined *Clostridium perfringens*, *Eimeria* sp. and *Capillaria* sp. enteritis and *Histomonas* sp. hepatitis with *Escherichia coli* septicemia in Bobwhite quails (*Colinus virginianus*).** *International Journal of Poultry Science* 3(7): 438-441. ISSN: 1682-8356.

**Descriptors:** bobwhite quail, epizootic, *Clostridium perfringens*, *Eimeria* sp, *Capillaria* sp., *Histomonas* sp., *E. coli*, enteritis, septicemia.

Rao, V.D.P. and Rajesh Chandra (2001). **Borna disease in ostriches.** *Intas Polivet* 2(2): 274-275. ISSN: 0972-1738.

**Online:** <http://www.intaspharm.com/neovet>

**Descriptors:** ostriches, Borna disease, clinical aspects, diagnosis, control, prevalence, prevention.

Raso, T.d.F., G.H.F. Seixas, N.M.R. Guedes, and A.A. Pinto (2006). ***Chlamydophila psittaci* in free-living Blue-fronted Amazon parrots (*Amazona aestiva*) and Hyacinth macaws (*Anodorhynchus hyacinthinus*) in the Pantanal of Mato Grosso do Sul, Brazil.** *Veterinary Microbiology* 117(2-4): 235-241. ISSN: 0378-1135.

**Abstract:** *Chlamydophila psittaci* (*C. psittaci*) infection was evaluated in 77 free-living nestlings of Blue-fronted Amazon parrots (*Amazona aestiva*) and Hyacinth macaws (*Anodorhynchus hyacinthinus*) in the Pantanal of Mato Grosso do Sul, Brazil. Tracheal and cloacal swab samples from 32 wild parrot and 45 macaw nestlings were submitted to semi-nested PCR, while serum samples were submitted to complement fixation test (CFT). Although all 32 Amazon parrot serum samples were negative by CFT, cloacal swabs from two birds were positive for *Chlamydophila* DNA by semi-nested PCR (6.3%); these positive birds were 32 and 45 days old. In macaws, tracheal and cloacal swabs were positive in 8.9% and 26.7% of the samples, respectively. Complement-fixing antibodies were detected in 4.8% of the macaw nestlings;

macaw nestlings with positive findings were between 33 and 88 days old. These results indicate widespread dissemination of this pathogen in the two evaluated psittacine populations. No birds had clinical signs suggestive of chlamydiosis. To the best of our knowledge, this is the first report on *C. psittaci* in free-living Blue-fronted Amazon parrots and Hyacinth macaws in Brazil.

**Descriptors:** Amazona, Psittacidae, parrots, wild birds, *Chlamydophila psittaci*, bird diseases, bacterial infections, chicks, diagnostic techniques, disease diagnosis, polymerase chain reaction, complement fixation tests, disease prevalence, *Anodorhynchus hyacinthinus*, macaws, asymptomatic infections, *Amazona aestiva*, Brazil.

Raso, T.F., S.N. Godoy, L. Milanelo, C.A. de Souza, E.R. Matuschima, J.P. Araujo Junior, and A.A. Pinto (2004). **An outbreak of chlamydiosis in captive blue-fronted Amazon parrots (*Amazona aestiva*) in Brazil.** *Journal of Zoo and Wildlife Medicine* 35(1): 94-6. ISSN: 1042-7260.

**Abstract:** Fifty-eight blue-fronted Amazon parrot (*Amazona aestiva*) nestlings, recovered from the illegal trade, became ill at a wildlife rehabilitation center in Sao Paulo State, Brazil. Clinical signs observed were nonspecific, and the mortality rate was 96.5% despite initial treatment with norfloxacin. Postmortem examinations were performed on 10 birds. Liver and spleen smears showed structures suggestive of *Chlamydophila psittaci* in four cases. Diagnosis was confirmed by seminested polymerase chain reaction on tissue samples. Other birds from the same location showed no clinical signs of the disease, although high complement fixation titers to *C. psittaci* were found in 10 adult psittacines. All birds in the facility were treated with doxycycline. The two surviving nestlings did not recover after two doxycycline treatments and were euthanatized. The high mortality rate observed in this outbreak was attributed to poor conditions of husbandry and delays in the diagnosis and treatment of the disease. After diagnosis, improved control measures for chlamydiosis were instituted.

**Descriptors:** Amazon parrots, disease, *chlamydophila psittaci*, pathogenicity, disease outbreaks, psittacosis, animal husbandry methods, anti bacterial agents, therapeutic use, microbiology, mortality, epidemiology, doxycycline therapeutic use, chlamydiosis, control measures, Brazil.

Raue, R., V. Schmidt, M. Freick, B. Reinhardt, R. Johne, L. Kamphausen, E.F. Kaleta, H. Muller, and M.E. Krautwald Junghanns (2005). **A disease complex associated with pigeon circovirus infection, young pigeon disease syndrome.** *Avian Pathology*. 34(5): 418-425. ISSN: 0307-9457.

**Descriptors:** pigeons, Pigeon circovirus, poultry diseases, etiology, clinical examination, pathology, age, disease severity, disease incidence, crop, proventriculus, small intestine, *Escherichia coli*, *Klebsiella pneumoniae*, spleen, lymphocytes, bursa of Fabricius, mixed infection, young-pigeon-disease-syndrome.

Reed, K.L., M.G. Conzemius, R.A. Robinson, and T.D. Brown (2004). **Osteocyte-based image analysis for quantitation of histologically apparent femoral head osteonecrosis: application to an emu model.** *Computer Methods in Biomechanics and Biomedical Engineering* 7(1): 25-32. ISSN: 1025-5842.

**Abstract:** Femoral head osteonecrosis is often characterized histologically by the presence of empty lacunae in the affected bony regions. The shape, size and location of a necrotic lesion influences prognosis, and can, in principle, be quantified by mapping the distribution of empty lacunae within a femoral head. An algorithm is here described that automatically identifies the locations of osteocyte-filled vs. empty lacunae. The algorithm is applied to necrotic lesions surgically induced in the emu, a large bipedal animal model in which osteonecrosis progresses to collapse, as occurs in humans. The animals' femoral heads were harvested at sacrifice, and hematoxylin and eosin-stained histological preparations of the coronal midsections were digitized and image-analyzed. The algorithm's performance in detecting empty lacunae was validated by comparing its results to corresponding assessments by six trained histologists. The percentage of osteocyte-filled lacunae identified by the algorithm vs. by the human readers was statistically indistinguishable.

**Descriptors:** emu, hip joint pathology, animal models, osteocytes pathology, osteonecrosis pathology, algorithms, Dromaiidae, femoral head, algorithm.

Reisen, W.K., R. Chiles, V. Martinez, Y. Fang, E. Green, and S. Clark (2004). **Effect of dose on house finch infection with western equine encephalomyelitis and St. Louis encephalitis viruses.** *Journal of Medical Entomology* 41(5): 978-981. ISSN: 0022-2585.

**Abstract:** house finches, *Carpodacus mexicanus*, were experimentally infected with high and standard doses of western equine encephalomyelitis virus (WEEV) or St. Louis encephalitis virus (SLEV) to determine whether high doses would produce an elevated viremia response and a high frequency of chronic infections. Finches inoculated with approximately equal to 100,000 plaque forming units (PFU) of WEEV or SLEV produced viremia and antibody responses similar to those in finches inoculated with approximately equal to 100 PFU of WEEV or 1000 PFU of SLEV, the approximate quantities of virus expectorated by blood-feeding *Culex tarsalis* *Coquillett*. Infected finches were held through winter and then necropsied. Only one finch inoculated with the high dose of SLEV developed a chronic infection. Our data indicated that elevated infectious doses of virus may not increase the viremia level or the frequency of chronic infection in house finches.

**Descriptors:** Fringillidae, house finches, Western equine encephalitis virus, Saint Louis encephalitis virus, infection, virus transmission, dose response, viremia, antibody formation, overwintering, host pathogen relationships, *Carpodacus mexicanus*, avian hosts, chronic infections.

Reisen, W.K., R.E. Chiles, V.M. Martinez, Y. Fang, and E.N. Green (2004). **Encephalitis virus persistence in California birds: experimental infections in mourning doves (*Zenaidura macroura*)**. *Journal of Medical Entomology* 41(3): 462-466. ISSN: 0022-2585.

**Abstract:** After-hatching and hatching year, mourning doves were infected by inoculation with either western equine encephalomyelitis (WEE) or St. Louis encephalitis (SLE) viruses; some birds in each group also were treated with the immunosuppressant cyclophosphamide before and during infection. Cyclophosphamide treatment significantly increased the WEE viremia but did not alter the antibody response. In contrast, cyclophosphamide-treated and -untreated doves did not develop a detectable SLE viremia but became antibody positive. Antibody peaked at 10 wk after inoculation for both viruses and remained detectable in most birds throughout the 26-wk study. When treated with cyclophosphamide the following spring, birds did not relapse and develop a detectable viremia. Previously infected birds were protected when challenged with conspecific virus (i.e., none produced a detectable viremia), but there was no anamnestic antibody response to reinfection. In agreement with our failure to detect relapses, all birds were negative for viral RNA when sera, spleen, lung, and kidney tissues were tested by reverse transcriptase-polymerase chain reaction after necropsy. Our results indicated that adult mourning doves were an incompetent host for SLE virus and probably do not serve as a suitable overwintering or dispersal host for either WEE and SLE viruses.

**Descriptors:** Columbidae, doves, infection, Western equine encephalitis virus, Saint Louis encephalitis virus, viral encephalitis, viremia, antibody formation, immunosuppressive agents, cyclophosphamide, host pathogen relationships, immunity, disease reservoirs, reinfection, host competence, California, USA.

Reisen, W.K., V.M. Martinez, Y. Fang, S. Garcia, S. Ashtari, S.S. Wheeler, and B.D. Carroll (2006). **Role of California (*Callipepla californica*) and Gambel's (*Callipepla gambelii*) quail in the ecology of mosquito-borne encephalitis viruses in California, USA**. *Vector Borne and Zoonotic Diseases* 6(3): 248-260. ISSN: 1530-3667.

**Descriptors:** *Callipepla californica*, quails, disease reservoirs, Western equine encephalitis virus, Saint Louis encephalitis virus, West Nile virus, animal age, seroprevalence, viremia, virus transmission, insect vectors, *Culex tarsalis*, viral encephalitis, reservoir competence, experimental infection, California.

Roy, P., P.G. Edwin, S.M. Sakthivelan, and V. Purushothaman (2004). **An outbreak of pasteurellosis among Japanese quails**. *Indian Journal of Animal Sciences*. 74(7): 728-729. ISSN: 0367-8318.

**Descriptors:** pasteurellosis, pathogenicity, histopathology, quails, Japan, Asia, bacterioses, biological properties, birds, domestic animals, galliformes, infectious diseases.

**Language of Text:** Summary in English.

Roy, P., V. Purushothaman, A. Koteeswaran, and A.S. Dhillon (2006). **Isolation, Characterization, and Antimicrobial Drug Resistance Pattern of *Escherichia coli* Isolated from Japanese Quail and their Environment.** *Journal of Applied Poultry Research* 15(3): 442-446.

**Descriptors:** Japanese quails, food animals, *Escherichia coli*, animal pathogenic bacteria, antibiotic resistance, multiple drug resistance, strains, strain differences, embryonic mortality, embryo, feathers, drinking water, serotypes, *Escherichia* infections, antibiotics, hygiene.

Roy, P., S. Vairamuthu, S.M. Sakthivelan, and V. Purushothaman (2004). **Hydropericardium syndrome in Japanese quail (*Coturnix coturnix japonica*).** *Veterinary Record Journal of the British Veterinary Association* 155(9): 273-274. ISSN: 0042-4900.

**Descriptors:** Japanese quail, hydropericardium syndrome, *Coturnix coturnix japonica*.

Sahnduran, S. (2004). **Isolation of *Escherichia coli* and *Staphylococcus aureus* from ostriches with conjunctivitis and respiratory disease.** *Revue De Medecine Veterinaire* 155(3): 167-169. ISSN: 0035-1555.

**Descriptors:** ostriches, conjunctivitis, respiratory disease, *Escherichia coli*, *Staphylococcus aureus*, isolation, clinical signs, treatment.

**Language of Text:** French.

Sakai, K., G. Sakabe, O. Tani, M. Nakamura, and K. Takehara (2006). **Antibody responses in ostriches (*Struthio camelus*) vaccinated with commercial live and killed Newcastle disease vaccines.** *Journal of Veterinary Medical Science the Japanese Society of Veterinary Science* 68(6): 627-9. ISSN: 0916-7250.

**Abstract:** Three ostriches (*Struthio camelus*) were immunized with commercially available live and killed Newcastle disease (ND) vaccines for chickens and the antibody responses to the ND vaccines were evaluated by a virus-neutralization (VN) test. Primary vaccination with the live vaccine, B1, by eye drop was followed with two shots of alum-precipitated killed vaccine via subcutaneous injection in the neck. As a final booster, another live vaccine, Clone 30, was used by eye drop. A VN antibody titer, more than 1:10 was observed for 6 months. This is the first report on the use of a live vaccine by eye drop as a booster in ostriches as well as evaluating responses to ND vaccines using the VN test in this avian species.

**Descriptors:** ostriches, antibody responses, Newcastle disease vaccines, live, killed, immunology, viral vaccines immunology, newcastle disease prevention, control, ophthalmic solutions, viral vaccines, administration, dosage.

- Santos, M.M.A.B., J.R. Peiro, and M.V. Meireles (2005). **Cryptosporidium infection in ostriches (*Struthio camelus*) in Brazil: clinical, morphological and molecular studies.** *Revista Brasileira De Ciencia Avicola* 7(2): 113-117. ISSN: 1516-635X.  
**Descriptors:** ostriches, cryptosporidium, infection, clinical, morphological, molecular, studies, Brazil.
- Saroglu, M., R. Yucel, and M. Aktas (2003). **Granulomatous conjunctivitis in an ostrich.** *Veterinary Ophthalmology* 6(4): 337-339. ISSN: 1463-5216.  
**Descriptors:** ostrich, granulomatous conjunctivitis, chronic, lacrimal glands, granulomatous dacryoadentia mass, excised.
- Schulz, J.H., A.J. Bermudez, and J.J. Millsbaugh (2005). **Monitoring presence and annual variation of Trichomoniasis in mourning doves.** [Erratum: 2005 Dec., v. 49, no. 4, p. 619.]. *Avian Diseases* 49(3): 387-389. ISSN: 0005-2086.  
**Abstract:** Information about the annual variation of trichomoniasis in mourning doves (*Zenaidura macroura*) may be important in understanding mechanisms affecting mourning dove populations. The objectives of this study were to monitor the presence and annual variation of *Trichomonas gallinae* for 6 yr in a local mourning dove population using hunter-killed doves. During 1998-2003, 4052 hunter-killed doves were sampled for the presence of *T. gallinae*; 226 (5.6%) tested positive (4.4%-10.6% range). Results of the monitoring effort were relatively consistent during the 6-yr period, with the presence of *T. gallinae* being within the range of previously reported estimates for mourning doves. Asymptomatic carriers in one segment of the dove population may provide a mechanism for spreading the disease to other segments of the mourning dove population.  
**Descriptors:** doves, *Trichomonas gallinae*, trichomoniasis, disease surveillance, temporal variation, disease detection, carrier state, wildlife management, sport hunting, Missouri, *Zenaidura macroura*.  
**Language of Text:** Summary in Spanish.
- Shao ChaoGang, Shan SongHua, and Chen JiaYi (2006). **Isolation and identification of a new pigeon genotype VI strain of Newcastle disease virus.** *Veterinary Science in China* 36(7): 543-546. ISSN: 1673-4696.  
**Descriptors:** pigeon, Newcastle disease virus, new genotype VI strain, isolation, paramyxovirus.  
**Language of Text:** Chinese, summary in English.
- Shivaprasad, H.L., D. Hill, D. Todd, and J.A. Smyth (2004). **Circovirus infection in a Gouldian finch (*Chloebia gouldiae*).** *Avian Pathology* 33(5): 525-9. ISSN: 0307-9457.  
**Abstract:** The bird examined was a 10-week-old female Gouldian finch (*Chloebia*

*gouldiae*) from an aviary that had housed about 100 Gouldian finches, which had nasal discharge, dyspnoea, anorexia, depression and a very high mortality (50%) in both adult and young birds. Gross and histopathology revealed moderate to severe lymphoid depletion in the bursa of Fabricius and thymus, and sinusitis/rhinitis, tracheitis, bronchopneumonia, myocarditis, nephritis and splenitis. Circovirus infection was diagnosed in the Gouldian finch based on finding characteristic globular intracytoplasmic inclusion bodies containing 15 to 18 nm virus particles in the mononuclear cells of the bursa of Fabricius by transmission electron microscopy and by demonstrating circovirus DNA in the cytoplasm of mononuclear cells of the bursa of Fabricius by in situ hybridization using a circovirus-specific DNA probe. The Gouldian finch was also affected by concurrent bacterial and adenovirus infections. This is the first report of circovirus infection in a Gouldian finch.

**Descriptors:** young Gouldian finch, circovirus infection, bird diseases, pathology, bursa of Fabricius ultrastructure, fatal outcome, inclusion bodies, viral pathology, kidney ultrastructure, thymus gland pathology, case study, new host record.

Simpson, V. and F. Molenaar (2006). **Increase in trichomonosis in finches.** *Veterinary Record* 159(18): 606. ISSN: 0042-4900.

**Descriptors:** finches, *Trichomonosis*, increase, bird diseases, epidemiology, epidemiology, trichomonas infections, etiology, England.

Sinclair, M., G.K. Bruckner, and J.J. Kotze (2006). **Avian influenza in ostriches: epidemiological investigation in the Western Cape Province of South Africa.** *Veterinaria Italiana* 42(2): 69-76. ISSN: 0505-401X.

**Online:** <http://www.izs.it>

**Descriptors:** ostriches, avian influenza, epidemiological investigation, South Africa.

**Language of Text:** Italian.

Sorrell, E.M. and D.R. Perez (2007). **Adaptation of influenza A/Mallard/Potsdam/178-4/83 H2N2 virus in Japanese quail leads to infection and transmission in chickens.** *Avian Diseases* 51(1 Suppl): 264-8. ISSN: 0005-2086.

**Abstract:** To assess the potential of quail as an intermediate host of avian influenza, we tested the influenza A/Mallard/Potsdam/178-4/83 (H2N2) virus to determine whether through adaptation a mallard strain can replicate and transmit in quail, as well as other terrestrial birds. After five serial passages of lung homogenate a virus arose that replicated and transmitted directly to contact cage mates. To test whether adaptation in quail led to interspecies transmission, white leghorn chickens were infected with the wild-type (mall/178) and quail-adapted (qa-mall/178) viruses. The results show that mall/178 H2N2 does not establish an infection in chickens nor does it transmit, while qa-mall/178 H2N2 infects and transmits to contact chickens causing clinical signs like depression and diarrhea. Completed sequences indicate six

amino acid changes spanning four genes, PB2, PB1, HA, and NP, suggesting that the internal genes play a role in host adaptation. Further adaptation of qa-mall/178 in white leghorn chickens created a virus that replicated more efficiently in the upper and lower respiratory tract. Sequence analysis of the chicken-adapted virus points to a deletion in the neuraminidase stalk region.

**Descriptors:** Japanese quail, infection, transmission, influenza A, Mallard, Potsdam, 178-4, 83 H2N2, intermediate host, avian influenza, chickens.

Styles, D.K., E.K. Tomaszewski, L.A. Jaeger, and D.N. Phalen (2004). **Psittacid herpesviruses associated with mucosal papillomas in neotropical parrots.** *Virology* 325(1): 24-35. ISSN: 0042-6822.

**Abstract:** Mucosal papillomas are relatively common lesions in several species of captive neotropical parrots. They cause considerable morbidity and in some cases, result in mortality. Previous efforts to identify papillomavirus DNA and proteins in these lesions have been largely unsuccessful. In contrast, increasing evidence suggests that mucosal papillomas may contain psittacid herpesviruses (PsHVs). In this study, 41 papillomas from 30 neotropical parrots were examined by PCR with PsHV-specific primers. All 41 papillomas were found to contain PsHV DNA. This 100% prevalence of PsHV infection in the papilloma population was found to be significantly higher than PsHV infection prevalence observed in other surveys of captive parrots. PsHV genotypes 1, 2, and 3, but not 4 were found in these lesions. *Psittacus erithacus* papillomavirus DNA and finch papillomavirus DNA were not found in the papillomas. A papilloma from a hyacinth macaw (*Anodorhynchus hyacinthinus*) was found to contain cells that had immunoreactivity to antiserum made to the common antigenic region of human papillomavirus (HPV) L1 major capsid protein. However, four other mucosal papillomas were negative for this immunoreactivity, and negative control tissues from a parrot embryo showed a similar staining pattern to that seen in the cloaca papilloma of the hyacinth macaw, strongly suggesting that the staining seen in hyacinth macaw papilloma was nonspecific. Based on these findings, it was concluded that specific genotypes of PsHV play a direct role in the development of mucosal papillomas of neotropical parrots and there is no evidence to suggest the concurrent presence of a papillomavirus in these lesions.

**Descriptors:** parrots, psittacid herpesvirus, bird diseases, virology, mucosal papillomas, papilloma virology, DNA primers, genotype, herpesviridae classification, immunohistochemistry, phylogeny, polymerase chain reaction.

Styles, D.K., E.K. Tomaszewski, and D.N. Phalen (2005). **A novel psittacid herpesvirus found in African grey parrots (*Psittacus erithacus erithacus*).** *Avian Pathology* 34(2): 150-4. ISSN: 0307-9457.

**Abstract:** DNA from a novel alphaherpesvirus was amplified from a cloacal papilloma, a cutaneous papilloma, and the normal cloacal mucosa of African grey parrots

(*Psittacus erithacus erithacus*). Phylogenetically, the virus was most closely related to the psittacid herpesvirus, but demonstrated sufficient nucleotide and amino acid diversity to be considered a new alphaherpesvirus. It is proposed that the previously described psittacid herpesvirus be designated as psittacid herpesvirus 1 (PsHV-1), and this new species be classified as psittacid herpesvirus 2 (PsHV-2). It is speculated that PsHV-2 co-evolved with the African grey parrot and should therefore be present in these birds in the wild.

**Descriptors:** bird diseases virology, herpesvirius, isolation, purification, parrots, cloacal papilloma, DNA, alphaherpesvirus, herpesviridae genetics.

Sydenstricker, K.V., A.A. Dhondt, D.M. Hawley, C.S. Jennelle, H.W. Kollias, and G.V. Kollias (2006). **Characterization of Experimental *Mycoplasma gallisepticum* Infection in Captive House Finch Flocks.** *Avian Diseases* 50(1): 39-44. ISSN: 0005-2086.

**Abstract:** The use of controlled, horizontal-transmission experiments provides detailed information on the spread of disease within fixed social groups, which informs our understanding of disease dynamics both in an empirical and theoretical context. For that reason, we characterized in 2002, horizontal transmission of *Mycoplasma gallisepticum* (MG) in two flocks of 11 wild-caught house finches housed in outdoor aviaries over a 6-mo period. All birds were initially free of MG by a polymerase chain reaction (PCR)-based test, rapid plate agglutination (RPA), and the scoring of physical signs. We inoculated one flock member bilaterally in the palpebral conjunctiva and reintroduced it into its cage. Index birds developed conjunctivitis within 3 to 5 days but died 13 and 20 days postinfection (PI) possibly because of very severe weather. The proportion of birds with physical signs increased gradually, reached 40% at 6 wk PI, and fluctuated around 40% until 21 wk PI. By the time our experiment ended at 24.5 wk PI, 28% of the birds still exhibited physical signs. Across both flocks, 80% of the birds developed unilateral or bilateral conjunctivitis, and several birds relapsed. The appearance of physical signs in new individuals occurred between 10 and 144 days PI (median 41 days PI). Physical signs lasted 1-172 days (median 42 days). Birds that became infected earlier during the experiment developed more severe conjunctivitis, and there was a tendency for birds that developed bilateral conjunctivitis to develop physical signs earlier. Most birds that developed physical signs of MG were also PCR- and RPA-positive, although we detected a single asymptomatic carrier and a single symptomatic false negative. No birds died as a result of secondary MG infection.

**Descriptors:** house finch, captive flocks, infection, *Mycoplasma gallisepticum*, experimental, horizontal transmission, disease spread.

**Language of Text:** Summary in Spanish.

Sydenstricker, K.V., A.A. Dhondt, D.H. Ley, and G.V. Kollias (2005). **Re-exposure of captive house finches that recovered from *Mycoplasma gallisepticum* infection.** *Journal of Wildlife Diseases* 41(2): 326-33. ISSN: 0090-3558.

**Abstract:** Fourteen house finches were reinoculated (re-exposed) with 0.05 ml ( $3.24 \times 10^5$ ) colony forming units/ml) of *Mycoplasma gallisepticum* (MG) in the conjunctival sac of each eye. All birds used in this reinoculation study had recovered from previous infection between 27 and 83 days after inoculation. Recovery was based on the absence of clinical signs of conjunctivitis and/ or the inability to detect MG in conjunctival or choanal samples. Birds were maintained in individual cages under controlled environmental conditions at temperature 21-24 C, relative humidity 70%, and a light cycle adjusted to ambient values. They were divided into three groups, (A, B, and C). Five birds each were reinoculated 219 days (7.3 mo, group A) and 314 days (10.47 mo, group B) after the original infection. The final group of four birds was reinoculated at 425 days after experimental infection (14.17 mo, group C). Although the birds were randomly assigned to the three groups, the duration of the disease state (number of days until clinical signs last observed) during initial infection differed: group A mean=37.0+/-SE 4.549, group B mean=63.6+/-SE 6.306, group C mean=42.75+/-SE 2.750; analysis of variance  $F_{2,11}=8.17$ ,  $P=0.007$ . Within 24 hr after reinoculation six of the 14 experimental birds had developed some clinical signs of MG-induced conjunctivitis. At 3 days after reinoculation, 12 of the 14 birds had unilateral or bilateral conjunctivitis. The duration of clinical signs in the reinoculated individuals was significantly shorter than with their previous infection. These results suggest that the birds were able to mount a rapid and strong immune response following re-exposure. However, they were susceptible to reinfection and developed disease, suggesting that reinfection or perhaps even recurrence of infection and disease could occur in the free-ranging population. This may represent an important component in the epidemiology of this disease in house finches.

**Descriptors:** captive house finches, *Mycoplasma gallisepticum*, re-exposure, recovered, immune response, clinical signs, previous infection, reinfection, disease epidemiology in free living finches.

Szeleszczuk, P. and A. Ledwon (2005). **Zakazenia paramyksowirusowe u papug. [Paramyxovirus infections in parrots].** *Zycie Weterynaryjne* 80(2): 86-89. ISSN: 0137-6810.

**Descriptors:** parrots, infections, paramyxovirus, avian pathogen, viral disease, symptoms.

**Language of Text:** Polish, summary in English.

Szymborski, J. and M. Szymborski (2004). **Zespo sabego strusiecia w Australii. [Ostrich fading syndrome in Australia].** *Zycie Weterynaryjne* 79(6): 321-322. ISSN: 0137-6810.

**Descriptors:** ostrich, fading syndrome, wasting, young, death, undetermined cause,

stress, transport, weather conditions, hygiene, Australia.

**Language of Text:** Polish, summary in English.

- Tarello, W. (2005). **Fatal *Haemoproteus psittaci* infection in an African grey parrot.** *Veterinary Record* 157(1): 32. ISSN: 0042-4900.  
**Descriptors:** African grey parrot, bird diseases, physiopathology, haemosporida, pathogenicity, parasitology, fatal infection.
- Teixeira, M., W.L. Teixeira Filho, and C.W.G. Lopes (2004). **Coccidiosis in Japanese quails (*Coturnix japonica*): characterization of a naturally occurring infection in a commercial rearing farm.** *Revista Brasileira De Ciencia Avicola* 6(2): 129-134. ISSN: 1516-635X.  
**Descriptors:** Japanese quail, coccidiosis, infection, naturally occurring, farm, *Eimeria*, characteristics, fecal exams, oocysts, diagnosis.
- Timurkaan, N., O. Keskin, F. Yilmaz, and I. Cimtay (2005). **Aspergillosis outbreak in an ostrich flock.** *Medycyna Weterynaryjna* 61(7): 765-766. ISSN: 0025-8628.  
**Descriptors:** ostrich flock, aspergillosis outbreak, air sacs, clinical symptoms, necropsy.
- Todd, D., J.P. Duchatel, J.C. Bustin, F.T. Scullion, M.G. Scullion, A.N.J. Scott, A. Curry, N.W. Ball, and J.A. Smyth (2006). **Detection of pigeon circovirus in cloacal swabs: implications for diagnosis, epidemiology and control.** *Veterinary Record: Journal of the British Veterinary Association.* 159((10)): 314-317. ISSN: 0042-4900.  
**Descriptors:** pigeon circovirus, disease detection, polymerase chain reaction, diagnosis, epidemiology, control.
- Todd, D., A.N. Scott, E. Fringuelli, H.L. Shivradas, D. Gavier Widen, and J.A. Smyth (2007). **Molecular characterization of novel circoviruses from finch and gull.** *Avian Pathology* 36(1): 75-81. ISSN: 0307-9457.  
**Abstract:** The purpose of this study was to molecularly characterize circoviruses that infect finches and gulls. Circovirus-specific DNAs were isolated using polymerase chain reaction methods from bursa of Fabricius tissues from a Gouldian finch (*Chloebia gouldiae*) and a herring gull (*Larus argentatus*) that were known to be circovirus-infected. Nucleotide sequence determination and analysis of cloned genomic DNAs showed that these circoviruses represented novel members of the genus Circovirus of the family Circoviridae, and have been tentatively named Finch circovirus (FiCV) and Gull Circovirus (GuCV). Both new circoviruses shared genome organizational features with previously characterized circoviruses, such that both contained two major, inversely-arranged open reading frames encoding the putative replication-associated and capsid proteins, and both contained a potential stem-loop and

nonanucleotide motif. Phylogenetic analyses based on genome nucleotide sequences and involving the seven additional genus members indicated that FiCV and GuCV were more closely related to canary circovirus, beak and feather disease virus and pigeon circovirus, and that FiCV and canary circovirus were the most closely related avian circoviruses. Pairwise comparisons showed that the capsid proteins of FiCV and GuCV shared highest amino acid identity values with those of canary circovirus (62.0%) and pigeon circovirus (40.6%), respectively. The 5' intergenic region of GuCV was longer (207 nucleotides) and contained more direct and inverse repeated sequences than those of other circoviruses, while the 3' intergenic region of FiCV was notable in being longer (307 nucleotides) than its counterparts in other circoviruses and in containing two long repeats of 77 nucleotides.

**Descriptors:** finches, gulls, circoviruses, molecular characterization, specific DNA's, bursa of Fabricius tissues, polymerase chain reaction.

Toffan, A., L. Bano, F. Montesi, M.S. Beato, R.D. Nardi, C. Terregino, and I. Capua (2005).

**Infezione da Calicivirus associata ad una sindrome enterica in giovani fagiani (*Phasianus colchicus*).** [Detection of Caliciviruses in young pheasants (*Phasianus colchicus*) with enteritis in Italy]. *Italian Journal of Animal Science* 4(3): 300-302. ISSN: 1594-4077.

**Descriptors:** pheasants, animal husbandry, infection, reoviridae, caliciviridae, isolation, intestines, microscopy, enteritis, Italy, birds, digestive system, digestive system diseases, disease transmission, Europe, galliformes, intestinal diseases.

**Language of Text:** Italian, summaries in English and Italian.

Tomaszewski, E.K., W. Wigle, and D.N. Phalen (2006). **Tissue distribution of psittacid herpesviruses in latently infected parrots, repeated sampling of latently infected parrots and prevalence of latency in parrots submitted for necropsy.** *Journal of Veterinary Diagnostic Investigation* 18(6): 536-544. ISSN: 1040-6387.

**Descriptors:** parrots, pets, Herpesviridae, bird diseases, latent period, disease prevalence, viral diseases, digestive system diseases, disease transmission, disease reservoirs, digestive tract mucosa, mouth, cloaca, genotype, serotypes, new host records, psittacid herpesviruses.

Toro, H., F.J. Hoerr, K. Farmer, C.C. Dykstra, S.R. Roberts, and M. Perdue (2005). **Pigeon paramyxovirus: association with common avian pathogens in chickens and serologic survey in wild birds.** *Avian Diseases*. 49(1): 92-98. ISSN: 0005-2086.

**Abstract:** Pigeon paramyxovirus-1 (PPMV-1) was isolated from pigeons from east-central Alabama and used in association with chicken anemia virus (CAV), infectious bursal disease virus (IBDV), or finch *Mycoplasma gallisepticum* (MG) in specific-pathogen-free chickens to assess clinical disease and pathology. PPMV-1 infection in all groups was conducted at day 10 of age via the ocular route. The low

passage PPMV-1 isolate was inoculated into chickens in different groups at 10 days post-CAV infection, 6 days post-IBDV infection, and 6 days post-finch MG infection, respectively. Additionally, to obtain information on the status of paramyxovirus infection in the wild bird population of the region, we used a multispecies competitive enzyme-linked immunosorbent assay kit to assess serum samples from 180 wild birds representing 24 species obtained throughout 2001. Mild respiratory signs characterized by sneezing were observed in PPMV-1-infected chicks. In the brain, PPMV-1 caused disseminated vasculitis in the neuropile and meninges, sometimes with small foci of gliosis. Most brains had only mild lesions. In the upper respiratory tract, lesions were confined to the larynx and proximal trachea as hyperplasia of laryngeal mucosa-associated lymphoid tissue. In the lung, PPMV-1 caused minimal to moderate multifocal interstitial pneumonia. Lymphocytic expansion occurred in the interstitium of the Harderian gland. PPMV-1 in the spleen caused expansion of the white pulp as a result of hypertrophy of the macrophages in the periarteriolar sheaths accompanied by lymphocytic hyperplasia at the periphery. No severe aggravation of either signs or lesions could be attributed to any of the avian pathogens used in association with PPMV-1. The serologic survey in wild birds showed antibody levels that were considered negative or doubtful. Interestingly, significantly ( $P < 0.05$ ) higher mean titers were observed during the months of October and November 2001, following closely multiple PPMV-1 episodes of mortality in wild collard doves in northwestern Florida.

**Descriptors:** wild birds, chickens, viral diseases, mycoplasmosis, Paramyxoviridae, bird diseases, seroprevalence, disease surveillance, disease incidence, chicken anemia virus, infectious bursal disease virus, *Mycoplasma gallisepticum*, pathology, symptoms.

**Language of Text:** Summary in Spanish.

Tully, T.N.J. (2005). **Aspergillus and African grey parrots.** *Small Animal and Exotics Proceedings of the North American Veterinary Conference, Volume 19, Orlando, Florida, USA, 8-12 January, 2005*, Vol. 19, Eastern States Veterinary Association: Gainesville, USA, p. 1245-1246.

**Online:** <http://www.navc.org>

**Descriptors:** African grey parrots, *Aspergillus*, diagnostic techniques, respiratory tract, infections, conference proceedings, book chapter.

**Notes:** Meeting Information: Small Animal and Exotics. Proceedings of the North American Veterinary Conference, Volume 19, Orlando, Florida, USA, 8-12 January, 2005.

Ujvari, D., E. Wehmann, J. Herczeg, and B. Lomniczi (2006). **Identification and subgrouping of pigeon type Newcastle disease virus strains by restriction enzyme cleavage site analysis.** *Journal of Virological Methods* 131(2): 115-121. ISSN: 0166-0934.

**Descriptors:** pigeon, Newcastle disease, virus strains, identification, subgrouping, restriction enzyme cleavage site analysis.

Verstappen, F.A.L.M. and G.M. Dorrestein (2005). **Aspergillosis in Amazon parrots after corticosteroid therapy for smoke-inhalation injury.** *Journal of Avian Medicine and Surgery* 19(2): 138-141. ISSN: 1082-6742.

**Descriptors:** Amazon parrots, aspergillosis, post corticosteroid therapy, smoke inhalation injury, *Amazona aestiva aestiva*.

Vitali, S.D., P.A. Eden, K.L. Payne, and R.J. Vaughan (2006). **An outbreak of mycobacteriosis in Gouldian finches caused by *Mycobacterium peregrinum*.** *Veterinary Clinics of North America. Exotic Animal Practice* 9(3): 519-22. ISSN: 1094-9194.

**Abstract:** An outbreak of mycobacteriosis was detected in an aviary containing Gouldian finches (*Erythrura gouldiae*) and golden shouldered parrots (*Psephotus chrysopterygius*). Affected birds developed granulomatous lesions, usually of the liver and intestine. *Mycobacterium peregrinum*, a species of the *Mycobacterium fortuitum* group, was cultured on pooled samples of intestinal tract from 31 euthanized finches. These rapid-growing mycobacteria are saprophytic organisms that are generally not associated with clinical disease in immunocompetent hosts. This is the first report of mycobacteriosis in finches implicating *M peregrinum* as a causative agent.

**Descriptors:** Gouldian finches, *Mycobacterium*, outbreak, golden shouldered parrots, granulomatous lesions, liver, intestine.

Wan, H. and D.R. Perez (2006). **Quail carry sialic acid receptors compatible with binding of avian and human influenza viruses.** *Virology* 346(2): 278-86. ISSN: 0042-6822.

**Abstract:** There is growing evidence that some terrestrial avian species may play a role in the genesis of influenza viruses with pandemic potential. In the present investigation, we examined whether quail, a widespread-farmed poultry, possess the proper characteristics for serving as an intermediate host for the zoonotic transmission of influenza viruses. Using a lectin-based staining based on specific agglutinins, we found that, in addition to the presence of sialic acid alpha2,3-galactose (SAalpha2,3-gal) linked receptors, there are abundant sialic acid alpha2,6-galactose (SAalpha2,6-gal) linked receptors in quail trachea and intestine. The presence of abundant SAalpha2,6-gal-linked receptors explains, at least in part, the circulation of avian influenza viruses with human-like receptor specificity in quail. In quail trachea, SAalpha2,3-gal linked receptors are present primarily in non-ciliated cells, while SAalpha2,6-gal linked receptors are localized predominantly on the surface of ciliated cells. In quail intestine, both types of receptors were found on epithelial cells as well as in crypts. In a solid-phase overlay binding assay, both avian and human influenza viruses bind to plasma membranes prepared from epithelial cells of quail trachea and

intestine, strongly suggesting that these receptors are functional for binding of influenza viruses from different species. Together with previous observations, these results are consistent with the notion that quail could provide an environment for the spread of reassortants between avian and human influenza viruses, thus acting as a potential intermediate host.

**Descriptors:** quail, avian influenza virus, human influenza virus, sialic acid receptors, binding, plasma membranes, quail as an intermediate host.

Wang, Z., K. Farmer, G.E. Hill, and S.V. Edwards (2006). **A cDNA macroarray approach to parasite-induced gene expression changes in a songbird host: genetic response of house finches to experimental infection by *Mycoplasma gallisepticum*.** *Molecular Ecology* 15(5): 1263-1273. ISSN: 0962-1083.

**Abstract:** In 1994, the bacterial parasite *Mycoplasma gallisepticum* expanded its host range and swept through populations of a novel host -- eastern US populations of the house finch (*Carpodacus mexicanus*). This epizootic caused a dramatic decline in finch population numbers, has been shown to have caused strong selection on house finch morphology, and presumably caused evolutionary change at the molecular level as finches evolved enhanced resistance. As a first step toward identifying finch genes that respond to infection by *Mycoplasma* and which may have experienced natural selection by this parasite, we used suppression subtractive hybridization (SSH) and cDNA macroarray approaches to identify differentially expressed genes regulated by the *Mycoplasma* parasite. Two subtractive cDNA libraries consisting of 16 512 clones were developed from spleen using an experimentally uninfected bird as the 'tester' and an infected bird as 'driver', and vice versa. Two hundred and twenty cDNA clones corresponding 34 genes with known vertebrate homologues and a large number of novel transcripts were found to be qualitatively up- or down-regulated genes by high-density filter hybridization. These gene expression changes were further confirmed by a high throughput reverse Northern blot approach and in specific cases by targeted Northern analysis. blast searches show that heat shock protein (HSP) 90, MHC II-associated invariant chain (CD74), T-cell immunoglobulin mucin 1 (TIM1), as well as numerous novel expressed genes not found in the databases were up- or down-regulated by the host in response to this parasite. Our results and macroarray resources provide a foundation for molecular co-evolutionary studies of the *Mycoplasma* parasite and its recently colonized avian host.

**Descriptors:** house finches, *Mycoplasma gallisepticum*, bacterial parasite, cDNA, experimental infection, induced gene expression, host range, eastern USA.

Wellehan, J.F.X., A.J. Johnson, K.S. Latimer, K. Bischoff, M. Lafortune, and E.R. Jacobson (2005). **Identification and initial characterization of an adenovirus associated with fatal hepatic and lymphoid necrosis in a Meyer's parrot (*Poicephalus meyeri*).** *Journal of Avian Medicine and Surgery* 19(3): 191-197. ISSN: 1082-6742.

**Descriptors:** Meyer's parrot, adenovirus, identification, characterization, fatal hepatic necrosis, fatal lymphoid necrosis, *Poicephalus meyeri*, viral diseases.

Wittig, W., K. Hoffmann, H. Muller, and R. Johne (2007). **Nachweis von DNA des Finken-polyomavirus bei Erkrankungen verschiedener Vogelarten der Ordnung Passeriformes.** [Detection of DNA of the finch polyomavirus in diseases of various types of birds in the order Passeriformes]. *Berliner Und Munchener Tierarztliche Wochenschrift* 120(3-4): 113-9. ISSN: 0005-9366.

**Abstract:** Between 2000 and 2004 a disease occurred in an aviary in Germany affecting various bird species belonging to the order Passeriformes including Collared Grosbeaks (*Mycerobas affinis*), Eurasian Bullfinches (*Pyrrhula pyrrhula griseiventris*), Brown Bullfinches (*Pyrrhula nipalensis*), Grey-headed bullfinches (*Pyrrhula erythaca*) and Yellow-bellied Tits (*Periparus venustulus*). The major clinical signs included increased mortality of fledglings and young birds, as well as feather disorders and feather loss in adult birds. In addition, adult Eurasian Bullfinches showed in one year a disease course, in which the major symptom was inflammation of the skin beginning on the basis of the beak and spreading over the head occurring a few days before death. Bacteriological and parasitological investigations did not reveal any consistent findings. Using a newly developed polymerase chain reaction protocol, DNA of the recently discovered finch polyomavirus (FPyV) was demonstrated in several affected birds. Because of the consistent detection of FPyV-DNA and the similarity of the symptoms with those observed during infection with the closely related avian polyomavirus in other bird species, an etiological role of FPyV in the observed disease is assumed.

**Descriptors:** bird diseases diagnosis, DNA, viral analysis, Passeriformes virology, polyomavirus isolation, purification, polyomavirus infections, tumor virus infections, bird diseases, mortality, virology, disease outbreaks, polymerase chain reaction, polyomavirus genetics, polyomavirus infections, diagnosis, mortality, virology, tumor virus infections, diagnosis, mortality, virology, Germany.

**Language of Text:** German.

Wnukiewicz, A., W. Dobrowolski, and A. Danczak (2005). **Limb diseases in emu (*Dromaius novaehollandiae*) and ostrich (*Struthio camelus*) - prevention and treatment.** *Acta Scientiarum Polonorum Zootechnika* 4(1): 153-162. ISSN: 1644-0714.

**Online:** [www.acta.media.pl](http://www.acta.media.pl)

**Descriptors:** emu, ostrich, limb diseases, prevention, treatment, lameness.

**Language of Text:** Polish.

Wood, A.M. and H.V. Smith (2005). **Spiroucleosis (Hexamitiasis, Hexamitosis) in the ring-necked pheasant (*Phasianus colchicus*): detection of cysts and description of *Spiroucleus meleagridis* in stained smears.** *Avian Diseases* 49(1): 138-143. ISSN: 0005-2086.

**Abstract:** Trophozoites and cysts of *Spiroucleus (Hexamita) meleagridis* were detected in the intestinal fluid and mucus of pheasant poult with spiroucleosis (hexamitiasis, hexamitosis) following staining with Heidenhain iron hematoxylin (HIH) and the Romanowsky-type stain Hemacolor. Their morphology was consistent with that of flagellates of the genus *Spiroucleus*, and bright-field morphologic observations were confirmed by transmission electron microscopy. Cysts occurred mostly within intestinal mucus, which was firmly compressed between microscope slides prior to staining. The internal structures of cysts were similar to those of trophozoites, allowing them to be confidently recognized. Hemacolor provided differential color staining of trophozoites and cysts, allowing accurate identification of *S. meleagridis* life cycle stages, even in smears in which there was heavy background staining. While HIH often produced clearer and more detailed staining of protozoan structures, in the context of a diagnostic laboratory its use was outweighed by the ease of use, rapidity of results, and differential color staining provided by Hemacolor. The possible significance of a resistant cystic stage in the life cycle of *S. meleagridis* is discussed.

**Descriptors:** *Phasianus colchicus*, game birds, bird diseases, Hexamita, protozoal infections, cysts (developmental-stages), trophozoites, pathogen identification, life cycle, intestinal mucosa, histopathology, differential staining, *Hexamita meleagridis*, *Spiroucleus meleagridis*.

**Language of Text:** Summary in Spanish.

Wunschmann, A. and A. Ziegler (2006). **West Nile Virus-Associated Mortality Events in Domestic Chukar Partridges (*Alectoris chukar*) and Domestic Impeyan Pheasants (*Lophophorus impeyanus*).** *Avian Diseases* 50(3): 456-459. ISSN: 0005-2086.

**Abstract:** West Nile virus (WNV) infection was diagnosed in captive juvenile chukars (*Alectoris chukar*), and captive juvenile Impeyan pheasants (*Lophophorus impeyanus*) on the basis of necropsy, histopathology, polymerase chain reaction, and immunohistochemistry. The chukars were kept in a game bird farm that experienced two outbreaks with approximately 25% mortality in hundreds of chukars between September and October 2002 and during the same months in 2003. The submitted pheasants were part of a group of 15 juvenile Impeyan pheasants that all died within approximately 2 wk at the end of August 2002. The macroscopic lesions in the pheasants were dominated by mucosal hemorrhage at the proventricular to ventricular junction and cecal ulcers, whereas the gross lesions in the chukar partridges were nonspecific. The predominant microscopic lesion in the chukar partridges was

myocardial necrosis, whereas fibrinous and necrotizing splenitis was prominent in the pheasants. Viral antigen was usually widespread in animals of both species. Spontaneously occurring WNV infection should be considered a differential diagnosis in cases of mortality among select species of galliform birds.

**Descriptors:** chukar partridges, pheasants, West Nile virus, mortality, necropsy, histopathology, lesions, mucosal hemorrhage, diagnosis.

**Language of Text:** Summary in Spanish.

Yilmaz, F., N. Timurkaan, and F. Coven (2004). **Pathological findings in quails infected with Avian Influenza A virus H7 N1 subtype.** *International Journal of Poultry Science* 3(12): 764-767. ISSN: 1682-8356.

**Descriptors:** Japanese quails, avian influenza virus, infected, H7N1, pathological findings, clinical signs, symptoms.

Yokota, T., T. Shibahara, Y. Wada, R. Hiraki, Y. Ishikawa, and K. Kadota (2004). ***Aspergillus fumigatus* infection in an ostrich (*Struthio camelus*).** *Journal of Veterinary Medical Science the Japanese Society of Veterinary Science* 66(2): 201-4. ISSN: 0916-7250.

**Abstract:** An 11-month-old female ostrich (*Struthio camelus*) had become gradually emaciated over a 2-week period and subsequently died. Necropsy revealed white to green mold growth on the walls of caseous thickened air sac membranes and multiple white necrotic foci in the lungs and liver. Histologically, the multiple exudative, necrotic and granulomatous lesions were compatible with mycotic infection in the air sacs and lungs, and hyphae positively reacted with a monoclonal antibody (Mab-WF-AF-1) to *Aspergillus fumigatus* wall fractions. Multifocal hepatic necrosis was also found, and several spores were observed in the blood vessels. Fungal culture of these lesions yielded pure growth of *A. fumigatus*. This is an established case of fatal *A. fumigatus* infection in an ostrich reared in Japan.

**Descriptors:** ostrich, aspergillosis, *Aspergillus fumigatus*, bird diseases, microbiology, pathology, infection, air sacs, lungs, histological techniques, pathology, Japan.

Zead, A.A.A., S.H. Geith, and A.A. Ali (2005). **Some investigations on Newcastle disease in Egyptian ostriches (*Struthio camelus*).** *Assiut Veterinary Medical Journal* 51(107): 270-282. ISSN: 1012-5973.

**Descriptors:** Egyptian ostriches, Newcastle disease, investigations, *Struthio camelus*.

**Language of Text:** Arabic.

# Enrichment

- Christensen, J. and B.L. Nielsen (2004). **Environmental enrichment for ostrich, *Struthio camelus*, chicks.** *Animal Welfare* 13(2): 119-124. ISSN: 0962-7286.  
**Descriptors:** ostriches, chicks, pecking, feed intake, animal behavior, animal welfare, enrichment.
- Fox, R.A. and J.R. Millam (2007). **Novelty and individual differences influence neophobia in orange-winged Amazon parrots (*Amazona amazonica*).** *Applied Animal Behaviour Science* 104(1-2): 107-115. ISSN: 0168-1591.  
**Descriptors:** Amazon parrots, fearfulness, parrot behavior, environmental enrichment, temperament, novel objects, enrichment rotation, individual variation.
- Garner, J.P., C.L. Meehan, T.R. Famula, and J.A. Mench (2006). **Genetic, environmental, and neighbor effects on the severity of stereotypies and feather picking in Orange-winged Amazon parrots (*Amazona amazonica*): an epidemiological study.** *Applied Animal Behaviour Science* 96(1-2): 153-168. ISSN: 0168-1591.  
**Descriptors:** Amazon parrots, abnormal behavior, stereotyped behavior, animal stress, genetic resistance, epidemiological studies, feather pecking, heritability, animal welfare.
- Meehan, C.L., J.P. Garner, and J.A. Mench (2004). **Environmental enrichment and development of cage stereotypy in Orange-winged Amazon parrots (*Amazona amazonica*).** *Developmental Psychobiology* 44(4): 209-18. ISSN: 0012-1630.  
**Descriptors:** Amazon parrots, cage stereotypy, environmental enrichment, captive birds, behavior.
- Miller, K.A. and J.A. Mench (2005). **The differential effects of four types of environmental enrichment on the activity budgets, fearfulness, and social proximity preference of Japanese quail.** *Applied Animal Behaviour Science* 95(3-4): 169-187. ISSN: 0168-1591.  
**Descriptors:** physical activity, foraging, dust bathing, stereotyped behavior, group housing, gender differences, social behavior, animal welfare, quail.
- Miller, K.A. and J.A. Mench (2006). **Differential effects of 4 types of environmental enrichment on aggressive pecking, feather pecking, feather loss, food wastage and productivity in Japanese quail.** *British Poultry Science* 47(6): 646-58. ISSN: 0007-1668.  
**Abstract:** 1. We examined the effects of 4 types of environmental enrichment (for-

aging opportunities, structural complexity, sensory stimulation/novelty, and social companionship) on aggressive and feather pecking, feather condition, food wastage, body weight, feed conversion, and egg production in adult Japanese quail. Sex differences were examined where possible. 2. GLM analysis was used to evaluate the effects of enrichment and housing, while test-retest reliability and the stability of measures over 18 d were assessed using partial correlation. 3. Foraging enrichment reduced food wastage. 4. Body weight, feed conversion, and egg production were not affected by enrichment. Rates of aggressive and feather pecking were also not significantly affected, but these behaviours were observed very infrequently in this study. 5. Socially-housed birds had poorer feather condition, lower body weight and less efficient feed conversion than singly-housed birds. Social housing did not affect food wastage. 6. There were not sex differences in feather pecking, feather condition, food wastage, or feed conversion. 7. All measures except feather pecking were reliable over 24 h, but only feather condition and body weight were stable over 18 d. The instability of the behavioural measures over time suggest that enrichment effects may vary with age.

**Descriptors:** Japanese quail, environmental enrichment, effects, feather picking, feather loss, food wastage, productivity, 4 types of environmental enrichment, behavior.

Pepperberg, I.M. (2004). **Cognitive and communicative capacities of Grey parrots--implications for the enrichment of many species.** *Animal Welfare* 13s203-S208. ISSN: 0962-7286.

**Descriptors:** *Psittacus*, Grey parrots, environmental enrichment, human animal relations, animal communication, animal behavior, training, animal welfare.

# Feed and Nutrition

Ai GuoLiang and Tao Jun (2002). **Feeding standard of pheasant.** *Journal of Economic Animal* 6(1): 30-32. ISSN: 1007-7448.

**Descriptors:** pheasant, feed requirements, feeding standards, nutrition, body weight, growing.

**Language of Text:** Chinese, summary in English.

Asrani, R.K., R.C. Katoch, V.K. Gupta, S. Deshmukh, N. Jindal, D.R. Ledoux, G.E. Rottinghaus, and S.P. Singh (2006). **Effects of feeding *Fusarium verticillioides* (formerly *Fusarium moniliforme*) culture material containing known levels of fumonisin B1 in Japanese quail (*Coturnix coturnix japonica*).** *Poultry Science* 85(7): 1129-1135.

**Abstract:** One hundred fifty 1-d-old quail chicks (*Coturnix coturnix japonica*) were divided into 2 groups. The 2 groups were designated as controls (CX) and fumonisin-fed birds (FX) with each containing 50 and 100 chicks, respectively. The birds in group CX were maintained on quail mash alone, whereas the birds in group FX were maintained on diets supplemented with 300 ppm of fumonisin B1 from *Fusarium verticillioides* (formerly *Fusarium moniliforme*) culture material from 1 d. Quail chicks in both groups were examined daily for clinical signs and mortality. Five randomly selected quail from each group were individually weighed on 0, 7, 14, 21, and 28 d postfeeding (DPF). After weighing, blood was collected from these birds at 7, 14, 21, and 28 DPF for hematological studies and at 14, 21, and 28 DPF for biochemical studies. Fumonisin B1-fed birds (FX) had ruffled feathers, reduced feed and water intake, poor body growth, and greenish mucus diarrhea with 59% mortality. Nearly 30% of the fumonisin B1-fed birds showed nervous signs during the 4-wk experimental period. From 7 DPF onward, BW in group FX were significantly lower than those in group CX. Fumonisin feeding significantly increased hemoglobin, packed cell volume, total erythrocyte count, and total leukocyte count. There was also a significant increase in aspartate transaminase and alanine transaminase in the fumonisin-fed group. Fumonisin significantly increased concentrations of total serum protein and albumin on 14 and 21 DPF, serum calcium and cholesterol levels from 14 DPF onward, and creatinine from 21 DPF onward. This study revealed that the addition of *F. verticillioides* culture material supplying a level of 300 ppm of FB1/kg of diet is highly toxic to quail chicks, resulting in heavy mortality, decreased growth rate, and significant alterations in hemato-biochemical parameters.

**Descriptors:** Japanese quails, fumonisin B1, poisoning, animal growth, body weight, mortality, blood chemistry.

- Aydin, C., I. Ak, N. Galip, and S.N. Zaugg (2004). **Effect of dietary protein levels on some haematological and production parameters of breeding ostriches.** *Indian Veterinary Journal* 81(3): 294-298. ISSN: 0019-6479.  
**Descriptors:** ostriches, breeding, dietary protein levels, effect, hematological, production, parameters.
- Bardai, G., G.I. Sunahara, P.A. Spear, M. Martel, P. Gong, and J. Hawari (2005). **Effects of Dietary Administration of CL-20 on Japanese Quail *Coturnix coturnix japonica*.** *Archives of Environmental Contamination and Toxicology* 49(2): 215-222.  
**Descriptors:** Japanese quail, *Coturnix coturnix japonica*., CL-20, dietary administration, effects.
- Barreto, S.L.d.T., M.S.d. Araujo, R.T. Umigi, J.L. Donzele, T.C.d. Rocha, S.R.F. Pinheiro, R.B. Teixeira, F.V.d.S. Abreu, and R.F. Silva (2006). **Exigencia nutricional de lisina para codornas europeias machos de 21 a 49 dias de idade. [Nutritional requirements of lysine for male European quails from 21 to 49 days old].** *Revista Brasileira De Zootecnia* 35(3): 750-753. ISSN: 1516-3598.  
**Descriptors:** quail, nutritional requirements, lysine, male 21 to 49 days old.  
**Language of Text:** Portuguese, summary in English.
- Bavelaar, F.J., J. van der Kuilen, R. Hovenier, A.G. Lemmens, and A.C. Beynen (2005). **Plasma lipids and fatty acid composition in parrots in relation to the intake of alpha-linolenic acid from two feed mixtures.** *Journal of Animal Physiology and Animal Nutrition* 89(9-10): 359-66. ISSN: 0931-2439.  
**Abstract:** The main objective of this study was to find out whether the content of alpha-linolenic acid (ALA) in plasma cholesteryl-esters (CE) or triglycerides (TG) in parrots might serve as an index of ALA intake. The intake of ALA might be a risk factor for atherosclerosis, but on the basis of the fatty acid composition of seed mixtures the intake is difficult to assess due to selective eating of seeds. Parrots were fed two seed mixtures that differed in ALA content according to a cross over design. The macronutrient composition of the diets supplied differed from that of the diets consumed. The diets consumed had higher levels of dry matter, crude protein, crude fat and energy, and lower levels of crude fibre and crude ash. The ALA content, expressed as g/kg diet, was similar for the diet supplied and that consumed, irrespective of the type of diet. The diets had no systematic effect on plasma lipid concentrations. There were marked differences in plasma cholesterol concentrations between parrot species. When the diet with the low ALA content was fed (0.8% ALA of total fatty acids consumed, 1.1 g ALA/kg of diet consumed), the plasma CE and TG did not contain detectable ALA amounts. When the diet with the high ALA content was fed (4.2% ALA of total fatty acids consumed, 6.1 g ALA/kg of diet consumed), the plasma CE and TG contained about 1% ALA of total fatty acids. It is suggested that the content

of ALA in plasma CE and TG might be used as an indicator of ALA intake.

**Descriptors:** parrots, cholesterol esters chemistry, parrots metabolism, triglycerides chemistry, alpha linolenic acid administration, dosage, parrot feed, diet consumed, physiology, biological markers blood, cholesterol esters blood, parrots blood, species specificity, triglycerides blood, alpha linolenic acid metabolism, alpha linolenic acid pharmacology.

Biswas, A., J. Mohan, and K.V.H. Sastry (2006). **Effect of higher levels of dietary selenium on production performance and immune responses in growing Japanese quail.** *British Poultry Science* 47(4): 511-515. ISSN: 0007-1668.

**Abstract:** 1. The effect of increasing dietary selenium (Se) on production performance and immune responses in growing (0 to 6 weeks) Japanese quail was investigated. 2. One-day-old chicks (240) were randomly selected and divided into 12 groups with 20 chicks in each group (3 dietary treatments x 4 replicates). The basal diet contained 0.2 mg Se/kg and the two experimental diets were supplemented with 0.5 and 1.0 mg Se/kg. 3. Body weight gain, food intake and food conversion ratio and mortality were not affected by Se supplementation. 4. On d 28, antibody responses to inoculated sheep red blood cells were determined. Antibody titres were significantly higher after feeding the two Se-supplemented diets. 5. During week 4, the response to intradermally injected phytohaemagglutinin, an index of the in vivo cell-mediated immune response, was shown to be increased in the groups fed on the Se-supplemented diets. 6. After 6 weeks, the relative weights of the bursa of Fabricius and thymus were greater in the chicks given the Se-supplemented diets but there was no effect on the relative weight of spleen and liver. 7. It is concluded that supplementing the diet with Se has a beneficial effect on immune responses but does not affect production performance in growing Japanese quail.

**Descriptors:** Japanese quails, poultry feeding, selenium, dietary minerals, immune response, dietary mineral supplements, feed supplements, antibodies, liveweight gain, feed intake, feed conversion, body weight, tissue weight, bursa of Fabricius, thymus gland, spleen, liver.

Biswas, A., J. Mohan, K.V.H. Sastry, and J.S. Tyagi (2007). **Effect of dietary Vitamin E on the cloacal gland, foam and semen characteristics of male Japanese quail.** *Theriogenology* 67(2): 259-263. ISSN: 0093-691X.

**Abstract:** This experiment was to investigate the effects of increasing the level of dietary Vitamin E (Vit. E) on cloacal gland size, foam production and semen characteristics of male Japanese quail (*Coturnix coturnix Japonica*). One hundred and eighty male Japanese quail chicks (day old) were randomly distributed to three dietary treatments for a period of 25 weeks. Each treatment comprised of three replicates each containing 20 chicks. The basal diet contained 15 IU Vit. E/kg and the two experimental diets were supplemented with 150 and 300 IU Vit. E/kg (diets T2 and T3,

respectively). DL (Sa(B-tocopherol acetate was used as the source of Vit. E. All chicks were provided feed and water ad libitum. Foam characteristics, in terms of frequency of foam discharge (24 h), cloacal gland index and foam weight were significantly higher ( $P < 0.05$ ) in T2 group. Body weight, testes weight (left and right) and plasma testosterone concentrations did not differ significantly. Semen characteristics (semen volume, sperm motility, % live sperm, % hatchability and sperm concentrations) did not differ significantly ( $P > 0.05$ ). Percentages of abnormal and dead spermatozoa were significantly ( $P < 0.05$ ) lower and fertility was higher ( $P < 0.05$ ) in the T2 group. From this study, it can be concluded that moderate supplementation of dietary Vit. E may be beneficial for foam production, cloacal gland and improve the semen characteristics in male Japanese quail.

**Descriptors:** male Japanese quails, cloaca, accessory sex glands, bodily secretions and exudates, secretion, semen, spermatozoa, sperm motility, vitamin supplements, vitamin E, male fertility, sperm concentration, sperm viability.

Bordoloi, J.P. and A. Haque (2005). **Growth performance and feed consumption pattern of pigeon reared in different housing systems and feeding regimes.** *Indian Journal of Poultry Science* 40(2): 199-201. ISSN: 0019-5529.

**Descriptors:** pigeon, growth performance, feed consumption, different rearing housing systems, different feeding regimes.

Bovera, F., G. Moniello, N. De Riu, C. Di Meo, W. Pinna, and A. Nizza (2007). **Effect of diet on the metabolic profile of ostriches (*Struthio camelus var. domesticus*).** *Tropical Animal Health and Production* 39(4): 265-70. ISSN: 0049-4747.

**Abstract:** In order to study the metabolic profile of ostriches in relation to diet, 40 animals of both sexes were divided equally into two groups and fed two diets ad libitum consisting, on a dry matter basis, of the same commercial concentrate (60%) for the two groups and of corn silage (group A) or alfalfa hay (group B). In the morning, after about 12 h of fasting, blood was collected from the wing vein. The following haematological parameters were determined with an automatic system (Ektachem 250 analyser, Kodak): glucose, cholesterol, triglycerides, lactate (LAC), total protein (TP), uric acid, total bilirubin (Tbil), creatinine (CREA), calcium (Ca), magnesium (Mg), phosphorus (P), sodium (Na), potassium (K), chloride (Cl<sup>-</sup>), iron (Fe), aspartate aminotransferase (AST), alanine aminotransferase (ALT), alkaline phosphatase (AP), cholinesterase (ChE), alpha-amylase (Amyl), lipase (LIP) and gamma-glutamyltransferase (GGT). Diet significantly affected some parameters of the metabolic profile. Indeed, owing to the presence of alfalfa hay in the diet, group B showed, in comparison to group A, significantly higher values of uric acid (222.5 vs 387.5 mmol/L,  $p < 0.01$ ), GGT (8.50 vs 11.3 U/L,  $p < 0.05$ ), Tbil (8.50 vs 10.7 mmol/L,  $p < 0.05$ ), Ca (2.41 vs 2.83 micromol/L,  $p < 0.01$ ), Mg (1.01 vs 1.18 micromol/L,  $p < 0.05$ ) and K (2.71 vs 3.16 micromol/L,  $p < 0.01$ ). The levels of

creatinine (27.3 vs 32.6 mmol/L,  $p < 0.05$ ) and AST (344.9 vs 461.4 U/l,  $p < 0.01$ ) were also higher for group B.

**Descriptors:** ostrich, diet, metabolic profile, effect, dry matter, corn silage, commercial concentrate, fasting blood profile.

Brand, T.S. and R.M. Gous (2006). **Feeding ostriches**. V. Bels *Feeding in Domestic Vertebrates: From Structure to Behaviour*, CABI: Wallingford, UK, p. 136-155. ISBN: 1845930630; 9781845930639.

**Descriptors:** ostriches, feeding, grazing, feed, protein, vitamins, book chapter.

Brand, Z., T.S. Brand, and C.R. Brown (2003). **The effect of different combinations of dietary energy and protein on the composition of ostrich eggs**. *South African Journal of Animal Science* 33(3): 193-200. ISSN: 0375-1589.

**Descriptors:** ostrich, eggs, dietary energy, protein, different combinations, effect on composition of eggs, nutrition, breeding females.

Butkeraitis, P., C.A.F. Oliveira, D.R. Ledoux, R. Ogido, R. Albuquerque, J.F. Rosmaninho, and G.E. Rottinghaus (2004). **Effect of dietary fumonisin B1 on laying Japanese quail**. *British Poultry Science* 45(6): 798-801. ISSN: 0007-1668.

**Abstract:** 1. A 28-d experiment was conducted to evaluate the effects of fumonisin B1 (FB1) on egg production and egg quality of young laying Japanese quail fed on fumonisin-contaminated rations. 2. To this end, 128 7-week-old birds were randomly distributed into 4 experimental groups (32 birds per group) and given rations containing 0 (control), 10, 50 and 250 mg FB1/kg feed. Each treatment consisted of 4 replicates of 8 quail. Egg production and egg weight were checked daily. Feed consumption and feed conversion were determined weekly. Eggs laid on the last day of each 7-d period were collected and subjected to individual analysis for specific gravity, Haugh units and percentage eggshell. 3. Compared with controls, quail given greater than or equal to 50 mg FB1/kg had reduced feed intake and lower body weight gain. Feed conversion was reduced only in birds given 250 mg FB1/kg. 4. Mean egg production and egg weight were lower in birds given 250 mg FB1/kg. Eggshell weight was reduced in birds given greater than or equal to 50 mg FB1/kg. However, mean specific gravity, Haugh units and percentage eggshell were not affected by FB1. 5. No histopathological changes were observed in liver, kidney or heart samples from any treatment group. 6. The results indicated that exposure to FB1 at concentrations greater than or equal to 50 mg/kg could adversely affect quail performance, emphasising the importance of controlling fumonisin contamination of quail rations.

**Descriptors:** Japanese quails, laying performance, egg production, poultry feeding, fumonisin B1, feed contamination, egg weight, young animals, feed intake, feed conversion, specific gravity, egg shell quality, liveweight gain, liver, kidneys, heart, histopathology, mycotoxicosis, toxicity testing.

Carciofi, A.C., C.S. Prada, C.S. Mori, and F. Prada (2003). **Evaluation of fruit and seed-based diets for parrots (*Amazona* spp.): II-determination of digestibility, nitrogen balance, consumption and metabolizable energy.** *Ars Veterinaria* 19(3): 288-293. ISSN: 0102-6380.

**Descriptors:** Amazon parrots, fruit diets, seed based diets, evaluation, papaw, banana, corn, sunflower, energy intake, protein.

**Language of Text:** Portuguese.

Clarke, E., J. Wilkinson, a. Stevenson, I. Kyriazakis, and L. Alexander (2007). **Feeding behaviour and diet selection in budgerigars and zebra finches** . *British Poultry Abstracts* 3(1): 18-20. ISSN: 1746-6202.

**Descriptors:** zebra finches, budgerigars, feeding behavior, diet selection, meeting.

**Notes:** Meeting Information: Spring Meeting of the Worlds Poultry Science Association UK Branch, Southport, UK; July 23 -25, 2007.

Cooper, R.G. (2004). **Ostrich (*Struthio camelus*) chick and grower nutrition.** *Animal Science Journal* 75(6): 487-490. ISSN: 1344-3941.

**Descriptors:** ostrich, chick, grower, nutrition, *Struthio camelus*.

Cooper, R.G., K. Erlwanger, and K.M. Mahroze (2005). **Nutrition of ostrich (*Struthio camelus* var. *domesticus*) breeder birds.** *Animal Science Journal* 76(1): 5-10. ISSN: 1344-3941.

**Descriptors:** ostrich, nutrition, feeding, reproduction, growing, breeder birds.

Cooper, R.G. and J.O. Horbanczuk (2004). **Ostrich nutrition: a review from a Zimbabwean perspective.** *Revue Scientifique Et Technique Internationale Office of Epizootics* 23(3): 1033-42. ISSN: 1608-0637.

**Abstract:** The ostrich is an important animal in many livestock industries and, in the developing world, the export of meat and skins is a valuable source of foreign currency. As the successful growth and reproductive performance of ostriches depends on good nutrition it is extremely important to provide the correct diet. Some researchers have incorrectly assumed that poultry diets are useful for ostriches, but the vitamin and mineral requirements of these birds are unique and their diets should never be substituted with poultry or other livestock feeds. Producers should be knowledgeable about how different ingredients provide the essential nutrients for growth and development. Adequate nutrition is key to good flock performance and more research into ostrich nutrition is required. In Zimbabwe, one of the greatest costs involved in the keep of ostrich breeder birds is purchased feed, which can cost approximately US\$ 4,555 for every 10 birds per annum. In order to cover these costs, the producer needs to ensure an adequate supply of birds for slaughter.

**Descriptors:** ostrich nutrition, animal feed analysis, animal nutrition physiology,

reproduction physiology, struthioniformes physiology, nutritional requirements, struthioniformes embryology, Struthioniformes growth, development, weight gain, Zimbabwe.

Cooper, R.G., J.O. Horbanczuk, and N. Fujihara (2004). **Nutrition and feed management of the ostrich (*Struthio camelus* var. domesticus)**. *Animal Science Journal* 75(3): 175-181. ISSN: 1344-3941.

**Descriptors:** ostrich, feed management, nutrition, growth, reproduction, energy.

Cooper, R.G., K.M. Mahrose, J.O. Horbanczuk, and K.H. Erlwanger (2004). **Nutrition of ostrich (*Struthio camelus* var. domesticus) breeder birds**. *Egyptian Poultry Science Journal* 24(3): 675-685. ISSN: 1110-5623.

**Descriptors:** ostriches, nutrition, breeder birds, growth, reproduction.

**Language of Text:** Arabic.

Cooper, R.G., K.M. Mahrose, and I.F.M. Marai (2004). **Nutrition of the ostrich (*Struthio camelus* var. domesticus)**. *Proceedings of the 11th Ostrich World Congress, Island Great Brijun, Croatia, 15-17 October 2004*: 46-59.

**Descriptors:** ostrich, nutrition, feeding, farming, reproduction, conference proceedings.

**Notes:** Meeting Information: Proceedings of the 11th Ostrich World Congress, Island Great Brijun, Croatia, 15-17 October 2004.

Cooper, R.G. (2004). **Ostrich (*Struthio camelus*) chick and grower nutrition**. *Animal Science Journal* 75(6): 487-490. ISSN: 1344-3941.

**Descriptors:** ostrich, chick, grower nutrition, breeding, hatching, diet, protein, energy.

Cooper, R.G., J.O. Horbanczuk, and N. Fujihara (2004). **Nutrition and feed management in the ostrich (*Struthio camelus* var. Domesticus)**. *Animal Science Journal* 75(3): 175-181. ISSN: 1344-3941.

**Descriptors:** ostrich, nutrition, feed, management, growth, development.

Cornejo, J. and P. Wolf (2005). ***Trichloria malachitacea* at Loro Parque Fundacion, Tenerife. [Quantitative review of the diet of the purple-bellied parrot]**. *International Zoo Yearbook* 39: 99-108. ISSN: 0074-9664.

**Descriptors:** purple bellied parrot, diet, review, nutrition, feeding.

De Azevedo, C.S., H.P. Tinoco, J.B. Ferraz, and R.J. Young (2006). **The fishing rhea: a new food item in the diet of wild greater rheas (*Rhea americana*, Rheidae, Aves).** *Revista Brasileira De Ornitologia* 14(3): 285-287. ISSN: 0103-5657.  
**Descriptors:** greater rheas, fishing, new food item, diet, wild, *Rhea americana*.

Dorey, C.K., L. Granata, C.R. Nichols, K.M. Cheng, and N.E. Craft (2005). **Dietary modulation of lens zeaxanthin in quail.** *Experimental Eye Research* 81(4): 464-77. ISSN: 0014-4835.

**Abstract:** Although higher dietary intake of lutein/zeaxanthin has been associated with reduced risk for cataracts, the impact of dietary supplements on lens lutein (L) or zeaxanthin (Z) has not been examined. If higher lens carotenoids do reduce risk for cataract, it would be essential to know whether dietary carotenoids can elevate carotenoids in the adult vertebrate lens. In this study, a covey of Japanese quail were hatched and raised 6 months on carotenoid-deficient diet, then switched to deficient diet supplemented with low or high 3R,3R'-zeaxanthin (5 or 35 mgkg<sup>-1</sup> food) or beta-carotene (50 mgkg<sup>-1</sup> food). Controls included a group of covey-mates that remained on the deficient diet and another raised from birth on the high Z (35 mg Zkg<sup>-1</sup>) diet. At 1 year of age, carotenoids and tocopherols in the lens and in the serum were analysed by HPLC, and compared by analysis of variance. Serum Z was significantly elevated in deficient birds fed the lower or higher Z supplement for 6 months (P<0.0001 for each). Serum Z in birds maintained on the higher Z supplement for 1 year was much higher than that in deficient birds (P<0.0001), but not different from deficient birds given the higher Z supplement. As in humans, the predominant lens carotenoids were lutein (L) and zeaxanthin (Z), and the total carotenoid concentration was of lower magnitude than the concentration of alpha-tocopherol. Responses to Z supplementation were sex-related. Female quail had 5-10 times higher serum concentrations of both Z and L than males (P<0.0001, <0.001), and they also had higher lens Z concentrations than males (P<0.0006); possible effects of estrogen on lens carotenoids are discussed. Lens Z concentration was strongly and positively correlated with serum Z in females (r=0.77; P<0.002). Deficient adult females supplemented with the 35 mgkg<sup>-1</sup> dose of Z for 6 months had a mean lens Z concentration (0.252±0.06 microgg<sup>-1</sup> protein) close to that in females fed with the supplement from birth (0.282±0.15 microgg<sup>-1</sup> protein). Birds fed with the higher dietary Z supplement for 6 or 12 months had significantly higher lens Z than birds fed lower or no dietary Z (P<0.0001). Lens L was not altered by dietary supplementation with either Z or beta-carotene. beta-Carotene supplements did not result in detectable lens beta-carotene, and had no effect on lens Z. Neither Z nor beta-carotene supplementation had a significant effect on serum or lens tocopherol concentrations. These studies in quail provide the first experimental evidence that lens carotenoids in adult vertebrates can be manipulated by dietary Z

supplements.

**Descriptors:** Japanese quail, dietary supplements, lens, crystalline metabolism, beta carotene analogs, derivatives, carotenoids deficiency, chromatography, *Coturnix*, lutein blood, lutein pharmacokinetics, sex factors, tocopherols blood, tocopherols metabolism, xanthophylls, beta carotene administration and dosage, beta carotene blood, beta carotene deficiency, beta carotene pharmacokinetics.

Fridrich, A.B. (2005). **Exigencia de proteína bruta para codornas europeias no período de crescimento. [Crude protein requirements for European quails during the growing period.]** *Arquivo Brasileiro De Medicina Veterinaria e Zootecnia* 57(2): 261-265. ISSN: 0102-0935.

**Descriptors:** quails, crude protein, nutritional requirements, animal performance, proximate composition, birds, domestic animals, galliformes, livestock, physiological requirements, poultry, proximate composition.

**Language of Text:** Portuguese, summaries in English and Portuguese.

Guclu, B.K., K.M. Iscan, F. Uyanik, M. Eren, and A.C. Agca (2004). **Effect of alfalfa meal in diets of laying quails on performance, egg quality and some serum parameters.** *Archives of Animal Nutrition* 58(3): 255-63. ISSN: 1745-039X.

**Abstract:** This study was conducted to investigate the effects of increasing levels of alfalfa meal in the diet of laying quails on egg production, feed consumption, feed efficiency, egg quality, egg yolk cholesterol and selected serum parameters. In this study, 192, 10-week old quails (*Coturnix coturnix japonica*) were evenly distributed to four groups with four replicates of 12 quails each. The control group was fed a basal diet containing 0% alfalfa meal and the remaining groups received 3, 6 or 9% alfalfa meal for 12 weeks. Live weight, feed consumption, and egg production were recorded and feed efficiency were calculated. Eggs were examined for interior and exterior quality and egg yolk cholesterol content. At the end of the experiment, blood samples were collected and sera were analysed for serum Ca, inorganic P (P(i)), Mg, triglycerides and total cholesterol. Any level of alfalfa meal had no effect on live weight, egg production, feed consumption, feed efficiency, egg weight, and egg yolk index. Six percent and 9% alfalfa meal increased specific gravity of whole egg and eggshell thickness as well as serum P(i) levels. Nine percent alfalfa meal reduced serum triglycerides, total cholesterol levels and egg yolk cholesterol content. The results of this experiment indicated that addition of 9% alfalfa meal into the laying quail diet may improve eggshell quality and reduced serum triglycerides and serum and egg yolk cholesterol without any adverse effect on performance.

**Descriptors:** quail, alfalfa meal diets, effect, laying performance, egg quality, serum parameters, coturnix, blood samples, triglycerides, cholesterol.

Guler, T., O.N. Ertas, M. Ciftci, and B. Dalkilic (2005). **The effect of coriander seed (*Coriandrum sativum* L.) as diet ingredient on the performance of Japanese quail.** *South African Journal of Animal Science*. 35(4): 261-267.

**Descriptors:** quails, diet, coriander, antibiotics, turkey, birds, flavorings, Galliformes, Europe.

Hooda, S., P.K. Tyagi, J. Mohan, A.B. Mandal, A.V. Elangovan, and K.T. Pramod (2007). **Effects of supplemental vitamin E in diet of Japanese quail on male reproduction, fertility and hatchability.** *British Poultry Science* 48(1): 104-110. ISSN: 0007-1668.

**Descriptors:** Japanese quail, supplemental vitamin E, effects, male reproduction, fertility, hatchability, diet.

Ipek, A., O. Canbolat, and A. Karabulut (2007). **The effect of vitamin E and vitamin C on the performance of Japanese quails (*Coturnix coturnix japonica*) reared under heat stress during growth and egg production period.** *Asian Australasian Journal of Animal Sciences* 20(2): 252-256. ISSN: 1011-2367.

**Descriptors:** Japanese quails, ascorbic acid, vitamin E, poultry feeding, heat stress, effect, growth, egg production.

Kalmar, I.D., G. Werquin, and G.P.J. Janssens (2007). **Apparent nutrient digestibility and excreta quality in African grey parrots fed two pelleted diets based on coarsely or finely ground ingredients.** *Journal of Animal Physiology and Animal Nutrition* 91(5-6): 210-216. ISSN: 0931-2439.

**Abstract:** A feeding trial was performed to study the influence of particle size in extruded parrot pellets on apparent digestibility and excreta consistency and pH. Two test diets were alternately provided to eight African grey parrots according to a 2 x 2 cross-over design. Both diets were similar in nutrient content and ingredient composition but differed in particle size of the composing particles of individual pellets. Apparent digestibility of macronutrients was studied using the total collection method. Next, the appearance of the excreta was studied by calculation of weight-surface ratio of individual excrements as an objective measurement of consistency. Last, excreta pH was measured directly on fresh excrements and on homogenized 10% excreta solutions. Neither apparent digestibility coefficients nor excreta pH values were significantly different in parrots fed the two diets. However, excreta consistency was significantly ( $p < 0.05$ ) more solid when fed the coarse diet than when fed with the finely ground diet. The results of this study suggest that excreta consistency can be improved through larger particle size, without adverse effects on nutritive value of the diet.

**Descriptors:** nutrition, digestibility, particle size, pellets, psittacine, African grey parrot, excreta consistency, pelleted diets, nutrient digestibility.

Kangas, B.D. and M.N. Branch (2006). **Stability of pigeon body weight under free-feeding conditions.** *Journal of the Experimental Analysis of Behavior* 86(3): 393-396. ISSN: 0022-5002.

**Descriptors:** pigeon, body weight, free feeding conditions, stability.

Karadas, F., P. Surai, E. Grammenidis, N.H.C. Sparks, and T. Acamovic (2006). **Supplementation of the maternal diet with tomato powder and marigold extract: effects on the antioxidant system of the developing quail.** *British Poultry Science* 47(2): 200-208. ISSN: 0007-1668.

**Abstract:** 1. The effects of natural dietary carotenoid supplementation of the maternal diet (tomato powder and marigold extract) on transfer to the egg yolk and on the development of the antioxidant system of the young quail liver in early postnatal life were investigated. 2. Sixty Japanese quail (*Coturnix coturnix japonica*) were allocated to four treatment groups, each with three replicates consisting of four females and one male each. The quail were fed on one of four different diets for 23 d, each of them based on a low carotenoid, wheat/barley-based control diet. Tomato powder and marigold extract were added at rates of 20 and 2 g/kg to treatments 2 and 3, respectively. Marigold extract and tomato powder were also used in combination in treatment 4 at 2 g marigold + 20 g tomato powder/kg of diet. 3. At 20 weeks of age, 60 eggs from each treatment were collected and placed in an incubator. After hatching, d-old quail from each group were reared (under standard commercial conditions) up to 14 d of age. They were fed on a low-carotenoid commercial diet. After hatch, at 1, 7 and 14 d, the livers of five young quail from each treatment were assessed for total carotenoid concentration and carotenoid profile. 4. Results indicated that lycopene is transferred from the feed to the egg yolk and further to the liver of the developing embryo. Elevated carotenoid concentration in the egg yolk and correspondingly in the liver of newly hatched quail remains significant during first week posthatch. 5. Lutein and lycopene did not affect vitamin E concentration in the egg yolk or liver of the newly hatched quail. A combination of increased concentrations of lycopene and lutein in the egg yolk results in elevated concentrations of coenzyme Q in the liver of the newly hatched quail.

**Descriptors:** Japanese quails, poultry feeding, maternal nutrition, feed supplements, tomato products, powdered foods, plant extracts, Tagetes, antioxidants, chicks, lycopene, egg yolk composition, postnatal development, wheat, feed barley, liver, lutein, vitamin E, ubiquinones.

Kaur, S., A.B. Mandal, K.B. Singh, M.M. Kadam, and A.V. Elangovan (2007). **Response of laying Japanese quails to graded levels of essential amino acids profile with reduced dietary protein.** *Journal of the Science of Food and Agriculture* 87(5): 751-759. ISSN: 0022-5142.

**Descriptors:** Japanese quail, dietary protein, essential amino acids, graded levels, response, laying quail.

Kaur, S., A.B. Mandal, K.B. Singh, and R. Narayan (2006). **Responses of growing Japanese quails (heavy body weight line) to graded levels of essential amino acid concentrations in diets with or without fishmeal.** *Journal of the Science of Food and Agriculture* 86(2): 320-327. ISSN: 0022-5142.

**Abstract:** The influence of dietary amino acid profile on growth and immune response was investigated in growing quails (n = 928) divided into 24 subgroups. Eight dietary treatments with four levels of essential amino acids (EAA), viz. 90, 100, 110 and 120% of NRC, each with or without fishmeal (FM), were formulated following a four (EAA levels) times two (protein type) factorial design. Each treatment was allotted to three replicates up to 5 weeks of age. After 5 weeks of age 10 quails were randomly sacrificed from each treatment to study the relative weight of immune organs. Live weight gain was significantly higher ( $P < 0.05$ ) in diets containing 120% EAA with or without FM and 110% EAA with FM during 0 to 21 days of age. However, live weight gain from 21 to 35 days of age was higher ( $P < 0.01$ ) in quails received diets containing 90% EAA with or without FM and 100% EAA without FM than in other dietary treatments. Live weight gain increased linearly ( $P < 0.01$ ) with the increase in EAA levels overall (0-35 days). Feed intake was higher ( $P < 0.01$ ) in diets with higher EAA levels (110 and 120%) from 0 to 21 days. The interaction of EAA and protein type influenced ( $P < 0.05$ ) feed intake from 21 to 35 days of age. There was linear decrease ( $P < 0.01$ ) in feed intake with the lowering of EAA level up to 100% during 0 to 35 days. Feed conversion ratio (FCR) was better ( $P < 0.01$ ) up to day 21 at higher EAA levels (110 or 120%) while during days 21 to 35 better FCR was calculated ( $P < 0.01$ ) in diet with low EAA levels (90 or 100%). FCR was improved in all vegetable protein diet in comparison with FM diet. Energy efficiency up to 21 days of age was better ( $P < 0.01$ ) at high EAA levels (110 and 120%), while thereafter better at low ( $P < 0.01$ ) EAA levels (90 and 100%). Protein efficiency improved linearly ( $P < 0.01$ ) with decreasing EAA level. Humoral (SRBC) and cellular (PHA-P) immune response did not differ in response to EAA levels or protein type. Higher ( $P < 0.01$ ) relative weight of spleen was recorded at 100% EAA level, while the relative weight of thymus was higher in diet containing 110% EAA level without fishmeal.

**Descriptors:** Japanese quails, growing, responses, essential amino acids, diet concentration, body weight, immune response.

Kelly, D.J. and N.M. Marples (2004). **The effects of novel odour and colour cues on food acceptance by the zebra finch, *Taeniopygia guttata*.** *Animal Behaviour* 68(5): 1049-1054. ISSN: 0003-3472.

**Descriptors:** zebra finch, food acceptance, color cues, novel odor, effects, eating behavior.

Mandal, A.B., A.V. Elangovan, P.K. Tyagi, P.K. Tyagi, A.K. Johri, and S. Kaur (2005). **Effect of enzyme supplementation on the metabolisable energy content of solvent-extracted rapeseed and sunflower seed meals for chicken, guinea fowl and quail.** *British Poultry Science* 46(1): 75-79. ISSN: 0007-1668.

**Descriptors:** cockerels, guineafowl, quails, poultry feeding, feed supplements, digestive enzymes, metabolizable energy, rapeseed meal, sunflower meal, feed intake, poultry manure, extraction, feed processing, animal models, model validation.

Mandal, A.B., S. Kaur, A.K. Johri, A.V. Elangovan, C. Deo, and H.P. Shrivastava (2006).

**Response of growing Japanese quails to dietary concentration of L-threonine.** *Journal of the Science of Food and Agriculture* 86(5): 793-798. ISSN: 0022-5142.

**Abstract:** The influence of dietary levels of L-threonine (Thr) on growth and immune response was investigated in growing (0-5 weeks of age) Japanese quails (n = 288). Three dietary treatments were formulated using three levels of Thr [9.6, 10.2 and 11.2 g kg<sup>-1</sup> diet dry matter (DM)] at a fixed protein level of 233 g kg<sup>-1</sup> and an energy level of 12.15 MJ (2900 kcal) metabolizable energy (ME) kg<sup>-1</sup> feed dry matter. A metabolism trial with a 3-day collection period was conducted at the third week of age employing all the birds. The cell-mediated (using PHA-P) and humoral (SRBC response) immune responses were measured at the fourth week of age. Carcass traits were assessed at the end of fifth week of age. Body weight gain was lower (P < 0.01) in birds received 9.6 g Thr kg<sup>-1</sup> DM than in groups fed 10.2 g or 11.2 g kg<sup>-1</sup> DM in the diet, but there was no significant difference in gain between the groups fed 10.2 or 11.2 g Thr kg<sup>-1</sup> DM in the diet. Feed intake differed significantly owing to Thr levels being lowest (P < 0.05) at 9.6 g Thr kg<sup>-1</sup> DM in the diet. Feed conversion ratio (FCR), protein efficiency and energy efficiency improved at the 11.2 g kg<sup>-1</sup> level from 0 to 3 weeks of age; however, from 3 to 5 weeks of age, better FCR emanated from a diet with 9.6 g Thr kg<sup>-1</sup> DM. The nitrogen balance did not differ (P > 0.05) with Thr level. Carcass traits, relative weight of immune organs and cell-mediated (PHA-P) and humoral (SRBC response) immune responses did not differ significantly (P > 0.05) as a result of the dietary treatments.

**Descriptors:** Japanese quail, growing response, L threonine, dietary concentration, immune response, dietary treatments.

Matson, K.D. and E.A. Koutsos (2006). **Captive parrot nutrition: interactions with anatomy, physiology, and behavior.** *Manual of Parrot Behavior.* Blackwell Publishing, 9600 Garsington Rd, Oxford OX4 2DQ, Oxen, UK, p. 49-58. ISBN: 0813827493.

**Descriptors:** captive parrot, nutrition, behavior, anatomy, physiology, interactions, book chapter.

Morata, R.L., T.M.M. Machado, L.F.T. Albino, H.S. Rostagno, E. Detmann, L.T.d.O. Fernandes, H.N. Parente, K.V. Antunes, A.C. Almeida, and A.C. Csermak Junior (2006). **Técnicas de avaliação dos valores energéticos e dos coeficientes de digestibilidade de alguns alimentos para emas (*Rhea americana*) em crescimento.** [Techniques of evaluation of the energy values and the coefficients of digestibility of some feedstuffs for growing greater rhea (*Rhea americana*). *Revista Brasileira De Zootecnia* 35(4): 1381-1388. ISSN: 1516-3598.

**Descriptors:** rhea, energy values, digestibility, feedstuffs, growing, evaluation techniques, *Rhea americana*.

**Language of Text:** Portuguese, summary in English.

Munshi South, J. and G.S. Wilkinson (2006). **Diet influences life span in parrots (psittaciformes).** *Auk* 123(1): 108-118. ISSN: 0004-8038.

**Descriptors:** parrots, diet, influences, life span, nutrition, mortality.

Mushi, E.Z., M.G. Binta, and R.G. Chabo (2004). **Yolk sac utilization in ostrich (*Struthio camelus*) chicks.** *Onderstepoort Journal of Veterinary Research* 71(3): 247-9. ISSN: 0030-2465.

**Abstract:** The mass of residual yolk sac expressed as a percentage of initial mass of the egg from which the chick hatched decreased sharply in the first 2 days post-hatching. A gradual reduction occurred between 3 and 10 days after which a sharp decline was noted between 11 and 13 days post-hatching. The highest number of chicks with unabsorbed yolk sac was noted on day 5 post-hatching followed by days 6 and 7. Chick mortality followed the same pattern. The dynamics, causes and clinical consequences of yolk sac utilization are discussed.

**Descriptors:** ostrich, chicks, yolk sac utilization, struthioniformes growth, development, yolk sac metabolism, age, struthioniformes embryology, days.

Nheta, C., J.H. Topps, K. Dzama, J. Kusina, and P.H. Mugabe (2005). **In vitro digestibility using caecal liquor of diets containing poor quality roughages and green forages fed to domesticated ostriches (*Struthio camelus* var. *domesticus*).** *Animal Feed Science and Technology* 119(3-4): 283-291. ISSN: 0377-8401.

**Descriptors:** in vitro digestibility, ostriches, forage composition, alternative livestock, livestock feeding, dietary fiber, forage, metabolizable energy, experimental diets, cecum, digestive juices, digestibility, forage quality, Tilly and Terry-method.

Nowaczewski, S., H. Kontecka, and E. Pruszyńska Oszałek (2006). **Effect of feed supplementation with vitamin C on haematological indices, corticosterone concentration in blood and duration of tonic immobility in pheasants.** *Annals of Animal Science* 6(1): 117-128. ISSN: 1642-3402.

**Descriptors:** pheasants, feed supplementation, vitamin C, effect, hematological indices, corticosterone concentration, blood, tonic immobility.

**Language of Text:** Polish.

Paoletti, G. and S. Puig (2007). **Diet of the Lesser Rhea (*Pterocnemia pennata*) and availability of food in the Andean Precordillera (Mendoza, Argentina).** *Emu Austral Ornithology* 107(1): 52-58. ISSN: 0158-4197.

**Descriptors:** lesser rhea, diet, food availability, *Pterocnemia pennata*, Argentina.

Rutstein, A.N., P.J. Slater, and J.A. Graves (2004). **Diet quality and resource allocation in the zebra finch.** *Proceedings. Biological Sciences The Royal Society* 271(Suppl 5): S286-9. ISSN: 0080-4649.

**Abstract:** We investigated the effect of diet quality on resource allocation in zebra finches (*Taeniopygia guttata*) by providing females with a high-quality (HQ) or low-quality (LQ) diet for six weeks prior to pairing, and continuing these diets during egg laying and chick rearing. Diet treatments were then reversed and the experiment repeated. When females laid on the HQ diet, egg mass increased with laying order, but the reverse was true on the LQ diet. Females laid significantly more male eggs on the LQ diet compared with on the HQ diet. In addition, female eggs were more frequent at the end of the clutch when on the HQ diet and at the beginning of the clutch when on the LQ diet. These differences in the primary sex ratio are in line with predictions from sex allocation theory, since in this species females are more vulnerable to nutritional stress than males.

**Descriptors:** zebra finch, animal nutrition physiology, finches physiology, ovum growth, development, sex ratio, body weight, diet quality, resource allocation, litter size.

Sahin, K., M. Onderci, N. Sahin, T.A. Balci, M.F. Gursu, V. Juturu, and O. Kucuk (2006). **Dietary arginine silicate inositol complex improves bone mineralization in quail.** *Poultry Science* 85(3): 486-92. ISSN: 0032-5791.

**Abstract:** Skeletal abnormalities, low bone mass, bone deformities, and bone fractures increase the risk of osteoporosis and osteoarthritis, which are of concern from both a public standpoint and a cost-of-care burden standpoint. Arginine silicate inositol complex (ASI; Arg = 49.47%, silicone = 8.2%, inositol = 25%) is a novel, bioavailable source of Si and Arg and one that offers potential benefits for vascular and bone health. Skeletal abnormalities and architectural deterioration of bone tissue are common under hot climate conditions in the poultry industry. In this study,

we evaluated the effects of ASI supplementation on performance and bone mineral density (BMD) in Japanese quail (*Coturnix coturnix japonica*) exposed to the high ambient temperature of 34 degrees C. The birds (n = 180; 10 d old) were randomly assigned to 6 treatment groups consisting of 10 replicates of 3 birds. Birds were kept in wire cages in a temperature-controlled room at either 22 degrees C (thermoneutral; TN) or 34 degrees C (heat stress; HS) for 8 h/d (0900 to 1700 h until the end of study) and were fed a basal (control) diet or the basal diet supplemented with either 500 or 1,000 mg of ASI/kg of diet. Heat exposure decreased performance and bone mineralization when the basal diet was fed (P = 0.001). The ASI supplement had no effect on feed intake, BW, feed efficiency, and carcass traits (P > 0.05) in quails reared under TN or HS conditions. The BMD was significantly improved by ASI supplementation in both TN and HS groups [0.72 (TN) vs. 0.60 (HS); P < or = 0.05]. Serum osteocalcin, dehydroepiandrosterone concentrations, and alkaline phosphatase activity increased, whereas tumor necrosis factor-alpha and Creactive protein concentrations decreased, as dietary ASI supplementation increased in quail reared under HS. This improvement was linear with increased doses of supplement (P = 0.001). In the ASI group, the amount of Ca, P, Mg, and Mn in the excreta decreased (P < or = 0.05), and the concentrations of these minerals in tibia ash increased in quail reared under HS conditions (P < or = 0.05). In conclusion, ASI supplementation to the basal diet significantly improved bone mineralization in quail and did not impact feed consumption, BW gain, or feed efficiency.

**Descriptors:** Japanese quail, diet, bone mineralization, arginine silicate inositol, dietary, calcification, *coturnix* physiology, bone density, *coturnix* growth, development, metabolism, dietary supplements.

Sahin, K., M. Onderci, N. Sahin, F. Gulcu, N. Yildiz, M. Avci, and O. Kucuk (2006).

**Responses of quail to dietary Vitamin E and zinc picolinate at different environmental temperatures.** *Animal Feed Science and Technology* 129(1-2): 39-48. ISSN: 0377-8401.

**Descriptors:** quails, food animals, feed supplements, nutrient intake, vitamin E, zinc, chelates, ambient temperature, carcass quality, liveweight gain, lipid peroxidation, ascorbic acid, cholesterol, heat stress, feed intake, feed conversion, body weight, poultry feeding, nutritional status.

Sahin, K., R. Ozercan, M. Onderci, N. Sahin, M.F. Gursu, F. Khachik, F.H. Sarkar, A.

Munkarah, R. Ali Fehmi, D. Kmak, and O. Kucuk (2004). **Lycopene supplementation prevents the development of spontaneous smooth muscle tumors of the oviduct in Japanese quail.** *Nutrition and Cancer* 50(2): 181-9. ISSN: 0163-5581.

**Abstract:** Leiomyomas (fibroids) are benign tumors of the uterus affecting millions of women. Spontaneous leiomyomas of the oviduct are common tumors of the Japanese quail (*Coturnix coturnix japonica*), which makes it a good animal model

for screening potential agents for testing in the prevention and treatment of human myoma uteri. Because dietary intake of lycopene has been associated with a reduced risk of a variety of human cancers, we investigated the effects of lycopene supplementation on the development of leiomyomas in the oviduct of Japanese quail. We also measured serum levels of oxidative stress markers [malondialdehyde (MDA) and homocysteine], lycopene, vitamins C, E, and A, and tissue biomarkers Bcl-2 and Bax expression. One hundred twenty quails (6 mo old) were assigned to 3 treatment groups consisting of 4 replicates of 10 birds in each group. Birds were fed either a basal diet (group C) or the basal diet supplemented with 100 mg (group L1) or 200 mg (group L2) of lycopene per kilogram of diet. The animals were sacrificed after 285 days and the tumors were identified. Lycopene supplementation decreased the number of leiomyomas compared with control subjects ( $P=0.056$ ). The tumors in lycopene-fed birds were smaller than those found in control birds ( $P=0.01$ ). There were no significant differences in the expression of tissue Bcl-2 and Bax among the study groups. Serum vitamins C, E, and A increased ( $P=0.01$ ), whereas MDA and homocysteine concentrations decreased ( $P=0.01$ ) with lycopene supplementation. No measurable lycopene could be detected in the serum of control birds, whereas a dose-dependent increase was observed in the serum of lycopene-supplemented birds. The results indicate that dietary supplementation with lycopene reduces the incidence and size of spontaneously occurring leiomyoma of the oviduct in the Japanese quail. Clinical trials should be conducted to investigate the efficacy of lycopene supplementation in the prevention and treatment of uterine leiomyoma in humans.

**Descriptors:** Japanese quail, smooth muscle tumors, oviduct, lycopene supplementation, prevents development, fibroids, leiomyomas, animal model.

Sahin, N., M. Onderci, K. Sahin, G. Cikim, and O. Kucuk (2005). **Magnesium proteinate is more protective than magnesium oxide in heat-stressed-quail.** *Journal of Nutrition* 135(7): 1732-1737.

**Abstract:** We evaluated the effects of dietary supplementation with Mg-oxide and Mg-proteinate on performance; nutrient digestibilities; malondialdehyde (MDA) concentrations in serum, liver, and thigh meat; and serum cholesterol and triacylglycerol concentrations in Japanese quail (*Coturnix coturnix japonica*) exposed to high ambient temperature. The birds ( $n = 360$ ; 10 d old) were randomly assigned to 12 treatment groups consisting of 6 replicates of 5 birds each in a  $2 \times 2 \times 3$  factorial arrangement (temperature, Mg source, Mg level). Birds were maintained in temperature-controlled rooms at 22degrees C for 24 h/d or 34degrees C for 8 h/d (0900-1700 h) and fed a basal diet or that diet supplemented with 1 or 2 g Mg-oxide or Mg-proteinate/kg of diet. Heat exposure decreased ( $P = 0.0001$ ) live weight gain, feed intake, feed efficiency, and carcass weight in quail fed the basal diet. A linear increase in feed intake ( $P = 0.008$ ) and body weight ( $P = 0.001$ ), and improvements

in feed efficiency ( $P = 0.001$ ), carcass weight ( $P < 0.0001$ ), digestibility of dry matter, organic matter, crude protein, and ether extract were found in Mg-supplemented, heat-stressed quail. The effects of Mg-proteinates were greater than those of Mg-oxide ( $P \leq 0.0001$ ). Serum Mg ( $P = 0.001$ ) concentration increased, whereas the concentration of MDA in serum ( $P = 0.0001$ ), liver ( $P = 0.04$ ), and thigh meat ( $P = 0.0001$ ) and serum triglyceride and cholesterol concentrations decreased linearly ( $P = 0.001$ ) with the level of Mg in the diet. Interactions between dietary Mg source, temperature, and level of supplementation ( $P \leq 0.05$ ) were found for several variables. Results of the present study suggest that supplementation with Mg-proteinates is more protective than Mg-oxide in reducing the negative effects of heat stress in quail.

**Descriptors:** Japanese quails, magnesium oxide, magnesium, heat stress, animal growth, digestibility, liver, lipid peroxidation, poultry meat, dietary mineral supplements, malondialdehyde, blood chemistry, thighs, cholesterol, triacylglycerols, feed intake, liveweight gain, feed conversion, carcass weight, protective effect, magnesium proteinates.

Sahin, N., K. Sahin, M. Onderci, M.F. Gursu, G. Cikim, J. Vijaya, and O. Kucuk (2005).

**Chromium picolinate, rather than biotin, alleviates performance and metabolic parameters in heat-stressed quail.** *British Poultry Science* 46(4): 457-463. ISSN: 0007-1668.

**Abstract:** 1. The effects of chromium picolinate and biotin supplementation alone and in combination on performance, carcass characteristics, malondialdehyde (MDA), vitamin C, vitamin E, glucose and cholesterol levels were evaluated in Japanese quail exposed to high ambient temperature. 2. Two hundred and forty quails (10 d old) were assigned randomly to 4 dietary treatments at room temperature (22 degrees C; thermoneutral, TN) or ambient (34 degrees C for 8 h/d; heat stress, HS). Both TN and HS were fed either on a basal (control) diet or the basal diet supplemented with 400 microgram of Cr/kg (Cr group), 0.5 mg of biotin/kg of diet (biotin group) or both (Cr + Biotin group). 3. Supplementing the diet of heat-stressed quails with chromium picolinate improved live weight gain, feed intake, feed efficiency and carcass traits. Biotin supplementation during TN and HS conditions did not have any beneficial effects on body weight gain, feed intake, feed efficiency or carcass traits. 4. Either in combination or alone, chromium picolinate increased serum concentrations of vitamins C and E, but decreased MDA, glucose and cholesterol concentrations in birds kept at high ambient temperature. There was no difference in vitamins C and E and MDA concentrations between birds given chromium picolinate and birds receiving chromium picolinate plus biotin, while glucose and cholesterol levels were significantly lower in all groups. The lowest concentrations of cholesterol and glucose were found in the combination group under both TN and HS conditions. An interaction between diet and temperature was detected for glucose

and cholesterol concentrations. 5. Excretion rates for zinc, iron and chromium were lower in TN groups than in the corresponding HS groups. Supplementing diet with chromium picolinate and chromium picolinate plus biotin decreased excretion of minerals while biotin alone did not effect excretion of minerals. 6. Chromium supplementation, but not biotin supplementation, attenuated the decline in performance and antioxidant status resulting from heat stress.

**Descriptors:** Japanese quails, food animals, feed supplements, poultry feeding, heat stress, ambient temperature, picolinic acid, biotin, carcass characteristics, animal performance, malondialdehyde, ascorbic acid, vitamin E, glucose, cholesterol, live-weight gain, feed intake, feed conversion, carcass quality, blood chemistry, zinc, iron, chromium, excretion, chromium picolinate.

Sahin, N., K. Sahin, M. Onderci, M. Karatepe, M.O. Smith, and O. Kucuk (2006). **Effects of dietary lycopene and vitamin E on egg production, antioxidant status and cholesterol levels in Japanese quail.** *Asian Australasian Journal of Animal Sciences* 19(2): 224-230. ISSN: 1011-2367.

**Descriptors:** Japanese quail, feed additives, laying performance, egg yolk composition, malondialdehyde, egg quality.

Sakamoto, M.I., A.E. Murakami, L.M.G.d. Souza, J.R.G. Franco, L.D.G. Bruno, and A.C. Furlan (2006). **Valor energetico de alguns alimentos alternativos para codornas japonesas. [Energy value of some alternative feedstuffs for Japanese quails].** *Revista Brasileira De Zootecnia* 35(3): 818-821. ISSN: 1516-3598.

**Descriptors:** japanese quail, alternative feedstuffs, energy value, oats, barley, feeding, Nutrition.

**Language of Text:** Portuguese, summary in English.

Sales, J. (2006). **Feeding of the captive kiwi.** *Zoos Print Journal* 21(11): 2454-2458. ISSN: 0973-2535.

**Descriptors:** captive kiwi, feeding, rearing, nutrition, diet, conservation, New Zealand.

Sehu, A., S. Cakir, O. Cengiz, and D. Essiz (2005). **MYCOTOX and aflatoxicosis in quails. [Erratum: 2006 Apr., v. 47, no. 2, p. 247.].** *British Poultry Science* 46(4): 520-524. ISSN: 0007-1668.

**Abstract:** 1. This study was to evaluate the toxic effects of aflatoxin (AF) on growth performance of quail, and to determine the preventive efficacy of MYCOTOX (oxcinol, tymol, micronised yeast). 2. One hundred and eighty 1-d-old quail (*Coturnix coturnix japonica*) of both sexes were weighed and randomly divided into 4 experimental groups each with 5 replicates of 9 birds. 3. There were 4 dietary treatments: (1) control with 0 mg AF/kg diet and 0% MYCOTOX; (2) 0 mg AF/kg diet and

0.5% MYCOTOX; (3) 2.5 mg AF/kg diet and 0% MYCOTOX; (4) 2.5 mg AF/kg diet plus 0.5% MYCOTOX. The chicks were maintained on these treatments to 3 weeks of age. Quail consumed the diets and water ad libitum. 4. Body weight (BW) gains in groups receiving AF alone were the lowest at all periods. Feed intake was lowest in the group consuming the AF diet. The addition of MYCOTOX to the AF diet did not prevent or reduce the toxic effects of AF on feed intake at any time period. Feeding diets containing MYCOTOX alone did not change feed intake significantly. With the exception of the 1 to 7 d period, feed conversion of chicks fed the AF diet was similar to those of the other experimental groups. 5. Bursa of Fabricius weight decreased, whereas the relative weights of liver, kidney and spleen increased in quail consuming diets containing AF and AF plus MYCOTOX. Liver colour was normal in the control and MYCOTOX alone group, but was lighter in groups fed AF. 6. The results indicated that MYCOTOX was not effective in preventing the deleterious effects of AF.

**Descriptors:** Japanese quails, food animals, aflatoxicosis, aflatoxins, feed supplements, body weight, feed intake, feed conversion, bursa of Fabricius, tissue weight, liver, kidneys, spleen, color, oxicol, tymol, micronized yeast, toxicosis prevention.

Sehu, A., O. Cengiz, and S. Cakir (2005). **The effects of diets including different energy and protein levels on egg production and quality in quails.** *Indian Veterinary Journal* 82(12): 1291-1294. ISSN: 0019-6479.

**Descriptors:** quail, diets, different energy levels, protein levels, effects, egg production.

Surai, P.F., F. Karadas, A.C. Pappas, and N.H.C. Sparks (2006). **Effect of organic selenium in quail diet on its accumulation in tissues and transfer to the progeny.** *British Poultry Science* 47(1): 65-72. ISSN: 0007-1668.

**Descriptors:** quails, selenium, dietary minerals, egg products, chicks, maternal nutrition, dietary mineral supplements, poultry feeding, selenites, corn, egg albumen, egg yolk, egg yolk composition, egg shell, quail eggs.

Tarhan, S. and M. Sezer (2004). **A mathematical model for the feed utilization of Japanese quail.** *Journal of Animal and Feed Sciences* 13(3): 509-518. ISSN: 1230-1388.

**Descriptors:** quail, feed utilization, mathematical model, study.

Taylor, S. and M.R. Perrin (2006). **The diet of the brown-headed parrot (*Poicephalus cryptoxanthus*) in the wild in southern Africa.** *Ostrich* 77(3-4): 179-185. ISSN: 0030-6525.

**Descriptors:** brown-headed parrot, diet, wild, southern Africa, *Poicephalus cryptoxanthus*.

Tyufekciev, K., P. Marinova, M. Ignatova, and I. Kitanov (2005). **Influence of the nutritional additive OVOCAP in pheasants II. Physicochemical composition of m. pectoralis and m. biceps femoris.** *Bulgarian Journal of Agricultural Science*. 11(5): 595-601. ISSN: 1310-0351.

**Descriptors:** pheasants, feed additives, muscles, chemico-physical properties, additives, birds, galliformes, musculoskeletal system.

**Language of Text:** Summary in English.

Werquin, G.J., K.J. De Cock, and P.G. Ghysels (2005). **Comparison of the nutrient analysis and caloric density of 30 commercial seed mixtures (in toto and dehulled) with 27 commercial diets for parrots.** *Journal of Animal Physiology and Animal Nutrition* 89(3-6): 215-21. ISSN: 0931-2439.

**Abstract:** In this paper, an overview is given of the composition of 30 commercially available parrot seed mixtures. As parrots dehull the seeds, the analysis of the total seed mixture tends to differ from that of the ingested feed. Statistical evaluation and comparison of the dehulled seeds vs. the whole seeds indicates that most parrot species are fed a diet rich in fat (31.7 +/- 13.1% crude fat) and energy (22.4 +/- 2.9 MJ ME/kg). As the analysis of the total seed mixtures underestimates fat and energy content of the ingested feed, it is suggested that researchers, bird nutritionists and bird food producers should calculate diets based on the analysis of the dehulled seeds. Finally, the calculated data were compared with the composition of formulated pelleted/extruded diets on the market. These data indicate that the energy density of most diets (15.6 +/- 1.4 MJ ME/kg) is far below the energy density of common seed mixtures.

**Descriptors:** parrots, nutrient analysis, caloric density, comparison study, commercial feed mixtures, commercial diets, fat, energy.

Wolf, P. and J. Kamphues (2005). **Fuetterung von Papageien unter praxisueblichen Bedingungen.** [The feeding of parrots, with practical considerations.]. *Gefiederte Welt* 129(8): 240-244. ISSN: 0016-5816.

**Descriptors:** parrots, feeding, practical considerations, nutrition.

**Language of Text:** German, summary in German.



# General

Bassett, S.M. and C.E. Travers (2006). **The role of captive rearing in kiwi conservation.** *Journal of Ornithology* 147(5, Suppl. 1): 115-116. ISSN: 0021-8375.

**Descriptors:** kiwi conservation, captive rearing, role, meeting.

**Notes:** Meeting Information: 24th International Ornithological Congress, Hamburg, Germany; 2006.

Bougiouklis, P.A. (2007). **Avian circoviruses of the genus *Circovirus*: A potential trigger in Pigeon breeder's lung (PBL)/bird fancier's lung (BFL).** *Medical Hypotheses* 68(2): 320-3. ISSN: 0306-9877.

**Abstract:** Pigeon breeder's lung (PBL) or bird fancier's lung (BFL) is one of the most common extrinsic allergic alveolitis or hypersensitivity pneumonitis. It is caused after prolonged inhalation of avian antigens and provokes a hypersensitivity reaction in the lungs of sensitised people. Although the pathogenic mechanism is unclear, the epidemiology of BFL shows that it occurs worldwide, and has been described in adults keeping birds and also in their children. Laboratory findings associated with the disease classified as a type III immunologic reaction that produces blood precipitin antibodies against birds' serum, feathers, intestinal mucin and/or faeces. In particular, the fine dust from pigeon feathers has strong antigenic properties. There is an interaction between host and antigen that seems to be influenced by both genetic and environmental factors. Avian circoviruses (ACV) of the genus *Circovirus*, has been detected in free-ranging and captive birds worldwide, such as pigeons, canaries, psittacines, Senegal doves, finches, gulls, Australian ravens and geese. T lymphocytes are the main target cells of the ACV and in the above avian species circovirus-like particles were detected in blood, macrophages, feathers, crop secretions, intestinal contents and/or faeces. Most of the ACV was demonstrated that are pantropic and viral antigen in pigeon tissues was most commonly detected in respiratory organs, including the trachea, pharynx and lung. The transmission of the circovirus between the birds usually occurs through inhalation of feathers dust. There is evidence that animal circoviruses may originate when vertebrates become "infected" with DNA from a plant nanovirus. So, it seems that further investigation for the avian circoviruses is needed to determine if they are host specific or not. This study attempts to demonstrate ACV or ACV-like particles as potential triggers in the BFL aetiology, and the possible involvement in BFL's pathogenic mechanism.

**Descriptors:** pigeon diseases virology, Circoviridae infections diagnosis, human immunological disease allergies, agricultural workers' diseases virology, Circoviridae

infections transmission, Circoviridae infections veterinary, Circovirus, Columbidae, allergic alveolitis.

Caruana, M., K.S. Cornish, S. Bajada, C.F. Jones, and J. Cacciottolo (2005). **Rosella parrot exposure as a cause of bird fancier's lung.** *Archives of Environmental and Occupational Health* 60(4): 187-92. ISSN: 0003-9896.

**Abstract:** A case of a 30-year-old man who presented with a 2-month history of progressively worsening dyspnoea, cough, and reduced exercise tolerance is discussed. A chest x-ray and computerized tomography of the chest suggested interstitial lung disease, which was confirmed on histology of an open lung biopsy. Careful questioning revealed that the patient had sustained close exposure to a rosella parrot acquired as a pet 9 months prior to presentation, which led to the diagnosis of bird fancier's lung. The case, investigations, and outcome are presented. This is followed by a discussion on extrinsic allergic alveolitis with particular emphasis on the importance of a complete social and environmental history in patients presenting with similar respiratory symptoms.

**Descriptors:** bird fancier's lung diagnosis, inhalation exposure adverse effects, parrots, adult, bird fancier's lung drug therapy, pathology, prednisolone therapeutic use, respiratory function tests, risk assessment, risk factors, tomography, x ray computed, allergic alveolitis.

Cooper, R.G. (2005). **Growth in the ostrich (*Struthio camelus* var. *domesticus*).** *Animal Science Journal* 76(1): 1-4. ISSN: 1344-3941.

**Descriptors:** ostrich, growth, *Struthio camelus*.

Dunn, M. (2006). **The dove.** *Journal of Pain and Palliative Care Pharmacotherapy* 20(4): 1. ISSN: 1536-0288.

**Descriptors:** birds, dove.

Engebretson, M. (2006). **The welfare and suitability of parrots as companion animals: a review.** *Animal Welfare* 15(3): 263-276. ISSN: 0962-7286.

**Descriptors:** parrots, pets, threatened species, animal welfare, animal stress, distress, stereotyped behavior, environmental enrichment, literature reviews, capture of animals, animal transport, rearing, wild birds.

Ferrell, S.T. (2004). **Husbandry and clinical medicine of finches.** *Small Animal and Exotics Book Two: Pain Management-Zoonosis Proceedings of the North American Veterinary Conference, Volume 18, Orlando, Florida, USA, 17 21 January 2004*, Eastern States Veterinary Association: Gainesville, USA, p. 1443-1445.

**Descriptors:** finches, husbandry, clinical medicine, book chapter, conference.

**Notes:** Meeting Information: Small Animal and Exotics. Book two: Pain Manage-

ment - Zoonosis. Proceedings of the North American Veterinary Conference, Volume 18, Orlando, Florida, USA, 17-21 January 2004.

Fraire, H.J.R. and M.B. Martella (2006). **DNA test to sex the lesser rhea (*Rhea pennata pennata*)**. *British Poultry Science* 47(3): 375-377 . ISSN: 0007-1668.

**Descriptors:** lesser rhea, DNA test, to sex, chain reaction, *Rhea pennata pennata*.

Gerhold, R.W., C.M. Tate, S.E. Gibbs, D.G. Mead, A.B. Allison, and J.R. Fischer (2007). **Necropsy findings and arbovirus surveillance in mourning doves from the southeastern United States**. *Journal of Wildlife Diseases* 43(1): 129-35. ISSN: 0090-3558.

**Abstract:** Mourning doves (*Zenaida macroura*) are the most abundant and widespread native member of the columbid family, as well as a major migratory game species, in the United States. However, there is little information on mortality factors in mourning doves. Records of necropsy accessions at the Southeastern Cooperative Wildlife Disease Study (SCWDS) from 15 southeastern states, from 1971 through 2005, were reviewed. One hundred thirty-five mourning doves were submitted from nine states during the 35-yr period. Trichomonosis constituted 40% (n = 54) of all diagnoses and was the most frequent diagnosis. Toxicoses and avian pox constituted 18.5% (n = 25) and 14.8% (n = 20) of all diagnoses, respectively. Remaining diagnoses included trauma, suspected toxicosis, *Ascaridia columbae* infection, suspected tick paralysis, and undetermined. Adults were observed more frequently with trichomonosis (94.1%) and toxicoses (68%) as compared to juveniles, but a gender predisposition was not apparent for either disease. Age and gender predilections were not apparent for cases of avian pox. The majority of the trichomonosis and avian pox cases were observed in the spring-summer, whereas the majority of the toxicosis cases were observed in the winter-spring. Additionally, the Georgia Department of Human Resources-Division of Public Health and West Virginia Department of Health and Human Resources submitted 809 mourning doves to SCWDS from 2001 through 2005 for West Nile virus surveillance efforts. West Nile virus was isolated from 2.1% (n = 17) and eastern equine encephalitis virus (EEEV) was isolated from 0.2% (n = 2) of the submitted birds.

**Descriptors:** mourning doves, arbovirus surveillance, necropsy findings, columbid family, diseases, parasites, viruses, southeastern USA.

Giunchi, D., N.E. Baldaccini, G. Sbragia, and C. Soldatini (2007). **On the use of pharmacological sterilisation to control feral pigeon populations**. *Wildlife Research* 34(4): 306-318. ISSN: 1035-3712.

**Descriptors:** feral pigeon populations, control, sterilization, pharmacological, adverse effects, breeding season, reproduction, sterilization, wildlife management.

- Harkinezhad, T., K. Verminnen, C. Van Droogenbroeck, and D. Vanrompay (2007). ***Chlamydophila psittaci* genotype E/B transmission from African grey parrots to humans.** *Journal of Medical Microbiology* 56(Pt 8): 1097-100. ISSN: 0022-2615.  
**Abstract:** Thirty-six birds from a parrot relief and breeding centre, as well as the manager, were examined for the presence of *Chlamydophila psittaci*. In the relief unit, 5 of 20 African grey parrots showed depression, ruffled feathers, loss of weight and mild dyspnoea. The birds received no antibiotic treatment. Birds of the breeding unit, 14 blue and gold macaws and 2 green-winged macaws, were healthy. They received doxycycline at the start of each breeding season. The manager complained of shortness of breath but took no medication. Using a nested PCR enzyme immunoassay (EIA), *Cp. psittaci* was detected in the faeces of all five sick birds, as well as in a nasal and pharyngeal swab from the manager. The veterinarian and her assistant became infected while sampling the parrots, as pharyngeal and nasal swabs from both were positive by nested PCR/EIA after visiting the parrot relief and breeding centre, but they showed no clinical signs of infection. Bacteria could be isolated from three of five nested PCR/EIA-positive birds, the manager and the veterinarian, but not from the veterinary assistant. Using an ompA genotype-specific real-time PCR, *Cp. psittaci* genotype E/B was identified as the transmitted strain. All breeding birds tested negative for *Cp. psittaci*. This is believed to be the first report on *Cp. psittaci* genotype E/B transmission from parrots to humans. In contradiction to genotype A strains, which are thought to be highly virulent to both birds and men, the currently described genotype E/B strain apparently caused no severe clinical symptoms in either parrots or humans.  
**Descriptors:** African grey parrots, *Chlamydophila psittaci*, genotype E, B, transmission, humans, diagnosis, strain, symptoms, treatment, doxycycline, zoonotic disease, case study.
- Jepson, M.H. and B. Wilton (2004). **Pigeon healthcare.** S.B.J.M.H. Kayne *Veterinary Pharmacology*, Pharmaceutical Press: London, UK, p. 475-498. ISBN: 0853695342.  
**Descriptors:** pigeon, health care, parasites, drugs, vaccines, disease, nutrition, book chapter.
- Malago Junior, W., A. Medaglia, E. Matheucci Junior, and F. Henrique Silva (2005). **New PCR multiplexes for sex typing of ostriches.** *Revista Brasileira De Biologia. [Brazilian Journal of Biology]* 65(4): 743-5. ISSN: 1519-6984.  
**Descriptors:** ostriches, DNA analysis, polymerase chain reaction methods, sex determination analysis methods, Struthioniformes genetics, DNA isolation, purification, feathers chemistry, genetic markers, molecular sequence data, struthioniformes anatomy, histology.

- Marshall, R. and I. Ward (2004). *A Guide to Eclectus Parrots As Pet and Aviary Birds*, Revised edition, ABK Publications: South Tweed Heads, 156 p. ISBN: 0975081705.  
**Descriptors:** guide, eclectus parrots, pet, aviary, birds, book.
- Martin, S. (2007). **The art of training parrots.** *Journal of Exotic Pet Medicine* 16(1): 11-18. ISSN: 1557-5063.  
**Descriptors:** parrots, behavior, training, methods.  
**Notes:** Special Issue: Behavior.
- Minvielle, F. (2004). **The future of Japanese quail for research and production.** *World's Poultry Science Journal* 60(4): 500-507. ISSN: 0043-9339.  
**Descriptors:** Japanese quails, animal models, laboratory animals, information exchange, information dissemination, poultry production.
- Moniello, G., F. Bovera, N.d. Riu, G. Piccolo, W. Pinna, and C.d. Meo (2006). **Gender effect on the metabolic profile of ostriches (*Struthio camelus domesticus*).** *Italian Journal of Animal Science* 5(3): 229-235. ISSN: 1594-4077.  
**Online:** www.aspajournal.it  
**Descriptors:** ostriches, gender effect, metabolic profile, *Struthio camelus*.  
**Language of Text:** Italian.
- Morata, R.L., T.M.M. Machado, L.F.T. Albino, H.S. Rostagno, E. Detmann, L.T.d.O. Fernandes, H.N. Parente, K.V. Antunes, A.C. Almeida, and A.C. Csermak Junior (2006). **Tecnicas de avaliacao dos valores energeticos e dos coeficientes de digestibilidade de alguns alimentos para emas (*Rhea americana*) em crescimento.** [Techniques of evaluation of the energy values and the coefficients of digestibility of some feedstuffs for growing greater rhea (*Rhea americana*)]. *Revista Brasileira De Zootecnia* 35(4): 1381-1388. ISSN: 1516-3598.  
**Descriptors:** rhea, energy values, digestibility, feedstuffs, growing, evaluation techniques, *Rhea americana*.  
**Language of Text:** Portuguese, summary in English.
- Moustaki, N. (2005). *Parrots for Dummies*, John Wiley & Sons Inc.: ISBN: 0764583530.  
**Descriptors:** parrots, book, dummies, nutrition, feeding, handling.
- Moustaki, N. (2004). *Quick & Easy Zebra Finch Care*, TFH Publications: Neptune City, N.J., ISBN: 9780793810208.  
**Descriptors:** zebra finch, care, book, housing, health care, breeding, nutrition.  
**Notes:** Quick and easy zebra finch care. Includes index. Quick & easy (Neptune City, N.J.). Contents: You and your zebra finch -- Housing your zebra finch -- Zebra finch nutrition -- Zebra finch health care -- Breeding zebra finches.

Moustaki, N. (2004). *A New Owner's Guide to African Grey Parrots.*, TFH Publications: Neptune City, N.J., ISBN: 0793828554.

**Descriptors:** African grey parrots, guide, book, nutrition, grooming, health, behavior, housing, training.

**Notes:** Includes bibliographical references (p. 141). Contents: Introducing the African grey -- Is the African grey for you -- Choosing the perfect African grey -- Housing your African grey -- African grey nutrition -- Keeping your African grey healthy -- Grooming your African grey -- African grey behavior -- Training your African grey -- Entertaining and educating your African grey -- African grey frequently asked questions and answers.

Ottinger, M.A., M. Abdelnabi, Q. Li, K. Chen, N. Thompson, N. Harada, C. Viglietti Panzica, and G.C. Panzica (2004). **The Japanese quail: a model for studying reproductive aging of hypothalamic systems.** *Experimental Gerontology* 39(11-12): 1679-93. ISSN: 0531-5565.

**Abstract:** During aging, the decline of neuroendocrine, endocrine, and behavioral components of reproduction ultimately leads to reproductive failure. These studies considered both neuroendocrine and behavioral aspects of reproductive aging in Japanese quail, using chronological age and reproductive status to separate animals into experimental groups. In Study I, age-related changes in the gonadotropin releasing hormone (GnRH-I) system were investigated and a sharp decrease was observed in GnRH-I concentration in the median eminence of aging animals of both sexes, whereas preoptic-lateral septal region GnRH-I concentrations declined only in aging males. Immunohistochemistry confirmed these findings since aging females retained, whereas males lost GnRH-I cells. Functional changes were assessed by in vitro incubation of parasagittal hypothalamic slices collected from young and old inactive males and females. Results showed reduced baseline GnRH-I release and diminished response to norepinephrine (NE). Deteriorating fertility also correlated with decreased male sexual behavior and loss of aromatase immunoreactive (AROM-ir) neurons in the medial, but not lateral preoptic nucleus (POA). Sexual behavior and AROM-ir were restored with exogenous testosterone, which was associated with increased cell size in the medial POA. Comparison of cell size and number of AROM-ir cells showed that aged sexually active males had fewer, larger AROM-ir cells when compared to young males, suggesting neuroplasticity of specific neural systems and a critical role of estradiol in maintaining reproductive function.

**Descriptors:** Japanese quail, animal model, reproductive aging, *coturnix*, hypothalamic systems, reproduction physiology, aromatase metabolism, gonadotropin releasing hormone metabolism, neurotransmitter agents, sexual behavior, testosterone metabolism.

Partridge, S.J., J.C. Pepperell, C. Forrester Wood, N.B. Ibrahim, A. Raynal, and C.R. Swinburn (2004). **Pheasant rearer's lung**. *Occupational Medicine* 54(7): 500-3. ISSN: 0962-7480.

**Abstract:** A 47-year-old gamekeeper presented with an 8 month history of variable breathlessness, cough and clinical features of severe interstitial lung disease. Open lung biopsy showed an extrinsic allergic alveolitis, which we believe related to his work rearing pheasants. Initially he was resistant, despite advice, to changing his occupation but subsequently, although ceasing exposure to pheasants and beginning treatment with corticosteroids, his disease progressed to the point where he developed respiratory failure and was referred for lung transplantation. Sadly, he died of progressive respiratory failure and cor pulmonale complicated by bronchopneumonia before this could be achieved.

**Descriptors:** pheasants, animal husbandry, bird fancier's lung, etiology, occupational diseases, poultry, bird fancier's lung diagnosis, bird fancier's lung pathology, fatal outcome, occupational diseases, diagnosis, pathology, allergic alveolitis.

Rosenwax, A. (2007). **Manual of parrot behaviour, 1st edn - Editor by Luescher AU**. *Australian Veterinary Journal* 85(3): 97. ISSN: 0005-0423.

**Descriptors:** parrot behavior, manual.

Ruffins, S.W., R. Lansford, M. Martin, R. Jacobs, and S. Fraser (2007). **A Mu Mri Atlas of quail development**. *FASEB Journal* 21(5): A201. ISSN: 0892-6638.

**Descriptors:** quail, development, Mu Mri Atlas, meeting.

**Notes:** Meeting Information: Experimental Biology 2007 Annual Meeting, Washington, DC, USA; April 28 -May 02, 2007.

Sandmeier, P. and P. Coutteel (2006). **Management of canaries, finches and mynahs**. G.J. Harrison and T.L.E. Lightfoot *Clinical Avian Medicine. Volume II*. Spix Publishing, Inc.: Palm Beach., p. 451-1008. ISBN: 0975499408.

**Descriptors:** canaries, finches, mynahs, care, captive management, review, pathological, reproductive, techniques, parasites, diseases, disorders.

Shousha, S., K. Nakahara, T. Nasu, T. Sakamoto, and N. Murakami (2007). **Effect of glucagon-like peptide-1 and-2 on regulation of food intake, body temperature and locomotor activity in the japanese quail**. *Neuroscience Letters* 415(2): 102-107. ISSN: 0304-3940.

**Descriptors:** Japanese quail, glucagon like peptide 1 and 2, effect, regulation of food intake, body temperature, locomotor activity.

Soderstrom, K., W. Qin, and M.H. Leggett (2007). **A minimally invasive procedure for sexing young zebra finches.** *Journal of Neuroscience Methods* 164(1): 116-9. ISSN: 0165-0270.

**Abstract:** Zebra finches have been widely used to study neurobiology underlying vocal development. Because only male zebra finches learn song, efficient developmental use of these animals requires early determination of sex at ages that precede maturation of secondary sex characteristics. We have developed a sex determination method that combines a forensics method of genomic DNA isolation (from very small blood samples) with PCR amplification from Z and W sex chromosomes (males are ZZ, females ZW). This combination results in a minimally invasive yet highly reliable and convenient genotyping method.

**Descriptors:** zebra finches, sexing, minimally invasive, genomic DNA, blood samples, forensic method, PCR amplification, Z and W sex chromosomes.

Stanford, M. (2004). **The effect of UV-B lighting supplementation in African grey parrots.** *Exotic DVM* 6(3): 29-32. ISSN: 1521-1363.

**Descriptors:** African grey parrots, UV-B lighting supplementation, effect, deficiency diseases, prevention, vitamin deficiencies, conference.

**Notes:** Meeting Information: Sixth Annual International Conference on Exotics, Naples, Florida, USA, 6-8 May 2004.

Wittig, W. (2004). **Aufzuchtprobleme beim Mohrengimpel. [Rearing problems with the gold-headed finch.]** *Gefiederte Welt* 128(11): 332-335. ISSN: 0016-5816.

**Descriptors:** gold-headed finch, rearing problems.

**Language of Text:** German.

Wohr, A.C., A. Schulz, and M.H. Erhard (2005). **Tierschutzaspekte bei der Haltung von Zuchtstraussen in Deutschland. [Housing of breeding ostriches in Germany and animal welfare aspects].** *Deutsche Tierärztliche Wochenschrift* 112(3): 87-91. ISSN: 0341-6593.

**Descriptors:** ostriches, housing, animal welfare, breeding, meat production, behavior, Germany.

**Language of Text:** German, summary in English.

**Notes:** Special issue: Animal welfare.

# Immunochemical

Graczyk, S., A. Wieliczko, A. Pliszcak Krol, and B. Janaczyk (2006). **Humoral and cellular response of pheasants vaccinated against newcastle disease and haentorrhagic enteritis.** *Acta Veterinaria Brno* 75(3): 379-386. ISSN: 0001-7213.

**Descriptors:** pheasants, cellular response, humoral response, vaccinated, newcastle disease, hemorrhagic enteritis.

Hou, J.M., J.Y. Liu, L. Yang, X. Zhao, L. Tian, Z.Y. Ding, Y.J. Wen, T. Niu, F. Xiao, Y.Y. Lou, G.H. Tan, H.X. Deng, J. Li, J.L. Yang, Y.Q. Mao, B. Kan, Y. Wu, Q. Li, and Y.Q. Wei (2005). **Combination of low-dose gemcitabine and recombinant quail vascular endothelial growth factor receptor-2 as a vaccine induces synergistic antitumor activities.** *Oncology* 69(1): 81-87. ISSN: 0923-7534.

**Abstract:** Vascular endothelial growth factor receptor-2 (VEGFR-2) has been shown to play a major role in inducing the full spectrum of VEGF biological response which is essential for tumor angiogenesis. We have demonstrated that immunotherapy of tumors with a vaccine based on quail homologous VEGFR-2 (qVEGFR) was effective in providing both protective and therapeutic antitumor immunity in several tumor models in mice. The purpose of this study was to determine whether the combination therapy of low-dose gemcitabine with qVEGFR as a vaccine could inhibit tumor growth to a greater extent. To test this concept, H22 hepatoma and Lewis lung carcinoma models were established in BALB/c mice and C57BL/6 mice, respectively. Mice were treated with either qVEGFR as a protein vaccine, gemcitabine, or both agents together. qVEGFR or low-dose chemotherapy treatment individually resulted in tumor inhibition to a certain extent. Remarkably, the combination therapy resulted in synergistic antitumor activity. Histological examination revealed that there was endothelial deposition of immunoglobulins within tumor tissues from mice treated with vaccine or combination therapy, especially intratumor angiogenesis was suppressed more significantly for the combination group. Also, ELISPOT analysis showed that mice treated with either qVEGFR alone or in combination with low-dose chemotherapy produced similar amount of anti-VEGFR antibody-producing B cells, which suggested that low-dose gemcitabine did not suppress the host's immune response, but potentiated the antitumor activity of the qVEGFR vaccine. Furthermore, TUNEL staining demonstrated a significant increase in the number of TUNEL-positive cells in the combination group compared with those of other groups. The observations may provide a new bio-chemotherapeutic approach for cancer.

**Descriptors:** antineoplastic combined chemotherapy protocols, therapeutic use,

cancer vaccines therapeutic use, carcinoma, lewis lung drug therapy, deoxycytidine analogs, derivatives, liver neoplasms, experimental drug therapy, vascular endothelial growth factor receptor 2, therapeutic use, antimetabolites, antineoplastic administration, dosage, deoxycytidine administration, dosage, drug administration schedule, drug synergism, mice, inbred Balb c inbred C57BL, quail , vaccines, synthetic therapeutic use.

Novak, I.L., M. Simpraga, and H. Mazija (2004). **Humoral immune reaction of ostriches vaccinated against Newcastle disease by different routes.** In: *Proceedings of the 11th Ostrich World Congress, Island Great Brijun, Croatia, 15-17 October 2004*, p. 82-88.

**Descriptors:** ostriches, vaccinated, Newcastle disease, humoral immune reaction, different routes, spraying, drinking, conference proceedings.

Raukar, J., M. Simpraga, R. Zadro, and J. Lukac (2006). **Immunological status in one-day old ostriches: preliminary results.** *Journal of Ornithology* 147(5, Suppl. 1): 236. ISSN: 0021-8375.

**Descriptors:** ostriches, one day old, immunological status, preliminary results, meeting.

**Notes:** Meeting Information: 24th International Ornithological Congress, Hamburg, Germany; 2006.

Roberts, M.L., K.L. Buchanan, D. Hasselquist, and M.R. Evans (2007). **Effects of testosterone and corticosterone on immunocompetence in the zebra finch.** *Hormones and Behavior* 51(1): 126-34. ISSN: 0018-506X.

**Abstract:** The original immunocompetence handicap hypothesis (ICHH) suggested that testosterone has a handicapping effect in males by both promoting the development of sexual signals and suppressing immune function. A modified version, the stress-linked ICHH, has recently proposed that testosterone is immunosuppressive indirectly by increasing production of corticosterone. To test both the original and stress-mediated versions of the ICHH, we implanted male zebra finches taken from lines selected for divergent maximum stress-induced levels of corticosterone (high, low and control) with either empty or testosterone-filled implants. Their humoral and cell-mediated immune responses were then assessed by challenge with diphtheria:tetanus vaccine and phytohemagglutinin respectively. We found no effect of the hormone manipulations on either PHA or tetanus antibody responses, but found a significant interaction between titers of both testosterone and corticosterone on diphtheria secondary antibody response; antibody response was greatest in individuals with high levels of both hormones. There was also a significant interactive effect between testosterone treatment group and corticosterone titer on body mass; the body mass of males in the elevated testosterone treatment group decreased with increasing corticosterone titer. These results suggest that, contrary to the assump-

tion of the stress-mediated version of the ICHH, high plasma levels of corticosterone are not immunosuppressive, but are in fact immuno-enhancing in the presence of high levels of plasma testosterone. Equally, the central assumption of the ICHH that testosterone is obligately immunosuppressive is also not supported. The same individuals with the highest levels of both hormones and consequently the most robust antibody response also possessed the lowest body mass.

**Descriptors:** zebra finches, corticosterone, blood, immunology, immunocompetence, testosterone, antibody formation, body weight, immunity, cellular.

Sakai, K., G. Sakabe, O. Tani, M. Nakamura, and K. Takehara (2006). **Antibody responses in ostriches (*Struthio camelus*) vaccinated with commercial live and killed Newcastle disease vaccines.** *Journal of Veterinary Medical Science the Japanese Society of Veterinary Science* 68(6): 627-9. ISSN: 0916-7250.

**Abstract:** Three ostriches (*Struthio camelus*) were immunized with commercially available live and killed Newcastle disease (ND) vaccines for chickens and the antibody responses to the ND vaccines were evaluated by a virus-neutralization (VN) test. Primary vaccination with the live vaccine, B1, by eye drop was followed with two shots of alum-precipitated killed vaccine via subcutaneous injection in the neck. As a final booster, another live vaccine, Clone 30, was used by eye drop. A VN antibody titer, more than 1:10 was observed for 6 months. This is the first report on the use of a live vaccine by eye drop as a booster in ostriches as well as evaluating responses to ND vaccines using the VN test in this avian species.

**Descriptors:** ostriches, antibody responses, Newcastle disease vaccines, live, killed, immunology, viral vaccines immunology, newcastle disease prevention, control, ophthalmic solutions, viral vaccines, administration, dosage.

Snoeijs, T., T. Dauwe, R. Pinxten, V.M. Darras, L. Arckens, and M. Eens (2005). **The combined effect of lead exposure and high or low dietary calcium on health and immunocompetence in the zebra finch (*Taeniopygia guttata*).** *Environmental Pollution* 134(1): 123-132. ISSN: 0269-7491.

**Descriptors:** zebra finch, pollutants, lead, dietary calcium, heavy metals, immunocompetence, bioaccumulation, wild birds, Passeriformes, uptake mechanisms.



# Intestinal

Cooper, R.G. and K.M. Mahroze (2004). **Anatomy and physiology and growth curves of the of the gastro-intestinal tract ostrich (*Struthio camelus*)**. *Animal Science Journal* 75(6): 491-498. ISSN: 1344-3941.

**Descriptors:** ostrich, anatomy, physiology, growth curves, gastrointestinal tract, digestive system.

Illanes, J., B. Fertilio, M. Chamblas, V. Leyton, and F. Verdugo (2006). **Descripcion Histologia de los Diferentes Segmentos del Aparato Digestivo de Avestruz (*Struthio camelus var. domesticus*)**. [Histologic description of the different segments from the ostrich digestive system (*Struthio camelus domesticus*)]. *International Journal of Morphology* 24(2): 205-214. ISSN: 0717-9367.

**Descriptors:** ostrich, digestive system, histologic description, defferent segments, *Struthio camelus domesticus*, histology.

**Language of Text:** Spanish, summaries in English and Spanish.

Potter, M.A., R.G. Lentle, C.J. Minson, M.J. Birtles, D. Thomas, and W.H. Hendriks (2006). **Gastrointestinal tract of the brown kiwi (*Apteryx mantelli*)**. *Journal of Zoology* 270(3): 429-436. ISSN: 0952-8369.

**Descriptors:** brown kiwi, gastrointestinal tract, length, thickness, mucosa, *Apteryx mantelli*.



# Morphology

Aire, T.A. and J.T. Soley (2003). **The morphological features of the rete testis of the ostrich (*Struthio camelus*)**. *Anatomy and Embryology* 207(4/5): 355-361. ISSN: 0340-2061.

**Descriptors:** ostrich, rete testis, morphological features, anatomy, epithelium.

Ando, K., T. Hiruma, Y. Nakajima, T. Yamagishi, R. Kobayashi, and H. Nakamura (2004). **Morphological and immunohistochemical studies of the aortic wall during coronary artery development in quail embryonic heart**. *Anatomical Science International* 79(August): 370. ISSN: 1447-6959.

**Descriptors:** quail, aortic wall, coronary artery development, embryonic heart, studies, morphological, immunohistochemical, meeting.

**Notes:** 16th International Congress of the IFAA (International Federation of Associations of Anatomists) and the 109th Annual Meeting of the Japanese Association of Anatomists, Kyoto, Japan; August 22-27, 2004.

Burke, M.R., E. Adkins Regan, and J. Wade (2007). **Laterality in syrinx muscle morphology of the Japanese quail (*Coturnix japonica*)**. *Physiology and Behavior* 90(4): 682-686. ISSN: 0031-9384.

**Descriptors:** Japanese quail, syrinx muscle, morphology, laterality, *Coturnix japonica*.

Cevik Demirkan, A., R. Hazirolu, and Kocortcol (2007). **Gross morphological and histological features of larynx, trachea and syrinx in Japanese quail**. *Anatomia Histologia, Embryologia* 36(3): 215-219. ISSN: 0340-2096.

**Abstract:** This study aimed at observing gross morphological and histological characteristics of the larynx, trachea and syrinx in *Coturnix coturnix japonicum* (Japanese quail). Sixteen mature quails were divided into two groups. Eight animals were stained with 0.1% methylene blue for 15 min, followed by 50% and 70% ethyl alcohol solution for gross morphological examination. For the observation of histological characteristics the larynx, trachea and syrinx were fixed in 10% formaldehyde and embedded in paraffin. Six-micron sections were stained with haematoxylin and eosin. There were three rows of papillae which were located oral (one row) and aboral (two rows) aspects of the mound. The cricoid cartilage was triangular in shape. Only the inlet of the larynx was covered by the olfactory mucosa whereas the rest was covered by the respiratory mucosa. There were 83-91 tracheal rings which were gradually narrowed from the cranial to the caudal direction. No overlapping occurred between the rings. The last few tracheal rings did not fuse dorsally and formed the

tympanium. The pessulus possessed connection with the last tracheal ring and the first bronchial ring. Moreover, it was like a semiprism in shape at the region of bifurcation being vertical in direction. The syrinx was formed by the paired, C-shaped and incomplete bronchial syringeal cartilages. The mucosa of the syrinx was lined with a pseudo-stratified layer of prism-shaped epithelium. There were nine or 14 C-shaped cartilaginous primary bronchi.

**Descriptors:** Japanese quail, larynx, trachea, syrinx, gross morphological, histological, features, anatomy.

Cevik Demirkan, A., I. Kurtul, and R.M. Haziroglu (2006). **Gross morphological features of the lung and air sac in the Japanese quail.** *Journal of Veterinary Medical Science the Japanese Society of Veterinary Science* 68(9): 909-13. ISSN: 0916-7250.

**Abstract:** This study was conducted to reveal the morphological characteristics of the lung and air sacs in *Coturnix coturnix japonica* (Japanese quails). Ten quails were allocated into two groups. Tracheas of 5 quails with neoprene latex and 5 quails with methylmetacrylate were injected to fill the trachea and air sacs. Latex embalmed animals were stored in 10% formaldehyde solution for two months. Animals given methylmetacrylate were maserated in 30% potassium hydroxide at 40 degrees C for two days. Lungs were located in the dorsal part of the thorax and very close to the thoracic vertebrae and ribs. Shorter than the dorsal border, the ventral border lied between the 3rd and 6th ribs. Cervical, clavicular, cranial thoracic, caudal thoracic and abdominal sacs were identified. These sacs had connection with the 3rd, 4th and 5th lateroventral and 4th mediolateral bronchi. Saccus cervicalis was located on the left and right portions of the vertebrae cervicales et thoraricae with a pronounced communication ventromedially. However, the cervical sac aeration of only all cervical vertebrae was present in this study. Humerus was a non-aerated bone. Pneumatic foramen was absent and did not aerate the sternum. Cranial thoracic sac connected to the 1st, 2nd and 4th medioventral bronchi and gave no diverticulum for aeration. Cranial thoracic sac received air through the 4th medioventral and the 1st and 2nd lateroventral bronchi. Left and right abdominal air sacs paramedially produced diverticulum femorale, but this diverticulum did not enter the femur.

**Descriptors:** Japanese quail, air sacs, anatomy, histology, *coturnix*, lung, histology, morphological characteristics, bronchi.

Cevik Demirkan, A., I. Kurtul, and R.M. Hazroglu (2007). **Gross morphological features of the nasal cavity in the Japanese quail.** *Ankara Universitesi Veteriner Fakultesi Dergisi* 54(1): 1-5. ISSN: 1300-0861.

**Descriptors:** Japanese quail, nasal cavity, gross morphological features, *Coturnix coturnix japonica*.

**Language of Text:** Turkish.

Chen WenQin, Liu HuaZhen, Luo GuanZhong, and Peng KeMei (2005). **Cytoarchitecture of 5 nerve nuclei in the medulla oblongata of ostrich.** *Journal of Huazhong Agricultural University* 24(2): 185-188. ISSN: 1000-2421.

**Descriptors:** ostrich, nerve nuclei, medulla oblongata, cytoarchitecture, anatomy, brain, morphology.

**Language of Text:** Chinese, summary in English.

Dzemeski, G. and A. Christian (2007). **Flexibility along the neck of the ostrich (*Struthio camelus*) and consequences for the reconstruction of dinosaurs with extreme neck length.** *Journal of Morphology* 268(8): 701-14. ISSN: 0362-2525.

**Descriptors:** ostrich, neck, flexibility, reconstruction, extreme neck length, giraffe, camel, relevance to dinosaurs.

Illanes, J., B. Fertilio, M. Chamblas, V. Leyton, and F. Verdugo (2006). **Descripcion Histologia de los Diferentes Segmentos del Aparato Digestivo de Avestruz (*Struthio camelus var. domesticus*). [Histologic description of the different segments from the ostrich digestive system (*Struthio camelus domesticus*).].** *International Journal of Morphology* 24(2): 205-214. ISSN: 0717-9367.

**Descriptors:** ostrich, digestive system, histologic description, different segments, *Struthio camelus domesticus*, histology.

**Language of Text:** Spanish, summaries in English and Spanish.

Imam, H.M.E. and O.M. El Mahdy (2004). **Some anatomical studies on the quadratomandibular articulation of ostrich (*Struthio camelus*) and flamingo (*Phoenicopterus ruber*).** *Assiut Veterinary Medical Journal* 50(102): 1-21. ISSN: 1012-5973.

**Descriptors:** ostrich, flamingo, quadratomandibular articulation, anatomical studies, joint, morphological features.

**Language of Text:** Arabic.

Kiama, S.G., J.N. Maina, J. Bhattacharjee, D.K. Mwangi, R.G. Macharia, and K.D. Weyrauch (2006). **The morphology of the pecten oculi of the ostrich, *Struthio camelus*.** *Annals of Anatomy; Anatomischer Anzeiger Official Organ of the Anatomische Gesellschaft* 188(6): 519-28. ISSN: 0940-9602.

**Abstract:** The pecten oculi is a structure peculiar to the avian eye. Three morphological types of pecten oculi are recognized: conical type, vaned type and pleated type. The pleated type has been well studied. However, there exists only scanty data on the morphology of the latter two types of pectens. The structure of the vaned type of pecten of the ostrich, *Struthio camelus* was investigated with light and electron microscope. The pecten of this species consists of a vertical primary lamella that arises from the optic disc and supports 16-19 laterally located secondary lamellae, which

run from the base and confluence at the apex. Some of the secondary lamellae give rise to 2 or 3 tertiary lamellae. The lamellae provide a wide surface, which supports 2-3 Layers of blood capillaries. Pigmentation is highest at the distal ends of the secondary and tertiary Lamella where blood capillaries are concentrated and very scanty on the primary and the proximal ends of the secondary lamella where the presence of capillaries is much reduced. In contrast to the capillaries of the pleated pecten, the endothelium of the capillaries in the pecten of the ostrich exhibits very few microvilli. These observations suggest that the morphology of the pecten of the ostrich, a flightless ratite bird is unique to the pleated pecten and is designed to meet the balance between optimal vision and large surface area for blood supply and yet ensuring it is kept firmly erect within the vitreous.

**Descriptors:** ostrich, eye anatomy, histology, pecten oculi, morphology, struthioniformes anatomy, histology, eye cytology, ultrastructure, retinal vessels, ultrastructure.

Lee, Y.H. (2005). **Morphological study on the mast cell of proventriculus in pheasant (*Phasianus colchicus*)**. *Korean Journal of Poultry Science* 32(2): 97-100. ISSN: 1225-6625.

**Descriptors:** pheasant, mast cell, proventriculus, morphological study.

**Language of Text:** Korean, summary in English.

Madekurozwa, M.C. and W.H. Kimaro (2006). **A morphological and immunohistochemical study of healthy and atretic follicles in the ovary of the sexually immature ostrich (*Struthio camelus*)**. *Anatomia, Histologia, Embryologia* 35(4): 253-8. ISSN: 0340-2096.

**Abstract:** The morphology of healthy and atretic follicles in the ovary of the sexually immature ostrich was described in the present study. In addition, the distribution of the intermediate filaments desmin, vimentin and smooth muscle actin, in these ovarian follicles, was demonstrated. Healthy and atretic primordial, pre-vitellogenic and vitellogenic follicles were present in the ovaries of the sexually immature ostrich. Atresia occurred during all stages of follicular development. Atretic primordial and pre-vitellogenic follicles were characterized by the presence of a shrunken oocyte surrounded by a multilayered granulosa cell layer. Two forms of atresia (types 1 and 2) were identified in vitellogenic follicles. In the advanced stages of type 1 atresia the follicle was dominated by a hyalinized mass. In contrast, in type 2 atresia the granulosa and theca interna cells differentiated into interstitial gland cells. Positive immunostaining for desmin was observed in the granulosa cells of only healthy primordial and pre-vitellogenic follicles. Atretic primordial and pre-vitellogenic follicles were immunonegative for desmin. Vimentin immunoreactivity was demonstrated in the granulosa cells of all follicles except the vitellogenic atretic follicles. The results of the present study indicate that ovarian follicles in the sexually immature ostrich undergo a cycle of growth and regression, which is similar to that reported in other

avian species. Furthermore, based on the results of the immunohistochemical study, it would appear that the distribution and immunostaining of intermediate filaments changes during follicular development and atresia.

**Descriptors:** ostrich, sexually immature, ovary, follicles, healthy, atretic, morphology, growth, regression, cycle.

Madekurozwa, M.C. and W.H. Kimaro (2005). **A morphological and immunohistochemical study of developing and atretic follicles in the ovary of the sexually immature ostrich (*Struthio camelus*)**. E. Carbajo *Proceedings of the 3rd International Ratite Science Symposium of the World's Poultry Science Association WPSA and 12th World Ostrich Congress, Madrid, Spain, 14th-16th October, 2005*, World Poultry Science Association (WPSA): Beekbergen, Netherlands, 97 p. ISBN: 8460963535.

**Descriptors:** ostrich, sexually immature, atretic follicles, developing, study, morphological, immunohistochemical, conference proceedings.

**Notes:** Meeting Information: Proceedings of the 3rd International Ratite Science Symposium of the World's Poultry Science Association (WPSA) and 12th World Ostrich Congress, Madrid, Spain, 14th-16th October, 2005.

Maxwell, E.E. and H.C. Larsson (2007). **Osteology and myology of the wing of the emu (*Dromaius novaehollandiae*), and its bearing on the evolution of vestigial structures**. *Journal of Morphology* 268(5): 423-41. ISSN: 0362-2525.

**Descriptors:** emu, wing, osteology, myology, bearing, evolution, vestigial structures.

Moraes, C., S.M. Baraldi Artoni, D. Oliveira, M.R. Pacheco, L. Amoroso, and V.S. Franzo (2007). **Morfologia e morfometria do oviduto de codornas *Nothura maculosa*, [Morphology and morphometry of *Nothura maculosa* quail oviduct]**. *Ciencia Rural* 37(1): 146-152 . ISSN: 0103-8478.

**Descriptors:** quail, oviduct, morphology, morphometry, reproduction, development.

**Language of Text:** Portuguese, summary in English.

Ozegbe, P.C., T.A. Aire, and J.T. Soley (2006). **The morphology of the efferent ducts of the testis of the ostrich, a primitive bird**. *Anatomy and Embryology* 211(5): 559-65. ISSN: 0340-2061.

**Abstract:** The efferent duct of the ostrich consists of two segments, the proximal efferent duct (PED) and the distal efferent duct (DED) that are continuous, as in some other birds. Both segments of the duct possess an epithelium comprising non-ciliated and ciliated cells in varying proportions between the two segments. The non-ciliated cell (type I) of the PED contains a well-developed, subapical endocytic apparatus of apical tubules and endocytic vacuoles, a solitary, large, heterogeneous lipid droplet, and numerous, oval, dense bodies in the supranuclear region of the cell. Mitochondria tend to concentrate in the basal part of the cell. Intercellular

spaces between the non-ciliated cells are enlarged, especially in the basal half of the epithelium. Together, these morphological features confer on the PED an efficient fluid absorption capability. The DED epithelium displays the type II non-ciliated cell whose poorly developed subapical endocytic apparatus as well as the absence of dilated basal intercellular spaces indicate its limited fluid absorptive capacity.

**Descriptors:** epididymis cytology, Struthioniformes, anatomy, histology, epithelial cells, ultrastructure, microscopy electron, microvilli ultrastructure, transport vesicles, vacuoles.

Pourlis, A.F., J. Antonopoulos, and I.N. Magras (2006). **A light and electron microscopic study of the limb long bones perichondral ossification in the quail embryo (*Coturnix coturnix japonica*)**. *Archivio Italiano Di Anatomia Ed Embriologia. [Italian Journal of Anatomy and Embryology]*. 111(3): 159-70. ISSN: 0004-0223.

**Abstract:** The perichondral ossification of the limb long bones in the quail embryo is investigated, in this study, by means of light and electron microscopy. Longitudinal sections of the humerus, radius, ulna, femur, tibia and fibula stained with haematoxylin-eosin were examined by the light microscope. Ultrathin cross sections were selected for the electron microscope as well. Light microscopic analysis showed that the ossification began at the same time in the long bones of the wing and leg. At the embryonic day 6, all the cartilaginous rudiments consisted of three zones. The central zone composed of hypertrophic chondrocytes, a second zone on either side of the central zone, which consisted of flattened cells and a third zone, which represented the epiphyseal region. A thin sheath of osteoid and a bi-layered perichondrium-periosteum surrounded the central zone of the cartilaginous rudiments of the long bones. The perichondrium consisted of a layer of osteoblasts, in contact with the cartilage, and a layer of fibroblasts. At the embryonic day 7, the thickness of the calcified osteoid ring increased and a vasculature appeared between the layer of osteoblasts and the layer of fibroblasts. At the embryonic day 8, a second sheath of periosteal bone began to be formed. Concurrently, vascular and perivascular elements began to invade the cartilage. The ossification spread towards the distal ends of both the diaphysis. At the electron microscopic level, the osteoblasts of the perichondrium showed cytoplasmatic characteristics of cells involved in protein synthesis. The perichondral ossification is the first hallmark of the osteogenesis in the long bones. The observations reported above, are in accordance with previous studies in the chick embryo.

**Descriptors:** *coturnix*, quail, embryo, bones of lower extremity embryology, bones of upper extremity, osteogenesis physiology, blood vessels embryology, blood vessels ultrastructure, bones ultrastructure, cartilage embryology, ultrastructure, mammalian, femur embryology, femur ultrastructure, humerus embryology, humerus ultrastructure, osteoblasts physiology, osteoblasts ultrastructure, periosteum embryology, periosteum physiology, periosteum ultrastructure.

Rubenson, J., D.G. Lloyd, T.F. Besier, D.B. Heliam, and P.A. Fournier (2007). **Running in ostriches (*Struthio camelus*): three-dimensional joint axes alignment and joint kinematics.** *Journal of Experimental Biology* 210(Pt 14): 2548-62. ISSN: 0022-0949. **Abstract:** Although locomotor kinematics in walking and running birds have been examined in studies exploring many biological aspects of bipedalism, these studies have been largely limited to two-dimensional analyses. Incorporating a five-segment, 17 degree-of-freedom (d.f.) kinematic model of the ostrich hind limb developed from anatomical specimens, we quantified the three-dimensional (3-D) joint axis alignment and joint kinematics during running (at approximately 3.3 m s<sup>-1</sup>) in the largest avian biped, the ostrich. Our analysis revealed that the majority of the segment motion during running in the ostrich occurs in flexion/extension. Importantly, however, the alignment of the average flexion/extension helical axes of the knee and ankle are rotated externally to the direction of travel (37 degrees and 21 degrees, respectively) so that pure flexion and extension at the knee will act to adduct and abduct the tibiotarsus relative to the plane of movement, and pure flexion and extension at the ankle will act to abduct and adduct the tarsometatarsus relative to the plane of movement. This feature of the limb anatomy appears to provide the major lateral (non-sagittal) displacement of the lower limb necessary for steering the swinging limb clear of the stance limb and replaces what would otherwise require greater adduction/abduction and/or internal/external rotation, allowing for less complex joints, musculoskeletal geometry and neuromuscular control. Significant rotation about the joints' non-flexion/extension axes nevertheless occurs over the running stride. In particular, hip abduction and knee internal/external and varus/valgus motion may further facilitate limb clearance during the swing phase, and substantial non-flexion/extension movement at the knee is also observed during stance. Measurement of 3-D segment and joint motion in birds will be aided by the use of functionally determined axes of rotation rather than assumed axes, proving important when interpreting the biomechanics and motor control of avian bipedalism. **Descriptors:** ostrich, running, motion, joint axis, alignment, kinematics, locomotor, walking, joint motion, flexion, extension, limb anatomy.

Schaller, N.U., B. Herkner and R. Prinzinger (2005). **Locomotor characteristics of the ostrich (*Struthio camelus*) I: Morphometric and morphological analyses.** E. Carbajo *Proceedings of the 3rd International Ratite Science Symposium of the World's Poultry Science Association WPSA and 12th World Ostrich Congress, Madrid, Spain, 14th 16th October, 2005*, World Poultry Science Association (WPSA): Beekbergen, Netherlands, p. 83-90. ISBN: 8460963535. **Descriptors:** ostrich, locomotor characteristics, morphometric, morphological, analysis, conference proceedings, book chapter. **Notes:** Meeting Information: Proceedings of the 3rd International Ratite Science

Symposium of the World's Poultry Science Association (WPSA) and 12th World Ostrich Congress, Madrid, Spain, 14th-16th October, 2005.

Soley, J.T., E. van Wilpe, T.A. Aire, and P.C. Ozegbe (2005). **The morphology of the seminiferous tubules in the three-day-old ostrich chicks.** *Microscopy Society of Southern Africa Proceedings* 35: 60. ISSN: 1028-3455.

**Descriptors:** ostrich chicks, seminiferous tubules, 3 day old, morphology, *Struthio camelus*, testis.

Stornelli, M.R., M.P. Ricciardi, E. Giannessi, and A. Coli (2006). **Morphological and histological study of the ostrich (*Struthio Camelus L.*) liver and biliary system.** *Archivio Italiano Di Anatomia Ed Embriologia. [Italian Journal of Anatomy and Embryology]*. 111(1): 1-7. ISSN: 0004-0223.

**Abstract:** The peculiarity of the digestive system of the ostrich (*Struthio Camelus L.*), which is characterized by the continuous production of bile, led us to undertake macroscopical and histological studies of the liver and its biliary system, since very little bibliographic data exist on the subject. For this purpose we observed the organs of male and female ostriches 16-18 months of age, in situ, in order to describe their location, relationships and morphology. Samples of the liver were processed for observation by light microscopy; samples of the hepatoenteric duct were processed for observation by light and electron microscopy. Our findings regarding the liver revealed the presence of two lobes: a left lobe, subdivided into three lobes, and a right undivided lobe. There was no gall-bladder. The histological picture showed unlimited hepatic lobules, with hepatocytes arranged in cord-like fashion two cells thick. A large hepatoenteric duct arose from the porta hepatis, and opened into a papilla in the descending limb of the duodenum. The mucosa of the duct was lined by simple columnar epithelium consisting of cells having the same morphological cytoplasmatic features but distinguished by either a light or a dark nucleus.

**Descriptors:** ostrich, liver, biliary system, morphological, histological study, digestive system, gall bladder, liver.

Stornelli, M.R., M.P. Ricciardi, V. Miragliotta, A. Coli, and E. Giannessi (2006). **Morpho-structural study of the pancreas and pancreatic duct in ostrich (*Struthio camelus L.*).** *Acta Veterinaria Brno* 75(2): 157-160. ISSN: 0001-7213.

**Descriptors:** ostrich, pancreas, pancreatic duct, morpho-structural study, *Struthio camelus*.

**Language of Text:** Czech and English.

Tae, H.J., B.G. Jang, D. Ahn, E.Y. Choi, H.S. Kang, N.S. Kim, J.H. Lee, S.Y. Park, H.H. Yang, and I.S. Kim (2005). **Morphometric studies on the testis of Korean ring-necked pheasant (*Phasianus colchicus karpowi*) during the breeding and**

**non-breeding seasons.** *Veterinary Research Communications* 29(7): 629-643. ISSN: 0165-7380.

**Descriptors:** Korean ring-necked pheasant, testis, morphometric studies, breeding season, non breeding season, *Phasianus colchicus karpowi*.

Tokita, M. (2004). **Morphogenesis of parrot jaw muscles: understanding the development of an evolutionary novelty.** *Journal of Morphology* 259(1): 69-81. ISSN: 0362-2525.

**Descriptors:** cockatiel, parrot, jaw muscles, development, evolutionary novelty, morphogenesis, head structures, strong jaw adduction, muscle development.

Tomiosso, T.C., L. Gomes, B. de Campos Vidal, and E.R. Pimentel (2005). **Extracellular matrix of ostrich articular cartilage.** *Biocell* 29(1): 47-54. ISSN: 0327-9545.

**Abstract:** The composition and organization of the extracellular matrix of ostrich articular cartilage was investigated, using samples from the proximal and distal surfaces of the tarsometatarsus. For morphological analysis, sections were stained with toluidine blue and analyzed by polarized light microscopy. For biochemical analysis, extracellular matrix components were extracted with 4 M guanidinium chloride, fractionated on DEAE-Sephacel and analyzed by SDS-PAGE. Glycosaminoglycans were analyzed by electrophoresis in agarose gels. Structural analysis showed that the fibrils were arranged in different directions, especially on the distal surface. The protein and glycosaminoglycan contents of this region were higher than in the other regions. SDS-PAGE showed the presence of proteins with molecular masses ranging from 17 to 121 kDa and polydisperse components of 67, 80-100, and 250-300 kDa in all regions. The analysis of glycosaminoglycans in agarose-propylene diamine gels revealed the presence of only chondroitin-sulfate. The electrophoretic band corresponding to putative decorin was a small proteoglycan containing chondroitin-sulfate and not dermatan-sulfate, unlike other cartilages. The higher amounts of proteins and glycosaminoglycans and the multidirectional arrangement of fibrils seen in the distal region may be correlated with the higher compression normally exerted on this region.

**Descriptors:** ostrich, articular cartilage, extracellular matrix, composition, organization, tarsometatarsus, biochemical analysis, protein, glycosaminoglycans.

Velotto, S. and A. Crasto (2004). **Histochemical and morphometrical characterization and distribution of fibre types in four muscles of ostrich (*Struthio camelus*).** *Anatomia, Histologia, Embryologia* 33(5): 251-6. ISSN: 0340-2096.

**Abstract:** A staining procedure used for simultaneously determining three different fibre types in single sections bovine, porcine or ovine skeletal muscle was modified for use with ostrich skeletal muscle. The muscle fibres of gastrocnemius pars externa, tibialis cranialis caput tibiale, tibialis cranialis caput femorale and fibularis longus tendo

caudalis were studied. The histochemical results revealed the presence of three types of fibre only in the gastrocnemius pars externa muscle: fast-twitch glycolytic fibres (FG), fast-twitch oxidative glycolytic fibres (FOG) and slow-twitch oxidative fibres (SO), while in the other muscles the FG fibres were absent. The percentage distribution of fibres types showed a higher incidence of SO fibres compared to FOG fibres in tibialis cranialis caput femorale and tibialis cranialis caput tibiale muscles, while it was opposite in the case of the fibularis longus tendo caudalis muscle. In the gastrocnemius pars externa muscle the FG fibres outnumber the other fibres, followed by the SO and FOG fibres. The results of the analysis of variance show significant interaction between muscle x fibre type for every morphometric parameter evaluated. Differences about value of fibres area exists between tibialis cranialis caput femorale and fibularis longus tendo caudalis muscles. Both fibre types in tibialis cranialis caput tibiale muscle have mean values of transversal section area smaller than tibialis cranialis caput femorale. The other morphometric parameters show a similar trend. The gastrocnemius pars externa muscle presents similar dimensions of muscle fibres for the FG and FOG types, and significantly smaller for the SO type.

**Descriptors:** ostrich, four muscles, fibre types, histochemical, morphometrical, characterization, skeletal muscle, gastrocnemius, tibialis, fibularis, staining procedures.

Warui, C.N., R.G. Macharia, D.K. Mwangi, P.W. Macheru, and J. Moilo (1998). **Observations on the morphology of the cloacal region of the African ostrich (*Struthio camelus massaicus*)**. *The Kenya Veterinarian* 23(Special Issue): 53-55. ISSN: 0256-5161.

**Descriptors:** ostriches, cloacal region, morphology, observations, *Struthio camelus*, conference proceedings.

**Notes:** Meeting Information: Proceedings of the Biennial Scientific Conference of the Faculty of Veterinary Medicine, University of Nairobi, Kenya, 5th-7th August 1998.

Yildiz, H., B. Yilmaz, I. Arican, M. Petek, and A. Bahadir (2006). **Effects of cage systems and feeding time on the morphological structure of female genital organs in pharaoh quails (*Coturnix coturnix pharaoh*)**. *Veterinarski Arhiv* 76(5): 383-391. ISSN: 0372-5480.

**Descriptors:** pharaoh quail, female genital organs, morphological structure, cage systems, feeding time, effects.

Yin YanBo, Li FangZheng, Tan JinShan, Song XueXiong, Dong WuZi, and Ji YaJie (2006). **Ultrastructure of the ostrich spermatozoa**. *Journal of Economic Animal* 10(4): 198-202. ISSN: 1007-7448.

**Descriptors:** ostrich, spermatozoa, ultrastructure, anatomy, reproduction.

**Language of Text:** Chinese, summary in English.

Yldz, H., B. Ylmaz, and I. Arcan (2005). **Morphological structure of the syrinx in the Bursa Roller Pigeon (*Columba livia*)**. *Bulletin of the Veterinary Institute in Puawy* 49(3): 323-327. ISSN: 0042-4870.

**Descriptors:** Bursa Roller Pigeon, syrinx, morphological structure, anatomy, histological.



# Parasites

Balakrishnan, C.N. and M.D. Sorenson (2007). **Dispersal ecology versus host specialization as determinants of ectoparasite distribution in brood parasitic indigobirds and their estrildid finch hosts.** *Molecular Ecology* 16(1): 217-229. ISSN: 0962-1083.

**Abstract:** Brood parasitic birds offer a unique opportunity to examine the ecological and evolutionary determinants of host associations in avian feather lice (Phthiraptera). Brood parasitic behaviour effectively eliminates vertical transfer of lice between parasitic parents and offspring at the nest, while at the same time providing an opportunity for lice associated with the hosts of brood parasites to colonize the brood parasites as well. Thus, the biology of brood parasitism allows a test of the relative roles of host specialization and dispersal ecology in determining the host-parasite associations of birds and lice. If the opportunity for dispersal is the primary determinant of louse distributions, then brood parasites and their hosts should have similar louse faunas. In contrast, if host-specific adaptations limit colonization ability, lice associated with the hosts of brood parasites may be unable to persist on the brood parasites despite having an opportunity for colonization. We surveyed lice on four brood parasitic finch species (genus *Vidua*), their estrildid finch host species, and a few ploceid finches. While *Brueelia* lice were found on both parasitic and estrildid finches, a molecular phylogeny showed that lice infesting the two avian groups belong to two distinct clades within *Brueelia*. Likewise, distinct louse lineages within the amblyceran genus *Myrsidea* were found on estrildid finches and the parasitic pin-tailed whydah (*Vidua macroura*), respectively. Although common on estrildid finches, *Myrsidea* lice were entirely absent from the brood parasitic indigobirds. The distribution and relationships of louse species on brood parasitic finches and their hosts suggest that host-specific adaptations constrain the ability of lice to colonize new hosts, at least those that are distantly related.

**Descriptors:** finch host, dispersal ecology, brood parasitic indigobirds, ectoparasite distribution, avian feather lice.

Bandyopadhyay, P.K., J.N. Bhakta, and R. Shukla (2006). **A new *Eimeria* species (Protozoa: Apicomplexa: Sporozoa) from the Blue Rock Pigeon *Columba livia* (Aves: Columbidae).** *Zoos' Print Journal* 21(9): 2386-2387. ISSN: 0971-6378.

**Descriptors:** Blue Rock Pigeon, new *Eimeria* species, protozoa, feces, oocysts, *Columba livia*.

Bastianello, S., P.B. McKenna, J. Hunter, and A. Julian (2005). **Clinical and pathological aspects of *Libyostrongylus* infection in ostriches**. *Surveillance Wellington* 32(3): 3-6. ISSN: 0112-4927.

**Descriptors:** ostriches, parasites, infection, clinical, pathological, aspects, *Libyostrongylus*.

Bean, D.L., E. Rojas Flores, G.W. Foster, J.M. Kinsella, and D.J. Forrester (2005). **Parasitic helminths of Eurasian collared-doves (*Streptopelia decaocto*) from Florida**. *Journal of Parasitology* 91(1): 184-7. ISSN: 0022-3395.

**Abstract:** Sixty-three Eurasian collared-doves (ECDs) (*Streptopelia decaocto*) from Florida were examined for parasitic helminths from June to December 2001. Nine species of helminths were identified (5 nematodes, 2 cestodes, and 2 trematodes). The most prevalent helminths were *Ascaridia columbae* (73.0%), *Fuhrmannetta crassula* (28.6%), *Ornithostrongylus quadriradiatus* (12.7%), and *Bruscapillaria obsignata* (11.1%). The helminths with the greatest mean intensity were *Tanaisia bragai* (13.5), *A. columbae* (9.3), and *O. quadriradiatus* (7.1). In Florida, the mean intensity of *A. columbae* in ECDs (9.3) was similar to that found in white-winged doves (*Zenaida asiatica*) (9.1) ( $P = 0.461$ ), and both the intensities were significantly higher than that in the native mourning doves (*Zenaida macroura*) (3.7) ( $P = 0.001$  and  $0.005$ , respectively). *Fuhrmannetta crassula* is reported for the first time in columbids from Florida.

**Descriptors:** bird diseases parasitology, columbidae parasitology, helminthiasis, animal parasitology, bird diseases, epidemiology, cestode infections, epidemiology, parasitology, epidemiology, helminthiasis, nematode infections, epidemiology, parasitology, trematode infections, epidemiology, parasitology, Florida.

Bonadiman, S.F., N.B. Ederli, A.K. Soares, A.H. de Moraes Neto, C.P. Santos, and R.A. DaMatta (2006). **Occurrence of *Libyostrongylus* sp. (Nematoda) in ostriches (*Struthio camelus Linnaeus, 1758*) from the north region of the state of Rio de Janeiro, Brazil**. *Veterinary Parasitology* 137(1-2): 175-9. ISSN: 0304-4017.

**Abstract:** Domestic production of ostrich in Brazil started in the beginning of the last decade, but its sanitary state has not been reported. *Libyostrongylus* sp. is an ostrich specific nematode whose parasitism can severely affect the birds. Thus, *Libyostrongylus* spp. larvae were identified in commercial ostriches in the north region of the state of Rio de Janeiro, Brazil. The EPG was determined and fecal cultivation was performed. The eggs presented typical characteristics of strongylid and were present in five out of six farms. The mean EPG varied from 22 to 2395 and *Libyostrongylus* spp. prevalence was from 0 to 100%, with adult birds more infected. Two types of infective larvae with tail finishing in a tipped spiny knob were distinguished. The first had a mean length of 848 microm (710-1010) with a long sheath tail of about 66 microm (52-112). The other had a mean length of 826 microm

(620-940) with a short, more abruptly ending sheath tail of 32 microm (22-40) and a less rounded cephalic end. The differences between these larvae suggest two *Libyostrongylus* species.

**Descriptors:** bird diseases epidemiology, Struthioniformes parasitology, Trichostrongyloidea isolation, purification, trichostrongyloidiasis, veterinary, epidemiology, feces parasitology, parasite egg count, phylogeny, prevalence, species specificity, Trichostrongyloidea anatomy, histology, Trichostrongyloidea classification, trichostrongyloidiasis epidemiology, Brazil.

Bunbury, N., E. Barton, C.G. Jones, A.G. Greenwood, K.M. Tyler, and D.J. Bell (2007).

**Avian blood parasites in an endangered columbid: *Leucocytozoon marchouxi* in the Mauritian Pink Pigeon *Columba mayeri*.** *Parasitology* 134(Pt 6): 797-804. ISSN: 0031-1820.

**Abstract:** There is increasing evidence that pathogens can play a significant role in species decline. This study of a complete free-living species reveals a cost of blood parasitism to an endangered host, the Pink Pigeon *Columba mayeri*, endemic to Mauritius. We investigated the prevalence and effect of infection of the blood parasite, *Leucocytozoon marchouxi*, in the free-living Pink Pigeon population. Overall, *L. marchouxi* infection prevalence detected was 18.3%. Juveniles were more likely to be infected than older birds and there was geographical variation in infection prevalence. Survival of birds infected with *L. marchouxi* was lower than that of uninfected birds to 90 days post-sampling. This study suggests that while common haematozoa are well tolerated in healthy adults, these parasites may have greater pathogenic potential in susceptible juveniles. The study is unusual given its completeness of species sampling (96%) within a short time-period, the accurate host age data, and its focus on blood parasites in a threatened bird species. Species for which long-term life-history data are available for every individual serve as valuable models for dissecting the contribution of particular pathogens to species decline.

**Descriptors:** Mauritian pink pigeon, free living, blood parasites, *Leucocytozoon marchouxi*, pathogens, species decline, endangered, hematozoa, epidemiology, age differences, Mauritius.

Cooper, R.G. (2007). **Thysanoptera infestation on skin and periorbital cellulitis in ostriches (*Struthio camelus*) aged 14 months.** *New Zealand Veterinary Journal* 55(3): 130-3. ISSN: 0048-0169.

**Abstract:** AIM: To report the infestation of Thysanoptera (*Limothrips denticornis*) on ostriches (*Struthio camelus*) and to determine their relative density. METHODS: A farm in Poland was studied on which ostriches aged 14 months were severely infested with *L. denticornis* (thrips). Thrips were collected and their density on the neck, torso and legs (10 cm<sup>2</sup>) of 85 ostriches determined at 0600, 1200 and 1800 h, respectively, over 7 days. At the same times, apparent densities of thrips/m<sup>2</sup> were determined

in adjacent grassy areas (120 m<sup>2</sup>) on a muslin cloth impregnated with permethrin. Thrips were mounted onto slides in Hoyer's medium, for identification. RESULTS: The apparent density of thrips was greatest at 1200 h, and was greater on the neck than the torso and legs ( $p=0.03$ ). In adjacent surroundings, densities were also highest at 1200 h (mean 199 (SE 9.3) thrips/m<sup>2</sup>) and were similar to the maximum densities recorded on the necks of ostriches at that time (mean 205 (SE 6.4) thrips/m<sup>2</sup>). Ostriches engaged in excessive preening and attempted to scratch their head/neck with their feet. Numerous small, pale red papules were observed on the skin. Observations of periorbital cellulitis, conjunctivitis, blepharitis, watery discharge, inflammation, and sclerotic discolouration were noted in 65 ostriches. CONCLUSION: Observations were commensurate with *L. denticornis* infestation. CLINICAL RELEVANCE: Infestation may exacerbate stress levels and subsequently lead to a reduction in feed intake and performance. The infestation and subsequent irritation from thrips impacts negatively on the general health of ostriches by damaging skin and irritating eyes.

**Descriptors:** ostriches, cellulitis, thrips, host parasite relations, insects growth, development, struthioniformes, parasitology, extremities parasitology, neck parasitology, population density, time factors.

- Cooper, R.G. and H.A. El Doumani (2006). **The presence of quill mites (*Gabucinia bicaudata*) and lice (*Struthiolipeurus struthionis*) in ostrich wing feathers.** *Journal of the South African Veterinary Association* 77(1): 9-11. ISSN: 0038-2809.
- Abstract:** Quill mites (*Gabucinia bicaudata*) and lice (*Struthiolipeurus struthionis*) may infest ostrich feathers, resulting in skin damage, pruritis and excessive feather preening and loss. Four different feather types (prime white, femina extra wide, femina class 1, and femina short; n = 10) were collected. The quill mites and lice were removed with fine forceps, studied using a photographic optical microscope and counted microscopically at x 100 magnification following collection by sedimentation. They were placed in separate Petri dishes containing lactophenol solution and examined (x40 magnification). Anatomical features are described. The density of quill mites in all feather types of both wings was higher than that of the lice. There was no significant difference between the counts of both arthropods on the left wing and the right wing, respectively, except for the femina class 1 quill mites ( $P = 0.01$ ). The femina extra wide feathers were a preferred habitat in both wings. Large standard deviations (quill mites left wing: 73 +/- 8; quill mites right wing: 69 +/- 7) suggested variations in the degree of migration between feather shafts or as a response to escape preening. It is recommended that ostriches be treated with an oral preparation of Ivermectin administered per os at a dosage rate of 0.2 mg/kg at 30-day intervals for quill mites, and with a 1-5 % Malathion dust at 14-day intervals for lice.
- Descriptors:** ostriches, antiparasitic agents, therapeutic use, bird parasites, para-

sitology, lice ultrastructure, mites ultrastructure, Struthioniformes parasitology, drug therapy, epidemiology, feathers parasitology , Ivermectin therapeutic use, lice anatomy, histology, lice infestations, drug therapy, epidemiology, Malathion therapeutic use, mite infestations drug therapy, epidemiology, mites anatomy, histology.

- Cooper, R.G. (2005). **Bacterial, fungal and parasitic infections in the ostrich (*Struthio camelus var. domesticus*)**. *Animal Science Journal* 76(2): 97-106. ISSN: 1344-3941.  
**Descriptors:** ostrich, infections, bacterial, fungal, parasitic, *Struthio camelus*, anthrax, *Salmonella*, *Pasteurella*, tuberculosis, tick, mite, tapeworm, fluke.
- Dabert, J., S.V. Mironov, and H. Proctor (2006). **A new species of the feather mite genus *Titanolichus* Gaud & Atyeo, 1996 (Acari: Astigmata: Pterolichidae) from the endangered orange-bellied parrot *Neophema chrysogaster* (Aves: Psittaciformes) from Australia**. *Australian Journal of Entomology* 45(3): 206-214. ISSN: 1326-6756.  
**Abstract:** *Titanolichus seemani* sp. n., a new species of the genus *Titanolichus* Gaud & Atyeo, 1996, is described from a museum skin of the endangered orange-bellied parrot *Neophema chrysogaster* (Latham) (Aves: Psittaciformes) from Australia. We also redescribe the type species *Titanolichus chiragricus* (Maegnin & Trouessart) from the ground parrot *Pezoporus wallicus* (Kerr), provide a key for all known species of *Titanolichus* and point out some problems in the systematics of this genus.  
**Descriptors:** *Astigmata*, feather mites, parrots, Aves, systematics, *Titanolichus* , Australia.
- Draycott, R.A.H., M.I.A. Woodburn, D.E. Ling, and R.B. Sage (2006). **The effect of an indirect anthelmintic treatment on parasites and breeding success of free-living pheasants *Phasianus colchicus***. *Journal of Helminthology* 80(4): 409-415. ISSN: 0022-149X.  
**Descriptors:** *Phasianus colchicus*, pheasants, game birds, helminths, helminthiasis, anthelmintics, drug evaluation, animal reproduction, population density, chemoprevention, worm burden, England .
- Fessl, B., B.J. Sinclair, and S. Kleindorfer (2006). **The life-cycle of *Philornis downsi* (Diptera: Muscidae) parasitizing Darwin's finches and its impacts on nestling survival**. *Parasitology* 133(6): 739-747. ISSN: 0031-1820.  
**Descriptors:** Muscidae, myiasis, wild birds, Fringillidae, mortality, life cycle, larvae, instars, insect morphology, parasitism, host parasite relationships, nests, hematophagous insects, Galapagos Islands, *Geospiza fortis*.
- Gartrell, B.D., M.R. Alley, and A.H. Mitchell (2005). **Fatal levamisole toxicosis of captive kiwi (*Apteryx mantelli*)**. *New Zealand Veterinary Journal* 53(1): 84-6. ISSN: 0048-0169.

**Abstract:** CASE HISTORY: Nine of 24 captive kiwi treated with oral levamisole at a dose between 25-43 mg/kg showed signs of respiratory distress. Six died within 4 h of treatment and the remaining three made a full recovery within 24 h. CLINICAL AND PATHOLOGICAL FINDINGS: Within 3-4 h of treatment, the affected birds had an elevated respiratory rate, mucoid nasal discharge and rapidly became comatose. Post mortem examination revealed accumulation of thick mucus in the oral cavity and trachea. There was severe pulmonary congestion and oedema and early bronchopneumonia in the lungs of five of the birds. In two birds, there was acute hepatic degeneration and necrosis and one bird had acute pancreatic degeneration and necrosis. DIAGNOSIS: Acute levamisole toxicity. CLINICAL RELEVANCE: Kiwi were acutely sensitive to levamisole toxicity at doses that are well within the safe range for domestic poultry. Levamisole should not be used as an anthelmintic in kiwi.

**Descriptors:** kiwi, antinematodal agents, adverse effects, bird diseases, diagnosis, orall levamisole, toxicosis, hepatitis, toxic etiology, fatalities.

Gelis, S. and S.R. Raidal (2006). **Microsporidiosis in a flock of tricolor parrot finches (*Erythrura tricolor*)**. *Veterinary Clinics of North America. Exotic Animal Practice* 9(3): 481-6. ISSN: 1094-9194.

**Abstract:** The lesions caused by a microsporidian infection in a flock of tricolor parrot finches (*Erythrura tricolor*) are described. Affected birds had a widespread nodular to diffuse granulomatous inflammation of the serosal surfaces of the gastrointestinal tract, peritoneum, perirenal airsacs and connective tissue, bone marrow, dura, and conjunctiva. This was composed predominantly of foamy macrophages containing numerous intracytoplasmic microsporidia measuring 1 to 2 microm. Ultrastructural features consistent with microsporidia were the presence of a coiled polar filament and an electrode-dense outer surface and thick electron-lucent capsule. Differential diagnoses included infection with intracellular organisms, including coccidian and other apicomplexan parasites, such as *Isospora*, *Eimeria*, and blood parasites; Chlamydophilosis; disseminated mycobacteriosis; and other bacterial and fungal species.

**Descriptors:** tricolor parrot finches, bird diseases, pathology, microbiology, microsporidia isolation, purification, microsporidiosis, diagnosis, infection.

Goldova, M., V. Palus, V. Letkova, A. Kocisova, J. Curlik, and J. Mojzisova (2006). **Parasitoses in pheasants (*Phasianus colchicus*) in confined systems**. *Veterinarski Arhiv* 76(Suppl. S): S83-S89. ISSN: 0372-5480.

**Descriptors:** pheasants, confined systems, parasitosis, infection, *Phasianus colchicus*.

Gonzalez, D., G. Castillo, J. Lopez, L. Moreno, S. Donoso, O. Skewes, R. Martinez, and J. Cabello (2004). **Parasitos gastrointestinales y externos de la paloma domestica (*Columba livia*) en la Ciudad de Chillan, Chile.** [Gastrointestinal and external parasitism in domestic dove (*Columba livia*) in Chillan City, Chile]. *Agro Ciencia* 20(2): 107-112. ISSN: 0716-1689.

**Descriptors:** domestic dove, parasitism, external, gastrointestinal, Chile.

**Language of Text:** Spanish, summary in English.

Gonzalez, D., A. Dausgchies, L. Rubilar, K. Pohlmeier, O. Skewes, and E. Mey (2004). **Fauna parasitaria de la tortola comun (*Zenaida auriculata*, de Murs 1847) (Columbiformes: Columbidae) en Nuble, Chile.** [Parasite-fauna of the eared dove (*Zenaida auriculata*, de Murs 1847) (Columbiformes Columbidae) in Nuble, Chile.]. *Parasitologia Latinoamericana* 59(1-2): 37-41. ISSN: 0717-7704.

**Descriptors:** eared dove, parasites, ectoparasites, endoparasites, mites, Chile, *Zenaida auriculata* de Murs.

**Language of Text:** Spanish, summaries in English and Spanish.

Haag Wackernagel, D. and R. Spiewak (2004). **Human infestation by pigeon fleas (*Ceratophyllus columbae*) from feral pigeons.** *Annals of Agricultural and Environmental Medicine AAEM* 11(2): 343-6. ISSN: 1232-1966.

**Abstract:** The report concerns a married couple who were repeatedly invaded by pigeon fleas (*Ceratophyllus columbae*) over a period of 2 months. The source of the fleas was a pair of breeding feral pigeons (*Columba livia*). The birds' nest was located in the attic immediately above the couple's apartment, and the fleas found their way along an unsealed heating pipe. The people encountered up to 40 bites per night. With invasions repeated almost every night, the man gradually developed an allergic urticarial reaction. The most traumatic experience for the couple, however, was to learn that they were invaded by fleas (initially, they had presumed they were bothered by mosquitoes). This information resulted in severe psychological distress with phobic reactions and insomnia. Despite the successful removal of the fleas and the pigeons that were source of the pest, parasitophobia of the man persisted over the following 4 months. This case is discussed from the broader aspect of health risks related to feral pigeons and animal fleas. Also summarised are previous observations on people invaded by pigeon fleas.

**Descriptors:** feral pigeons, bird parasites, transmission, Columbidae parasitology, ectoparasitic, home infestations, transmission, fleas, ectoparasitic infestations, pathology, house invaded by fleas, stress, zoonoses, Switzerland.

Halliday, R.B. (2006). ***Struthiopterolichus bicaudatus* (Gervais) (Acari: Pterolichidae): A feather mite pest of the ostrich in Australia.** *Australian Veterinary Journal* 84(1-2): 68-69. ISSN: 0005-0423.

**Descriptors:** Acari, insect pests, feather mites, arthropod pests, animal parasites and pests, ostriches, new geographic records, pest identification, signs and symptoms, ivermectin, *Struthiopterolichus bicaudatus*, Pterolichidae, Australia.

Hove, T. and S. Mukaratirwa (2005). **Seroprevalence of *Toxoplasma gondii* in farm-reared ostriches and wild game species from Zimbabwe.** *Acta Tropica* 94(1): 49-53. ISSN: 0001-706X.

**Abstract:** One hundred and seventy one serum samples from 10 game species from Zimbabwe were tested for IgG antibodies to *Toxoplasma gondii* infection using the modified agglutination test (MAT). Significantly higher seroprevalences were found in the felidae (*Panthera leo*) (92% of 26), bovidae (Tragelaphus species) (55.9% of 34) and farm-reared struthionidae (*Struthio camelus*) (48% of 50) compared to the other groups tested. Among the bovidae, the nyala (*Tragelaphus angasii*) had the highest seroprevalence of 90% (9/10). Anti-Toxoplasma antibody prevalences in browsers [greater kudu (*Tragelaphus strepsiceros*) (20% of 10), giraffe (*Giraffa camelopardalis*) (10% of 10) and elephant (*Loxodonta africana*) (10% of 20)] were generally in the lower range. No antibodies were detected in the wild African suidae [warthog (*Phacochoerus africanus*) and bushpig (*Potamochoerus larvatus*)]. Attempts to isolate *T. gondii* from the heart muscles of seropositive ostriches by subinoculation in BALB/c mice were unsuccessful.

**Descriptors:** ostriches, *Toxoplasma gondii*, seroprevalence, wild game species, *Panthera*, nyala, giraffe, elephant, warthog, bushpig, Zimbabwe.

Kumar, K.S., R. Thirumurugan, K. Devaki, and P.N. Khan (2005). **Acariasis in an emu (*Dromaius novaehollandiae*) - a case report.** *Zoos' Print Journal* 20(5): 1876. ISSN: 0971-6378.

**Descriptors:** emu, parasites, Acariasis, female, ticks, case report.

Landgrebe, J.N., B. Vasquez, R.G. Bradley, A.M. Fedynich, S.P. Lerich, and J.M. Kinsella (2007). **Helminth community of scaled quail (*Callipepla squamata*) from western Texas.** *Journal of Parasitology* 93(1): 204-8. ISSN: 0022-3395.

**Abstract:** Forty-eight scaled quail (*Callipepla squamata*) were collected during August 2002 at Elephant Mountain Wildlife Management Area in Brewster County, Texas, and examined for helminths. Eight species of helminths were found (5 nematodes and 3 cestodes), representing 2,811 individuals. Of these species, *Gongylonema* sp., *Procyrnea pileata*, and *Choanotaenia infundibulum* are reported from scaled quail for the first time. Prevalence of *Aulonocephalus pennula*, *Gongylonema* sp., *Oxyspirura petrowi*, *Physaloptera* sp., *P. pileata*, *C. infundibulum*, *Fuhrmannetta* sp., and *Rhabdometra odiosa* was 98, 2, 56, 4, 60, 2, 25, and 35%, respectively. *Aulonocephalus pennula* numerically dominated, accounting for 88% of total worms. Statistical analyses were performed on the 5 species with > or = 25% prevalence using the after-

hatch-year host sample (n = 38). Prevalence of *P. pileata* was higher (P = 0.049) in females than in males and higher (P = 0.037) in the sample collected from the site that had spreader dams (berms 1-2 m high and 4-55 m long constructed in varying sizes to catch and retain rainfall) than the control site (no spreader dams). Higher rank mean abundance of *A. pennula* and *O. petrowi* (P = 0.0001 and P = 0.0052, respectively) was found in the host sample collected from the site that had spreader dams than the control site. A host gender-by-collection site interaction (P = 0.0215) was observed for *P. pileata*. Findings indicate that scaled quail are acquiring indirect life cycle helminths in arid western Texas habitats.

**Descriptors:** wild scaled quail, helminth community, nematodes, cestodes, *Callipepla squamata*, Texas, USA.

Lee, K.A., J.C. Franson, J.M. Kinsella, T. Hollmen, S.P. Hansen, and A. Hollmen (2004).

**Intestinal helminths in mourning doves (*Zenaidura macroura*) from Arizona, Pennsylvania, South Carolina, and Tennessee, U.S.A.** *Comparative Parasitology* 71(1): 81-85.

**Descriptors:** mourning doves, intestinal helminths, parasitology, Arizona, Pennsylvania, South Carolina, Tennessee, USA.

Luo Feng, Wang YaBiao, Zhang JianFei, Zhu XingQuan, and Li GuoQing (2006). **Efficacy of common antitrichomonal drugs against *Trichomonas gallinae* from pigeon in vitro.** *Veterinary Science in China* 36(12): 980-982. ISSN: 1673-4696.

**Descriptors:** pigeon, *Trichomonas gallinae*, common antitrichomonal drugs, efficacy, against, antiprotozoal drugs, parasites.

**Language of Text:** Chinese, summary in English.

Macchioni, F., M. Magi, F. Mancianti, and S. Perrucci (2005). **Phoretic association of mites and mallophaga with the pigeon fly *Pseudolynchia canariensis*.** *Parasite Paris, France* 12(3): 277-9. ISSN: 1776-1042.

**Abstract:** *Myialges anchora* Trouessart, 1906 and *M. lophortyx* (Furman & Tarshis, 1953) gravid females, surrounded by clusters of eggs, were found strongly inserted into the cuticle of head, thorax, abdomen, femurs and wings of *Pseudolynchia canariensis* (Macquart, 1840), a hippoboscid fly parasite of the pigeon. This lousefly results obligatory host for ovigerous females of *Myialges* and for the development of their eggs, and phoretic host because the dispersal of hatching larvae to new hosts may then occur with dispersal of fly carriers. Together with the *Myialges* species, not ovigerous females of *Ornithocheyletia hallae* Smiley, 1970 and *Columbicola columbae* (Linnaeus, 1758) were found on the pigeon fly.

**Descriptors:** pigeon fly, bird diseases, parasitology, Columbidae parasitology, diptera parasitology, mallophaga, mite infestations, mites, mallophaga.

Mackereth, G.F. (2004). *Libyostrongylus douglassii* in New Zealand ostriches. *Surveillance Wellington* 31(3): 14-16. ISSN: 0112-4927.

**Descriptors:** ostriches, Nw Zealand, *Libyostrongylus douglassii*, infection, worms, nematode, fecal.

Masello, J.F., R. Gustavo Choconi, R.N.M. Sehgal, L. Tell, and P. Quillfeldt (2006).

**Blood and intestinal parasites in wild Psittaciformes: a case study of burrowing parrots (*Cyanoliseus patagonus*).** *Ornitologia Neotropical* 17(4): 515-529. ISSN: 1075-4377.

**Descriptors:** burrowing parrots, wild Psittaciformes, blood, intestinal, parasites, case study, *Cyanoliseus patagonus*.

McKenna, P.B. (2005). *Libyostrongylus* infections in ostriches--a brief review with particular reference to their detection in New Zealand. *New Zealand Veterinary Journal* 53(5): 267-70. ISSN: 0048-0169.

**Abstract:** Following the recent discovery of *Libyostrongylus douglassii* in ostriches in New Zealand, information relating to this nematode is reviewed. Amongst some of the topics considered are the parasite's distribution and prevalence, its life cycle and survival, and its diagnosis and control. Of particular interest from a New Zealand perspective is the potential for the parasite to infect other ratites, especially the kiwi. While the current evidence suggests that this may be unlikely to occur, the possibility that it might be able to do so cannot be ruled out entirely.

**Descriptors:** ostriches, kiwi, *Libyostrongylus* infections, detection, nematode, review, diagnosis, control, New Zealand.

Meireles, M.V., R.M. Soares, M.M. dos Santos, and S.M. Gennari (2006). **Biological studies and molecular characterization of a *Cryptosporidium* isolate from ostriches (*Struthio camelus*).** *Journal of Parasitology* 92(3): 623-6. ISSN: 0022-3395.

**Abstract:** There are many reports of cryptosporidial infection in ostriches, but none with molecular characterization of the isolates. A study was undertaken for the characterization of a Brazilian *Cryptosporidium* sp. ostrich isolate by using molecular phylogenetic analysis of fragments of the 18S ribosomal DNA, heat-shock protein (hsp) 70 coding gene, and actin coding gene. Biological studies were accomplished by the experimental inoculation of chickens via oral or intratracheal routes with fresh ostrich *Cryptosporidium* sp. oocysts. Molecular analysis of nucleotide sequences of the 3 genes by using neighbor-joining and parsimony methods grouped the ostrich isolate as a sister taxon of *Cryptosporidium baileyi* and showed that the ostrich isolate is genetically distinct from all other known *Cryptosporidium* species or genotypes. None of the inoculated chickens developed infection as determined by mucosal smears, histology, and fecal screening for oocysts. Although biological and molecular studies indicate that the ostrich *Cryptosporidium* is a new species, further studies

regarding morphological, biological, and molecular characteristics of other ostrich isolates are required to confirm the species status of the ostrich *Cryptosporidium*.

**Descriptors:** ostriches, *Cryptosporidium* isolate, biological studies, molecular characterization, oocysts, phylogenetic analysis.

Mironov, S.V., J. Dabert, and R. Ehrnsberger (2003). **A review of feather mites of the *Psittophagus* generic group (Astigmata, Pterolichidae) with descriptions of new taxa from parrots (Aves, Psittaciformes) of the Old World.** *Acta Parasitologica* 48(4): 280-293. ISSN: 1230-2821.

**Descriptors:** parrots, feather mites, review, new taxa description, old world.

Mironov, S.V. and T.M. Perez (2003). ***Micropsittophagus* n. gen., a new feather mite genus (Astigmata: Pterolichidae) from the green pygmy parrot, *Micropsitta finschi* (Psittaciformes: Psittacidae).** *International Journal of Acarology* 29(4): 371-375. ISSN: 0164-7954.

**Descriptors:** green pigmy parrot, new feather mite genus, *Mycropsittophagus atyeoi*, new genus.

Morgan, K.J., M.R. Alley, and J. Potter (2005). **Visceral larval migrans in New Zealand brown kiwi (*Apteryx mantelli*).** *New Zealand Journal of Zoology* 32(4): 277. ISSN: 0301-4223.

**Descriptors:** brown kiwi, New Zealand, visceral larval migrans, parasitology, parasitic disease, symptoms.

**Notes:** Meeting Information: 5th Oamaru Penguin Symposium, Oamaru, New Zealand; June 30 -July 01, 2005.

Mukaratirwa, S., Z.M. Cindzi, and D.B. Maononga (2004). **Prevalence of *Libyostrongylus douglassii* in commercially reared ostriches in the highveld region of Zimbabwe.** *Journal of Helminthology* 78(4): 333-6. ISSN: 0022-149X.

**Abstract:** A total of 435 freshly dropped faecal samples were collected from 11 randomly selected ostrich farms during September and November 2002 to determine the prevalence of *Libyostrongylus douglassii* (ostrich wireworm) in the highveld region of Zimbabwe. Samples, which consisted of 339 samples from breeder birds and 96 samples from pre-slaughter grower birds were screened for nematode eggs using the modified McMaster technique before being individually cultured in an incubator at 28 degrees C. Cultures were examined for the presence of *L. douglassii* third stage larvae (L3). Using faecal egg counts, eight of 11 farms (72.7%) were positive for *L. douglassii* in breeders but no eggs were detected in the growers. The faecal culture method detected wireworm larvae in the breeding stock of all farms that were surveyed (100%) and five of the eight farms (62.5%) which had grower birds. *Libyostrongylus douglassii* was detected in all farms (100%) based on the faecal culture

method. *Libyostrongylus douglassii* was detected for the first time in 7 of 11 farms (64%) surveyed. Data from questionnaires designed to assess farm management practices showed that four out of seven (57.1%) of the ostrich producers were unaware of the importance of wireworms in ostriches. The farms did not have a regular deworming programme for their birds and no faecal samples were sent routinely to the veterinary laboratory for screening of wireworms. Wireworm infections were not taken into consideration by farmers during buying and selling of birds.

**Descriptors:** ostriches, commercially reared, bird diseases, parasitology, intestinal diseases, diagnosis, strongylida infections, Struthioniformes parasitology, *Libyostrongylus douglassii*, Zimbabwe.

Mukaratirwa, S., T. Hove, Z.M. Cindzi, D.B. Maononga, M. Taruvinga, and E. Matenga (2005). **First report of a field outbreak of the oriental eye-fluke, *Philophthalmus gralli* (Mathis & Leger 1910), in commercially reared ostriches (*Struthio camelus*) in Zimbabwe.** *Onderstepoort Journal of Veterinary Research* 72(3): 203-6. ISSN: 0030-2465.

**Abstract:** A total of 17 commercially reared ostriches (*Struthio camelus*) from Msengi farm, Chinhoyi, Zimbabwe, observed with swollen eyes, severe conjunctivitis and constant lacrimation accompanied by a purulent exudate, were restrained for further clinical examination. Some of the birds were semi-blind with severe loss of body condition. When examined, tiny organisms were observed attached to the nictitating membranes and the conjunctival sacs of both eyes. The organisms were identified as *Philophthalmus gralli*, the “oriental eye-fluke” and *Melanoides tuberculata*, a prosobranch snail, was confirmed as the intermediate host through natural and experimental infection. To the best of our knowledge this is the first record of the oriental eye-fluke infection in birds in Zimbabwe and Africa and extends its known geographical range.

**Descriptors:** ostriches, bird diseases epidemiology, eye infections, parasitic, struthioniformes parasitology, trematoda, infections, parasitology, disease outbreaks, epidemiology, eye infections, snails parasitology, trematode infections, Zimbabwe.

Mullens, B.A., C.J. Cardona, L. McClellan, C.E. Szijj, and J.P. Owen (2006). ***Culicoides bottimeri* as a vector of *Haemoproteus lophortyx* to quail in California, USA.** *Veterinary Parasitology* 140(1-2): 35-43. ISSN: 0304-4017.

**Abstract:** Arthropod sampling via periodic direct bird examination and regular light trapping was conducted between June 2000 and October 2002 to survey for potential vectors of *Haemoproteus lophortyx* to nonnative, captive-raised bobwhite quail (*Colinus virginianus*) in northern California, USA. Examination of individual bobwhite quail (from 5 weeks of age through adult, total n=76) was conducted on several dates during the transmission period (June-October). No ectoparasites, including hippoboscids (reported as *Haemoproteus* vectors to wild quail in early literature),

were collected from the birds. Trapping with ultraviolet light suction traps near the quail revealed nine species of biting midges (*Culicoides* spp.). Of these, 94% were *C. bottimeri*, which was abundant near the birds, and 65% of collected *C. bottimeri* were engorged with blood. *C. bottimeri* adult activity began in late-April, slightly before the onset of disease in the quail. Activity peaked between July and late-September, coincident with maximum reported transmission, and adult activity ceased by early-November. Nonengorged *C. bottimeri* had a parity rate of 43.6% overall, suggesting excellent survival for biological transmission of a pathogen like *H. lophortyx*. A controlled study was done injecting a macerated slurry of pooled, nonengorged, wild-caught *C. bottimeri* into the peritoneum of 1-day-old bobwhite quail hatchlings held in insect-proof containers. Blood smears 13-19 days later confirmed *H. lophortyx* infection in zero controls but all insect-injected quail. Biting midges, especially *C. bottimeri*, transmit *H. lophortyx* to captive quail and probably are the dominant vector to native California quail (*Callipepla californica*) as well.

**Descriptors:** Bobwhite quail, *Haemoproteus lophortyx*, *Colinus virginianus*, *Callipepla californica*, biting smidges, hippoboscids.

Munhoz, A.D., G.R. Albuquerque, F.C.R.d. Oliveira, and C.W.G. Lopes (2004). **Studies of clinical signs and hematological alterations in Japanese quails (*Coturnix japonica*) due to *Toxoplasma gondii* Nicolle and Manceaux, 1909 (Apicomplexa: Toxoplasmatinae) experimental infection.** *Revista Brasileira De Parasitologia Veterinaria* 13(1): 1-5. ISSN: 0103-846X.

**Descriptors:** Japanese quail, *Toxoplasma gondii*, clinical signs, hematological alterations, experimental infection.

**Language of Text:** Portuguese.

O'Callaghan, M.G., M. Davies, and R.H. Andrews (2006). **The spatial distribution of five species of *Raillietina* infecting the emu, *Dromaius novaehollandiae*.** *Transactions of the Royal Society of South Australia* 130(1): 71-78. ISSN: 0372-1426.

**Descriptors:** emu, *Raillietina* species, spatial distribution, intensity, cestode, intestine, parasite.

OConnor, B.M., J. Foufopoulos, D. Lipton, and K. Lindstrom (2005). **Mites associated with the small ground finch, *Geospiza fuliginosa* (Passeriformes: Emberizidae), from the Galapagos Islands.** *Journal of Parasitology* 91(6): 1304-13. ISSN: 0022-3395.

**Abstract:** In collections of ectoparasites from 368 small ground finches, *Geospiza fuliginosa*, in populations from the islands of Isabela, Santa Cruz, San Cristobal, and Santa Fe, in the Galapagos Archipelago, Ecuador, we found 8 species of mites. Four mite species were common on all islands sampled, i.e., *Mesalgooides geospizae* Mironov and Perez (Psoroptoididae), *Xolalges palmai* Mironov and Perez (Xolalgiidae), and 2

new species, *Trouessartia geospiza n. sp.* (Trouessartiidae) and *Proctophyllodes darwini n. sp.* (Proctophyllodidae). Four other species were represented by single collections from *G. fuliginosa*, i.e., *Pterodectes atyeoi n. sp.* (Proctophyllodidae), *Strelkoviacarus sp.* (Analgidae), *Dermoglyphus sp.* (Dermoglyphidae), and *Dermanyssus sp.* (Dermanyssidae). Authorship of new species names is attributed to the 3 authors who prepared the descriptions (B.M.O.C., J.F., D.L.). *Trouessartia geospiza* and *P. atyeoi* were also found on previously collected specimens of other *Geospiza* species in museum collections. For the 4 common species, we found no differences in prevalence among the 4 island populations, but infection prevalence differed among the 4 species. The mean infection prevalence was high for *T. geospizae* (89%), moderate for *M. geospizae* (58%) and *X. palmai* (44%), and low for *P. darwini* (26%) in all populations. The feather mite fauna of *G. fuliginosa* was similar to that of other *Geospiza* species, and generally related to communities found on other emberizid finches.

**Descriptors:** ground finch, bird diseases, parasitology, mite infestations, mites classification, bird diseases epidemiology, mite infestations, epidemiology, parasitology, mite anatomy, histology, prevalence, Ecuador.

Palma, R.L. and R.D. Price (2004). ***Apterygon okarito*, a new species of chewing louse (Insecta: Phthiraptera: Menoponidae) from the Okarito brown kiwi (Aves: Apterygidae).** *New Zealand Journal of Zoology* 31(1): 67-73. ISSN: 0301-4223.  
**Descriptors:** brown kiwi, chewing louse, new species, morphological relationships, New Zealand.

Pavlovic, I., B. Miljkovic, and L. Spalevic (2004). **Parazitofauna nojeva. [Parasitoses in ostriches].** *Zivinarstvo* 39(10): 21-23. ISSN: 0354-4036.  
**Descriptors:** ostriches, parasites, infection, protozoa, trematode, cestode, nematode, ectoparasites.  
**Language of Text:** Serbian, summary in English.

Pennycott, T., B. Lawson, A. Cunningham, V. Simpson, and J. Chantrey (2005). **Necrotic ingluvitis in wild finches.** *Veterinary Record* 157(12): 360. ISSN: 0042-4900.  
**Descriptors:** wild finches, necrotic ingluvitis, bird diseases, epidemiology, crop, pathology, esophagus pathology, parasitology, mastigophora infections, avian parasitology, esophagus, necrosis, Scotland, England.  
**Notes:** Comment In: Vet Rec. 2005 Oct 8;157(15):455 Library: National-Library-of-Medicine.

Pereira Soares, M., S. Silva Da Silva, L. Quintana Nizoli, S. Rodrigues Felix, and A. Lucia Schild (2007). **Chronic fascioliasis in farmed and wild greater rheas (*Rhea americana*).** *Veterinary Parasitology* 145(1-2): 168-171. ISSN: 0304-4017.  
**Descriptors:** greater rheas, farmed, wild, chronic fascioliasis, parasites.

Pinto, R.M., R. Tortelly, R.C. Menezes, and D.C. Gomes (2004). **Trichurid nematodes in ring-necked pheasants from backyard flocks of the State of Rio de Janeiro, Brazil: frequency and pathology.** *Memorias Do Instituto Oswaldo Cruz* 99(7): 721-6. ISSN: 1678-8060.

**Abstract:** The present investigation is related to the frequency of infection and to the gross and microscopic lesions associated to the presence of trichurid worms in 50 ring-necked pheasants (*Phasianus colchicus*) from backyard flocks in the state of Rio de Janeiro, Brazil. In the investigated birds, the overall infection rate was of 74%, with the presence of *Eucoleus perforans* with 72% of prevalence and 21.2 of mean intensity, in the esophageal and crop mucosa and rarely in the junction of the proventriculus and esophagus, *E. annulatus* with 2% and 3 in the crop mucosa, *Capillaria phasianina*, with 12% and 4.3 in the cecum and small intestine and *Baruscapillaria obsignata*, for the first time referred in this host, with 2% and 1 in the small intestine. Clinical signs were absent. The gross lesions observed in the crop and esophagus of 14 (38.9%) pheasants parasitized with *E. perforans* were thickening, small nodules, congestion, and petechial haemorrhages in the mucosa. These birds presented a mean infection of 37.5 and a range of infection of 10-82. The microscopic lesions revealed chronic esophagitis with diffuse inflammatory process in the lamina propria characterized mostly by a mononuclear cell infiltrate and also with the presence of granulocytes. In the case of the parasitism of pheasants with *C. phasianina*, the gross lesions were absent; microscopic lesions were characterized by chronic typhlitis with mononuclear infiltrate. Gross and microscopic lesions were absent in the pheasants parasitized with *E. annulatus* and *B. obsignata*.

**Descriptors:** ring-necked pheasants, bird diseases, epidemiology, enoplida infections, galliformes parasitology, trichuroidea, epidemiology, prevalence, trichuroidea classification, Brazil.

Ponce Gordo, F., R.A. Martinez Diaz, and S. Herrera (2004). ***Entamoeba struthionis n.sp. (Sarcomastigophora: Endamoebidae) from ostriches (Struthio camelus).*** *Veterinary Parasitology* 119(4): 327-35. ISSN: 0304-4017.

**Abstract:** In the present work we identify the species of *Entamoeba* from ostriches (*Struthio camelus*). The complete sequence of the small subunit ribosomal RNA gene from this organism has been compared with those published for other species of the genus and clear differences have been found. These results confirm previous data which showed differences on parasite morphology and class of host with the other *Entamoeba* species. Taking all these data together, it can be concluded that the organism from ostriches is a new species whose proposed name is *Entamoeba struthionis n.sp.* This species probably infects rheas (*Rhea americana*), but genetic analysis of isolates from this host should be performed to confirm morphological data. Also, comparison of gene sequences with data from other authors on cysts recovered from

human stool samples showed the possibility that this amoeba may affect humans. Further studies are needed to determine the risk of transmission of this new species to humans.

**Descriptors:** ostriches, rhea, bird diseases, parasitology, entamoebiasis, struthioniformes parasitology, transmission, DNA, protozoan chemistry, parasitology, entamoebiasis transmission.

Robbins, R.G. and S.E. Bush (2006). **First report of *Amblyomma papuanum* Hirst (Acari: Ixodida: Ixodidae) from the Dwarf Cassowary, *Casuarius bennetti* Gould (Aves: Struthioniformes: Casuariidae), with additional records of parasitism of *Casuarius* spp. by this tick.** *Proceedings of the Entomological Society of Washington* 108(4): 1002-1004. ISSN: 0013-8797.

**Descriptors:** *Amblyomma*, ectoparasites, new host records, wild birds, *Casuarius*, parasitism, tick infestations, Papua New-Guinea.

Robel, R., T.L.J. Walker, R.K. Ridley, K.E. Kemp, and R.D. Applegate (2005). **Helminthic parasites in ring-necked pheasant from southwestern Kansas.** *Prairie Naturalist* 37(3): 143-150. ISSN: 0091-0376.

**Descriptors:** ring necked pheasant, helminthic parasites, southwestern Kansas.

Saxena, A.K., S.K. Singh, S. Kumar, and N. Gupta (2004). **The influence of two environmental factors on the development of the eggs of two pigeon lice (phthiraptera, insecta).** *Journal of Parasitology and Applied Animal Biology* 13(1-2): 39-44. ISSN: 0971-2208.

**Descriptors:** pigeon lice, egg development, environmental factors, influence, temperature, relative humidity.

Schulze, C., E. Grossmann, and O. Krone (2006). **Fallbericht: *Libyostrongylus douglassii*-assoziierte Magenentzündungen bei Straussen (*Struthio camelus*) in Deutschland. [Case report: *Libyostrongylus douglassii*-associated proventriculitis in ostriches in Germany].** *Deutsche Tierärztliche Wochenschrift* 113(6): 240-242. ISSN: 0341-6593.

**Online:** <http://www.schaper-verlag.de>

**Descriptors:** ostriches, *Libyostrongylus douglassii*, proventriculitis, adult, female, wireworm, infection, case report, nematodes.

**Language of Text:** German, summary in English.

Skoracki, M. (2005). **A review of the quill mites (Acari: Syringophilidae) parasitizing parrots (Aves: Psittaciformes) with description of three new species.** *Acarina* 13(2): 127-136. ISSN: 0132-8077.

**Descriptors:** parrots, quill mites parasitizing, new species, review.

**Language of Text:** English and Russian.

Soares, M.P., S.S. da Silva, L.Q. Nizoli, S.R. Felix, and A.L. Schild (2007). **Chronic fascioliasis in farmed and wild greater rheas (*Rhea americana*)**. *Veterinary Parasitology* 145(1-2): 168-71. ISSN: 0304-4017.

**Abstract:** From 50 farmed *Rhea americana* slaughtered for human consumption, adult forms and eggs of *Fasciola hepatica* were found in 4. The other three livers were free of flukes but did show lesions caused by larval fluke migration. Histological lesions were similar to those caused by flukes in cattle and sheep. The rheas were from an endemic area of ruminant fascioliasis in Southern Brazil. *F. hepatica* eggs were also found in faecal samples of wild rheas from another endemic area in Southern Brazil. It is likely that the rheas play a role in the transmission of the disease to ruminants and could be jeopardizing the control of this parasitosis in endemic areas. From the best of our knowledge this is the first report of fascioliasis in *R. americana*.

**Descriptors:** Rhea, fascioliasis, slaughter, human consumption, liver fluke, larval migration, adult, eggs, liver, fecal samples, transmission, Brazil.

Stone, E.G., G. Montiel Parra, and T.M. Perez (2005). **A survey of selected parasitic and viral pathogens in four species of Mexican parrots, *Amazona autumnalis*, *Amazona oratrix*, *Amazona viridigenalis*, and *Rhynchopsitta pachyrhyncha***. *Journal of Zoo and Wildlife Medicine* 36(2): 245-9. ISSN: 1042-7260.

**Abstract:** Isolated populations of four species of Mexican parrots were sampled for evidence of selected pathogens of concern in birds originating in Latin America. Data were collected between June and September 1997, and ectoparasite collection was repeated with *Rhynchopsitta pachyrhyncha* in September 2000. Serum samples from nine *Amazona oratrix*, 10 *Amazona viridigenalis*, 6 *Amazona autumnalis*, and 25 *R. pachyrhyncha* chicks were screened for neutralizing antibodies to psittacid herpesvirus and avian influenza and for antibodies to paramyxovirus serotypes 1 and 3. Chicks were also examined visually for fecal parasites and ectoparasites. All serologic and fecal parasite tests were negative. Ectoparasites included ticks, Ixodidae; mites, *Ornithonyssus sylviarum*; fleas, *Psyttopsylla mexicana*; lice, *Paragoniocoltes mexicanus*, *Heteromenopon sp.*, and *Psittacobrosus sp.*; and bugs, *Ornithocoris sp.* This study provides baseline information to guide future health studies.

**Descriptors:** Mexican parrots, four species, parasitic pathogens, viral pathogens, survey, ticks, mites, fleas, lice, bugs, Latin America.

Tampieri, M.P., R. Galuppi, and G. Rugna (2005). **Survey on helminthofauna in pheasants from Eastern Europe**. *Parassitologia* 47(2): 241-5. ISSN: 0048-2851.

**Abstract:** In order to assess the parasitological status in imported pheasants, 51 birds (*Phasianus colchicus*) coming from Poland and Rumania and used in Italy in

repopulation interventions for hunting purposes were examined. From each animal the trachea, oesophagus, crop and intestine were collected and examined for the presence of nematodes. The examination of the oesophagi and crops of 5 birds revealed the presence of parasites pertaining to the family Capillariidae: *Eucoleus contortus* was found in all of the 5 animals, *E. annulatus* was present along with the previous parasite in one animal coming from Poland. The examination of the tracheae revealed the presence of *Syngamus trachea* in 5 animals (9.80%). Adult or larval stages of *Heterakis gallinarum* (37.25% of birds) and Capillariidae (35.29%) were found in the intestinal tracts. *Aonchotheca caudinflata* was detected only in one bird coming from Poland; the capillarids found in all of the remaining pheasants exhibited morphological characteristics referable to *Capillaria phasianina*, a species never reported in Italy. The release of game from foreign countries, therefore, may always constitute a risk for the autochthonous one due to the spread of new parasitic infections.

**Descriptors:** pheasants, parasites, helminthofauna, Eastern Europe, Poland, Rumania, Italy, trachea, esophagus, crop, intestines, nematodes, infections.

Tanizaki, A., H. Yoshikawa, S. Iwatani, and I. Kimata (2005). **Infectivity of *Blastocystis* isolates from chickens, quails and geese in chickens.** *Parasitology Research* 96(1): 57-61. ISSN: 0932-0113.

**Abstract:** The infectivity of six *Blastocystis* isolates obtained from two domestic chickens, two Japanese quails and two domestic geese, were examined in 1-week-old male chicks. All six isolates were able to infect the chicks via the intracecal inoculation of  $1 \times 10^6$  cells of cultured organisms. Since the infected chicks discharged many cysts in their feces, the infectivity of the concentrated cysts in chicks was compared among three isolates from different bird species. The CK86-1 and QQ93-3 isolates, which were obtained from a chicken and a quail, respectively, were successfully infected in chicks by orally inoculating with  $1 \times 10^2$ - $1 \times 10^6$  cysts. On the other hand, the AC03-1 isolate from a goose required more cysts to infect the chicks, from  $1 \times 10^3$  cysts to  $1 \times 10^6$  cysts. In addition, when an uninfected normal chick was housed with five experimentally inoculated chicks with cysts of the QQ93-3 isolate, the normal chick became infected, indicating the fecal-oral transmission of the cyst form among the birds. These results show that the transmission of *Blastocystis* infection occurs easily between the same or different bird species. Therefore, the proposal of new *Blastocystis* species on the basis of different avian host species is problematic.

**Descriptors:** quails, chickens, geese, *Blastocystis* isolates, infectivity, cysts, oral inoculation, transmission between species.

Teixeira, M., W.L. Teixeira Filho, and C.W.G. Lopes (2004). **Coccidiosis in Japanese quails (*Coturnix japonica*): characterization of a naturally occurring infection in a commercial rearing farm.** *Revista Brasileira De Ciencia Avicola* 6(2): 129-134. ISSN:

1516-635X.

**Descriptors:** Japanese quail, coccidiosis, infection, naturally occurring, farm, *Eimeria*, characteristics, fecal exams, oocysts, diagnosis.

Tisljar, M., R. Beck, R.G. Cooper, A. Marinculic, M. Tudja, I. Lukac Novak, Z. Grabarevic, V. Herak Perkovic, and B. Simpraga (2007). **First finding of libyostrongylosis in farm-reared ostriches (*Struthio camelus*) in Croatia: unusual histopathological finding in the brain of two ostriches, naturally infected with *Libyostrongylus douglasi*.** *Veterinary Parasitology* 147(1-2): 118-24. ISSN: 0304-4017.

**Abstract:** In the present work, the very first finding of *Libyostrongylus douglasi* in farm-reared ostriches in Croatia, was described, not only as the main cause of the death, but also as the cause of persistent infection. The results of histopathological examination of almost all parenchymatous organs in two routinely necropsied ostriches were presented, including atypical histopathological finding in the brain and the result of the *L. douglasi* scanning electron microscopical (SEM) examination. In order to determine the parasite species to which the larval form found in the brain belonged, polymerase chain reaction (PCR) was performed. Total DNA was isolated from fresh *L. douglasi*, and from archival formalin-fixed and paraffin-embedded brain section. Additionally, the smears of the proventricular mucosal lining were cytologically examined. Virological examination for newcastle disease virus (NDV) was also performed. As there was very limited information concerned ostrich's health status in Croatian farms, a preliminary evaluation of the parasite infestation level in the Croatian ostrich population over the period 2001-2002 was also done, and an attempt at characterising individual parasite species, was made.

**Descriptors:** ostriches, infected, *Libyostrongylus douglasi*, brain, histopathological examination, necropsy, scanning electron microscopical examination, Croatia.

Vasconcelos Meireles, M., R. Martins Soares, M.M.A. Bianchi dos Santos, and S.M. Gennari (2006). **Biological studies and molecular characterization of a *Cryptosporidium* isolate from ostriches (*Struthio camelus*).** *Journal of Parasitology* 92(3): 623-626. ISSN: 0022-3395.

**Descriptors:** ostriches, cryptosporidium isolate, biological studies, molecular characterization, *Struthio camelus*, parasites.

Villanua, D., P. Acevedo, U. Hofle, O. Rodriguez, and C. Gortazar (2006). **Changes in parasite transmission stage excretion after pheasant release.** *Journal of Helminthology* 80(3): 313-318. ISSN: 0022-149X.

**Descriptors:** pheasants, *Phasianus colchicus*, *Eimeria*, *Heterakis*, *Capillaria*, oocysts, ova, excretion, fecal egg count, disease transmission, disease prevalence, fenbendazole, drug therapy, farmed pheasants, parasite excretion.

Waliullah, M.I.S. (2005). **Nematodes associated with kiwi (*Actinidia deliceous* Chev.) in Kashmir Valley, India.** *Indian Journal of Nematology* 35(2): 227. ISSN: 0303-6960.  
**Descriptors:** kiwi, nematodes, *Actinidia deliceous*, India.

Whiteman, N.K., D. Santiago Alarcon, K.P. Johnson, and P.G. Parker (2004). **Differences in straggling rates between two genera of dove lice (Insecta: Phthiraptera) reinforce population genetic and cophylogenetic patterns.** *International Journal for Parasitology* 34(10): 1113-1119. ISSN: 0020-7519.

**Abstract:** Differences in dispersal abilities have been implicated for causing disparate evolutionary patterns between *Columbicola* and *Physconelloides* lice (Insecta: Phthiraptera). However, no study has documented straggling (when lice are found on atypical hosts) rates within these lineages. We used the fact that the Galapagos Hawk, *Buteo galapagoensis* (Gould) (Falconiformes) feeds on the Galapagos Dove *Zenaida galapagoensis* Gould (Columbiformes) within an ecologically simplified setting. The Galapagos Dove is the only typical host of *Columbicola macrourae* (Wilson) and *Physconelloides galapagensis* (Kellogg and Huwana) in Galapagos. We quantitatively sampled and found these lice on both bird species. A DNA barcoding approach confirmed that stragglers were derived from Galapagos doves. We also collected a *Bovicola* sp. louse, likely originating from a goat (*Capra hircus*). On hawks, *C. macrourae* was significantly more prevalent than *P. galapagensis*. On doves, the two lice were equally prevalent and abundant. Differences in prevalence on hawks was a function of differences in straggling rate between lice, and not a reflection of their relative representation within the dove population. This provides further evidence that differences in dispersal abilities may drive differences in the degree of cospeciation in *Columbicola* and *Physconelloides* lice, which have become model systems in evolutionary biology.

**Descriptors:** Philopteridae, *Columbicola*, lice, dispersal behavior, insect behavior, doves, Columbiformes, hawks, host-parasite relationships, population genetics, nucleotide sequences, phylogeny, coevolution, Galapagos Islands, *Physconelloides galapagensis*, *Columbicola macrourae*, *Zenaida galapagoensis*, *Buteo galapagoensis*, straggling behavior, molecular sequence data.

Yaman, M. and R. Durgut (2005). **Devekuslarinin parazitler hastalıkları ve tedavileri. [Parasitic infestations in ostriches and therapy].** *Türkiye Parazitoloji Dergisi* 29(2): 103-109. ISSN: 1300-6320.

**Descriptors:** ostriches, parasitic infections, therapy, *Struthio camelus*, treatment for parasites.

**Language of Text:** Turkish, summaries in English and Turkish.

Zettermann, C.D., A.A. Nascimento, J.A. Tebaldi, and M.J. Szabo (2005). **Observations on helminth infections of free-living and captive rheas (*Rhea americana*) in Brazil.** *Veterinary Parasitology* 129(1-2): 169-72. ISSN: 0304-4017.

**Abstract:** The present work describes helminth infection of eight free-living and 12 captive rheas (*Rhea americana*) from, respectively, Pantanal of Mato Grosso do Sul State, and Jaboticabal, Sao Paulo State, Brazil. Captive birds were young and had a high mortality rate, while free-living birds were adult and apparently healthy. Infections were evaluated by post-mortem examination of internal organs and recovery of helminths using standard parasitological procedures. Seven species of nematodes (*Sicarius uncinipenis*, *Torquatooides crotophaga*, *Deletrocephalus dimidiatus*, *D. cesarpin-toi*, *Paradeletrocephalus minor*, *Capillaria venteli* and *Dicheilonema rhaeae*) and two species of cestodes (*Houuttuynia struthionis* and *Chapmania tauricolis*) were identified. *P. minor*, which inhabits the large intestine, was the most common helminth in free-living birds (63.9%). In captive rheas, a mean parasitic load of 173 helminths per host was found. The gizzard of these birds was the most parasitized organ and *S. uncinipenis* was most common (92.5%). Parasitism of free-living and captive birds and associated pathology are discussed.

**Descriptors:** bird diseases, epidemiology, helminthiasis, rheiformes parasitology, wild parasitology, Brazil epidemiology, gizzard parasitology, prevalence.

Ziomko, I., J. Karamon, and T. Cencek (2006). **Parasites in ostriches.** *Medycyna Weterynaryjna* 62(6): 628-631. ISSN: 0025-8628.

**Descriptors:** ostriches, parasites, disease, infection, review, *Struthio camelus*.

**Language of Text:** Polish.



# Reproductive

Aire, T.A. and J.T. Soley (2003). **The morphological features of the rete testis of the ostrich (*Struthio camelus*)**. *Anatomy and Embryology* 207(4/5): 355-361. ISSN: 0340-2061.

**Descriptors:** ostrich, rete testis, morphological features, anatomy, epithelium.

Babic, K., T.T. Vukievic, D. Mihelic, and V.G. Kantura (2004). **The anatomy of the female and male ostrich (*Struthio camelus*) genital system as a base of reproductive physiology**. *Proceedings of the 11th Ostrich World Congress, Island Great Brijun, Croatia, 15 17 October 2004*: 70-73.

**Descriptors:** ostrich, male, female, genital system, anatomy, reproductive physiology, conference proceedings.

**Notes:** Meeting Information: Proceedings of the 11th Ostrich World Congress, Island Great Brijun, Croatia, 15-17 October 2004.

Barbosa, T., G. Zavala, S. Cheng, T. Lourenco, and P. Villegas (2006). **Effects of reticuloendotheliosis virus on the viability and reproductive performance of Japanese quail**. *Journal of Applied Poultry Research* 15(4): 558-563. ISSN: 1056-6171.

**Online:** <http://japr.fass.org/cgi/content/abstract/15/4/558>

**Descriptors:** Japanese quail, reticuloendotheliosis virus, effects, viability, reproductive performance.

Brand, Z., T.S. Brand, and C.R. Brown (2003). **The effect of different combinations of dietary energy and protein on the composition of ostrich eggs**. *South African Journal of Animal Science* 33(3): 193-200. ISSN: 0375-1589.

**Descriptors:** ostrich, eggs, dietary energy, protein, different combinations, effect on composition of eggs, nutrition, breeding females.

Castillo, A., M. Marzoni, R. Chiarini, and I. Romboli (2003). **Storage of pheasant semen: some aspects on quality and fertilising ability**. *Avian and Poultry Biology Reviews* 14(4): 200. ISSN: 1470-2061.

**Descriptors:** pheasant, semen, storage, fertilising ability, quality, aspects, conference.

**Notes:** Meeting Information: Incubation and Fertility Research Group Meeting, WPSA Working Group 6 (Reproduction), University of Lincoln, UK, 4-5 September 2003.

Cooper, R.G. and J.O. Horbanczuk (2005). **Egg and embryo abnormalities in the ostrich (*Struthio camelus*)**. *West Indian Veterinary Journal* 5(2): 21-23. ISSN: 1815-8986.  
**Online:** [www.uwivet.edu/wivj](http://www.uwivet.edu/wivj)  
**Descriptors:** ostrich, egg, embryo, abnormalities, reproduction.

Hahn, T.P., M.E. Pereyra, S.M. Sharbaugh, and G.E. Bentley (2004). **Physiological responses to photoperiod in three cardueline finch species**. *General and Comparative Endocrinology* 137(1): 99-108. ISSN: 0016-6480.

**Abstract:** Cardueline finches (canaries, goldfinches, and rosefinches, etc.) vary widely in the degree to which their natural reproductive schedules track seasonal changes in photoperiod. In this study, we tested for photo-induction of reproductive development and photorefractoriness in males of three cardueline finch species: pine siskins (*Carduelis pinus*), common redpolls (*Carduelis flammea*), and white-winged crossbills (*Loxia leucoptera*). Exposure to long days (20L:4D) in winter induced gonadal growth and elevation of circulating luteinizing hormone (LH) in all three species. After 4.5 months on constant long days, gonadal regression was complete in redpolls and siskins, but only partial in crossbills. Feather molt was most advanced in redpolls, slightly less advanced in siskins, and least advanced in crossbills. These results indicate that the reproductive systems of all three species were stimulated by long days, but that the crossbills, which are temporal opportunists, either did not become absolutely photorefractory, or developed refractoriness more slowly than did the other two species. Reproductive development of controls held for 4.5 months on constant short days (5L:19D) was negligible in redpolls and crossbills, but substantial in siskins, suggesting that of the three species, pine siskins may be the least dependent on long days for reproductive development. Changes in fat deposition and body mass also differed among species. Short day redpolls tended to be fatter and heavier than long day redpolls, and long day crossbills tended to be fatter and heavier than short day crossbills. Body mass and fat depot of siskins remained high irrespective of photoperiod. These results illustrate substantial variation among these close relatives, and are consistent with the idea that differences in apparent reproductive flexibility among cardueline taxa relate to interspecific differences in responsiveness to environmental cues, not simply to differences in the environments experienced. This kind of information is critical to an understanding of the mechanistic bases of natural variation in reproductive schedules, and of how different species may be affected by modifications to the environment.

**Descriptors:** finches physiology, photoperiod, adipose tissue physiology, body weight physiology, gonads physiology, luteinizing hormone blood, sexual behavior, animal physiology, species specificity.

Hassan, S.M., A.A. Siam, M.E. Mady, and A.L. Cartwright (2004). **Incubation temperature for ostrich (*Struthio camelus*) eggs.** *Poultry Science* 83(3): 495-499.

**Abstract:** The impact of incubation temperature on egg weight loss, embryonic mortality, incubation period, hatchability, and chick weight in 394 ostrich (*Struthio camelus*) eggs was studied. Eggs were obtained from 3 farms in Texas. Three incubation temperatures (36.5, 37.0, or 37.5degrees C) with relative humidity ranging from 20 to 30% were used. Results showed that incubation of fertile eggs at 36.5degrees C increased hatchability and incubation period in comparison with other treatments. The incidence of dead in shell and total dead embryos was increased at 37.5degrees C when compared with 36.5degrees C. No differences in hatchability, incubation period, dead-in-shell embryos, and total dead embryos were observed between eggs incubated at 37.0 or 37.5degrees C. Neither chick weight nor egg weight loss at 7, 14, 28, or 38 d of incubation was affected by incubation temperature, but egg weight loss at 21 d was lower for eggs incubated at 37.5degrees C than for the other treatments. Results show that the most effective incubation temperature for the ostrich is lower than the most effective incubation temperature for most bird species.

**Descriptors:** ostriches, ova, egg hatchability, embryonic mortality, incubation, duration, ambient temperature, relative humidity, egg weight, egg fertility, hatching, birth weight, egg weight loss.

Hoogesteijn, A.L., T.J. DeVoogd, F.W. Quimby, T. De Caprio, and G.V. Kollias (2005).

**Reproductive impairment in zebra finches (*Taeniopygia guttata*).** *Environmental Toxicology and Chemistry* 24(1): 219-23. ISSN: 0730-7268.

**Abstract:** The effects of polychlorinated biphenyls (PCBs) as compounds that may disrupt endocrine activity and, consequently, alter reproductive performance were investigated in altricial zebra finches (*Taeniopygia guttata*). The breeding performance and breeding cycle of zebra finches differed significantly between nonexposed birds and those experimentally pulse-exposed to Aroclor 1248, a PCB compound (40 microg/bird). Aroclor-exposed birds showed significantly increased numbers of clutches laid, nests constructed per pair, incubation time per pair, and percentage of hatchling mortality compared to controls. Not all reproductive parameters were affected. Those traditionally regarded as indicators of reproductive capacity (number of eggs laid per clutch, number of eggs laid per pair, hatchlings per clutch, and fledglings per clutch) did not differ statistically between exposed and control birds. Findings support the hypothesis that very low PCB doses may be associated with endocrine disruption. It is suggested that evaluation of reproductive parameters related to parental care is more adequate to assess endocrine disruption than is evaluation of reproductive success parameters. Given its short breeding cycle, altricial breeding behavior, and other advantages not possessed by precocial birds, we propose using the zebra finch for evaluations of chemicals with endocrine-disruptive activity.

**Descriptors:** zebra finches, reproductive impairment, PCBs, breeding performance, breeding cycle, Aroclor 1248, chemicals, behavior.

Immler, S., M. Saint Jalme, L. Lesobre, G. Sorci, Y. Roman, and T.R. Birkhead (2007). **The evolution of sperm morphometry in pheasants.** *Journal of Evolutionary Biology* 20(3): 1008-1014. ISSN: 1010-061X.

**Abstract:** Post-copulatory sexual selection is thought to be a potent evolutionary force driving the diversification of sperm shape and function across species. In birds, insemination and fertilization are separated in time and sperm storage increases the duration of sperm-female interaction and hence the opportunity for sperm competition and cryptic female choice. We performed a comparative study of 24 pheasant species (Phasianidae, Galliformes) to establish the relative importance of sperm competition and the duration of sperm storage for the evolution of sperm morphometry (i.e. size of different sperm traits). We found that sperm size traits were negatively associated with the duration of sperm storage but were independent of the risk of sperm competition estimated from relative testis mass. Our study emphasizes the importance of female reproductive biology for the evolution of sperm morphometry particularly in sperm-storing taxa.

**Descriptors:** pheasants, sperm competition, comparative study, female reproductive biology, sperm morphometry, sperm storage duration.

Jensen, T. and B. Durrant (2006). **Assessment of reproductive status and ovulation in female brown kiwi (*Apteryx mantelli*) using fecal steroids and ovarian follicle size.** *Zoo Biology* 25(1): 25-34. ISSN: 0733-3188.

**Descriptors:** wild birds, brown kiwi, ultrasonography, ovaries, ovarian follicles, follicular development, feces, estradiol, testosterone, progesterone, oviposition, egg yolk.

Kimaro, W.H. and M.C. Madekurozwa (2005). **An immunohistochemical study of the innervation of the ovary in the sexually immature ostrich.** *Microscopy Society of Southern Africa Proceedings* 35: 73. ISSN: 1028-3455.

**Descriptors:** ostrich, sexually immature, ovary, innervation, immunohistochemical study, innervation, growth and development.

Kimaro, W.H. and M.C. Madekurozwa (2005). **The ultrastructure of gland cells in the ovary of the sexually immature ostrich.** *Microscopy Society of Southern Africa Proceedings* 35: 72. ISSN: 1028-3455.

**Descriptors:** ostrich, sexually immature, gland cells, ovary, ultrastructure.

Kimaro, W.H. and M.C. Madekurozwa (2005). **Ultrastructural features of healthy and atretic ovarian follicles in the sexually immature ostrich.** *Microscopy Society of Southern Africa Proceedings* 35: 61. ISSN: 1028-3455.

**Descriptors:** ostrich, sexually immature, ovarian follicles, healthy, atretic, ultrastructural features.

Klimowicz, M., E. Lukaszewicz, and A. Dubiel (2005). **Effect of collection frequency on quantitative and qualitative characteristics of pigeon (*Columba livia*) semen.** *British Poultry Science*. 46((3)): 361-365. ISSN: 0007-1668.

**Descriptors:** *Columba livia*, pigeons, males, spermatozoa, semen, frequency, sampling, reproductive traits, viability, anatomy, morphology.

Klimowicz, M. and W. Nizanski (2006). **Viability assessment of pigeon sperm using eosin-nigrosin staining and flow cytometry.** *Reproduction in Domestic Animals* 41(4): 331. ISSN: 0936-6768.

**Descriptors:** pigeon, sperm, assessment, eosin-nigrosin staining, flow cytometry, viability, meeting.

**Notes:** Meeting Information: 10th Annual Conference of the European Society for Domestic Animal Reproduction, Portoroz, Slovenia; September 07 -09, 2006.

Klimowicz, M. and W. Nizanski (2006). **Evaluation motility of pigeon semen after in vitro storage using casa system.** *Reproduction in Domestic Animals* 41(4): 330. ISSN: 0936-6768.

**Descriptors:** pigeon, semen, motility, evaluation, after, invitro storage, casa system, meeting.

**Notes:** Meeting Information: 10th Annual Conference of the European Society for Domestic Animal Reproduction, Portoroz, Slovenia; September 07 -09, 2006.

Labaque, M.C., J.L. Navarro, and M.B. Martella ( 2004). **Effects of storage time on hatchability of artificially incubated Greater Rhea (*Rhea americana*) eggs.** *British Poultry Science* 45(5): 638-42. ISSN: 0007-1668.

**Abstract:** (1) A study was conducted to determine the effects of the length of the storage period on the hatchability of artificially incubated Greater Rhea eggs. Hatchability was evaluated in eggs gathered daily from a captive population and in eggs collected less frequently from a semi-captive population. (2) Eggs from both sites were either immediately incubated after being collected or were stored for 1 to 9 d prior to incubation. (3) The maximum number of days for which an egg could be stored without depressing hatchability (with respect to non-stored eggs) was longer in the eggs collected daily. (4) Eggs collected daily and stored for 4d or more showed total hatchability (28%) and fertile hatchability (43%) which was approximately 30% lower than non-stored eggs or eggs stored for 3 d or less. In the semi-captive population, the total and fertile hatchability of non-stored eggs and of eggs stored for one day were 40% greater than of eggs stored for 2 to 9 d (20 and 34%, respectively). (5) The period for which Greater Rhea eggs could be stored without depressing

hatchability varied depending on the frequency of egg collection: non-daily egg collection reduces the possible period of storage.

**Descriptors:** Greater Rhea, eggs, hatchability, storage time, artificially incubated, effects, frequency of collection.

Madekurozwa, M.C. (2005). **Morphological features of the luminal surface of the magnum in the sexually immature ostrich (*Struthio camelus*)**. *Anatomia, Histologia, Embryologia* 34(6): 350-3. ISSN: 0340-2096.

**Abstract:** Observations were made, using scanning electron microscopy, of the surface features of the magnum in the immature ostrich during periods of ovarian inactivity, activity and regression. In birds with inactive ovaries the luminal surface of the magnum was lined with non-ciliated cells, which were densely covered by microvilli. In contrast, the magnum in birds with active ovaries was composed of ciliated and non-ciliated cells. The distribution of ciliated cells was not uniform, with clumps of cilia occurring next to non-ciliated areas. Samples collected from birds with regressing ovaries, during periods of decreasing daylength, revealed that the magnum was undergoing involution. The deciliation of ciliated cells and the presence of short microvilli on non-ciliated cells characterized magnum regression. These results suggest that ovarian activity and changes in daylength have a profound effect on the surface features of the magnum in the immature ostrich.

**Descriptors:** ostrich, sexually immature, magnum, morphological features, ovarian activity, daylength, ciliated cells, non ciliated cells.

Madekurozwa, M.C. (2004). **Immunohistochemical localization of the progesterone and oestrogen receptors in the shell gland of sexually immature ostriches (*Struthio camelus*) with active or inactive ovaries**. *Research in Veterinary Science* 76(1): 63-68. ISSN: 0034-5288.

**Descriptors:** ostriches, immature, ovaries, active, inactive, progesterone, estrogen, receptors, immunohistochemical localization, shell gland.

Malecki, I.A., S.W.P. Cloete, W.D. Gertenbach, and G.B. Martins (2004). **Sperm storage and duration of fertility in female ostriches (*Struthio camelus*)**. *South African Journal of Animal Science* 34(3): 158-165. ISSN: 0375-1589.

**Descriptors:** ostriches, reproduction, sperm storage, duration of fertility in female.

Malecki, I.A., J.O. Horbanczuk, C.E. Reed, and G.B. Martin (2005). **The ostrich (*Struthio camelus*) blastoderm and embryo development following storage of eggs at various temperatures**. *British Poultry Science* 46(6): 652-660. ISSN: 0007-1668.

**Descriptors:** ostrich, blastoderm, embryo, development, egg storage, various temperatures.

Malecki, I.A. and G.B. Martin (2003). **Sperm supply and egg fertilization in the ostrich (*Struthio camelus*)**. *Reproduction in Domestic Animals* 38(6): 429-435. ISSN: 0936-6768.

**Descriptors:** ostrich, sperm supply, egg fertilization, mating.

Malecki, I.A. and G.B. Martin (2004). **Artificial insemination in the emu (*Dromaius novaehollandiae*): effects of numbers of spermatozoa and time of insemination on the duration of the fertile period**. *Animal Science Papers and Reports* 22(3): 315-323. ISSN: 0860-4037.

**Descriptors:** emu, artificial insemination, spermatazoa numbers, time of insemination, duration of fertile period, effects.

Mohan, J., K.V. Sastry, J.S. Tyagi, and D.K. Singh (2004). **Isolation of *E. coli* from foam and effects of fluoroquinolones on *E. coli* and foam production in male Japanese quail**. *Theriogenology* 62(8): 1383-90. ISSN: 0093-691X.

**Abstract:** Sexually active male Japanese quail (*Coturnix coturnix Japonica*) produce a foamy substance from their cloacal gland. It was postulated that bacteria played an important role in production of foam. The primary objective of this study was to isolate and identify bacteria present in the cloacal foam. The secondary objective was to evaluate the effect of fluoroquinolone treatment on bacterial counts and foam production. Healthy adult Japanese quail were maintained in individual cages under uniform husbandry conditions and allocated arbitrarily into three groups (each group consisted of 12 male and 12 female birds). Foam was collected from the cloacal gland of male birds of each group separately into sterile petri dishes and was cultured to isolate and identify bacteria and to determine their sensitivity to various antibiotics. *Escherichia coli* bacteria, sensitive to various antibacterials (including the fluoroquinolones ciprofloxacin and pefloxacin), were isolated. In the second part of the study, male quails of Group I (control) received 1 mL vehicle (normal saline 0.9% (w/v) NaCl) daily (via the intraperitoneal route) for 12 days. Male birds from groups II and III were treated intraperitoneally with ciprofloxacin or pefloxacin at the rate of 10 mg and 12 mg per/kg body weight respectively, for 12 days. In antibiotic-treated birds, there was a gradual reduction in foam production during treatment. At the end of treatment, the cloacal gland area was smaller ( $P < 0.05$ ) in pefloxacin-treated birds compared to the other groups. Furthermore, a trend towards decreasing body weight and fertilizing ability was noted in the same group. A drastic reduction in bacterial counts of foam was recorded only in fluoroquinolone-treated groups during treatment period. After cessation of treatment, all end points were increasing back to pre-treatment levels. In conclusion, *E. coli* were present in the foam of the cloacal gland of Japanese quail and may have a role in foam production.

**Descriptors:** Japanese quail, male, cloacal foam production, *E. coli*, isolation, fluoroquinolones, effect, cloacal gland, bacteria from cloacal gland.

Mohan, L. and S.P. Dhiman (2005). **Stress management - an important factor in the effective breeding of the cheer pheasant *Catreus wallichii***. *Avicultural Magazine* 111(2): 83-90. ISSN: 0005-2256.

**Descriptors:** cheer pheasant, *Catreus wallichii*, effective breeding, stress management, important factor.

Ozbey, O., N. Yildiz, and F. Esen (2006). **The effects of high temperature on breeding characteristics and the living strength of the Japanese quails (*Coturnix coturnix japonica*)**. *International Journal of Poultry Science* 5(1): 56-59. ISSN: 1682-8356.

**Descriptors:** Japanese quail, high temperature, effects, breeding characteristics, living strength.

Ozegbe, P.C., T.A. Aire, and J.T. Soley (2005). **The efferent ductules of the testis of the ostrich (*Struthio camelus*)**. *Microscopy Society of Southern Africa Proceedings* 35: 74. ISSN: 1028-3455.

**Descriptors:** ostrich, *Struthio camelus*, testis, efferent ductules.

Pike, T.W. and M. Petrie (2006). **Experimental evidence that corticosterone affects offspring sex ratios in quail**. *Proceedings of the Royal Society Biological Sciences Series B* 273(1590): 1093-1098. ISSN: 0962-8452.

**Descriptors:** Japanese quail, *Coturnix japonica*, corticosterone, affects, offspring sex ratio, studies, sex biasing process, birds.

Robertson, H.A., R.M. Colbourne, A. Nelson, and I.M. Westbrooke (2006). **At what age should brown kiwi (*Apteryx mantelli*) eggs be collected for artificial incubation?** *Notornis* 53(Part 2): 231-234. ISSN: 0029-4470.

**Descriptors:** brown kiwi, eggs, artificial incubation, collection age, *Apteryx mantelli*.

Sarasqueta, D.V. (2005). **Aspects of rearing, reproduction and hybridization of Darwin's Rhea or Choique (*Rhea pennata* syn. *Pterocnemis pennata*, spp. *pennata*)**. E. Carbajo *Proceedings of the 3rd International Ratite Science Symposium of the World's Poultry Science Association WPSA and 12th World Ostrich Congress, Madrid, Spain, 14th 16th October, 2005*, World Poultry Science Association (WPSA): Beekbergen, Netherlands, p. 35-44. ISBN: 8460963535.

**Descriptors:** Darwin's rhea, rearing, reproduction, hybridization, choique, aspects, conference proceedings, book chapter.

**Notes:** Meeting Information: Proceedings of the 3rd International Ratite Science Symposium of the World's Poultry Science Association (WPSA) and 12th World Ostrich Congress, Madrid, Spain, 14th-16th October, 2005.

Sontakke, S.D., G. Umapathy, V. Sivaram, S.D. Kholkute, and S. Shivaji (2004). **Semen characteristics, cryopreservation, and successful artificial insemination in the Blue rock pigeon (*Columba livia*)**. *Theriogenology*. 62((1-2)): 139-153. ISSN: 0093-691X.

**Abstract:** The present study was undertaken in the Blue rock pigeon (*Columba livia*) to evaluate the annual semen characteristics, to identify a suitable extender for semen short-term storage, to determine a protocol for cryopreservation of semen and finally to check whether intracloacal insemination would lead to the birth of a chick. Semen characteristics such as semen volume, sperm concentration, sperm motility, and percentage of normal spermatozoa were maximum during the monsoon season. TALP was observed to be the most suitable semen extender and the sperm survived best at 37 degrees C at a dilution of 1:100 in TALP. Further, cryopreservation studies on pigeon semen indicated that 8% DMSO with or without egg yolk (20%) proved to be a better cryoprotectant compared to glycerol and polyethylene glycol. In addition, the slow freezing protocol was better than the fast-freezing protocol and about 40% of the cryopreserved spermatozoa were motile following thawing. Computer-aided semen analysis indicated that pigeon spermatozoa were extremely active immediately after dilution in TALP and exhibited linear trajectories persisting up to 9 h. But, with time there was a time-dependent decrease in the velocity parameters (VAP, VSL, and VCL). Cryopreserved spermatozoa following thawing also exhibited linear trajectories but had reduced velocity as evident from the significant decrease in VAP, VSL, and VCL. Further, artificial inseminations using fresh semen resulted in 45% fertilization and birth of a live chick.

**Descriptors:** Blue rock pigeon, reproduction, semen, volume, spermatozoa, sperm motility, seasonal variation, semen extenders, cryoprotectants, dimethyl sulfoxide, egg yolk, cryopreservation, artificial insemination, cloaca, freezing, thawing, India.

Symes, C.T. and M.R. Perrin (2004). **Breeding biology of the greyheaded parrot (*Poicephalus fuscicollis suabelicus*) in the wild**. *Emu* 104(1): 45-57. ISSN: 0158-4197.

**Descriptors:** greyheaded parrot, wild, breeding biology, *Poicephalus fuscicollis suabelicus*, reproduction.

Taylor, S. and M.R. Perrin (2006). **Aspects of the breeding biology of the brown-headed parrot *Picephalus cryptoxanthus* in South Africa**. *Ostrich* 77(3-4): 225-228. ISSN: 0030-6525.

**Descriptors:** brown-headed parrot, *Picephalus cryptoxanthus*, breeding biology, aspects, South Africa.

Yildiz, H., B. Yilmaz, I. Arican, M. Petek, and A. Bahadir (2006). **Effects of cage systems and feeding time on the morphological structure of female genital organs in pharaoh quails (*Coturnix coturnix pharaoh*)**. *Veterinarski Arhiv* 76(5): 383-391.

ISSN: 0372-5480.

**Descriptors:** pharaoh quail, female genital organs, morphological structure, cage systems, feeding time, effects.

Yin YanBo, Li FangZheng, Tan JinShan, Song XueXiong, Dong WuZi, and Ji YaJie (2006).

**Ultrastructure of the ostrich spermatozoa.** *Journal of Economic Animal* 10(4): 198-202. ISSN: 1007-7448.

**Descriptors:** ostrich, spermatozoa, ultrastructure, anatomy, reproduction.

**Language of Text:** Chinese, summary in English.

# Research

Abolnik, C., R.F. Horner, R. Maharaj, and G.J. Viljoen (2004). **Characterization of a pigeon paramyxovirus (PPMV-1) isolated from chickens in South Africa.** *Onderstepoort Journal of Veterinary Research* 71(2): 157-160. ISSN: 0030-2465.

**Descriptors:** pigeon, paramyxovirus, characterization, isolated, chickens, south Africa.

Acerbo, M.J., P. Vyboh, L. Kostal, L. Kubikova, and J.D. Delius (2005). **Repeated apomorphine administration alters dopamine D1 and D2 receptor densities in pigeon basal telencephalon.** *Experimental Brain Research; Experimentelle Hirnforschung; Experimentation Cerebrale* 160(4): 533-7. ISSN: 0014-4819.

**Abstract:** When pigeons are repeatedly administered a dose of apomorphine they show an increasing behavioral response, much as rodents do. In birds this expresses itself in an augmented pecking response. This sensitization is assumed to be largely due to a conditioning process. Here we present evidence that sensitization is accompanied by an alteration of the D(1) to D(2) dopamine receptor densities. An experimental group of pigeons was repeatedly injected with apomorphine, and a control group with saline. The basal forebrain tissue, known to be rich in dopamine receptors, was subjected to binding assays using tritiated specific D(1) and D(2) dopamine receptor antagonists. There was a trend towards an increase in D(1) and a significant decrease in D(2) receptor densities in apomorphine-treated birds compared to the saline-treated controls. We conclude that extended apomorphine treatment modifies the D(1) dopamine receptor density in the opposite manner to the D(2) dopamine receptor density.

**Descriptors:** pigeon, basal telencephalon, repeated apomorphine administration, alters dopamine, D1, D2, receptor densities, behavioral response.

Adcock, G.J., R. Heinsohn, D. Ebert, N. Amini, and R. Peakall (2005). **Microsatellite loci for behavioural studies of Eclectus parrot (*Eclectus roratus*: Aves).** *Molecular Ecology Notes* 5(3): 616-618. ISSN: 1471-8278.

**Descriptors:** parrot, *Eclectus roratus*, behavioral studies, microsatellite loci.

Ai, H.B., X.Y. Zhang, and J.P. Zhu (2004). **Comparative studies on the wide frequency band electrocardiogram and vectorcardiogram in pigeon and mouse.** *Comparative Biochemistry and Physiology Part A Molecular and Integrative Physiology*. 137((3)): 577-583. ISSN: 1095-6433.

**Abstract:** Wide frequency band ECG and vectorcardiogram in anesthetized pigeon and mouse were studied from the standpoint of comparison. The key results were as

follows: in pigeon, the direction of the main QRS was inverted in leads II, III and aVF, and upright in lead aVR, which was contrary to that in mouse. The T wave was upright in leads II, III and aVF, but inverted in lead aVR in pigeon, which was the same as that in mouse. In pigeon, there was a large notch on the upstroke of the S wave in lead II without exception, but there was no such notch in the corresponding lead in mouse. The QRS vector loop in the frontal plane lay between and -90 and -180degrees in pigeon, while that of mouse lay between 0 and 90degrees . The relative power of high frequency range (80-1000 Hz) of the QRS in lead II was approximately 15% in pigeon, but 55% in mouse. The direction of the main QRS was contrary in pigeon and mouse because the subepicardial muscles were depolarized before the subendocardial muscles in pigeon, but the latter were depolarized before the former in mouse. The direction of the T waves was the same in both pigeon and mouse because subepicardial muscles were all repolarized before subendocardial muscles.

**Descriptors:** pigeons, mice, heart, electrocardiography, electrophysiology, vectorcardiography, comparative studies.

Alvarado Mallart, R.M. (2005). **The chick/quail transplantation model: discovery of the isthmic organizer center.** *Brain Research. Brain Research Reviews* 49(2): 109-13. ISSN: 0014-4819; 0165-0173.

**Abstract:** This paper summarizes chick/quail transplantation experiments performed in the INSERM U106 by Alvarado-Mallart's group from 1989 to 2002. First, it will present the various steps leading us to demonstrate that, at stage 10 of Hamburger and Hamilton, the avian neuroepithelium is still competent to change its fate influenced by environmental inductive factors and that these factors emanate from the cerebellar neuroepithelium; then, it will be briefly reported, experiments aimed to characterize the genetic cascade involved in the formation of the midbrain/hindbrain boundary and the specification of the meso-isthmic-cerebellar domain.

**Descriptors:** chick-quail transplantation, animal models, quail physiology, isthmic organizer center, body patterning, gene expression regulation, environmental inductive factors.

Ando, K., H. Kusaba, T. Soh, and H. Iwamoto (2007). **Different patterns of vasoactive intestinal polypeptide (vip)-immunoreactive and acetylcholinesterase (ache)-positive innervation in the internal carotid artery and cerebral arterial tree of the quail.** *Journal of Veterinary Medical Science* 69(2): 177-183. ISSN: 0916-7250.

**Descriptors:** quail, vasoactive intestinal polypeptide, vip, immunoreactive and acetylcholinesterase, ache, different patterns, positive innervation, internal carotid artery, cerebral arterial tree.

Bandah, D., T. Swissa, G. Ben Shlomo, E. Banin, R. Ofri, and D. Sharon (2007). **A complex expression pattern of Pax6 in the pigeon retina.** *Investigative Ophthalmology and Visual Science* 48(6): 2503-9. ISSN: 0146-0404.

**Abstract:** PURPOSE: The retina of some avian species contains two macular regions, making it an excellent model for retinal, and especially macular, development. Previous studies have provided evidence of the involvement of Pax6 in macular development. The purpose was to perform a comprehensive expression analysis of Pax6 isoforms in different regions of the pigeon retina. METHODS: The different mRNA transcripts were amplified by RT-PCR and characterized by sequencing analysis. Semiquantitative PCR and quantitative real-time PCR analyses were used to study the level of expression of each transcript. Western blot analysis was performed on both the cytosolic and nuclear cell fractions. RESULTS: An evolutionary analysis of all human-chicken retinal homologues revealed that Pax6 is one of the most conserved retinal genes. By alternative splicing and alternative initiation of transcription, Pax6 produces 41 different mRNA transcripts, encoding 17 protein isoforms in the pigeon retina, five of which are paired-less cytosolic proteins. Semiquantitative expression analysis revealed that the short, paired-less, transcripts have a relatively high level of expression. Quantitative real-time PCR analysis of the central macula, red area, and peripheral retina revealed a spatial and temporal expression profile indicating that many Pax6 transcripts take a part in macular development. CONCLUSIONS: These data suggest that Pax6, a highly conserved gene, can maintain evolutionarily conserved variability at the protein level by alternative splicing and initiation mechanisms, allowing it to perform multiple functions. The variability in the length of the paired domain suggests that the different Pax6 isoforms activate different sets of genes.

**Descriptors:** pigeon, retina, pax6, complex expression pattern, model, retinal, macular development.

Barbezange, C. and V. Jestin (2005). **Molecular study of the quasispecies evolution of a typical pigeon paramyxovirus type 1 after serial passages in pigeons by contact.** *Avian Pathology*. 34(2): 111-122. ISSN: 0307-9457.

**Descriptors:** pigeons, Paramyxoviridae, evolution, microbial genetics, reverse transcriptase polymerase chain reaction, brain, kidneys, Newcastle disease, genetic variation, nucleotide sequences, in vivo studies, strains, pathogenicity, molecular-sequence-data.

Basha, S.H., M. Sivakumar, and G. Ramesh (2007). **Histogenesis of the adrenal gland in japanese quail (*Coturnix coturnix japonica*).** *Indian Journal of Animal Sciences* 77(3): 222-224. ISSN: 0367-8318.

**Descriptors:** Japanese quail, adrenal gland, histogenesis, *Coturnix coturnix japonica*.

Bashir, M. and M.T. Javed (2005). **Effects of ethanol on brain and pancreas weights, serum sodium and potassium, and haematological parameters in quail (*Coturnix coturnix japonica*)**. *Avian Pathology* 34(2): 96-100. ISSN: 0307-9457.

**Descriptors:** Japanese quails, ethanol, brain, pancreas, tissue weight, blood chemistry, sodium, potassium, hematology, dosage, animal behavior, locomotion, erythrocyte count, hematocrit, hemoglobin, leukocyte count, animal models, adverse effects, drug evaluation, broilers, drug toxicity, animal well being.

Berdeen, J.B. and D.L. Otis (2006). **Effects of subcutaneous transmitter implants on mourning doves**. *Wildlife Society Bulletin* 34(1): 93-103. ISSN: 0091-7648.

**Descriptors:** mourning doves, transmitter, implants, subcutaneous, effects.

Bertrand, S., C. Alonso Alvarez, G. Devevey, B. Faivre, J. Prost, and G. Sorci (2006).

**Carotenoids modulate the trade-off between egg production and resistance to oxidative stress in zebra finches**. *Oecologia* 147(4): 576-584.

**Abstract:** The allocation of resources to reproduction and survival is a central question of studies of life history evolution. Usually, increased allocation to current reproduction is paid in terms of reduced future reproduction and/or decreased survival. However, the proximal mechanisms underlying the cost of reproduction are poorly understood. Recently, it has been shown that increased susceptibility to oxidative stress might be one of such proximate links between reproduction and self-maintenance. Organisms possess a range of antioxidant defenses, including endogenously produced molecules (e.g., enzymes) and compounds ingested with food (e.g., carotenoids). If reproductive effort increases the production of reactive oxygen species, the availability of antioxidant defenses may partly or fully counteract the free-radical damages. One could, therefore, expect that the trade-off between reproduction and oxidative stress is modulated by the availability of antioxidant defenses. We tested this hypothesis in zebra finches. We manipulated reproductive effort by either allowing or preventing pairs to breed. Within each breeding or non-breeding group, the availability of antioxidant compounds was manipulated by supplementing or not supplementing the drinking water with carotenoids. We found that although birds in the breeding and non-breeding groups did not differ in their resistance to oxidative stress (the breakdown of red blood cells submitted to a controlled free-radical attack), one aspect of breeding effort (i.e., the number of eggs laid by birds in both breeding and non-breeding groups) was negatively correlated with resistance to oxidative stress only in birds that did not benefit from a carotenoid-supplemented diet. This result therefore suggests that carotenoid availability can modulate the trade-off between reproduction and resistance to oxidative stress.

**Descriptors:** free radicals, carotenoids, oxidative stress, reproduction, Zebra finch, resistance, egg production.

Bertrand, S., F. Criscuolo, B. Faivre, and G. Sorci (2006). **Immune activation increases susceptibility to oxidative tissue damage in zebra finches.** *Functional Ecology* 20(6): 1022-1027. ISSN: 0269-8463.

**Descriptors:** zebra finches, immune activation, susceptibility, increases, oxidative tissue damage.

Bhosale, P., B. Serban, d.Y. Zhao, and P. Bernstein S (2007). **Identification and metabolic transformations of carotenoids in ocular tissues of the Japanese quail *Coturnix japonica*.** *Biochemistry* 46(31): 9050-7. ISSN: 0162-0134.

**Abstract:** As in humans and monkeys, lutein [(3R,3'R,6'R)-beta,epsilon-carotene-3,3'-diol] and zeaxanthin [a mixture of (3R,3'R)-beta,beta-carotene-3,3'diol and (3R,3'S-meso)-beta,beta-carotene-3,3'-diol] are found in substantial amounts in the retina of the Japanese quail *Coturnix japonica*. This makes the quail retina an excellent nonprimate small animal model for studying the metabolic transformations of these important macular carotenoids that are thought to play an integral role in protection against light-induced oxidative damage such as that found in age-related macular degeneration (AMD). In this study, we first identified the array of carotenoids present in the quail retina using C30 HPLC coupled with in-line mass spectral and photodiode array detectors. In addition to dietary lutein (2.1%) and zeaxanthin (11.8%), we identified adonirubin (5.4%), 3'-oxolutein (3.8%), meso-zeaxanthin (3.0%), astaxanthin (28.2%), galloxanthin (12.2%), epsilon,epsilon-carotene (18.5%), and beta-apo-2'-carotenol (9.5%) as major ocular carotenoids. We next used deuterium-labeled lutein and zeaxanthin as dietary supplements to study the pharmacokinetics and metabolic transformations of these two ocular pigments in serum and ocular tissues. We then detected and quantitated labeled carotenoids in ocular tissue using both HPLC-coupled mass spectrometry and noninvasive resonance Raman spectroscopy. Results indicated that dietary zeaxanthin is the precursor of 3'-oxolutein, beta-apo-2'-carotenol, adonirubin, astaxanthin, galloxanthin, and epsilon,epsilon-carotene, whereas dietary lutein is the precursor for meso-zeaxanthin. Studies also revealed that the pharmacokinetic patterns of uptake, carotenoid absorption, and transport from serum into ocular tissues were similar to results observed in most human clinical studies.

**Descriptors:** Japanese quail, carotenoids, ocular tissue, metabolic transformation, retina, animal model.

Błaszczuk, B., Z. Tarasewicz, J. Udała, D. Gaczarzewicz, T. Stankiewicz, D. Szczerbinska, K. Romaniszyn, and J. Jasieniecka (2006). **Changes in the blood plasma testosterone and cholesterol concentrations during sexual maturation of pharaoh quails.** *Animal Science Papers and Reports* 24(3): 259-266. ISSN: 0860-4037.

**Descriptors:** pharaoh quails, changes, blood plasma testosterone, cholesterol concentrations, sexual maturation.

Bovera, F., S. D'Urso, S. Calabro, R. Tudisco, C. Di Meo, and A. Nizza (2007). **Use of faeces as an alternative inoculum to caecal content to study in vitro feed digestibility in domesticated ostriches (*Struthio camelus var. domesticus*)**. *British Poultry Science* 48(3): 354-62. ISSN: 0007-1668.

**Abstract:** 1. In order to find an alternative source of inoculum to caecal content for studying the in vitro feed digestibility in domesticated ostriches (*Struthio camelus var. domesticus*), caecal content and faeces of 4 male birds were used as inocula for an in vitro gas production trial. 2. About 1 g of each of 5 substrates (maize silage, CS; alfalfa hay, AH; barley, BG; soybean meal, SM; beet pulp, BP) was weighed, in quadruplicate per inoculum, in 120 ml flasks; 75 ml of an anaerobic medium and 4 ml of reducing solution were added and flasks were kept at 39 degrees C. Caecal content and faeces were diluted respectively 1 : 2 (CI) and 1 : 4 (FI) with an anaerobic medium and were injected into the respective flasks (10 ml). 3. Gas production was recorded 22 times up to 120 h of incubation and fermentation characteristics (for instance, degraded organic matter, OMD; potential gas production, A; maximum fermentation rate, Rmax; time at which it is reached, Tmax; pH; volatile fatty acid, VFA; ammonia) were studied for each inoculum and substrate. 4. CI and FI showed significant differences in Tmax (16.37 vs 18.47 h, respectively), propionic (16.47 vs 12.07 mmoles/l) and butyric acid (6.50 vs 7.98 mmoles/l) and ammonia concentration (17.18 vs 19.95 mmoles/l). The substrates, according to their chemical composition, showed different fermentation characteristics. However, the regression equations able to estimate some fermentation characteristics of the caecum from those of faeces were statistically significant and showed R<sup>2</sup>-values ranging from 0.87 to 0.99. 5. The differences in fermentation pathways of the two inocula did not appear to influence the rate and extent of OM digestion. Faecal fermentation predicted rates and extent of OM digestion by caecal fermentation in ostriches; consequently, the faeces could be considered as an alternative to caecal content to study feed digestibility in the species, although there is a need to undertake further research.

**Descriptors:** ostrich, in vitro feed digestibility, caecal content, inoculum, feces, study, fermentation, digestion.

Brand, Z., T.S. Brand, and C.R. Brown (2003). **The effect of different combinations of dietary energy and protein on the composition of ostrich eggs**. *South African Journal of Animal Science* 33(3): 193-200. ISSN: 0375-1589.

**Descriptors:** ostrich, eggs, dietary energy, protein, different combinations, effect on composition of eggs, nutrition, breeding females.

Bronneberg, R.G.G., M.A.M. Taverne, S.J. Dieleman, E. Decuypere, V. Bruggeman, J.C.M. Vernooij, and J.A. Stegeman (2007). **The relation between ultrasonographic observations in the oviduct and plasma progesterone, luteinizing hormone and**

**estradiol during the egg laying cycle in ostriches.** *Domestic Animal Endocrinology* 32(1): 15-28.

**Abstract:** In this study we investigated the temporal relationship between ovulation, egg formation, oviposition and the changes in plasma concentrations of progesterone, luteinizing hormone and estradiol-17(Sb(B during the egg laying cycle in farmed ostriches. In 10 egg-producing birds, transcutaneous ultrasound scanning was performed at 3 h intervals and blood sampling at hourly intervals during a period of at least 48 h (one egg laying cycle). In hens (n = 8) that ovulated during the observational period, the ovulated egg was first detected 2 h after oviposition; thus, ovulation occurred shortly after oviposition in all birds. During the period between two consecutive ovipositions, the developing egg remained for 9 h in the proximal part (infundibulum, magnum or isthmus) and for 39 h in the distal part of the oviduct (uterus). In ovulating hens, plasma progesterone concentrations showed a characteristic and consistent profile: from basal levels of around 0.1 ng/ml concentrations started to increase 12 h before oviposition, reached an average maximum of 3.5 ng/ml at 3 h before oviposition and returned to basal levels 3 h and 30 min after oviposition. Changes in plasma luteinizing hormone and estradiol-17(Sb(B concentrations showed comparable patterns of elevation and decline relative to the timing of oviposition and ovulation. However, variation in their individual basal concentrations was generally larger and peak values were less conspicuous than those of progesterone. In non-ovulating hens (n = 2) neither progesterone, nor luteinizing hormone nor estradiol-17(Sb(B showed elevations to peak concentrations before oviposition. These data demonstrate that during the egg laying cycle of ostriches, events such as ovulation, egg development and oviposition evolve according to a rather strict time schedule, and that progesterone, luteinizing hormone and estradiol-17(Sb(B reach peak concentrations shortly before ovulation. Additionally, our findings also show that on-farm ultrasound scanning is a useful technique to discriminate between ovulating and non-ovulating hens.

**Descriptors:** ostriches, ovulation, oviposition, oviducts, ultrasonography, hormone secretion, progesterone, luteinizing hormone, estradiol, temporal variation, ostrich hens, egg development.

Butkeraitis, P., C.A.F. Oliveira, D.R. Ledoux, R. Ogido, R. Albuquerque, J.F. Rosmaninho, and G.E. Rottinghaus (2004). **Effect of dietary fumonisin B1 on laying Japanese quail.** *British Poultry Science* 45(6): 798-801. ISSN: 0007-1668.

**Abstract:** 1. A 28-d experiment was conducted to evaluate the effects of fumonisin B1 (FB1) on egg production and egg quality of young laying Japanese quail fed on fumonisin-contaminated rations. 2. To this end, 128 7-week-old birds were randomly distributed into 4 experimental groups (32 birds per group) and given rations containing 0 (control), 10, 50 and 250 mg FB1/kg feed. Each treatment consisted of 4

replicates of 8 quail. Egg production and egg weight were checked daily. Feed consumption and feed conversion were determined weekly. Eggs laid on the last day of each 7-d period were collected and subjected to individual analysis for specific gravity, Haugh units and percentage eggshell. 3. Compared with controls, quail given greater than or equal to 50 mg FB1/kg had reduced feed intake and lower body weight gain. Feed conversion was reduced only in birds given 250 mg FB1/kg. 4. Mean egg production and egg weight were lower in birds given 250 mg FB1/kg. Eggshell weight was reduced in birds given greater than or equal to 50 mg FB1/kg. However, mean specific gravity, Haugh units and percentage eggshell were not affected by FB1. 5. No histopathological changes were observed in liver, kidney or heart samples from any treatment group. 6. The results indicated that exposure to FB1 at concentrations greater than or equal to 50 mg/kg could adversely affect quail performance, emphasising the importance of controlling fumonisin contamination of quail rations. **Descriptors:** Japanese quails, laying performance, egg production, poultry feeding, fumonisin B1, feed contamination, egg weight, young animals, feed intake, feed conversion, specific gravity, egg shell quality, liveweight gain, liver, kidneys, heart, histopathology, mycotoxicosis, toxicity testing.

- Chadman, K.K. and J.H. Woods (2004). **Cardiovascular effects of nicotine, chlorisondamine, and mecamlamine in the pigeon.** *Journal of Pharmacology and Experimental Therapeutics* 308(1): 73-78. ISSN: 0022-3565. **Descriptors:** pigeon, cardiovascular effects, nicotine, chlorisondamine, mecamlamine.
- Chan, C.h., K.N. Ballantyne, D.M. Lambert, and G.K. Chambers (2005). **Characterization of variable microsatellite loci in Forbes' parakeet (*Cyanoramphus forbesi*) and their use in other parrots.** *Conservation Genetics* 6(4): 651-654. ISSN: 1566-0621. **Descriptors:** Forbes parakeet, parrots, variable mucrosatellite loci, characterization, use, *Cyanoramphus forbesi*.
- Cornil, C.A., V. Seutin, P. Motte, and J. Balthazart (2004). **Electrophysiological and neurochemical characterization of neurons of the medial preoptic area in Japanese quail (*Coturnix japonica*).** *Brain Research* 1029(2): 224-40. ISSN: 0014-4819. **Abstract:** Intracellular recordings of medial preoptic neurons demonstrated that most neurons show a spontaneous firing, a linear I-V relationship and low-threshold-like events suppressed by the application of Ni<sup>2+</sup>. Some neurons had a depolarizing sag of the membrane potential in response to hyperpolarizing current pulses. The majority of the cells exhibited a robust spontaneous synaptic activity suppressed by SR95531 (100 microM), a GABAA receptor antagonist, and/or by 6-cyano-7-nitroquinoxaline-2,3-dione (CNQX, 10 microM), an (RS)-alpha-amino-3-hydroxy-5-methylisoxazole-4-propionic acid (AMPA)/kainate (KA) glutamate

receptor antagonist. Most neurons were affected by the application of AMPA (10 microM), kainate (30 microM), N-methyl-D-aspartic acid (NMDA, 10 microM), isoguvacine (a GABAA receptor agonist, 100 microM), dopamine (100 microM), and norepinephrine (100 microM). Biocytin injections coupled to aromatase immunocytochemistry identified 19 recorded neurons including 3 displaying a dense aromatase immunoreactivity. All of them responded to kainate, dopamine, and norepinephrine, while only one responded to isoguvacine and NMDA. Taken together, these results demonstrate a relative electrical and neurochemical homogeneity of the medial preoptic neurons, including a few aromatase-immunoreactive neurons that could be identified by immunocytochemistry after biocytin labeling of the recorded neurons.

**Descriptors:** Japanese quail, *Coturnix* physiology, characterization of neurons, electrophysiological, neurochemical, medial preoptic area, intracellular recordings.

Derjushcheva, S., A. Kurganova, F. Habermann, and E. Gaginskaya (2004). **High chromosome conservation detected by comparative chromosome painting in chicken, pigeon and passerine birds.** *Chromosome Research*. 12(7): 715-723. ISSN: 0967-3849.

**Descriptors:** chickens, pigeons, Fringillidae, *Turdus*, chromosomes, cytogenetics, fluorescence in situ hybridization, cytogenetic analysis, telomeres, Fringilla-coelebs, *Turdus iliacus*.

Dickman, J.D., D. Huss, and M. Lowe (2004). **Morphometry of otoconia in the utricle and saccule of developing Japanese quail.** *Hearing Research* 188(1-2): 89-103. ISSN: 0378-5955.

**Abstract:** The development of otoconia in the utricular and saccular maculae from initial embryonic formation to adult stages was examined in Japanese quails. Both the morphology and size of the otoconia were quantified at different developmental stages. It was observed that the otoconia were initially formed on embryologic stage E5 in the saccule and E6 in the utricle. Otolith mass areas increased in a sigmoidal growth pattern, with saccular otolith areas being smaller than the utricular mass areas. Saccular otolith masses reached adult values at embryonic stage E12 and utricular areas reached adult values at post-hatch day 7. Mature individual otoconia were characterized by a barrel shape with two trihedral faceted ends. However, initial formation of otoconia at E5 (saccular) and E6 (utricular) maculae was characterized by a double fluted morphology that consisted of an hourglass shape with extended fins forming trihedral angles of 120 degrees. Double fluted otoconia rapidly filled, so that by embryonic day 8 mature otoconia dominated the maculae for the remainder of development through adulthood. Thus, a progression from double fluted to mature forms was noted. Mature utricular otoconia in adult quails averaged 11 microm in length and 5 microm in width, with length/width ratios of approximately 2.5:1, for

all size ranges. Saccular otoconia were smaller, having about 70% the size of utricular otoconia in both length and width. During development, the average size and range of individual otoconia increased nearly linearly for both otolith organs. In the utricular macula, large otoconia were concentrated in the lateral regions of the epithelium. In contrast, otoconia of various sizes were distributed uniformly across the surface of the saccular macula.

**Descriptors:** Japanese quail, *Coturnix*, otolithic membrane embryology, otolithic membrane ultrastructure, saccule and utricle embryology, acoustic maculae embryology, electron microscopy, scanning, animal models, saccule and utricle ultrastructure, morphometry.

Dooling, R.J. and B. Lohr (2006). **Auditory temporal resolution in the zebra finch (*Taeniopygia guttata*): a model of enhanced temporal acuity.** *Ornithological Science* 5(1): 15-22. ISSN: 1347-0558.

**Descriptors:** zebra finch, auditory temporal resolution, model, enhanced temporal acuity, *Taeniopygia guttata*.

Dorey, C.K., L. Granata, C.R. Nichols, K.M. Cheng, and N.E. Craft (2005). **Dietary modulation of lens zeaxanthin in quail.** *Experimental Eye Research* 81(4): 464-77. ISSN: 0014-4835.

**Abstract:** Although higher dietary intake of lutein/zeaxanthin has been associated with reduced risk for cataracts, the impact of dietary supplements on lens lutein (L) or zeaxanthin (Z) has not been examined. If higher lens carotenoids do reduce risk for cataract, it would be essential to know whether dietary carotenoids can elevate carotenoids in the adult vertebrate lens. In this study, a covey of Japanese quail were hatched and raised 6 months on carotenoid-deficient diet, then switched to deficient diet supplemented with low or high 3R,3R'-zeaxanthin (5 or 35 mg/kg(-1) food) or beta-carotene (50 mg/kg(-1) food). Controls included a group of covey-mates that remained on the deficient diet and another raised from birth on the high Z (35 mg Z/kg(-1)) diet. At 1 year of age, carotenoids and tocopherols in the lens and in the serum were analysed by HPLC, and compared by analysis of variance. Serum Z was significantly elevated in deficient birds fed the lower or higher Z supplement for 6 months ( $P < 0.0001$  for each). Serum Z in birds maintained on the higher Z supplement for 1 year was much higher than that in deficient birds ( $P < 0.0001$ ), but not different from deficient birds given the higher Z supplement. As in humans, the predominant lens carotenoids were lutein (L) and zeaxanthin (Z), and the total carotenoid concentration was of lower magnitude than the concentration of alpha-tocopherol. Responses to Z supplementation were sex-related. Female quail had 5-10 times higher serum concentrations of both Z and L than males ( $P < 0.0001$ ,  $< 0.001$ ), and they also had higher lens Z concentrations than males ( $P < 0.0006$ ); possible effects of estrogen on lens carotenoids are discussed. Lens Z concentration

was strongly and positively correlated with serum Z in females ( $r=0.77$ ;  $P<0.002$ ). Deficient adult females supplemented with the 35 mg/kg(-1) dose of Z for 6 months had a mean lens Z concentration ( $0.252\pm 0.06$  microg/g(-1) protein) close to that in females fed with the supplement from birth ( $0.282\pm 0.15$  microg/g(-1) protein). Birds fed with the higher dietary Z supplement for 6 or 12 months had significantly higher lens Z than birds fed lower or no dietary Z ( $P<0.0001$ ). Lens L was not altered by dietary supplementation with either Z or beta-carotene. beta-Carotene supplements did not result in detectable lens beta-carotene, and had no effect on lens Z. Neither Z nor beta-carotene supplementation had a significant effect on serum or lens tocopherol concentrations. These studies in quail provide the first experimental evidence that lens carotenoids in adult vertebrates can be manipulated by dietary Z supplements.

**Descriptors:** Japanese quail, dietary supplements, lens, crystalline metabolism, beta carotene analogs, derivatives, carotenoids deficiency, chromatography, *Coturnix*, lutein blood, lutein pharmacokinetics, sex factors, tocopherols blood, tocopherols metabolism, xanthophylls, beta carotene administration and dosage, beta carotene blood, beta carotene deficiency, beta carotene pharmacokinetics.

Dzialowski, E.M., W.W. Burggren, T. Komoro, and H. Tazawa (2007). **Development of endothermic metabolic response in embryos and hatchlings of the emu (*Dromaius novaehollandiae*)**. *Respiratory Physiology and Neurobiology* 155(3): 286-92. ISSN: 1569-9048.

**Abstract:** During hatching, there is a maturation of the mechanisms controlling the respiratory physiology involved in endotherm in precocial avian species. Here we examined the timing of the development of an endothermic response of oxygen uptake ( $MO_2$ ) to an alteration of ambient temperature ( $T(a)$ ) in a model precocial species, the preterm and hatching emu (*Dromaius novaehollandiae*). Late stage pre-pipped and pipped embryos and hatchlings were measured for responses of  $MO_2$  and shell or skin temperature ( $T(s)$ ) to altered  $T(a)$  ( $\Delta T(a)$ ).  $MO_2$  remained unchanged in pre-pipped and internally pipped (IP) embryos at the end of 1.5h exposure to  $\Delta T(a)$  of  $\pm 10$  degrees C. Externally pipped (EP) embryos responded to a cooling and a warming exposure with marked increase and decrease in  $MO_2$ , as hatchlings responded to  $\Delta T(a)$  with an endothermic change in  $MO_2$ . The demonstration of the endothermic inverse metabolic response first appearing in EP embryos suggests that pre-EP embryos may also possess the ability to produce the endothermic inverse metabolic response, but they are restricted by the eggshell gas conductance. Late pre-pipped and IP embryos were measured again for responses of [Formula: see text] to  $\Delta T(a)$  in air and then in a 40%  $O_2$  environment. The metabolic response of pre-pipped embryos at 90% of incubation was partially altered by switching from air to hyperoxia. IP embryos responded to  $\Delta T(a)$  in 40%  $O_2$

with apparent inverse changes in MO<sub>2</sub>. The late stage emu embryo possesses the ability to produce an endothermic metabolic response at an earlier stage of development than in chickens, but this response is limited by the eggshell gas conductance. **Descriptors:** emu, animals, newborn metabolism, newborn physiology, body temperature regulation physiology, dromaiidae embryology, embryo, nonmammalian metabolism, respiratory system, hyperoxia metabolism, oxygen consumption physiology.

Eklom, K. and A. Lill (2006). **Development of parameters influencing blood oxygen-carrying capacity in nestling doves.** *Emu* 106(4): 283-288. ISSN: 0158-4197.

**Descriptors:** nestling doves, blood oxygen carrying capacity, influencing parameters, development.

Fang, Y. and W.K. Reisen (2006). **Previous infection with West Nile or St. Louis encephalitis viruses provides cross protection during reinfection in house finches.**

*American Journal of Tropical Medicine and Hygiene* 75(3): 480-5. ISSN: 0002-9637.

**Abstract:** House finches are competent hosts for both West Nile and St. Louis encephalitis viruses and frequently become infected during outbreaks. In the current study, house finches were infected initially with either West Nile or St. Louis encephalitis viruses and then challenged 6 weeks post infection with either homologous or heterologous viruses. Although mortality rates were high during initial infection with West Nile virus, prior infection with either virus prevented mortality upon challenge with West Nile virus. Prior infection with West Nile virus provided sterilizing immunity against both viruses, whereas prior infection with St. Louis encephalitis virus prevented viremia from St. Louis encephalitis virus, but only reduced West Nile virus viremia titers. Immunologic responses were measured by enzyme immunoassay and plaque reduction neutralization tests. Heterologous challenge with West Nile virus in birds previously infected with St. Louis encephalitis virus produced the greatest immunologic response, markedly boosting antibody levels against St. Louis encephalitis virus. Our data have broad implications for free-ranging avian serological diagnostics and possibly for the recent disappearance of St. Louis encephalitis virus from California.

**Descriptors:** house finches, St. Louis encephalitis virus, physiology, finches virology, West Nile virus, physiology, immunology, recurrence, viremia.

Franciosini, M.P., E. Fringuelli, O. Tarhuni, G. Guelfi, D. Todd, P. Casagrande Proietti, N. Falocci, and G. Asdrubali (2005). **Development of a polymerase chain reaction-based in vivo method in the diagnosis of subclinical pigeon circovirus infection.** *Avian Diseases*. 49(3): 340-343. ISSN: 0005-2086.

**Abstract:** This paper describes a polymerase chain reaction (PCR)-based method performed on blood samples and intestinal content to detect subclinical pigeon circo-

virus (PiCV) infection in live pigeons. In addition, two sets of primers (primer set 1 and 2), designed in two different regions of the viral genome, were used to provide evidence of possible differences in PCR responses. Blood and intestinal content samples were randomly collected from a total of 50 apparently healthy meat pigeons, aged 1 to 5 wk, which came from central Italy. Samples of primary lymphoid organs were also collected. Results showed a high level of PiCV infection, although clinical signs were not present. The results obtained with the two sets of primers showed that primer set 2 was able to detect a higher number of PCR-positive pigeons (45 of 50 pigeons) than primer set 1 (11 of 50 pigeons). In both cases an increase in positive results with pigeon age indicates that the major direction of transmission is likely horizontal. In these circumstances feces can play an important epidemiologic role, as supported by the consistent circovirus detection in intestinal content. The high sensitivity of this PCR test, which is able to detect very low amounts of viral DNA (5.5 X 10<sup>-3</sup> fg of plasmid containing the cloned PiCV genome), makes it suitable for possible application as an epidemiologic tool for identifying virus carriers for subsequent removal from lofts.

**Descriptors:** pigeons, pigeon circovirus, PiCV polymerase chain reaction, PCR early diagnosis, diagnostic techniques, disease detection, poultry diseases, viral diseases, blood sampling, tissue analysis, virus transmission, feces.

**Language of Text:** Summary in Spanish.

Gomez Meda, B.C., A.L. Zamora Perez, J. Luna Aguirre, A. Gonzalez Rodriguez, M.L. Ramos Ibarra, O. Torres Bugarin, C.M. Batista Gonzalez, and G.M. Zuniga Gonzalez (2006). **Nuclear abnormalities in erythrocytes of parrots (*Aratinga canicularis*) related to genotoxic damage.** *Avian Pathology* 35(3): 206-210. ISSN: 0307-9457.

**Abstract:** Nuclear abnormalities in erythrocytes, as micronuclei and nuclear buds (BE), are considered potential biomarkers of genotoxic exposure. We described previously the frequency of spontaneous micronucleated erythrocytes (MNE) in the species *Aratinga canicularis*. Here, we have used this species to evaluate the induction of MNE and BE by mitomycin-C. Animals were given a single intracoelomic injection of 0, 2, 3 or 4 mg/kg mitomycin-C on two consecutive days. A drop of blood was obtained after 0, 24, 48 and 72 h, and stained smears were used to count micronucleated polychromatic erythrocytes (MNPCE) and polychromatic erythrocytes with buds (BPCE)/1000 polychromatic erythrocytes. The number of MNE and BE in 10 000 total erythrocytes was also counted. MNPCE and BPCE frequencies were elevated at 24, 48, and 72 h after the administration of the lower dose (P<0.03). At a 3 mg/kg dose, the frequency of MNPCE increased at 48 and 72 h (P<0.04) whereas the number of BPCE increased, but not significantly. Administration of 4 mg/kg mitomycin-C increased the number of MNE observed at 72 h (P<0.03), the

number of MNPCE at 48 h ( $P < 0.01$ ) and 72 h ( $P < 0.006$ ), the BE frequency at 72 h ( $P < 0.05$ ), and the frequency of BPCE at 48 and 72 h ( $P < 0.001$ ). While mitomycin-C appears to produce a parallel increase in MNPCE and BPCE frequencies, the MNE seemed to be a more sensitive indicator of genotoxicity than the BE. This suggests that evaluating BE and MNE in routine haematological analysis should be considered to evaluate environmental genotoxic exposure.

**Descriptors:** parrots, *Aratinga canicularis*, erythrocytes, cell nucleus, genotoxicity, mitomycin, dosage, symptoms, biomarkers, diagnostic techniques, screening, hematologic tests, micronuclei, nuclear buds.

Grizzle, J.M., D.B. Kersten, M.D. McCracken, A.E. Houston, and A.M. Saxton (2004).

**Determination of the acute 50% lethal dose T-2 toxin in adult bobwhite quail: additional studies on the effect of T-2 mycotoxin on blood chemistry and the morphology of internal organs.** *Avian Diseases* 48(2): 392-9. ISSN: 0005-2086.

**Abstract:** Three experiments were conducted to assess mortality rate, blood chemistry, and histologic changes associated with acute exposure to T-2 mycotoxin in adult bobwhite quail. In Experiment 1, adult quail were orally dosed with T-2 toxin to determine the lethal dose that resulted in 50% mortality of the affected population (LD50), and that dose was determined to be 14.7 mg of T-2 toxin per kilogram of body weight (BW). A second experiment was performed to study the effects of 12-18 mg/kg BW T-2 toxin on blood chemistry and liver enzyme profiles. Post-treatment uric acid, aspartate aminotransferase, lactic dehydrogenase, and gamma glutamyltransferase increased as compared with pretreatment values. In contrast, posttreatment plasma total protein, cholesterol, and triglyceride levels numerically decreased as compared with pretreatment values. Changes in blood chemistry values were consistent with liver and kidney damage after T-2 toxin exposure. In Experiment 3, histologic analyses of bone marrow, spleen, liver, small intestine, kidney, and heart were conducted on birds dosed in Experiment 2. Marked lymphocyte necrosis and depletion throughout the spleen, thymus, bursa, and gut-associated lymphoid tissue in the small intestine were observed in birds dosed with 15 and 18 mg/kg BW T-2 toxin. Necrosis of liver and lipid accumulation as a result of malfunctioning hepatocytes were also observed. Little or no morphologic change was observed in bone marrow and heart tissue. The LD50 for adult bobwhite quail as found in this study is two to three times higher than that reported for other species of commercial poultry. Results from these data confirm previous reports of immunosuppressive and/or cytotoxic effects of T-2 toxin in other mammalian and avian species. T-2 toxin may have a negative impact on the viability of wild quail populations.

**Descriptors:** bobwhite quail, *Colinus*, blood, T-2 toxin toxicity, blood chemical analysis, enzyme tests, heart drug effects, intestines drug effects, kidney drug effects, lethal dose 50, liver drug effects, lymphocytes pathology, mortality.

- Guenther, G., L.M. Hylle, C.H. Stahl, E.A. Koutsos, and D.G. Peterson (2006). **Development of methods for the production of transgenic quail expressing an *E-coli* phytase gene.** *Transgenic Research* 15(1): 128. ISSN: 0962-8819.  
**Descriptors:** quail, transgenic quail, production, methods, development, expressing *E-coli* phytase gene, meeting.  
**Notes:** Meeting Information: Transgenic Animal Research Conference V, Tahoe City, CA, USA; 200508.
- Honarmand, M. and M. Naguib (2006). **Effects of stress on sexually selected traits in zebra finches at different stages of development.** *Journal of Ornithology* 147(5, Suppl. 1): 182. ISSN: 0021-8375.  
**Descriptors:** zebra finches, stress effects, sexually selected traits, different stages of development, meeting.  
**Notes:** Meeting Information: 24th International Ornithological Congress, Hamburg, Germany; 2006.
- Hou, J.M., J.Y. Liu, L. Yang, X. Zhao, L. Tian, Z.Y. Ding, Y.J. Wen, T. Niu, F. Xiao, Y.Y. Lou, G.H. Tan, H.X. Deng, J. Li, J.L. Yang, Y.Q. Mao, B. Kan, Y. Wu, Q. Li, and Y.Q. Wei (2005). **Combination of low-dose gemcitabine and recombinant quail vascular endothelial growth factor receptor-2 as a vaccine induces synergistic antitumor activities.** *Oncology* 69(1): 81-7. ISSN: 0923-7534.  
**Abstract:** Vascular endothelial growth factor receptor-2 (VEGFR-2) has been shown to play a major role in inducing the full spectrum of VEGF biological response which is essential for tumor angiogenesis. We have demonstrated that immunotherapy of tumors with a vaccine based on quail homologous VEGFR-2 (qVEGFR) was effective in providing both protective and therapeutic antitumor immunity in several tumor models in mice. The purpose of this study was to determine whether the combination therapy of low-dose gemcitabine with qVEGFR as a vaccine could inhibit tumor growth to a greater extent. To test this concept, H22 hepatoma and Lewis lung carcinoma models were established in BALB/c mice and C57BL/6 mice, respectively. Mice were treated with either qVEGFR as a protein vaccine, gemcitabine, or both agents together. qVEGFR or low-dose chemotherapy treatment individually resulted in tumor inhibition to a certain extent. Remarkably, the combination therapy resulted in synergistic antitumor activity. Histological examination revealed that there was endothelial deposition of immunoglobulins within tumor tissues from mice treated with vaccine or combination therapy, especially intratumor angiogenesis was suppressed more significantly for the combination group. Also, ELISPOT analysis showed that mice treated with either qVEGFR alone or in combination with low-dose chemotherapy produced similar amount of anti-VEGFR antibody-producing B cells, which suggested that low-dose gemcitabine did not suppress the host's immune response, but potentiated the antitumor activity of the qVEGFR vaccine.

Furthermore, TUNEL staining demonstrated a significant increase in the number of TUNEL-positive cells in the combination group compared with those of other groups. The observations may provide a new bio-chemotherapeutic approach for cancer.

**Descriptors:** antineoplastic combined chemotherapy protocols, therapeutic use, cancer vaccines therapeutic use, carcinoma, lewis lung drug therapy, deoxycytidine analogs, derivatives, liver neoplasms, experimental drug therapy, vascular endothelial growth factor receptor 2, therapeutic use, antimetabolites, antineoplastic administration, dosage, deoxycytidine administration, dosage, drug administration schedule, drug synergism, mice, inbred Balb c inbred C57BL, quail, vaccines, synthetic therapeutic use.

Ikebuchi, M., T. Hasegawa, and H.J. Bischof (2005). **Neuroanatomical study of taenial amygdala (tna) in zebra finch.** *Zoological Science (Tokyo)* 22(12): 1484. ISSN: 0289-0003.

**Descriptors:** zebra finch, taenial amygdala, neurological study, meeting.

**Notes:** Meeting Information: 76th Annual Meeting of the Zoological Society of Japan, Tsukuba, Japan; October 06 -08, 2005.

Inafuku, M., T. Toda, T. Okabe, A. Shinjo, H. Iwasaki, and H. Oku (2007). **Expression of cell-cycle-regulating genes in the development of atherosclerosis in Japanese quail (*Coturnix japonica*).** *Poultry Science* 86(6): 1166-73. ISSN: 0032-5791.

**Abstract:** The levels of mRNA expression in regulatory genes that are involved in the pathological changes of aortic atherosclerotic and fibroblastic intimal thickening was investigated in Japanese quail. The quail were divided into a control diet group and an atherogenic diet group. The quail were euthanized at 2, 4, 8, and 12 wk after consuming either a control diet or an atherogenic diet. Thereafter, both histological and immunohistochemical studies and mRNA expression analysis of the cell-cycle-regulating genes in aortic atherosclerotic lesions were performed on selected ascending aortas and their large branches. In the atherogenic diet group, aortic lipid-containing intimal and atheromatous lesions were seen mainly at 8 and 12 wk, respectively. Semiquantitative reverse-transcription PCR was used to analyze the alterations of mRNA expression on the development of atherosclerotic lesions. Messenger RNA expression of the c-fos and c-src genes showed peak levels at 8 wk in the atherogenic diet group. However, no significant alteration of c-jun mRNA expression was noted during the entire experimental period. According to the progression of aortic atherosclerotic lesions, c-myc mRNA expression in the atherogenic diet group increased chronologically, and the highest level was observed at 12 wk. Alterations in mRNA expression of proliferating cell nuclear antigen and the p27 gene were similar to that of c-myc. The levels of c-myc, proliferating cell nuclear antigen, and p27 mRNA expression was significantly correlated with the degree of aortic atheroscle-

rotic lesion development at 12 wk in our experiment.

**Descriptors:** Japanese quail, atherosclerosis, *Coturnix* genetics, cell cycle regulating genes, development, expression, pathologic changes, diet.

Inafuku, M., T. Toda, T. Okabe, K. Wada, K. Takara, H. Iwasaki, and H. Oku (2007). **Effect of Kokuto, a non-centrifugal cane sugar, on the development of experimental atherosclerosis in Japanese quail and apolipoprotein E deficient mice.** *Food Science and Technology Research* 13(1): 61-66. ISSN: 1344-6606.

**Descriptors:** Japanese quail, kokuto, cane sugar, effect, experimental atherosclerosis, apolipoprotein E deficient, mice.

Iwaniuk, A.N., K.M. Dean, and J.E. Nelson (2005). **Interspecific allometry of the brain and brain regions in parrots (Psittaciformes): Comparisons with other birds and primates.** *Brain Behavior and Evolution* 65(1): 40-59. ISSN: 0006-8977.

**Descriptors:** parrots, brain, allometry, brain regions, birds, primates, comparisons, avian, brain volume, size, telencephalic volumes.

Jakhar, K.K. and J.R. Sadana (2004). **Sequential pathology of experimental aflatoxicosis in quail and the effect of selenium supplementation in modifying the disease process.** *Mycopathologia* 157(1): 99-109. ISSN: 0301-486X.

**Abstract:** Feeding of aflatoxin B1 @ 1 ppm to 2-week old Japanese quail for a period of 8 weeks produced gross and microscopic changes in the liver, skeletal muscles, heart and bursa of Fabricius. These included fatty changes, bile duct hyperplasia and lymphoid aggregation in liver; haemorrhages in thigh, breast muscles and myocardium; mild depletion of lymphocytes, cystic degeneration and fibrous tissue proliferation in bursa of Fabricius. More or less similar lesions were seen in quail chicks fed on aflatoxin with sodium selenite @ 5 ppm but these were of lesser intensity and appeared at later stages of the experiment thereby indicating that supplementation of selenium had some protective action against the toxic effect of aflatoxin B1 in Japanese quail.

**Descriptors:** Japanese quail, *coturnix*, aflatoxin B1 metabolism, poultry diseases, drug therapy, diseases pathology, selenium pharmacology, aflatoxin B1 toxicity, bursa of Fabricius pathology, dietary supplements, liver pathology, lung pathology, lymphoid tissue pathology, skeletal muscle pathology, myocardium pathology.

Jiang, P.P., P. Ding, and S.G. Fang (2006). **Isolation and characterization of microsatellite markers in Elliot's pheasant (*Syrnaticus ellioti*).** *Molecular Ecology Notes* 6(4): 1160-1161. ISSN: 1471-8278.

**Abstract:** We isolated eight microsatellite loci from genomic DNA in Elliot's pheasant *Syrnaticus ellioti* using streptavidin-coated magnetic beads. In the analyses of 53 individuals sampled, these loci displayed polymorphism varying from six to nine

alleles per locus and observed heterozygosities ranging from 0.174 to 0.430. The results suggested that these novel microsatellite markers could become useful molecular tools for genetic studies of *S. ellioti*.

**Descriptors:** Elliot's pheasant, microsatellite markers, isolation, characterization, genomic DNA, genetic studies.

Kawka, M., J.O. Horbanczuk, M. Sacharczuk, G. Zieba, M. Lukaszewicz, K. Jaszczak, and R. Parada (2007). **Genetic characteristics of the ostrich population using molecular methods.** *Poultry Science* 86(2): 277-281. ISSN: 0032-5791.

**Descriptors:** ostrich population, genetic characteristics, molecular methods.

Kayang, B.B., A. Vignal, M. Inoue Murayama, M. Miwa, J.L. Monvoisin, S. Ito, and F. Minvielle (2004). **A first-generation microsatellite linkage map of the Japanese quail.** *Animal Genetics* 35(3): 195-200. ISSN: 0268-9146.

**Descriptors:** Japanese quails, microsatellite repeats, genetic markers, loci, chromosome mapping, genetic variation, linkage groups, egg production, fearfulness, molecular sequence data.

Kimaro, W.H. and M.C. Madekurozwa (2005). **An immunohistochemical study of the innervation of the ovary in the sexually immature ostrich.** *Microscopy Society of Southern Africa Proceedings* 35: 73. ISSN: 1028-3455.

**Descriptors:** ostrich, sexually immature, ovary, innervation, immunohistochemical study, innervation, growth and development.

Kimaro, W.H. and M.C. Madekurozwa (2005). **The ultrastructure of gland cells in the ovary of the sexually immature ostrich.** *Microscopy Society of Southern Africa Proceedings* 35: 72. ISSN: 1028-3455.

**Descriptors:** ostrich, sexually immature, gland cells, ovary, ultrastructure.

Kimaro, W.H. and M.C. Madekurozwa (2005). **Ultrastructural features of healthy and atretic ovarian follicles in the sexually immature ostrich.** *Microscopy Society of Southern Africa Proceedings* 35: 61. ISSN: 1028-3455.

**Descriptors:** ostrich, sexually immature, ovarian follicles, healthy, atretic, ultrastructural features.

Kollias, G.V., K.V. Sydenstricker, H.W. Kollias, D.H. Ley, P.R. Hosseini, V. Connolly, and A.A. Dhondt (2004). **Experimental infection of house finches with *Mycoplasma gallisepticum*.** *Journal of Wildlife Diseases* 40(1): 79-86. ISSN: 0090-3558.

**Abstract:** *Mycoplasma gallisepticum* (MG) has caused an endemic upper respiratory and ocular infection in the eastern house finch (*Carpodacus mexicanus*) after the epidemic first described in 1994. The disease has been studied by a number of

investigators at a population level and reports describe experimental infection in group-housed MG-free house finches. Because detailed observation and evaluation of individual birds in group-housed passerines is problematic, we studied individually housed house finches that were experimentally inoculated with the finch strain of MG in a controlled environment. To accomplish this, a study was conducted spanning the period of November 2001-April 2002 with 20 MG-free (confirmed by the rapid plate agglutination assay and polymerase chain reaction [PCR] assay) eastern house finches captured in the Cayuga Basin area of central New York (USA) in the summer of 2001. After a period of acclimatization and observation (12 wk), 20 finches were inoculated with a 0.05-ml aliquot of MG ( $3.24 \times 10^5$  colony-forming units/ml) via bilateral conjunctival sac instillations. Two additional finches acted as controls and were inoculated in the same manner with preservative-free sterile saline solution. After inoculation, all finches except the controls exhibited clinical signs of conjunctivitis within 2-6 days. The progression of the disease was evaluated by several methods, including PCR, behavioral observations, and physical examination including eye scoring, body weight, and body condition index. Over a period of 21 wk, MG-infected finches developed signs of disease and recovered (80%), developed signs of disease and progressed to become chronically infected (15%), or died (5%). We hypothesize that the high survival rate and recovery of these finches after infection was associated with the use of controlled environmental conditions, acclimatization, a high plane of nutrition, and low stocking (housing) density, all of which are factors documented to be important in the outcome of MG infections in domestic poultry and other species.

**Descriptors:** house finches, experimental infection, *Mycoplasma gallisepticum*, bird diseases, immunology, conjunctivitis, mycoplasma infections, pathogenicity, song-birds, epidemiology, pathology, disease susceptibility, population density, New York state, USA.

Kondiah, K., J. Albertyn, and R.R. Bragg (2005). **Beak and feather disease virus haemagglutinating activity using erythrocytes from African Grey parrots and Brown-headed parrots.** *Onderstepoort Journal of Veterinary Research* 72(3): 263-5. ISSN: 0030-2465.

**Abstract:** Psittacine beak and feather disease (PBFD) is a common viral disease of wild and captive psittacine birds characterized by symmetric feather loss and beak deformities. The causative agent, beak and feather disease virus (BFDV), is a small, circular single-stranded DNA virus that belongs to the genus Circovirus. BFDV can be detected by PCR or the use of haemagglutination (HA) and haemagglutination inhibition (HI) assays that detect antigen and antibodies respectively. Erythrocytes from a limited number of psittacine species of Australian origin can be used in these tests. In South Africa, the high cost of these birds makes them difficult to obtain for

experimental purposes. Investigation into the use of erythrocytes from African Grey parrots and Brown-headed parrots yielded positive results showing the haemagglutinating activity of their erythrocytes with purified BFDV obtained from confirmed clinical cases of the disease. The HA activity was further confirmed by the demonstration of HI using BFDV antiserum from three different African Grey parrots previously exposed to the virus and not showing clinical signs of the disease.

**Descriptors:** grey parrots, brown-headed parrots, beak and feather diseases, diagnosis, Circoviridae infections, parrots virology, antibodies, viral blood, diagnosis, erythrocytes virology, hemagglutination inhibition tests methods, hemagglutination, sensitivity, specificity.

Labaque, M.C., J.L. Navarro, and M.B. Martella (2004). **Effects of storage time on hatchability of artificially incubated Greater Rhea (*Rhea americana*) eggs.** *British Poultry Science* 45(5): 638-42. ISSN: 0007-1668.

**Abstract:** (1) A study was conducted to determine the effects of the length of the storage period on the hatchability of artificially incubated Greater Rhea eggs. Hatchability was evaluated in eggs gathered daily from a captive population and in eggs collected less frequently from a semi-captive population. (2) Eggs from both sites were either immediately incubated after being collected or were stored for 1 to 9 d prior to incubation. (3) The maximum number of days for which an egg could be stored without depressing hatchability (with respect to non-stored eggs) was longer in the eggs collected daily. (4) Eggs collected daily and stored for 4d or more showed total hatchability (28%) and fertile hatchability (43%) which was approximately 30% lower than non-stored eggs or eggs stored for 3 d or less. In the semi-captive population, the total and fertile hatchability of non-stored eggs and of eggs stored for one day were 40% greater than of eggs stored for 2 to 9 d (20 and 34%, respectively). (5) The period for which Greater Rhea eggs could be stored without depressing hatchability varied depending on the frequency of egg collection: non-daily egg collection reduces the possible period of storage.

**Descriptors:** Greater Rhea, eggs, hatchability, storage time, artificially incubated, effects, frequency of collection.

Latshaw, J.D., T.Y. Morishita, C.F. Sarver, and J. Thilsted (2004). **Selenium toxicity in breeding ring-necked pheasants (*Phasianus colchicus*).** *Avian Diseases* 48(4): 935-939. ISSN: 0005-2086.

**Abstract:** A flock of breeding ring-necked pheasants received feed with a high selenium content. Within 4 days of eating the toxic feed, the rate of egg production began to decrease, and bird aggression increased. Approximately 12% of the hens died within a week. Necropsy of the hens revealed colorless fluid around the heart and a friable, but otherwise normal, liver. The rapid onset of the problem and signs noted at necropsy suggested toxicosis. Based on analysis, the feed contained

9.3 ppm of selenium. Selenium toxicity was consistent with the histologic diagnosis of degenerative cardiomyopathy, vacuolar degeneration of hepatocytes, and centrilobular hepatic necrosis. After 8 days, the toxic feed was removed and replaced with fresh feed. Egg production, which had dropped to 50%, returned to normal within 10 days of feed replacement. Hatchability of eggs laid from days 8 to 14 after delivery of the toxic feed was 35%. Approximately 10% of the chicks that hatched had deformed beaks and abnormal eyes. Many of the chicks that died in the shell had deformities, bringing the total to more than 50% of all embryos that developed. The selenium content of eggs that had no embryonic development was 2.05 ppm. Hatchability of eggs laid from days 21 to 28 after the toxic feed was delivered was almost 80%, which was slightly lower than normal. The selenium content of these eggs was 0.30 ppm. These results show the rapid onset and correction of selenium toxicity and suggest that specific embryologic defects are diagnostic for selenium toxicity.

**Descriptors:** Pheasants, *Phasianus colchicus*, ring-necked pheasants, game birds, breeding stock, selenium toxicity, selenosis, feeds, fecundity, animal fertility, animal behavior, aggression, liver, heart, symptoms, egg hatchability, embryogenesis, embryonic mortality, deformed embryos.

**Language of Text:** Summary in Spanish.

Lavoie, E.T., E.M. Sorrell, D.R. Perez, and M.A. Ottinger (2007). **Immunosenescence and age-related susceptibility to influenza virus in Japanese quail.** *Developmental and Comparative Immunology* 31(4): 407-14. ISSN: 0145-305X.

**Abstract:** We evaluated juvenile, pubescent, reproductive adult, and aged Japanese quail (*Coturnix coturnix japonica*) to determine if there were age-related differences in immune function with the hypothesis that aged birds would have weaker immune responses. Immune responses were measured using phytohemagglutinin (PHA) skin test, antibody response to foreign red blood cells and exposure to an H9N2 influenza virus. Adult birds consistently had stronger immune responses than young and aged birds. Aged quail had skin responses 38% lower than adults. Pubescent birds' mean anti-red blood cell response was four-fold lower than adult birds. Adults had greater increase in total anti-viral antibody between primary and secondary infections than all other groups. Our data demonstrate an age-related difference in immune function in Japanese quail that has similarities to age-related immunity in humans; younger and older animals had weaker immune responses compared to young adults.

**Descriptors:** Japanese quail, immunosenescence, age related susceptibility, avian influenza, immune responses, young birds, aged birds.

Li, X. and K.A. Schat (2004). **Quail cell lines supporting replication of Marek's disease virus serotype 1 and 2 and herpesvirus of turkeys.** *Avian Diseases* 48(4): 803-812. ISSN: 0005-2086.

**Abstract:** Marek's disease virus (MDV), a highly cell-associated alphaherpesvirus,

can be isolated and propagated in chicken kidney cells (CKC) and chicken or duck embryo fibroblast cells (CEF or DEF, respectively). Two recently developed cell lines, CU447 and CU453, developed from methylcholanthrene-induced tumors in Japanese quail, were examined for their suitability to propagate the three serotypes of MDV. The MDV strain RB-1B (serotype 1) was passaged for more than 30 passages in CU447 without causing cytopathic effects (CPE). Polymerase chain reaction analysis of RB-1B-infected CU447 cells demonstrated the presence of MDV DNA using primers specific for ICP4, pp38, and gB. The 132-bp direct repeats within the BamH1-H and -D fragments were amplified to the same level as RB-1B that was passaged in CKC or CEF. Different passages of RB-1B in CU447 were examined for expression of gB and pp38 transcripts, and pp38, gB, gE, and VP22 protein expression. Irrespective of the passage level, these transcripts and proteins were detected in the RB-1B-infected CU447 cells. Infectious virus was rescued by cocultivation of RB-1B-infected CU447 with CKC. Herpes virus of turkeys was propagated in CU447 and CU453 causing CPE in both cell lines. SB-1 did not cause CPE in either cell line but a few SB-1-infected cells could be detected using a monoclonal antibody specific for serotype 2 MDV.

**Descriptors:** turkeys, Marek's disease, Gallid herpesvirus 2, Gallid herpesvirus 3, serotypes, virus replication, cell lines, quails, cultured cells, polymerase chain reaction, microbial genetics, DNA, messenger RNA, viral proteins.

**Language of Text:** Summary in Spanish.

Lima, F.S., E. Santin, A.C. Paulillo, L. Doretto Junior, V.M.B.d. Moraes, and N.M.Q. Gama (2004). **Evaluation of different programmes of Newcastle disease vaccination in Japanese quail (*Coturnix coturnix japonica*)**. *International Journal of Poultry Science* 3(5): 354-356. ISSN: 1682-8356.

**Descriptors:** Japanese quail, Newcastle disease, vaccination, different programs, evaluation.

Lindstrom, K.M., D.M. Hawley, A.K. Davis, and M. Wikelski (2005). **Stress responses and disease in three wintering house finch (*Carpodacus mexicanus*) populations along a latitudinal gradient**. *General and Comparative Endocrinology* 143(3): 231-9. ISSN: 0016-6480.

**Abstract:** In laboratory studies, stress hormones have been shown to impair immune functions, and increase susceptibility to diseases. However, the interactions between stress hormones and disease have rarely been studied in free-ranging populations. In this study, we measured concentrations of the avian stress hormone corticosterone across four winter months (December-March) over two years in three eastern North American house finch populations (*Carpodacus mexicanus*) along a latitudinal gradient. Because *Mycoplasma gallisepticum* infections appear in these populations in late winter, we hypothesized that the timing of the disease outbreaks could be medi-

ated by changes in corticosterone concentrations. We found a significant increase in baseline and stress-induced plasma corticosterone concentrations in house finches without *Mycoplasma* symptoms in late winter; when the prevalence of *Mycoplasma* infection peaks. We also found that house finches with *Mycoplasma* symptoms had elevated stress-induced corticosterone concentrations. High baseline concentrations were associated with a low body condition and a high fat load. We found that the relationship between corticosterone concentrations and the latitude of the study population changed between years. The first year, corticosterone concentrations were lowest in the southern latitude, but became higher in the second year when average winter temperatures were low. A causal understanding of the implications for this variation in corticosterone concentrations for *Mycoplasma* disease dynamics awaits further studies.

**Descriptors:** house finch, stress response, diseases, winter, *Mycoplasma*, corticosterone, plasma, concentration, immune functions, impair, North America.

Liu, H.z., K.m. Peng, and W.q. Chen (2005). **Study on the cytoarchitecture in the medullary reticular formation of African ostrich.** *Acta Veterinaria Et Zootechnica Sinica* 36(8): 851-854. ISSN: 0366-6964.

**Descriptors:** African ostrich, medullary reticular formation, cytoarchitecture, study, *Struthio camelus*.

**Language of Text:** Chinese, summary in English.

MacLeod, K.M., D. Soares, and C.E. Carr (2006). **Interaural timing difference circuits in the auditory brainstem of the emu (*Dromaius novaehollandiae*).** *Journal of Comparative Neurology* 495(2): 185-201. ISSN: 0021-9967.

**Descriptors:** emu, auditory brainstem, interaural timing difference, circuits, sound localization, birds, anatomy, physiology.

Madekurozwa, M.C. (2005). **Morphological features of the luminal surface of the magnum in the sexually immature ostrich (*Struthio camelus*).** *Anatomia, Histologia, Embryologia* 34(6): 350-3. ISSN: 0340-2096.

**Abstract:** Observations were made, using scanning electron microscopy, of the surface features of the magnum in the immature ostrich during periods of ovarian inactivity, activity and regression. In birds with inactive ovaries the luminal surface of the magnum was lined with non-ciliated cells, which were densely covered by microvilli. In contrast, the magnum in birds with active ovaries was composed of ciliated and non-ciliated cells. The distribution of ciliated cells was not uniform, with clumps of cilia occurring next to non-ciliated areas. Samples collected from birds with regressing ovaries, during periods of decreasing daylength, revealed that the magnum was undergoing involution. The deciliation of ciliated cells and the presence of short microvilli on non-ciliated cells characterized magnum regression. These results

suggest that ovarian activity and changes in daylength have a profound effect on the surface features of the magnum in the immature ostrich.

**Descriptors:** ostrich, sexually immature, magnum, morphological features, ovarian activity, daylength, ciliated cells, non ciliated cells.

Madekurozwa, M.C. (2004). **Immunohistochemical localization of the progesterone and oestrogen receptors in the shell gland of sexually immature ostriches (*Struthio camelus*) with active or inactive ovaries.** *Research in Veterinary Science* 76(1): 63-68. ISSN: 0034-5288.

**Descriptors:** ostriches, immature, ovaries, active, inactive, progesterone, estrogen, receptors, immunohistochemical localization, shell gland.

Maestro, M.M., J. Turnay, N. Olmo, P. Fernandez, D. Suarez, J.M. Garcia Paez, S. Urillo, M.A. Lizarbe, and E. Jorge Herrero (2006). **Biochemical and mechanical behavior of ostrich pericardium as a new biomaterial.** *Acta Biomaterialia* 2(2): 213-9. ISSN: 1742-7061.

**Abstract:** We have performed a comparative analysis of glutaraldehyde-preserved ostrich pericardium, as a novel biomaterial, with bovine pericardium. The biochemical characteristics (histology, water content, amino acid composition, and collagen and elastin contents), mechanical properties, and in vivo calcification in a subcutaneous rat model were examined. Ostrich pericardium is slightly thinner and shows a higher water content (70+/-2% vs. 62+/-2%) than bovine pericardium. Additionally, ostrich pericardium presents 1.6-fold lower elastin content and a lower percentage of collagen in reference to the total protein content (68+/-2% vs. 76+/-2%). However, ostrich pericardium shows better mechanical properties, with higher tensile stress at rupture (32.4+/-7.5 vs. 11.5+/-4.6) than calf pericardium. In vivo calcification studies in a rat subcutaneous model show that ostrich pericardium is significantly less calcified than bovine pericardium (23.95+/-13.30 vs. 100.10+/-37.36 mg/g tissue) after 60 days of implantation. In conclusion, glutaraldehyde-stabilized ostrich pericardium tissue shows better mechanical properties than calf tissue. However, calcium accumulation in implanted ostrich tissue is still too high to consider it a much better alternative to bovine pericardium, and anticalcification treatments should be considered.

**Descriptors:** ostrich, pericardium, biochemical, mechanical, behavior, biomaterial, comparative analysis, bovine, rat model.

Maguire, G.S., P.J. Guay, and R.A. Mulder (2006). **Isolation and characterization of microsatellite markers in the southern emu-wren (*Stipiturus malachurus*: Aves).** *Molecular Ecology Notes* 6(2): 422-424. ISSN: 1471-8278.

**Abstract:** We isolated and characterized eight novel microsatellite loci in the southern emu-wren (*Stipiturus malachurus*). We used nonradioactive polymerase chain

reaction (PCR)-based techniques to screen an enriched genomic DNA library. Based on genotypes from a single population, six loci showed no evidence of null alleles and were polymorphic (allele range = 2-9, mean heterozygosity = 0.57), and one locus was sex-linked (NA = 4). These loci were variable and had different allele size ranges in three other populations of southern emu-wrens, and are therefore useful for determining levels of genetic diversity within and between populations of the species.

**Descriptors:** southern emu wren, (*Stipiturus malachurus*), microsatellite markers, isolation, characterization, polymerase chain reaction, PCR.

Mahmood, F., R.E. Chiles, Y. Fang, C.M. Barker, and W.K. Reisen (2004). **Role of nestling mourning doves and house finches as amplifying hosts of St. Louis encephalitis virus.** *Journal of Medical Entomology* 41(5): 965-972. ISSN: 0022-2585.

**Abstract:** Nestling mourning doves and house finches produced elevated viremias after inoculation with 2-3 log<sub>10</sub> plaque-forming units (PFU) of St Louis encephalitis (SLE) virus and infected 67 and 70% of *Culex tarsalis* Coquillett that engorged upon them, respectively. Mosquito infection rates as well as the quantity of virus produced after extrinsic incubation increased as a function of the quantity of virus ingested and peaked during days 3-5 postinoculation in mourning doves and days 2-4 in house finches. Only female *Cx. tarsalis* with body titers > or = 4.6 log<sub>10</sub> PFU were capable of transmitting virus. Overall, 38% of females infected by feeding on mourning doves and 22% feeding on house finches were capable of transmission. The quantity of virus expectorated was variable, ranging from 0.8 to 3.4 log<sub>10</sub> PFU and was greatest during periods when avian viremias were elevated. Our data indicated that nestling mourning doves and house finches were competent hosts for SLE virus and that the quantity of virus ingested from a viremic avian host varies during the course of the infection and determines transmission rates by the mosquito vector.

**Descriptors:** Columbidae, Fringillidae, doves, disease reservoirs, host pathogen relationships, Saint Louis encephalitis virus, viremia, *Culex tarsalis*, mosquitoes, infection, virus transmission, insect vectors, vector competence, *Zenaida macroura*, house finches, *Carpodacus mexicanus*, virus amplification.

Main, R.P. and A.A. Biewener (2007). **Skeletal strain patterns and growth in the emu hindlimb during ontogeny.** *Journal of Experimental Biology* 210(Pt 15): 2676-90. ISSN: 0022-0949.

**Abstract:** Most studies examining changes in mechanical performance in animals across size have typically focused on inter-specific comparisons across large size ranges. Scale effects, however, can also have important consequences in vertebrates as they increase in size and mass during ontogeny. The goal of this study was to examine how growth and development in the emu (*Dromaius novaehollandiae*) hindlimb skeleton reflects the demands placed upon it by ontogenetic changes in locomotor mechanics and body mass. Bone strain patterns in the femur and tibiotarsus (TBT)

were related to ontogenetic changes in limb kinematics, ground reaction forces, and ontogenetic scaling patterns of the cross-sectional bone geometry, curvature and mineral ash content over a 4.4-fold increase in leg length and 65-fold increase in mass. Although the distribution of principal and axial strains remained similar in both bones over the ontogenetic size range examined, principal strains on the cranial femur and caudal femur and TBT increased significantly during growth. The ontogenetic increase in principal strains in these bones was likely caused by isometry or only slight positive allometry in bone cross-sectional geometry during growth, while relative limb loading remained similar. The growth-related increase in bone strain magnitude was likely mitigated by increased bone mineralization and decreased curvature. Throughout most of ontogeny, shear strains dominated loading in both bones. This was reflected in the nearly circular cross-sectional geometry of the femur and TBT, suggesting selection for resistance to high torsional loads, as opposed to the more eccentric cross-sectional geometries often associated with the bending common to tetrapods with parasagittal limb orientations, for which in vivo bone strains have typically been measured to date.

**Descriptors:** emu, hindlimb, ontogeny, growth, skeletal strain patterns, mechanical performance, size, mass, femur, bones.

MalagoJunior, W., H.M. Franco, E. Matheucci Junior, A. Medaglia, and F. Henrique Silva (2002). **Large scale sex typing of ostriches using DNA extracted from feathers.** *BMC Biotechnology* 2(19): (1 October 2002). ISSN: 1472-6750.

**Descriptors:** ostriches, sex typing, large scale, DNA extraction from feathers.

Minivielle, F., R. Grossmann, and D. Gourichon (2007). **Development and performances of a Japanese quail line Homozygous for the diabetes insipidus (di) mutation.** *Poultry Science* 86(2): 249-254. ISSN: 0032-5791.

**Descriptors:** Japanese quail, development, homozygous, diabetes insipidus, mutation, performance, quail line.

Mitgutsch, C., K. Au, B. Wong, B.F. Eames, and R.a. Schneider (2007). **Nervus trigeminus development in quail, duck, and quck chimeras.** *Developmental Biology* 306(1): 377. ISSN: 0012-1606.

**Descriptors:** quail, duck, quck chimeras, nervus trigeminus, development, meeting.

**Notes:** Meeting Information: 66th SDB Annual Meeting/8th SMBD Annual Meeting/3rd LASDB International Meeting, Cancun, MEXICO; June 16 -20, 2007.

Mohan, J., K.V. Sastry, J.S. Tyagi, and D.K. Singh (2004). **Isolation of *E. coli* from foam and effects of fluoroquinolones on *E. coli* and foam production in male Japanese quail.** *Theriogenology* 62(8): 1383-90. ISSN: 0093-691X.

**Abstract:** Sexually active male Japanese quail (*Coturnix coturnix Japonica*) produce

a foamy substance from their cloacal gland. It was postulated that bacteria played an important role in production of foam. The primary objective of this study was to isolate and identify bacteria present in the cloacal foam. The secondary objective was to evaluate the effect of fluoroquinolone treatment on bacterial counts and foam production. Healthy adult Japanese quail were maintained in individual cages under uniform husbandry conditions and allocated arbitrarily into three groups (each group consisted of 12 male and 12 female birds). Foam was collected from the cloacal gland of male birds of each group separately into sterile petri dishes and was cultured to isolate and identify bacteria and to determine their sensitivity to various antibiotics. *Escherichia coli* bacteria, sensitive to various antibacterials (including the fluoroquinolones ciprofloxacin and pefloxacin), were isolated. In the second part of the study, male quails of Group I (control) received 1 mL vehicle (normal saline 0.9% (w/v) NaCl) daily (via the intraperitoneal route) for 12 days. Male birds from groups II and III were treated intraperitoneally with ciprofloxacin or pefloxacin at the rate of 10 mg and 12 mg per/kg body weight respectively, for 12 days. In antibiotic-treated birds, there was a gradual reduction in foam production during treatment. At the end of treatment, the cloacal gland area was smaller ( $P < 0.05$ ) in pefloxacin-treated birds compared to the other groups. Furthermore, a trend towards decreasing body weight and fertilizing ability was noted in the same group. A drastic reduction in bacterial counts of foam was recorded only in fluoroquinolone-treated groups during treatment period. After cessation of treatment, all end points were increasing back to pre-treatment levels. In conclusion, *E. coli* were present in the foam of the cloacal gland of Japanese quail and may have a role in foam production.

**Descriptors:** Japanese quail, male, cloacal foam production, *E. coli*, isolation, fluoroquinolones, effect, cloacal gland, bacteria from cloacal gland.

Mohan, J., K.V.H. Sastry, J.S. Tyagi, G.S. Rao, and R.V. Singh (2006). **Residues of fluoroquinolone drugs in the cloacal gland and other tissues of Japanese quail.** *British Poultry Science* 47(1): 83-87. ISSN: 0007-1668.

**Descriptors:** Japanese quails, ciprofloxacin, cloaca, drug residues, breast muscle, testes, brain, kidneys, blood plasma, pharmacokinetics, males, intraperitoneal injection, dosage, pefloxacin.

Mossman, J., T.R. Birkhead, and J. Slate (2006). **The whole mitochondrial genome sequence of the zebra finch (*Taeniopygia guttata*).** *Molecular Ecology Notes* 6(4): 1222-1227. ISSN: 1471-8278.

**Abstract:** Here we describe the complete nucleotide sequence of the mitochondrial genome (16 583/4 bp) of the zebra finch (*Taeniopygia guttata*). Primers were designed based on highly conserved regions of an alignment of three passerine complete mitochondrial DNA (mtDNA) sequences. A combination of overlapping long polymerase chain reaction (PCR) purification, followed by fully nested PCR and sequencing was

used to determine the complete mtDNA genome. Six birds, from distinct maternal lineages of a pedigreed population were sequenced. Five novel haplotypes were identified. These sequences provide the first data for sequence variation across the whole mitochondrial genome of a passerine bird species.

**Descriptors:** zebra finch, mitochondrial genome sequence, complete nucleotide sequence, DNA, passerine, birds.

Nacher, V., A. Carretero, M. Navarro, C. Armengol, C. Llombart, A. Rodriguez, I. Herrero Fresneda, E. Ayuso, and J. Ruberte (2006). **The quail mesonephros: a new model for renal senescence?** *Journal of Vascular Research* 43(6): 581-6. ISSN: 1018-1172.

**Abstract:** BACKGROUND/AIMS: Renal senescence during normal aging is associated with specific vascular alterations and tissue degeneration. Although the degenerative program executed during embryonic kidney development is known to include vascular alterations, studies yet have to examine whether it involves replicative senescence. In this study, we assessed the potential of the quail mesonephros, a transitory embryonic kidney, as a model of human renal senescence. METHODS: Quail embryos with developing or degenerating mesonephros were studied on day 6 or day 11 of incubation, respectively. Senescence-associated beta-galactosidase activity, a marker of replicative senescence, was examined on whole mounts and sections. Senescent vascular characterization was performed by the scanning electron-microscopic analysis of vascular corrosion casts. RESULTS: Senescence-associated beta-galactosidase activity was found only in old mesonephros. Moreover, at 11 days of incubation glomerular capillaries showed discontinuities and were thinner and more tortuous than those observed at 6 days, characteristics also reported for the aging human kidney. CONCLUSION: The degenerating quail mesonephros is a potential model of renal senescence, showing biochemical and morphological characteristics of the aging human kidney.

**Descriptors:** quail, mesonephros, renal senescence, normal aging, vascular alterations, new model, human kidney.

Nielsen, K., A.L. De Obaldia, and J. Heitman (2007). ***Cryptococcus neoformans* mates on pigeon guano: implications for the realized ecological niche and globalization.** *Eukaryotic Cell* 6(6): 949-59. ISSN: 1535-9778.

**Abstract:** The ecological niche that a species can occupy is determined by its resource requirements and the physical conditions necessary for survival. The niche to which an organism is most highly adapted is the realized niche, whereas the complete range of habitats that an organism can occupy represents the fundamental niche. The growth and development of *Cryptococcus neoformans* and *Cryptococcus gattii* on pigeon guano were examined to determine whether these two species occupy the same or different ecological niches. *C. neoformans* is a cosmopolitan pathogenic yeast that infects predominantly immunocompromised individuals, exists in two varieties

(grubii [serotype A] and neoformans [serotype D]), and is commonly isolated from pigeon guano worldwide. By contrast, *C. gattii* often infects immunocompetent individuals and is associated with geographically restricted environments, most notably, eucalyptus trees. Pigeon guano supported the growth of both species, and a brown pigment related to melanin, a key virulence factor, was produced. *C. neoformans* exhibited prolific mating on pigeon guano, whereas *C. gattii* did not. The observations that *C. neoformans* completes the life cycle on pigeon guano but that *C. gattii* does not indicates that pigeon guano could represent the realized ecological niche for *C. neoformans*. Because *C. gattii* grows on pigeon guano but cannot sexually reproduce, pigeon guano represents a fundamental but not a realized niche for *C. gattii*. Based on these studies, we hypothesize that an ancestral *Cryptococcus* strain gained the ability to sexually reproduce in pigeon guano and then swept the globe.

**Descriptors:** pigeon, guano, *Cryptococcus*, growth, reproduction, ecological niche, mating, life cycle, sexually reproduce.

Nowaczewski, S., H. Kontecka, and E. Pruszyńska Oszałek (2006). **Effect of feed supplementation with vitamin C on haematological indices, corticosterone concentration in blood and duration of tonic immobility in pheasants.** *Annals of Animal Science* 6(1): 117-128. ISSN: 1642-3402.

**Descriptors:** pheasants, feed supplementation, vitamin C, effect, hematological indices, corticosterone concentration, blood, tonic immobility.

**Language of Text:** Polish.

Osofsky, A., L.A. Tell, P.H. Kass, S.E. Wetzlich, J. Nugent Deal, and A.L. Craigmill (2005). **Investigation of Japanese quail (*Coturnix japonica*) as a pharmacokinetic model for cockatiels (*Nymphicus hollandicus*) and Poicephalus parrots via comparison of the pharmacokinetics of a single intravenous injection of oxytetracycline hydrochloride.** *Journal of Veterinary Pharmacology and Therapeutics* 28(6): 505-13. ISSN: 0140-7783.

**Abstract:** The purpose of this study was to determine whether Japanese quail (*Coturnix japonica*) would serve as a pharmacokinetic animal model for two small companion parrots: cockatiels (*Nymphicus hollandicus*) and Poicephalus parrots. Oxytetracycline (OTC) was the pharmacologic agent chosen for this study as it is eliminated primarily by renal glomerular filtration and undergoes minimal metabolism. A single intravenous injection of 20 mg/kg oxytetracycline hydrochloride was administered to the three study groups and blood samples were obtained at 5, 10, 15, and 30 min post-OTC injection as well as 1, 2, 4, 8, 12 and 24 h post-OTC injection. Quantification of plasma OTC was accomplished using a standardized microbial inhibition assay. Naive-pooled data (NPD) analysis of the plasma concentration-time profile of OTC best fit a two-compartment open model for all three avian species. Noncompartmental analysis of the mean data yielded the following

parameters for quail, cockatiels and Poicephalus parrots respectively:  $\lambda(z) = 3.14, 4.57, 3.71$  h; AUC = 38.9, 42.7, 49.6  $\mu\text{g} \times \text{h}/\text{mL}$ ; and Cl = 514, 468, 403  $\text{mL}/\text{h}/\text{kg}$ . Based on the similarity of these pharmacokinetic parameters, it appears that quail could be used as a model species to predict the appropriate OTC dosing regimen for small psittacine birds. A bootstrap procedure was also applied to these sparse data sets for both compartmental and noncompartmental analysis. The bootstrap procedure allowed for the calculation of variability of parameters; however, the estimates of the parameters were very similar to those calculated using the NPD and the data mean values.

**Descriptors:** quail, anti bacterial agents pharmacokinetics, *Coturnix* metabolism, oxytetracycline pharmacokinetics, administration, dosage, anti bacterial agents blood, anti bacterial agents urine, cockatoos metabolism, glomerular filtration rate, intravenous injections, kidney metabolism, animal models, oxytetracycline administration, dosage.

Ozbey, O., N. Yildiz, and F. Esen (2006). **The effects of high temperature on breeding characteristics and the living strength of the Japanese quails (*Coturnix coturnix japonica*)**. *International Journal of Poultry Science* 5(1): 56-59. ISSN: 1682-8356.

**Descriptors:** Japanese quail, high temperature, effects, breeding characteristics, living strength.

Ozegbe, P.C., T.A. Aire, and J.T. Soley (2005). **The efferent ductules of the testis of the ostrich (*Struthio camelus*)**. *Microscopy Society of Southern Africa Proceedings* 35: 74. ISSN: 1028-3455.

**Descriptors:** ostrich, *Struthio camelus*, testis, efferent ductules.

Palmieri, G., A.A. Dessole, L.B. Minelli, M. Botti, F. Gazza, A. Corriero, S. Desantis, and F. Acone (2004). **The sensitive innervation of the ostrich nasal mucosa**. *Archivio Italiano Di Anatomia Ed Embriologia. [Italian Journal of Anatomy and Embryology]*. 109(4): 239-48. ISSN: 0004-0223.

**Abstract:** The sensitive innervation of the ostrich's nasal mucosa, through impregnative gold chloride methods, was investigated. The autonomy innervation, constituted by ganglion cells placed along the course of nerve trunks was particularly represented in the respiratory tract of the nasal cavity. The somatic nerve component, composed by free and capsulated endings, was especially distributed in the vestibular district. The nerve corpuscles were morphologically classified as Pacini, Pacini-like, Golgi-Mazzoni and Herbst. Further investigations must be expected to attribute an effective functional role particularly to this last nerve component.

**Descriptors:** ostrich, nasal mucosa, sensitive innervation, ganglion cells, nerve trunks, nasal cavity, respiratory tract, somatic nerve, nerve corpuscles.

Palmieri, G., L.B. Minelli, M. Botti, F. Gazza, S. Desantis, M. Deflorio, G. Costa, M.G. Cappai, and F. Acone (2005). **Autonomic and sensitive somatic innervation of the ostrich elbow and knee joints articular capsule.** *Archivio Italiano Di Anatomia Ed Embriologia. [Italian Journal of Anatomy and Embryology]*. 110(2): 111-23. ISSN: 0004-0223.

**Abstract:** The present research was carried out on the fibrous layer of the ostrich's elbow and knee joints articular capsule, employing opportunely modified gold chloride Ruffini's method, to study the autonomic and sensitive somatic nerve components. The distribution of both nerve components followed frequently the vascular networks. The autonomic innervation was represented by isolated or grouped ganglion cells, frequently placed along the course of nerve trunks, close to the epineurium or located within the perineural connective tissue. The sensitive somatic innervation was constituted by free and encapsulated corpuscles. The last one, morphologically classified as Pacini, Pacini-like and Golgi-Mazzoni's corpuscles, were found isolated or grouped to constitute simple and complex flower sprays, "oppositopolar corpuscles" and "poichilomorphous fibres". The very few Golgi-Mazzoni's corpuscles were found only in the knee joint articular capsule. The two nerve components, found in the considered districts, did not shown significant quanti-qualitative and topographic differences. This datum, at least in appearance, seems to conflict with the ostrich functional aptitudes. In fact, the ostrich is a bird unable to fly but very able to run.

**Descriptors:** ostrich, elbow, knee joint, forelimb anatomy, histology, hindlimb anatomy, histology, joint capsule innervation, joints anatomy, histology, joints innervation, struthioniformes anatomy, afferent pathways anatomy, autonomic pathways anatomy, connective tissue innervation.

Pasmans, F., F. Van Immerseel, K. Hermans, M. Heyndrickx, J.M. Collard, R. Ducatelle, and F. Haesebrouck (2004). **Assessment of virulence of pigeon isolates of *Salmonella enterica* subsp. *enterica* serovar *typhimurium* variant copenhagen for humans.** *Journal of Clinical Microbiology* 42(5): 2000-2. ISSN: 0095-1137.

**Abstract:** *Salmonella enterica* serovar *Typhimurium* variant Copenhagen was isolated from 5 of 152 (3.3%) feral pigeons from the city of Ghent (Belgium) and from 26 pooled fecal samples from 114 pigeon lofts (22.8%). These isolates belonged to phage type (PT) 99. Seven of the pigeon isolates were further compared in vitro to five human variant Copenhagen isolates, 2 isolates of PT 208, 1 isolate each of PT 120 and U302, and a nontypeable isolate. No differences in invasiveness in human intestinal epithelial Caco-2 cells were found. The human strains, however, were able to multiply significantly more inside human THP-1 macrophages than the pigeon strains. After inoculation of mice with a pigeon PT 99 strain, high numbers of *Salmonella* bacteria were shed with the feces, the internal organs were heavily colonized,

and the animals showed severe clinical symptoms resulting in death. In conclusion, the less-pronounced ability of the pigeon variant Copenhagen strains to multiply inside human macrophages than human strains as well as the lack of human PT 99 isolates during 2002, despite the relatively high frequency of this PT in the pigeon population, suggest these strains to be of low virulence to humans. However, the high virulence for mice of the tested strain implies that rodents may act as reservoirs.

**Descriptors:** pigeon isolates, *Salmonella typhimurium* isolation, purification, pathogenicity, virulence, assessment, disease reservoirs, feces microbiology, mice, salmonella infections, transmission, species specificity, urban health, virulence, Belgium.

Pettifer, G.R., J. Cornick Seahorn, J.A. Smith, G. Hosgood, and T.N.J. Tully (2002). **The comparative cardiopulmonary effects of spontaneous and controlled ventilation by using the Hallowell EMC Anesthesia WorkStation in Hispaniolan Amazon parrots (*Amazona ventralis*).** *Journal of Avian Medicine and Surgery* 16(4): 268-276. ISSN: 1082-6742.

**Descriptors:** Amazon parrots, cardiopulmonary effects, ventilation, spontaneous, controlled, anesthesia, work station, anesthetic.

Pike, T.W. and M. Petrie (2006). **Experimental evidence that corticosterone affects offspring sex ratios in quail.** *Proceedings of the Royal Society Biological Sciences Series B* 273(1590): 1093-1098. ISSN: 0962-8452.

**Descriptors:** Japanese quail, *Coturnix japonica*, corticosterone, affects, offspring sex ratio, studies, sex biasing process, birds.

Polat, U., M. Cetin, O. Turkyilmaz, and A. Yalcin (2004). **Reference serum protein and lipoprotein fractions of ostriches (*Struthio camelus*) in Turkey.** *Onderstepoort Journal of Veterinary Research* 71(1): 77-9. ISSN: 0030-2465.

**Abstract:** The aim of this study was to determine for reference purposes the values of serum albumin, alpha 1-globulin, alpha 2-globulin, beta-globulin, gamma-globulin, and alpha-lipoprotein (high density lipoprotein), pre-beta-lipoprotein (very low density lipoprotein) and beta-lipoprotein (low density lipoprotein) fractions of normal ostriches (*Struthio camelus*) in Turkey. Five male and five female ostriches, 18 months old, were used. All the ostriches were fed on a diet that contained 15.14% crude protein and 2,950 Kcal/kg of metabolizable energy. The serum protein and lipoprotein fractions were measured using agarose gel electrophoresis. The fractions were found to be 60.96% albumin, 0.24% alpha 1-globulin, 15.91% alpha 2-globulin, 13.34% beta-globulin, 9.55% gamma-globulin, 53.77% HDL, 0.60% VLDL and 48.09% LDL.

**Descriptors:** ostriches, serum protein, lipoprotein, fractions, reference, values, globulin, diet, agarose gel electrophoresis, Turkey.

Pourlis, A.F., J. Antonopoulos, and I.N. Magras (2006). **A light and electron microscopic study of the limb long bones perichondral ossification in the quail embryo (*Coturnix coturnix japonica*)**. *Archivio Italiano Di Anatomia Ed Embriologia*. [Italian Journal of Anatomy and Embryology]. 111(3): 159-70. ISSN: 0004-0223.

**Abstract:** The perichondral ossification of the limb long bones in the quail embryo is investigated, in this study, by means of light and electron microscopy. Longitudinal sections of the humerus, radius, ulna, femur, tibia and fibula stained with haematoxylin-eosin were examined by the light microscope. Ultrathin cross sections were selected for the electron microscope as well. Light microscopic analysis showed that the ossification began at the same time in the long bones of the wing and leg. At the embryonic day 6, all the cartilaginous rudiments consisted of three zones. The central zone composed of hypertrophic chondrocytes, a second zone on either side of the central zone, which consisted of flattened cells and a third zone, which represented the epiphyseal region. A thin sheath of osteoid and a bi-layered perichondrium-periosteum surrounded the central zone of the cartilaginous rudiments of the long bones. The perichondrium consisted of a layer of osteoblasts, in contact with the cartilage, and a layer of fibroblasts. At the embryonic day 7, the thickness of the calcified osteoid ring increased and a vasculature appeared between the layer of osteoblasts and the layer of fibroblasts. At the embryonic day 8, a second sheath of periosteal bone began to be formed. Concurrently, vascular and perivascular elements began to invade the cartilage. The ossification spread towards the distal ends of both the diaphysis. At the electron microscopic level, the osteoblasts of the perichondrium showed cytoplasmic characteristics of cells involved in protein synthesis. The perichondral ossification is the first hallmark of the osteogenesis in the long bones. The observations reported above, are in accordance with previous studies in the chick embryo.

**Descriptors:** *coturnix*, quail, embryo, bones of lower extremity embryology, bones of upper extremity, osteogenesis physiology, blood vessels embryology, blood vessels ultrastructure, bones ultrastructure, cartilage embryology, ultrastructure, mammalian, femur embryology, femur ultrastructure, humerus embryology, humerus ultrastructure, osteoblasts physiology, osteoblasts ultrastructure, periosteum embryology, periosteum physiology, periosteum ultrastructure.

Rama, C., K. Revathi, R. Kungumapriya, S. Gulati, M. Yogananda, and R. Prabhakaran (2006). **Histopathological changes due to aflatoxins in japanese quail, *Coturnix coturnix japonica***. *Journal of Experimental Zoology India* 9(2): 421-424. ISSN: 0972-0030.

**Descriptors:** Japanese quail, *coturnix*, aflatoxins, histopathological changes, peanut meal, livestock feed, *Coturnix coturnix japonica*, toxins.

Rama, C., K. Revathy, S. Gulati, R. Kungumapriya, and M. Yogananda (2006). **Haematological and biochemical changes due to aflatoxins in japanese quail, *Coturnix coturnix japonica***. *Journal of Experimental Zoology India* 9(2): 389-395. ISSN: 0972-0030.

**Descriptors:** Japanese quail, *coturnix*, aflotoxins, changes, haematological, biochemical.

Rasmussen, U.F., S.E. Vielwerth, and H.N. Rasmussen (2004). **Skeletal muscle bioenergetics: a comparative study of mitochondria isolated from pigeon pectoralis, rat soleus, rat biceps brachii, pig biceps femoris and human quadriceps**. *Comparative Biochemistry and Physiology Part A Molecular and Integrative Physiology*. 137((2)): 435-446. ISSN: 1095-6433.

**Abstract:** The metabolism of mitochondria isolated from five functionally different skeletal muscles is compared. Data for a single ectothermic preparation are also reported. The mitochondria were prepared in yields of 44 +/- 7% from 50 to 100 mg muscle. The muscle content of mitochondrial protein ranged between 2 and 40 g kg<sup>-1</sup>. Twelve specific activities of key enzymes and metabolic systems were determined, 10 of these in functional assays with respiratory measurements. The specific activities of glutamate dehydrogenase, α-glycerophosphate dehydrogenase, and exo-NADH oxidase differed considerably among muscle sources. Seven specific activities, including very central reactions, showed low among-muscle variation. The activity of ATP synthesis, for instance, was 1.0-1.3 mmol min<sup>-1</sup> g<sup>-1</sup> mitochondrial protein, 25degrees C. In vitro data were extrapolated to in vivo conditions of the muscles. The calculated rates of respiration and ATP synthesis were in accordance with reported tissue activities. Pigeon pectoralis mitochondria showed a unique cytochrome spectrum and a respiratory chain activity that might effect simultaneous carbohydrate and fatty acid respiration. In mitochondria from the other muscles, the respiratory chain activity balanced the carbohydrate oxidation capacity. In all muscles, the respiratory capacity exceeds that needed for oxidative phosphorylation. This may secure maximal mitochondrial ATP synthesis during maximal work rates and high cellular [Ca<sup>2+</sup>].

**Descriptors:** energy metabolism, skeletal muscle, pigeons, rats, swine, humans.

Rattenborg, N.C., W.H. Obermeyer, E. Vacha, and R.M. Benca (2005). **Acute effects of light and darkness on sleep in the pigeon (*Columba livia*)**. *Physiology and Behavior* 84(4): 635-40. ISSN: 0031-9384.

**Abstract:** In addition to entraining circadian rhythms, light has acute effects on sleep and wakefulness in mammals. To determine whether light and darkness have similar effects in birds, the only non-mammalian group that displays sleep patterns comparable to mammals, we examined the effects of lighting changes on sleep and wakefulness in the pigeon. We quantified sleep behavior (i.e., bilateral or unilateral eye closure) in pigeons maintained under a 12:12 LD cycle, and immediately follow-

ing a change from a 12:12 to a 3:3 LD cycle. During both LD cycles, sleep was most prevalent during dark periods. During the 3:3 LD cycle, darkness had the greatest sleep promoting effect during the hours corresponding to the subjective night of the preceding 12:12 LD cycle, whereas light suppressed sleep across circadian phases. As previously suggested, the light-induced decrease in sleep in the subjective night might be partly mediated by the suppression of melatonin by light. Although the sleep promoting effect of darkness was modulated by the circadian rhythm, sleep in darkness occurred during all circadian phases, suggesting that darkness per se may play a direct role in inducing sleep. In addition to the effects of lighting on behavioral state, we observed an overall bias toward more right eye closure under all lighting conditions, possibly reflecting a response to the novel testing environment.

**Descriptors:** pigeon, sleep, light, darkness, acute effects, circadian rhythms, wakefulness.

Raukar, J., M. Simpraga, R. Zadro, and J. Lukac (2006). **Immunological status in one-day old ostriches: preliminary results.** *Journal of Ornithology* 147(5, Suppl. 1): 236. ISSN: 0021-8375.

**Descriptors:** ostriches, one day old, immunological status, preliminary results, meeting.

**Notes:** Meeting Information: 24th International Ornithological Congress, Hamburg, GERMANY; 2006.

Reed, K.L., M.G. Conzemius, R.A. Robinson, and T.D. Brown (2004). **Osteocyte-based image analysis for quantitation of histologically apparent femoral head osteonecrosis: application to an emu model.** *Computer Methods in Biomechanics and Biomedical Engineering* 7(1): 25-32. ISSN: 1025-5842.

**Abstract:** Femoral head osteonecrosis is often characterized histologically by the presence of empty lacunae in the affected bony regions. The shape, size and location of a necrotic lesion influences prognosis, and can, in principle, be quantified by mapping the distribution of empty lacunae within a femoral head. An algorithm is here described that automatically identifies the locations of osteocyte-filled vs. empty lacunae. The algorithm is applied to necrotic lesions surgically induced in the emu, a large bipedal animal model in which osteonecrosis progresses to collapse, as occurs in humans. The animals' femoral heads were harvested at sacrifice, and hematoxylin and eosin-stained histological preparations of the coronal midsections were digitized and image-analyzed. The algorithm's performance in detecting empty lacunae was validated by comparing its results to corresponding assessments by six trained histologists. The percentage of osteocyte-filled lacunae identified by the algorithm vs. by the human readers was statistically indistinguishable.

**Descriptors:** emu, hip joint pathology, animal models, osteocytes pathology, osteonecrosis pathology, algorithms, Dromaiidae, femoral head, algorithm.

Reisen, W.K., R.E. Chiles, V.M. Martinez, Y. Fang, and E.N. Green (2004). **Encephalitis virus persistence in California birds: experimental infections in mourning doves (*Zenaidura macroura*)**. *Journal of Medical Entomology* 41(3): 462-466. ISSN: 0022-2585.

**Abstract:** After-hatching and hatching year, mourning doves were infected by inoculation with either western equine encephalomyelitis (WEE) or St. Louis encephalitis (SLE) viruses; some birds in each group also were treated with the immunosuppressant cyclophosphamide before and during infection. Cyclophosphamide treatment significantly increased the WEE viremia but did not alter the antibody response. In contrast, cyclophosphamide-treated and -untreated doves did not develop a detectable SLE viremia but became antibody positive. Antibody peaked at 10 wk after inoculation for both viruses and remained detectable in most birds throughout the 26-wk study. When treated with cyclophosphamide the following spring, birds did not relapse and develop a detectable viremia. Previously infected birds were protected when challenged with conspecific virus (i.e., none produced a detectable viremia), but there was no anamnestic antibody response to reinfection. In agreement with our failure to detect relapses, all birds were negative for viral RNA when sera, spleen, lung, and kidney tissues were tested by reverse transcriptase-polymerase chain reaction after necropsy. Our results indicated that adult mourning doves were an incompetent host for SLE virus and probably do not serve as a suitable overwintering or dispersal host for either WEE and SLE viruses.

**Descriptors:** Columbidae, doves, infection, Western equine encephalitis virus, Saint Louis encephalitis virus, viral encephalitis, viremia, antibody formation, immunosuppressive agents, cyclophosphamide, host pathogen relationships, immunity, disease reservoirs, reinfection, host competence, California, USA.

Roberts, M.L., K.L. Buchanan, D. Hasselquist, and M.R. Evans (2007). **Effects of testosterone and corticosterone on immunocompetence in the zebra finch**. *Hormones and Behavior* 51(1): 126-34. ISSN: 0018-506X.

**Abstract:** The original immunocompetence handicap hypothesis (ICHH) suggested that testosterone has a handicapping effect in males by both promoting the development of sexual signals and suppressing immune function. A modified version, the stress-linked ICHH, has recently proposed that testosterone is immunosuppressive indirectly by increasing production of corticosterone. To test both the original and stress-mediated versions of the ICHH, we implanted male zebra finches taken from lines selected for divergent maximum stress-induced levels of corticosterone (high, low and control) with either empty or testosterone-filled implants. Their humoral and cell-mediated immune responses were then assessed by challenge with diphtheria:tetanus vaccine and phytohemagglutinin respectively. We found no effect of the hormone manipulations on either PHA or tetanus antibody responses, but

found a significant interaction between titers of both testosterone and corticosterone on diphtheria secondary antibody response; antibody response was greatest in individuals with high levels of both hormones. There was also a significant interactive effect between testosterone treatment group and corticosterone titer on body mass; the body mass of males in the elevated testosterone treatment group decreased with increasing corticosterone titer. These results suggest that, contrary to the assumption of the stress-mediated version of the ICHH, high plasma levels of corticosterone are not immunosuppressive, but are in fact immuno-enhancing in the presence of high levels of plasma testosterone. Equally, the central assumption of the ICHH that testosterone is obligately immunosuppressive is also not supported. The same individuals with the highest levels of both hormones and consequently the most robust antibody response also possessed the lowest body mass.

**Descriptors:** zebra finches, corticosterone, blood, immunology, immunocompetence, testosterone, antibody formation, body weight, immunity, cellular.

Ronning, B., H. Jensen, B. Moe, and C. Bech (2007). **Basal metabolic rate: heritability and genetic correlations with morphological traits in the zebra finch.** *Journal of Evolutionary Biology* 20(5): 1815-22. ISSN: 1010-061X.

**Abstract:** Studies of genetic variation in metabolic traits have so far not focused on birds. In our study population of captive zebra finches we found evidence for a significant heritable genetic component in basal metabolic rate (BMR). Heritability of all morphological traits investigated (body mass, head length, tars length and wing length) was significantly larger than zero. All traits were positively phenotypically correlated. Eight of 10 genetic correlations presented in this study differed significantly from zero, all being positive, suggesting the possibility of correlated responses to any selection acting on the traits. When conditioned on the genetic variance in body mass, the heritability of BMR was reduced from 25% to 4%. Hence, our results indicate that genetic changes in BMR through directional selection are possible, but the potential for adaptation independent of body mass may be limited.

**Descriptors:** zebra finch, basal metabolic rate, genetic correlations, heritability, morphological traits, BMR.

Rossi Fraire, H.J. and M.B. Martella (2006). **DNA test to sex the lesser rhea (*Rhea pennata pennata*).** *British Poultry Science* 47(3): 375-377. ISSN: 0007-1668.

**Abstract:** 1. A polymerase-chain-reaction (PCR)-based test was adapted to sex the lesser rhea. Feathers instead of blood were used as the source of DNA. 2. The primers used allowed the assignment of sex by amplification of Z and W chromosome linked sequences. 3. This method proved to be safe, accurate and non-invasive. 4. The W chromosome linked fragment was sequenced and compared to other ratite sequences.

**Descriptors:** rheas, alternative livestock, sexing, polymerase chain reaction, feathers,

sex chromosomes, sex linkage, genetic markers, nucleotide sequences, sequence alignment, sequence analysis, molecular sequence data.

Rubenson, J., D.G. Lloyd, T.F. Besier, D.B. Heliamas, and P.A. Fournier (2007). **Running in ostriches (*Struthio camelus*): three-dimensional joint axes alignment and joint kinematics.** *Journal of Experimental Biology* 210(Pt 14): 2548-62. ISSN: 0022-0949.

**Abstract:** Although locomotor kinematics in walking and running birds have been examined in studies exploring many biological aspects of bipedalism, these studies have been largely limited to two-dimensional analyses. Incorporating a five-segment, 17 degree-of-freedom (d.f.) kinematic model of the ostrich hind limb developed from anatomical specimens, we quantified the three-dimensional (3-D) joint axis alignment and joint kinematics during running (at approximately 3.3 m s<sup>-1</sup>) in the largest avian biped, the ostrich. Our analysis revealed that the majority of the segment motion during running in the ostrich occurs in flexion/extension. Importantly, however, the alignment of the average flexion/extension helical axes of the knee and ankle are rotated externally to the direction of travel (37 degrees and 21 degrees, respectively) so that pure flexion and extension at the knee will act to adduct and abduct the tibiotarsus relative to the plane of movement, and pure flexion and extension at the ankle will act to abduct and adduct the tarsometatarsus relative to the plane of movement. This feature of the limb anatomy appears to provide the major lateral (non-sagittal) displacement of the lower limb necessary for steering the swinging limb clear of the stance limb and replaces what would otherwise require greater adduction/abduction and/or internal/external rotation, allowing for less complex joints, musculoskeletal geometry and neuromuscular control. Significant rotation about the joints' non-flexion/extension axes nevertheless occurs over the running stride. In particular, hip abduction and knee internal/external and varus/valgus motion may further facilitate limb clearance during the swing phase, and substantial non-flexion/extension movement at the knee is also observed during stance. Measurement of 3-D segment and joint motion in birds will be aided by the use of functionally determined axes of rotation rather than assumed axes, proving important when interpreting the biomechanics and motor control of avian bipedalism.

**Descriptors:** ostrich, running, motion, joint axis, alignment, kinematics, locomotor, walking, joint motion, flexion, extension, limb anatomy.

Ruffins, S.W., M. Martin, L. Keough, S. Truong, S.E. Fraser, R.E. Jacobs, and R. Lansford (2007). **Digital three-dimensional atlas of quail development using high-resolution MRI.** *The Scientific World Journal* 7: 592-604. ISSN: 1537-744X.

**Abstract:** We present an archetypal set of three-dimensional digital atlases of the quail embryo based on microscopic magnetic resonance imaging (microMRI). The atlases are composed of three modules: (1) images of fixed ex ovo quail, ranging in age from embryonic day 5 to 10 (e05 to e10); (2) a coarsely delineated anatomical

atlas of the microMRI data; and (3) an organ system-based hierarchical graph linked to the anatomical delineations. The atlas is designed to be accessed using SHIVA, a free Java application. The atlas is extensible and can contain other types of information including anatomical, physiological, and functional descriptors. It can also be linked to online resources and references. This digital atlas provides a framework to place various data types, such as gene expression and cell migration data, within the normal three-dimensional anatomy of the developing quail embryo. This provides a method for the analysis and examination of the spatial relationships among the different types of information within the context of the entire embryo.

**Descriptors:** quail, development, three dimensional, high resolution MRI, embryo, anatomy, histology, embryology, magnetic resonance imaging.

Rutstein, A.N., P.J. Slater, and J.A. Graves (2004). **Diet quality and resource allocation in the zebra finch.** *Proceedings. Biological Sciences The Royal Society* 271(Suppl 5): S286-9. ISSN: 0080-4649.

**Abstract:** We investigated the effect of diet quality on resource allocation in zebra finches (*Taeniopygia guttata*) by providing females with a high-quality (HQ) or low-quality (LQ) diet for six weeks prior to pairing, and continuing these diets during egg laying and chick rearing. Diet treatments were then reversed and the experiment repeated. When females laid on the HQ diet, egg mass increased with laying order, but the reverse was true on the LQ diet. Females laid significantly more male eggs on the LQ diet compared with on the HQ diet. In addition, female eggs were more frequent at the end of the clutch when on the HQ diet and at the beginning of the clutch when on the LQ diet. These differences in the primary sex ratio are in line with predictions from sex allocation theory, since in this species females are more vulnerable to nutritional stress than males.

**Descriptors:** zebra finch, animal nutrition physiology, finches physiology, ovum growth, development, sex ratio, body weight, diet quality, resource allocation, litter size.

Sahin, K., R. Ozercan, M. Onderci, N. Sahin, M.F. Gursu, F. Khachik, F.H. Sarkar, A. Munkarah, R. Ali Fehmi, D. Kmak, and O. Kucuk (2004). **Lycopene supplementation prevents the development of spontaneous smooth muscle tumors of the oviduct in Japanese quail.** *Nutrition and Cancer* 50(2): 181-9. ISSN: 0163-5581.

**Abstract:** Leiomyomas (fibroids) are benign tumors of the uterus affecting millions of women. Spontaneous leiomyomas of the oviduct are common tumors of the Japanese quail (*Coturnix coturnix japonica*), which makes it a good animal model for screening potential agents for testing in the prevention and treatment of human myoma uteri. Because dietary intake of lycopene has been associated with a reduced risk of a variety of human cancers, we investigated the effects of lycopene supplementation on the development of leiomyomas in the oviduct of Japanese quail. We

also measured serum levels of oxidative stress markers [malondialdehyde (MDA) and homocysteine], lycopene, vitamins C, E, and A, and tissue biomarkers Bcl-2 and Bax expression. One hundred twenty quails (6 mo old) were assigned to 3 treatment groups consisting of 4 replicates of 10 birds in each group. Birds were fed either a basal diet (group C) or the basal diet supplemented with 100 mg (group L1) or 200 mg (group L2) of lycopene per kilogram of diet. The animals were sacrificed after 285 days and the tumors were identified. Lycopene supplementation decreased the number of leiomyomas compared with control subjects ( $P=0.056$ ). The tumors in lycopene-fed birds were smaller than those found in control birds ( $P=0.01$ ). There were no significant differences in the expression of tissue Bcl-2 and Bax among the study groups. Serum vitamins C, E, and A increased ( $P=0.01$ ), whereas MDA and homocysteine concentrations decreased ( $P=0.01$ ) with lycopene supplementation. No measurable lycopene could be detected in the serum of control birds, whereas a dose-dependent increase was observed in the serum of lycopene-supplemented birds. The results indicate that dietary supplementation with lycopene reduces the incidence and size of spontaneously occurring leiomyoma of the oviduct in the Japanese quail. Clinical trials should be conducted to investigate the efficacy of lycopene supplementation in the prevention and treatment of uterine leiomyoma in humans.

**Descriptors:** Japanese quail, smooth muscle tumors, oviduct, lycopene supplementation, prevents development, fibroids, leiomyomas, animal model.

Sahin, N., M. Onderci, K. Sahin, G. Cikim, and O. Kucuk (2005). **Magnesium proteinate is more protective than magnesium oxide in heat-stressed-quail.** *Journal of Nutrition* 135(7): 1732-1737.

**Abstract:** We evaluated the effects of dietary supplementation with Mg-oxide and Mg-proteinate on performance; nutrient digestibilities; malondialdehyde (MDA) concentrations in serum, liver, and thigh meat; and serum cholesterol and triacylglycerol concentrations in Japanese quail (*Coturnix coturnix japonica*) exposed to high ambient temperature. The birds ( $n = 360$ ; 10 d old) were randomly assigned to 12 treatment groups consisting of 6 replicates of 5 birds each in a 2 x 2 x 3 factorial arrangement (temperature, Mg source, Mg level). Birds were maintained in temperature-controlled rooms at 22degrees C for 24 h/d or 34degrees C for 8 h/d (0900-1700 h) and fed a basal diet or that diet supplemented with 1 or 2 g Mg-oxide or Mg-proteinate/kg of diet. Heat exposure decreased ( $P = 0.0001$ ) live weight gain, feed intake, feed efficiency, and carcass weight in quail fed the basal diet. A linear increase in feed intake ( $P = 0.008$ ) and body weight ( $P = 0.001$ ), and improvements in feed efficiency ( $P = 0.001$ ), carcass weight ( $P < 0.0001$ ), digestibility of dry matter, organic matter, crude protein, and ether extract were found in Mg-supplemented, heat-stressed quail. The effects of Mg-proteinate were greater than those of Mg-oxide ( $P \leq 0.0001$ ). Serum Mg ( $P = 0.001$ ) concentration increased, whereas the con-

centration of MDA in serum ( $P = 0.0001$ ), liver ( $P = 0.04$ ), and thigh meat ( $P = 0.0001$ ) and serum triglyceride and cholesterol concentrations decreased linearly ( $P = 0.001$ ) with the level of Mg in the diet. Interactions between dietary Mg source, temperature, and level of supplementation ( $P \leq 0.05$ ) were found for several variables. Results of the present study suggest that supplementation with Mg-proteinate is more protective than Mg-oxide in reducing the negative effects of heat stress in quail.

**Descriptors:** Japanese quails, magnesium oxide, magnesium, heat stress, animal growth, digestibility, liver, lipid peroxidation, poultry meat, dietary mineral supplements, malondialdehyde, blood chemistry, thighs, cholesterol, triacylglycerols, feed intake, liveweight gain, feed conversion, carcass weight, protective effect, magnesium proteinate.

Sahin, N., K. Sahin, M. Onderci, M.F. Gursu, G. Cikim, J. Vijaya, and O. Kucuk (2005).

**Chromium picolinate, rather than biotin, alleviates performance and metabolic parameters in heat-stressed quail.** *British Poultry Science* 46(4): 457-463. ISSN: 0007-1668.

**Abstract:** 1. The effects of chromium picolinate and biotin supplementation alone and in combination on performance, carcass characteristics, malondialdehyde (MDA), vitamin C, vitamin E, glucose and cholesterol levels were evaluated in Japanese quail exposed to high ambient temperature. 2. Two hundred and forty quails (10 d old) were assigned randomly to 4 dietary treatments at room temperature (22 degrees C; thermoneutral, TN) or ambient (34 degrees C for 8 h/d; heat stress, HS). Both TN and HS were fed either on a basal (control) diet or the basal diet supplemented with 400 microgram of Cr/kg (Cr group), 0.5 mg of biotin/kg of diet (biotin group) or both (Cr + Biotin group). 3. Supplementing the diet of heat-stressed quails with chromium picolinate improved live weight gain, feed intake, feed efficiency and carcass traits. Biotin supplementation during TN and HS conditions did not have any beneficial effects on body weight gain, feed intake, feed efficiency or carcass traits. 4. Either in combination or alone, chromium picolinate increased serum concentrations of vitamins C and E, but decreased MDA, glucose and cholesterol concentrations in birds kept at high ambient temperature. There was no difference in vitamins C and E and MDA concentrations between birds given chromium picolinate and birds receiving chromium picolinate plus biotin, while glucose and cholesterol levels were significantly lower in all groups. The lowest concentrations of cholesterol and glucose were found in the combination group under both TN and HS conditions. An interaction between diet and temperature was detected for glucose and cholesterol concentrations. 5. Excretion rates for zinc, iron and chromium were lower in TN groups than in the corresponding HS groups. Supplementing diet with chromium picolinate and chromium picolinate plus biotin decreased excretion of minerals while biotin alone did not effect excretion of minerals. 6. Chromium sup-

plementation, but not biotin supplementation, attenuated the decline in performance and antioxidant status resulting from heat stress.

**Descriptors:** Japanese quails, food animals, feed supplements, poultry feeding, heat stress, ambient temperature, picolinic acid, biotin, carcass characteristics, animal performance, malondialdehyde, ascorbic acid, vitamin E, glucose, cholesterol, live-weight gain, feed intake, feed conversion, carcass quality, blood chemistry, zinc, iron, chromium, excretion, chromium picolinate.

Sahnduran, S. (2004). **Isolation of *Escherichia coli* and *Staphylococcus aureus* from ostriches with conjunctivitis and respiratory disease.** *Revue De Medecine Veterinaire* 155(3): 167-169. ISSN: 0035-1555.

**Descriptors:** ostriches, conjunctivitis, respiratory disease, *Escherichia coli*, *Staphylococcus aureus*, isolation, clinical signs, treatment.

**Language of Text:** French.

Sandkc, M., U. Eren, A.G. Onol, and S. Kum (2004). **The effect of heat stress and the use of *Saccharomyces cerevisiae* or (and) bacitracin zinc against heat stress on the intestinal mucosa in quails.** *Revue De Medecine Veterinaire* 155(11): 552-556. ISSN: 0035-1555.

**Descriptors:** quails, heat stress, effect, intestinal mucosa, use of *Saccharomyces cerevisiae*, bacitracin, against heat stress.

**Language of Text:** French.

Sasazaki, S., T. Hinenoya, B. Lin, A. Fujiwara, and H. Mannen (2006). **A comparative map of macrochromosomes between chicken and Japanese quail based on orthologous genes.** *Animal Genetics* 37(4): 316-320. ISSN: 0268-9146.

**Abstract:** In order to develop a comparative map between chicken and quail, we identified orthologous gene markers based on chicken genomic sequences and localized them on the Japanese quail Kobe-NIBS linkage map, which had previously been constructed with amplified fragment length polymorphisms. After sequencing the intronic regions of 168 genes located on chicken chromosomes 1-8, polymorphisms among Kobe-NIBS quail family parents were detected in 51 genes. These orthologous markers were mapped on eight Japanese quail linkage groups (JQG), and they allowed the comparison of JQG to chicken macrochromosomes. The locations of the genes and their orders were quite similar between the two species except within a previously reported inversion on quail chromosome 2. Therefore, we propose that the respective quail linkage groups are macrochromosomes and designated as quail chromosomes CJA 1-8.

**Descriptors:** chickens, Japanese quails, chromosomes, genes, chromosome mapping, sequence alignment, genetic markers, linkage, introns, genetic polymorphism, chro-

mosome inversions, comparative mapping, macrochromosomes, molecular sequence data.

Savlik, M., L. Polackova, B. Szotakova, J. Lamka, J. Velik, and L. Skalova (2007). **Activities of biotransformation enzymes in pheasant (*Phasianus colchicus*) and their modulation by in vivo administration of mebendazole and flubendazole.** *Research in Veterinary Science* 83(1): 20-26. ISSN: 0034-5288.

**Abstract:** Basal activities of certain pheasant hepatic and intestinal biotransformation enzymes and modulation of their activities by anthelmintics flubendazole (FLBZ) and mebendazole (MBZ) were investigated in subcellular fractions that were prepared from liver and small intestine of control and FLBZ or MBZ treated birds. Several oxidation, reduction and conjugation enzyme activities were assessed. In the liver, treatment of pheasants by FLBZ or MBZ caused very slight or no changes in monooxygenase activities and conjugation enzymes. More significant changes were detected in small intestine. Metyrapone and daunorubicin reductase activities were increased by both substances in the liver. This is the first evidence that certain benzimidazoles modulate reductases of carbonyl group. With respect to the relatively slight extent of the changes caused by FLBZ or MBZ we can assume that repeated administration of therapeutic doses of both FLBZ and MBZ has probably no serious influence on pheasant biotransformation enzyme system.

**Descriptors:** pheasant, biotransformation enzymes, activities, modulation, mebendazole, flubendazole, in vivo administration.

Savlik, M., P. Polaskova, B. Szotakova, J. Lamka, and L. Skalova (2005). **The effects of flubendazole and mebendazole on cytochromes P4501A in pheasant hepatocytes.** *Research in Veterinary Science* 79(2): 139-147. ISSN: 0034-5288.

**Descriptors:** pheasants, flubendazole, mebendazole, cytochrome P 450, hepatocytes, drug evaluation, cell culture, chemical concentration, immunoblotting, enzyme activity, enzyme inhibition, product safety, animal well being.

Schaller, N., K. D'auot, P. Aerts, and B. Herkner (2007). **Phalangeal load and pressure distribution in walking and running ostriches (*Struthio camelus*).** *Comparative Biochemistry and Physiology Part A Molecular and Integrative Physiology* 146(4, Suppl. S): S122. ISSN: 1095-6433.

**Descriptors:** ostriches feet, walking, running, phalangeal load, pressure distribution, skeletal system, *Struthio camelus*, meeting.

**Notes:** Meeting Information: Annual Meeting of the Society for Experimental Biology, Glasgow, UK; March 31-April 04, 2007.

Schaller, N.U., B. Herkner and R. Prinzinger (2005). **Locomotor characteristics of the ostrich (*Struthio camelus*) I: Morphometric and morphological analyses.** E. Carbajo *Proceedings of the 3rd International Ratite Science Symposium of the World's Poultry Science Association WPSA and 12th World Ostrich Congress, Madrid, Spain, 14th-16th October, 2005*, World Poultry Science Association (WPSA): Beekbergen, Netherlands, p. 83-90. ISBN: 8460963535.

**Descriptors:** ostrich, locomotor characteristics, morphometric, morphological, analysis, conference proceedings, book chapter.

**Notes:** Meeting Information: Proceedings of the 3rd International Ratite Science Symposium of the World's Poultry Science Association (WPSA) and 12th World Ostrich Congress, Madrid, Spain, 14th-16th October, 2005.

Schulte, M., B. Diekamp, M. Manns, A. Schwarz, C. Valencia Alfonso, J.A. Kirsch, O. Gunturkun, and K. Folta (2006). **Visual responses and afferent connections of the n. ventrolateralis thalami (VLT) in the pigeon (*Columba livia*).** *Brain Research Bulletin* 68(4): 285-292. ISSN: 0361-9230.

**Descriptors:** pigeon, visual responses, afferent connections, n. ventrolateralis thalami, VLT, retinal, forebrain.

Schulz, J.H., J.J. Millsbaugh, B.E. Washburn, A.J. Bermudez, J.L. Tomlinson, T.W. Mong, and Z. He (2005). **Physiological effects of radiotransmitters on mourning doves.** *Wildlife Society Bulletin* 33(3): 1092-1100. ISSN: 0091-7648.

**Descriptors:** mourning doves, radiotransmitters, physiological effects, attachment techniques.

Sehu, A., S. Cakir, O. Cengiz, and D. Essiz (2005). **MYCOTOX and aflatoxicosis in quails. [Erratum: 2006 Apr., v. 47, no. 2, p. 247.].** *British Poultry Science* 46(4): 520-524. ISSN: 0007-1668.

**Abstract:** 1. This study was to evaluate the toxic effects of aflatoxin (AF) on growth performance of quail, and to determine the preventive efficacy of MYCOTOX (oxi-cinol, tymol, micronised yeast). 2. One hundred and eighty 1-d-old quail (*Coturnix coturnix japonica*) of both sexes were weighed and randomly divided into 4 experimental groups each with 5 replicates of 9 birds. 3. There were 4 dietary treatments: (1) control with 0 mg AF/kg diet and 0% MYCOTOX; (2) 0 mg AF/kg diet and 0.5% MYCOTOX; (3) 2.5 mg AF/kg diet and 0% MYCOTOX; (4) 2.5 mg AF/kg diet plus 0.5% MYCOTOX. The chicks were maintained on these treatments to 3 weeks of age. Quail consumed the diets and water ad libitum. 4. Body weight (BW) gains in groups receiving AF alone were the lowest at all periods. Feed intake was lowest in the group consuming the AF diet. The addition of MYCOTOX to the AF diet did not prevent or reduce the toxic effects of AF on feed intake at any time period. Feeding diets containing MYCOTOX alone did not change feed intake

significantly. With the exception of the 1 to 7 d period, feed conversion of chicks fed the AF diet was similar to those of the other experimental groups. 5. Bursa of Fabricius weight decreased, whereas the relative weights of liver, kidney and spleen increased in quail consuming diets containing AF and AF plus MYCOTOX. Liver colour was normal in the control and MYCOTOX alone group, but was lighter in groups fed AF. 6. The results indicated that MYCOTOX was not effective in preventing the deleterious effects of AF.

**Descriptors:** Japanese quails, food animals, aflatoxicosis, aflatoxins, feed supplements, body weight, feed intake, feed conversion, bursa of Fabricius, tissue weight, liver, kidneys, spleen, color, oxiconol, tymol, micronized yeast, toxicosis prevention.

Sellier, N., J.P. Brillard, V. Dupuy, and M.R. Bakst (2006). **Comparative staging of embryo development in chicken, turkey, duck, goose, guinea fowl, and Japanese quail assessed from five hours after fertilization through seventy-two hours of incubation.** *Journal of Applied Poultry Research* 15(2): 219-228. ISSN: 1056-6171.

**Descriptors:** poultry, embryo, embryogenesis, ova, fertilization, developmental stages, oviposition, oviducts, blastoderm, species differences.

Shao ChaoGang, Shan SongHua, and Chen JiaYi (2006). **Isolation and identification of a new pigeon genotype VI strain of Newcastle disease virus.** *Veterinary Science in China* 36(7): 543-546. ISSN: 1673-4696.

**Descriptors:** pigeon, Newcastle disease virus, new genotype VI strain, isolation, paramyxovirus.

**Language of Text:** Chinese, summary in English.

Shepherd, L. and D.M. Lambert (2006). **Nuclear microsatellite DNA markers for New Zealand kiwi (*Apteryx* spp.).** *Molecular Ecology Notes* 6(1): 227-229. ISSN: 1471-8278.

**Abstract:** Kiwi (*Apterygidae*) is an endemic New Zealand avian family comprising five species whose conservation is actively managed. We present five polymorphic microsatellite DNA loci isolated from North Island brown kiwi (*Apteryx mantelli*). In addition, we demonstrate cross-amplification, and in some cases, polymorphism, of these microsatellite DNA loci in four other kiwi species. Therefore, these markers may be broadly applicable to conservation genetic studies within this family.

**Descriptors:** kiwi, New Zealand, DNA markers, nuclear microsatellite, loci.

Sloley, S., S. Smith, M. Algeciras, V. Cavett, J.A. Busby, S. London, D.F. Clayton, and S.K. Bhattacharya (2007). **Proteomic analyses of songbird (Zebra finch; *Taeniopygia guttata*) retina.** *Journal of Proteome Research* 6(3): 1093-100. ISSN: 1535-3893.

**Abstract:** Proteomic analyses of male songbird (Zebra finch; *Taeniopygia guttata*; ZF) retina were performed resulting in identification of 129 proteins. Comparison of T.

*guttata* retinal proteome with that of chicken found proteins detected in both retinas. Immunohistochemical analyses of *T. guttata* retinal sections and Western analyses of total retinal protein extract were performed confirming presence of select bona fide retinal proteins. Results demonstrate the utility of one-dimensional gel fractionation for mass spectrometry and will be useful for future proteomic comparison of songbird retina and brain tissues in different behavioral and pharmacological studies.

**Descriptors:** zebra finch, proteomic analysis, retina, genetics, proteins analysis, immunohistochemical analysis, retinal sections, retinal proteome.

Small, M.F., J.T. Baccus, J.N. Mink, and J.A. Roberson (2005). **Hematologic responses in captive white-winged doves (*Zenaida asiatica*), induced by various radiotrasmmitter attachments.** *Journal of Wildlife Diseases* 41(2): 387-94. ISSN: 0090-3558.

**Abstract:** White blood cell counts, heterophil-lymphocyte ratios, and leukocyte differentials of captive white-winged doves (*Zenaida asiatica*) from Texas equipped with different radiotrasmmitter attachment packages were monitored. Doves were segregated by gender and age by males, females, and hatching year; individuals housed in 30 large outdoor pens in groups of seven. Treatments consisted of controls, glue-on transmitters, body loop harnesses, surgically implanted intracoelomic transmitters, surgically implanted subcutaneous transmitters, intracoelomic surgery without implants, and subcutaneous surgery without implants. We used multivariate analysis of variance with pen as a blocking variable and gender nested and repeated measures analysis of variance to identify differences among any of the transmitter attachment techniques and the control for dependent variables. We found no difference in blood parameters between transmitter attachment technique versus a control.

**Descriptors:** white-winged doves, *Zenaida asiatica*, Columbidae blood, leukocyte count, prostheses, telemetry, multivariate analysis, sentinel surveillance, telemetry methods, radiotrasmmitter, blood cell counts.

Small, M.F., R. Rosales, J.T. Baccus, F.W. Weckerly, D.N. Phalen, and J.A. Robertson (2004). **A comparison of effects of radiotrasmmitter attachment techniques on captive white-winged doves.** *Wildlife Society Bulletin* 32(3): 627-637. ISSN: 0091-7648.

**Descriptors:** white-winged doves, radiotrasmmitter, attachment techniques, effects, comparison.

Smith, N.C., R.C. Payne, K.J. Jaspers, and A.M. Wilson (2007). **Muscle moment arms of pelvic limb muscles of the ostrich (*Struthio camelus*).** *Journal of Anatomy* 211(3): 313-24. ISSN: 0021-8782.

**Abstract:** Muscle moment arms were measured for major muscles of the pelvic limb of the ostrich (*Struthio camelus*) in order to assess specific functional behaviour and to apply this to locomotor performance. Pelvic limbs of six juvenile ostriches were used

for this study. The tendon travel technique was used to measure moment arms of 21 muscles at the hip, knee, ankle and metatarsophalangeal joints throughout the ranges of motion observed during level running. Six of the 21 muscles measured were found to have moment arms that did not change with joint angle, whilst the remainder all demonstrated angle-dependent changes for at least one of the joints crossed. Moment arm lengths tended to be longest for the large proximal muscles, whilst the largest relative changes were found for the moment arms of the distal muscles. For muscles where moment arm varied with joint angle: all hip muscles were found to have increasing moment arms with extension of the joint, knee flexors were found to have moment arms that increased with extension, knee extensor moment arms were found to increase with flexion and ankle extensor moment arms increased with extension. The greatest relative changes were observed in the flexors of the metatarsophalangeal joint, for which a three-fold increase in moment arm was observed from flexion to full extension. Changes in muscle moment arm through the range of motion studied appear to optimize muscle function during stance phase, increasing the effective mechanical advantage of these muscles.

**Descriptors:** ostrich, muscle moment arms, pelvic limb muscles, functional behavior, locomotor performance, hip, knee, ankle, flexion, extension.

Smith, N.C., A.M. Wilson, K.J. Jespers, and R.C. Payne (2006). **Muscle architecture and functional anatomy of the pelvic limb of the ostrich (*Struthio camelus*)**. *Journal of Anatomy* 209(6): 765-79. ISSN: 0021-8782.

**Abstract:** The functional anatomy of the pelvic limb of the ostrich (*Struthio camelus*) was investigated in order to assess musculoskeletal specialization related to locomotor performance. The pelvic limbs of ten ostriches were dissected and detailed measurements of all muscle tendon units of the pelvic limb were made, including muscle mass, muscle length, fascicle length, pennation angle, tendon mass and tendon length. From these measurements other muscle properties such as muscle volume, physiological cross-sectional area (PCSA), tendon cross-sectional area, maximum isometric muscle force and tendon stress were derived, using standard relationships and published muscle data. Larger muscles tended to be located more proximally and had longer fascicle lengths and lower pennation angles. This led to an expected proximal to distal reduction in total muscle mass. An exception to this trend was the gastrocnemius muscle, which was found to have the largest volume and PCSA and also had the highest capacity for both force and power production. Generally high-power muscles were located more proximally in the limb, while some small distal muscles (tibialis cranialis and flexor perforatus digiti III), with short fibres, were found to have very high force generation capacities. The greatest proportion of pelvic muscle volume was for the hip extensors, while the highest capacity for force generation was observed in the extensors of the ankle, many of which were also in series with long tendons and

thus were functionally suited to elastic energy storage.

**Descriptors:** ostrich, functional anatomy, pelvic limb, muscle architecture, locomotion physiology, muscle, skeletal anatomy, histology, biomechanics, hindlimb, muscle contraction, tendons anatomy, histology.

Soman, A., T.L. Hedrick, and A.A. Biewener (2005). **Regional patterns of pectoralis fascicle strain in the pigeon *Columba livia* during level flight.** *Journal of Experimental Biology* 208(Pt 4): 771-86. ISSN: 0022-0949.

**Abstract:** Regional fascicle strains were recorded in vivo from the pectoralis of carneau pigeons using sonomicrometry during level slow flight, together with regional electromyography (EMG) and deltopectoral crest (DPC) strain measurements of whole muscle force. Fascicle strain measurements were obtained at four sites within the pectoralis: the anterior (Ant), middle (Mid) and posterior (Post) sternobrachium (SB), and the smaller thoracobrachium (TB). Strains were also recorded along the intramuscular aponeurosis of the pectoralis to assess its 'in-series' compliance with respect to strains of Post SB and TB fascicles. In-series segment strains were also obtained along Ant SB and Mid SB fascicles, which insert directly on the DPC without attaching to the intramuscular aponeurosis. In-series segment strains differed from 2% to 17.2%, averaging differences of 6.1% at the Ant SB site and 1.4% at the Mid SB site. Temporal patterns of in-series fascicle segment strain were similar at both sites. Regional fascicle strains also exhibited similar temporal patterns of lengthening and shortening and were most uniform in magnitude at the Ant SB, Mid SB and TB sites (total strain: 33.7%, 35.9% and 33.2% respectively), but were smaller at the Post SB site (24.4%). Strains measured along the aponeurosis tracked the patterns of contractile fascicle strain but were significantly lower in magnitude (19.1%). Fascicle lengthening strains (+25.4%) greatly exceeded net shortening strains (-6.5%) at all sites. Much of the variation in regional fascicle strain patterns resulted from variation of in vivo recording sites among individual animals, despite attempts to define consistent regions for obtaining in vivo recordings. No significant variation in EMG activation onset was found, but deactivation of the Ant SB occurred before the other muscle sites. Even so, the range of variation was small, with all muscle regions being activated midway through lengthening (upstroke) and turned off midway through shortening (downstroke). While subtle differences in the timing and rate of fascicle strain may relate to differing functional roles of the pectoralis, regional patterns of fascicle strain and activation suggest a generally uniform role for the muscle as a whole throughout the wingbeat cycle. Shorter fascicles located in more posterior regions of the muscle underwent generally similar strains as longer fascicles located in more anterior SB regions. The resulting differences in fiber length were accommodated by strain in the intramuscular aponeurosis and rotation of the pectoralis insertion with respect to the origin. As a result, longer Ant and Mid SB fascicles were

estimated to contribute substantially more work per unit mass than shorter Post SB and TB fascicles. When the mass fractions of these regions are accounted for, our regional fascicle strain measurements show that the anterior regions of the pectoralis likely contribute 76%, and the posterior regions 24%, of the muscle's total work output. When adjusted for mass fraction and regional fascicle strain, pectoralis work averaged  $24.7 \pm 5.1 \text{ J kg}^{-1}$  ( $206.6 \pm 43.5 \text{ W kg}^{-1}$ ) during level slow (approximately  $4\text{-}5 \text{ m s}^{-1}$ ) flight.

**Descriptors:** pigeon, level flight, pectoralis fascicle, strains, muscle, regional patterns, muscle force, strain measurements.

Sorrell, E.M. and D.R. Perez (2007). **Adaptation of influenza A/Mallard/Potsdam/178-4/83 H2N2 virus in Japanese quail leads to infection and transmission in chickens.** *Avian Diseases* 51(1 Suppl): 264-8. ISSN: 0005-2086.

**Abstract:** To assess the potential of quail as an intermediate host of avian influenza, we tested the influenza A/Mallard/ Potsdam/178-4/83 (H2N2) virus to determine whether through adaptation a mallard strain can replicate and transmit in quail, as well as other terrestrial birds. After five serial passages of lung homogenate a virus arose that replicated and transmitted directly to contact cage mates. To test whether adaptation in quail led to interspecies transmission, white leghorn chickens were infected with the wild-type (mall/178) and quail-adapted (qa-mall/178) viruses. The results show that mall/178 H2N2 does not establish an infection in chickens nor does it transmit, while qa-mall/178 H2N2 infects and transmits to contact chickens causing clinical signs like depression and diarrhea. Completed sequences indicate six amino acid changes spanning four genes, PB2, PB1, HA, and NP, suggesting that the internal genes play a role in host adaptation. Further adaptation of qa-mall/178 in white leghorn chickens created a virus that replicated more efficiently in the upper and lower respiratory tract. Sequence analysis of the chicken-adapted virus points to a deletion in the neuraminidase stalk region.

**Descriptors:** Japanese quail, infection, transmission, influenza A, Mallard, Potsdam, 178-4, 83 H2N2, intermediate host, avian influenza, chickens.

Stanford, M. (2004). **The effect of UV-B lighting supplementation in African grey parrots.** *Exotic DVM* 6(3): 29-32. ISSN: 1521-1363.

**Descriptors:** African grey parrots, UV-B lighting, supplementation, effect, *Psittacus erithacus erithacus*.

Suchy, P., I. Bedanova, V. Vecerek, E. Voslarova, V. Pistekova, P. Chloupek, and F. Vitula (2007). **Effects of transport stress and floor space reduction on selected biochemical indices in common pheasant (*Phasianus colchicus*).** *Archiv Fuer Gefluegelkunde* 71(2): 56-61. ISSN: 0003-9098.

**Descriptors:** common pheasant, *Phasianus colchicus*, transport stress, floor space reduction, effect, biochemical indices.

Sugiarto, H. and P.L. Yu (2007). **Mechanisms of action of ostrich (Sb(B-defensins against *Escherichia coli*. *FEMS Microbiology Letters* 270(2): 195-200. ISSN: 0378-1097.**

**Abstract:** To understand their mechanism of antimicrobial activity against Gram-negative bacteria, ostrich (Sb(B-defensins, ostricacins-1 and 2 (Osp-1 and Osp-2), were compared with those of sheep myeloid antimicrobial peptide (SMAP)-29 and human neutrophil peptide (HNP)-1, well-characterized sheep (Sa(B-helical and human (Sa(B-defensin peptides, respectively. Fluorescence-based biochemical assays demonstrated that the ostricacins bound lipopolysaccharides and disrupted both outer and cytoplasmic membrane integrity. The ostricacins' permeabilizing ability was weaker than that of SMAP-29, but stronger than HNP-1. As ostricacins have previously shown the ability to inhibit bacterial growth, these peptides were suggested to be bacteriostatic to Gram-negative bacteria, which are caused by the interaction between the peptides and cytoplasmic targets causing the inhibition of DNA, RNA, and protein synthesis as well as enzymatic activities. These findings indicated promising possibilities for the peptides to be used in the development of therapeutic and topical products.

**Descriptors:** (Sb(B-defensins, antimicrobial peptide, membrane disruption, *E coli*, mechanisms.

Sydenstricker, K.V., A.A. Dhondt, D.M. Hawley, C.S. Jennelle, H.W. Kollias, and G.V. Kollias ( 2006). **Characterization of Experimental *Mycoplasma gallisepticum* Infection in Captive House Finch Flocks. *Avian Diseases* 50(1): 39-44. ISSN: 0005-2086.**

**Abstract:** The use of controlled, horizontal-transmission experiments provides detailed information on the spread of disease within fixed social groups, which informs our understanding of disease dynamics both in an empirical and theoretical context. For that reason, we characterized in 2002, horizontal transmission of *Mycoplasma gallisepticum* (MG) in two flocks of 11 wild-caught house finches housed in outdoor aviaries over a 6-mo period. All birds were initially free of MG by a polymerase chain reaction (PCR)-based test, rapid plate agglutination (RPA), and the scoring of physical signs. We inoculated one flock member bilaterally in the palpebral conjunctiva and reintroduced it into its cage. Index birds developed conjunctivitis within 3 to 5 days but died 13 and 20 days postinfection (PI) possibly because of very severe weather. The proportion of birds with physical signs increased gradually, reached 40% at 6 wk PI, and fluctuated around 40% until 21 wk PI. By the time our experiment ended at 24.5 wk PI, 28% of the birds still exhibited physical signs. Across both flocks, 80% of the birds developed unilateral or bilateral conjunctivitis, and several birds relapsed. The appearance of physical signs in new individuals

occurred between 10 and 144 days PI (median 41 days PI). Physical signs lasted 1-172 days (median 42 days). Birds that became infected earlier during the experiment developed more severe conjunctivitis, and there was a tendency for birds that developed bilateral conjunctivitis to develop physical signs earlier. Most birds that developed physical signs of MG were also PCR- and RPA-positive, although we detected a single asymptomatic carrier and a single symptomatic false negative. No birds died as a result of secondary MG infection.

**Descriptors:** house finch, captive flocks, infection, *Mycoplasma gallisepticum*, experimental, horizontal transmission, disease spread.

**Language of Text:** Summary in Spanish.

Sydenstricker, K.V., A.A. Dhondt, D.H. Ley, and G.V. Kollias (2005). **Re-exposure of captive house finches that recovered from *Mycoplasma gallisepticum* infection.** *Journal of Wildlife Diseases* 41(2): 326-33. ISSN: 0090-3558.

**Abstract:** Fourteen house finches were reinoculated (re-exposed) with 0.05 ml ( $3.24 \times 10^5$ ) colony forming units/ml) of *Mycoplasma gallisepticum* (MG) in the conjunctival sac of each eye. All birds used in this reinoculation study had recovered from previous infection between 27 and 83 days after inoculation. Recovery was based on the absence of clinical signs of conjunctivitis and/ or the inability to detect MG in conjunctival or choanal samples. Birds were maintained in individual cages under controlled environmental conditions at temperature 21-24 C, relative humidity 70%, and a light cycle adjusted to ambient values. They were divided into three groups, (A, B, and C). Five birds each were reinoculated 219 days (7.3 mo, group A) and 314 days (10.47 mo, group B) after the original infection. The final group of four birds was reinoculated at 425 days after experimental infection (14.17 mo, group C). Although the birds were randomly assigned to the three groups, the duration of the disease state (number of days until clinical signs last observed) during initial infection differed: group A mean=37.0+/-SE 4.549, group B mean=63.6+/-SE 6.306, group C mean=42.75+/-SE 2.750; analysis of variance  $F_{2,11}=8.17$ ,  $P=0.007$ . Within 24 hr after reinoculation six of the 14 experimental birds had developed some clinical signs of MG-induced conjunctivitis. At 3 days after reinoculation, 12 of the 14 birds had unilateral or bilateral conjunctivitis. The duration of clinical signs in the reinoculated individuals was significantly shorter than with their previous infection. These results suggest that the birds were able to mount a rapid and strong immune response following re-exposure. However, they were susceptible to reinfection and developed disease, suggesting that reinfection or perhaps even recurrence of infection and disease could occur in the free-ranging population. This may represent an important component in the epidemiology of this disease in house finches.

**Descriptors:** captive house finches, *Mycoplasma gallisepticum*, re-exposure, recovered,

immune response , clinical signs, previous infection, reinfection, disease epidemiology in free living finches.

Tanizaki, A., H. Yoshikawa, S. Iwatani, and I. Kimata (2005). **Infectivity of *Blastocystis* isolates from chickens, quails and geese in chickens.** *Parasitology Research* 96(1): 57-61. ISSN: 0932-0113.

**Abstract:** The infectivity of six *Blastocystis* isolates obtained from two domestic chickens, two Japanese quails and two domestic geese, were examined in 1-week-old male chicks. All six isolates were able to infect the chicks via the intracecal inoculation of  $1 \times 10^6$  cells of cultured organisms. Since the infected chicks discharged many cysts in their feces, the infectivity of the concentrated cysts in chicks was compared among three isolates from different bird species. The CK86-1 and QQ93-3 isolates, which were obtained from a chicken and a quail, respectively, were successfully infected in chicks by orally inoculating with  $1 \times 10^2$ - $1 \times 10^6$  cysts. On the other hand, the AC03-1 isolate from a goose required more cysts to infect the chicks, from  $1 \times 10^3$  cysts to  $1 \times 10^6$  cysts. In addition, when an uninfected normal chick was housed with five experimentally inoculated chicks with cysts of the QQ93-3 isolate, the normal chick became infected, indicating the fecal-oral transmission of the cyst form among the birds. These results show that the transmission of *Blastocystis* infection occurs easily between the same or different bird species. Therefore, the proposal of new *Blastocystis* species on the basis of different avian host species is problematic.

**Descriptors:** quails, chickens, geese, *Blastocystis* isolates, infectivity, cysts, oral inoculation, transmission between species.

Taylor, T.D. and D.T. Parkin (2007). **Characterization of 12 microsatellite primer pairs for the African grey parrot, *Psittacus erithacus* and their conservation across the Psittaciformes.** *Molecular Ecology Notes* 7(1): 163-167. ISSN: 1471-8278.

**Abstract:** This study describes 12 microsatellite loci identified in the African grey parrot *Psittacus erithacus*. Eleven were polymorphic, with observed heterozygosities 42-94% (average 68) and exclusion powers of PE subscript 1 ( $B = 0.996$  and PE subscript 2 ( $B = 0.999$ ). Microsatellites have previously been developed for a number of other parrots but showed limited cross-species polymorphism. Here high levels of cross-species amplification were observed: 71% of 32 Psittacines (22 genera). At least seven loci, 58%, were polymorphic in other African parrots as well as Neotropical and Australasian parrots, which diverged from the African parrots c30.6 and over 41.4 million years ago, respectively.

**Descriptors:** African grey parrot, microsatellite primer pairs, characterization, study, conservation, Psittaciformes.

Todd, D., A.N. Scott, E. Fringuelli, H.L. Shivraprasad, D. Gavier Widen, and J.A. Smyth (2007). **Molecular characterization of novel circoviruses from finch and gull.** *Avian Pathology* 36(1): 75-81. ISSN: 0307-9457.

**Abstract:** The purpose of this study was to molecularly characterize circoviruses that infect finches and gulls. Circovirus-specific DNAs were isolated using polymerase chain reaction methods from bursa of Fabricius tissues from a Gouldian finch (*Chloebia gouldiae*) and a herring gull (*Larus argentatus*) that were known to be circovirus-infected. Nucleotide sequence determination and analysis of cloned genomic DNAs showed that these circoviruses represented novel members of the genus Circovirus of the family Circoviridae, and have been tentatively named Finch circovirus (FiCV) and Gull Circovirus (GuCV). Both new circoviruses shared genome organizational features with previously characterized circoviruses, such that both contained two major, inversely-arranged open reading frames encoding the putative replication-associated and capsid proteins, and both contained a potential stem-loop and nonanucleotide motif. Phylogenetic analyses based on genome nucleotide sequences and involving the seven additional genus members indicated that FiCV and GuCV were more closely related to canary circovirus, beak and feather disease virus and pigeon circovirus, and that FiCV and canary circovirus were the most closely related avian circoviruses. Pairwise comparisons showed that the capsid proteins of FiCV and GuCV shared highest amino acid identity values with those of canary circovirus (62.0%) and pigeon circovirus (40.6%), respectively. The 5' intergenic region of GuCV was longer (207 nucleotides) and contained more direct and inverse repeated sequences than those of other circoviruses, while the 3' intergenic region of FiCV was notable in being longer (307 nucleotides) than its counterparts in other circoviruses and in containing two long repeats of 77 nucleotides.

**Descriptors:** finches, gulls, circoviruses, molecular characterization, specific DNAs, bursa of Fabricius tissues, polymerase chain reaction.

Tomaszewski, E.K., W. Wigle, and D.N. Phalen (2006). **Tissue distribution of psittacid herpesviruses in latently infected parrots, repeated sampling of latently infected parrots and prevalence of latency in parrots submitted for necropsy.** *Journal of Veterinary Diagnostic Investigation* 18(6): 536-544. ISSN: 1040-6387.

**Descriptors:** parrots, pets, Herpesviridae, bird diseases, latent period, disease prevalence, viral diseases, digestive system diseases, disease transmission, disease reservoirs, digestive tract mucosa, mouth, cloaca, genotype, serotypes, new host records, psittacid herpesviruses.

Tomiosso, T.C., L. Gomes, B. de Campos Vidal, and E.R. Pimentel (2005). **Extracellular matrix of ostrich articular cartilage.** *Biocell* 29(1): 47-54. ISSN: 0327-9545.

**Abstract:** The composition and organization of the extracellular matrix of ostrich articular cartilage was investigated, using samples from the proximal and distal sur-

faces of the tarsometatarsus. For morphological analysis, sections were stained with toluidine blue and analyzed by polarized light microscopy. For biochemical analysis, extracellular matrix components were extracted with 4 M guanidinium chloride, fractionated on DEAE-Sephacel and analyzed by SDS-PAGE. Glycosaminoglycans were analyzed by electrophoresis in agarose gels. Structural analysis showed that the fibrils were arranged in different directions, especially on the distal surface. The protein and glycosaminoglycan contents of this region were higher than in the other regions. SDS-PAGE showed the presence of proteins with molecular masses ranging from 17 to 121 kDa and polydisperse components of 67, 80-100, and 250-300 kDa in all regions. The analysis of glycosaminoglycans in agarose-propylene diamine gels revealed the presence of only chondroitin-sulfate. The electrophoretic band corresponding to putative decorin was a small proteoglycan containing chondroitin-sulfate and not dermatan-sulfate, unlike other cartilages. The higher amounts of proteins and glycosaminoglycans and the multidirectional arrangement of fibrils seen in the distal region may be correlated with the higher compression normally exerted on this region.

**Descriptors:** ostrich, articular cartilage, extracellular matrix, composition, organization, tarsometatarsus, biochemical analysis, protein, glycosaminoglycans.

Tsuda, Y., C. Nishida Umehara, J. Ishijima, K. Yamada, and Y. Matsuda (2007). **Comparison of the Z and W sex chromosomal architectures in elegant crested tinamou (*Eudromia elegans*) and ostrich (*Struthio camelus*) and the process of sex chromosome differentiation in palaeognathous birds.** *Chromosoma* 116(2): 159-173. ISSN: 0009-5915.

**Abstract:** To clarify the process of avian sex chromosome differentiation in palaeognathous birds, we performed molecular and cytogenetic characterization of W chromosome-specific repetitive DNA sequences for elegant crested tinamou (*Eudromia elegans*, Tinamiformes) and constructed comparative cytogenetic maps of the Z and W chromosomes with nine chicken Z-linked gene homologues for *E. elegans* and ostrich (*Struthio camelus*, Struthioniformes). A novel family of W-specific repetitive sequences isolated from *E. elegans* was found to be composed of guanine- and cytosine-rich 293-bp elements that were tandemly arrayed in the genome as satellite DNA. No nucleotide sequence homologies were found for the Struthioniformes and neognathous birds. The comparative cytogenetic maps of the Z and W chromosomes of *E. elegans* and *S. camelus* revealed that there are partial deletions in the proximal regions of the W chromosomes in the two species, and the W chromosome is more differentiated in *E. elegans* than in *S. camelus*. These results suggest that a deletion firstly occurred in the proximal region close to the centromere of the acrocentric proto-W chromosome and advanced toward the distal region. In *E. elegans*, the W-specific repeated sequence elements were amplified site-specifically after deletion

of a large part of the W chromosome occurred.

**Descriptors:** crested tinamou, (*Eudromia elegans*), ostrich, sex chromosomes, Z and W, architecture, differentiation, palaeognathous birds, cytogenetic characterization.

Uchiyama, R., T. Moritomo, O. Kai, K. Uwatoko, Y. Inoue, and T. Nakanishi (2005).

**Counting absolute number of lymphocytes in quail whole blood by flow cytometry.** *Journal of Veterinary Medical Science the Japanese Society of Veterinary Science* 67(4): 441-4. ISSN: 0916-7250.

**Abstract:** In a previous study, we reported a new method for counting quail blood cells. After quail blood cells were stained with fluorescent lipophilic dye (DiOC6(3)), absolute counts of erythrocytes, granulocytes, and monocytes were obtained by means of flow cytometry (FC). The FC method has the potential for application to avian blood cells count; however, the method was unable to distinguish between lymphocytes and thrombocytes. In the present study, we improved the FC method to obtain separate counts of lymphocytes using DiOC5(3). After quail blood cells were stained with DiOC5(3), the cells were measured with FC. Each blood cell type was distinguished by means of their typical FL-1 (green fluorescence) and SSC (side scatter). Absolute numbers of erythrocytes, granulocytes, monocytes and lymphocytes in whole blood were obtained. The improved FC analysis worked equally well with chicken (*Gallus gallus*) and goose (*Anser cygnoides*) blood.

**Descriptors:** flow cytometry methods, lymphocytes, quail blood, carbocyanines, fluorescent dyes, lymphocyte count methods.

Usherwood, J. (2007). **Aerodynamics, lift, drag and power of slow pigeon flight.** *Comparative Biochemistry and Physiology Part A Molecular and Integrative Physiology* 146(4, Suppl. S): S116-S117. ISSN: 1095-6433.

**Descriptors:** slow pigeon flight, lift, drag, power, aerodynamics, bird flight, meeting.

**Notes:** Meeting Information: Annual Meeting of the Society for Experimental Biology, Glasgow, UK; March 31 -April 04, 2007.

Velotto, S. and A. Crasto (2004). **Histochemical and morphometrical characterization and distribution of fibre types in four muscles of ostrich (*Struthio camelus*).** *Anatomia, Histologia, Embryologia* 33(5): 251-6. ISSN: 0340-2096.

**Abstract:** A staining procedure used for simultaneously determining three different fibre types in single sections bovine, porcine or ovine skeletal muscle was modified for use with ostrich skeletal muscle. The muscle fibres of gastrocnemius pars externa, tibialis cranialis caput tibiale, tibialis cranialis caput femorale and fibularis longus tendo caudalis were studied. The histochemical results revealed the presence of three types of fibre only in the gastrocnemius pars externa muscle: fast-twitch glycolytic fibres (FG), fast-twitch oxidative glycolytic fibres (FOG) and slow-twitch oxidative fibres

(SO), while in the other muscles the FG fibres were absent. The percentage distribution of fibres types showed a higher incidence of SO fibres compared to FOG fibres in tibialis cranialis caput femorale and tibialis cranialis caput tibiale muscles, while it was opposite in the case of the fibularis longus tendo caudalis muscle. In the gastrocnemius pars externa muscle the FG fibres outnumber the other fibres, followed by the SO and FOG fibres. The results of the analysis of variance show significant interaction between muscle x fibre type for every morphometric parameter evaluated. Differences about value of fibres area exists between tibialis cranialis caput femorale and fibularis longus tendo caudalis muscles. Both fibre types in tibialis cranialis caput tibiale muscle have mean values of transversal section area smaller than tibialis cranialis caput femorale. The other morphometric parameters show a similar trend. The gastrocnemius pars externa muscle presents similar dimensions of muscle fibres for the FG and FOG types, and significantly smaller for the SO type.

**Descriptors:** ostrich, four muscles, fibre types, histochemical, morphometrical, characterization, skeletal muscle, gastrocnemius, tibialis, fibularis, staining procedures.

Wan, H. and D.R. Perez (2006). **Quail carry sialic acid receptors compatible with binding of avian and human influenza viruses.** *Virology* 346(2): 278-86. ISSN: 0042-6822.

**Abstract:** There is growing evidence that some terrestrial avian species may play a role in the genesis of influenza viruses with pandemic potential. In the present investigation, we examined whether quail, a widespread-farmed poultry, possess the proper characteristics for serving as an intermediate host for the zoonotic transmission of influenza viruses. Using a lectin-based staining based on specific agglutinins, we found that, in addition to the presence of sialic acid alpha2,3-galactose (SAalpha2,3-gal) linked receptors, there are abundant sialic acid alpha2,6-galactose (SAalpha2,6-gal) linked receptors in quail trachea and intestine. The presence of abundant SAalpha2,6-gal-linked receptors explains, at least in part, the circulation of avian influenza viruses with human-like receptor specificity in quail. In quail trachea, SAalpha2,3-gal linked receptors are present primarily in non-ciliated cells, while SAalpha2,6-gal linked receptors are localized predominantly on the surface of ciliated cells. In quail intestine, both types of receptors were found on epithelial cells as well as in crypts. In a solid-phase overlay binding assay, both avian and human influenza viruses bind to plasma membranes prepared from epithelial cells of quail trachea and intestine, strongly suggesting that these receptors are functional for binding of influenza viruses from different species. Together with previous observations, these results are consistent with the notion that quail could provide an environment for the spread of reassortants between avian and human influenza viruses, thus acting as a potential intermediate host.

**Descriptors:** quail, avian influenza virus, human influenza virus, sialic acid receptors, binding, plasma membranes, quail as an intermediate host.

Wang XiaoLi, Xia XingXia, Zhao YongQian, Zhu YuMei, and Dai DingZhen (2007). **Development of oil-adjuvant inactivated vaccine against pigeon Newcastle disease.**

*Jiangsu Journal of Agricultural Sciences* 23(2): 109-113. ISSN: 1000-4440.

**Descriptors:** pigeon, Newcastle disease, development, oil adjuvant inactivated vaccine, immunity.

**Language of Text:** Chinese, summary in English.

Wang, Z., K. Farmer, G.E. Hill, and S.V. Edwards (2006). **A cDNA macroarray approach to parasite-induced gene expression changes in a songbird host: genetic response of house finches to experimental infection by *Mycoplasma gallisepticum*.** *Molecular Ecology* 15(5): 1263-1273. ISSN: 0962-1083.

**Abstract:** In 1994, the bacterial parasite *Mycoplasma gallisepticum* expanded its host range and swept through populations of a novel host -- eastern US populations of the house finch (*Carpodacus mexicanus*). This epizootic caused a dramatic decline in finch population numbers, has been shown to have caused strong selection on house finch morphology, and presumably caused evolutionary change at the molecular level as finches evolved enhanced resistance. As a first step toward identifying finch genes that respond to infection by *Mycoplasma* and which may have experienced natural selection by this parasite, we used suppression subtractive hybridization (SSH) and cDNA macroarray approaches to identify differentially expressed genes regulated by the *Mycoplasma* parasite. Two subtractive cDNA libraries consisting of 16 512 clones were developed from spleen using an experimentally uninfected bird as the 'tester' and an infected bird as 'driver', and vice versa. Two hundred and twenty cDNA clones corresponding 34 genes with known vertebrate homologues and a large number of novel transcripts were found to be qualitatively up- or down-regulated genes by high-density filter hybridization. These gene expression changes were further confirmed by a high throughput reverse Northern blot approach and in specific cases by targeted Northern analysis. blast searches show that heat shock protein (HSP) 90, MHC II-associated invariant chain (CD74), T-cell immunoglobulin mucin 1 (TIM1), as well as numerous novel expressed genes not found in the databases were up- or down-regulated by the host in response to this parasite. Our results and macroarray resources provide a foundation for molecular co-evolutionary studies of the *Mycoplasma* parasite and its recently colonized avian host.

**Descriptors:** house finches, *Mycoplasma gallisepticum*, bacterial parasite, cDNA, experimental infection, induced gene expression, host range, eastern USA.

Watanabe, S. and H.J. Bischof (2004). **Effects of hippocampal lesions on acquisition and retention of spatial learning in zebra finches.** *Behavioural Brain Research* 155(1): 147-52. ISSN: 0166-4328.

**Abstract:** We tested the role of the hippocampus in spatial memory of zebra finches. The birds were trained to find the location of a food site among four identical feeders arranged on the aviary floor. Extra-maze cues were present. The birds had to perform the task from four different starting points. Successful visits and the time to find the food were recorded. Hippocampal lesions made before acquisition led to a decrease in correct choices. Hippocampal lesions following training disrupted the retention of the spatial memory. Surprisingly, birds with hippocampal damage reached the food as quickly as intact birds, but they needed more visits to find the correct feeder. Therefore, the birds with hippocampal damage used an alternative, nonspatial memory-based strategy to find the food.

**Descriptors:** zebra finches, spatial learning, hippocampal lesions, effects, acquisition, retention, spatial memory, nonspatial memory-based strategy, food finding.

Weir, K.A. and C.A. Lunam (2006). **Immunohistochemical study of cutaneous nerves in the emu.** *Cell and Tissue Research* 326(3): 697-705. ISSN: 0302-766X.

**Abstract:** The distribution and chemical content of cutaneous nerves in 3- to 13-day-old emu chicks (*Dromaius novaehollandiae*) were examined by using double-labelling immunohistochemistry. Seven different subpopulations of cutaneous nerves were identified based on their neurochemistry. No intraepidermal nerve fibres were found. However, axons were located within the dermis and were often associated with blood vessels, pennator muscles and feather follicles or innervated Herbst corpuscles. Both similarities and differences exist between subpopulations of cutaneous nerves in the emu and volant birds. As in volant birds, a subpopulation of cutaneous axons innervates the superficial skin layers and contains immunoreactivity to both substance P and calcitonin gene-related peptide (CGRP). This suggests that the neuropeptide content of these presumptive free nerve endings is conserved throughout the evolution of birds. In contrast, Herbst corpuscles in the emu are innervated by axons that contain immunoreactivity for CGRP or neuropeptide Y (NPY) but that lack the calbindin D-28k immunoreactivity found in fibres innervating Herbst corpuscles of volant birds. Herbst corpuscles therefore may have a different chemical content in a flightless species from that in volant birds.

**Descriptors:** emu, anatomy, histology, cutaneous nerves, immunohistochemistry study, nerve tissue metabolism, skin innervation, axons metabolism, blood vessels innervation, nerve fibers metabolism, skin blood supply.

Weir, K.A. and C.A. Lunam (2004). **A histological study of emu (*Dromaius novaehollandiae*) skin.** *Journal of Zoology London* 264(3): 259-266. ISSN: 0952-8369.

**Descriptors:** emu, *Dromaius novaehollandiae*, skin, histological study.

Whiteman, N.K., D. Santiago Alarcon, K.P. Johnson, and P.G. Parker (2004). **Differences in straggling rates between two genera of dove lice (Insecta: Phthiraptera) reinforce population genetic and cophylogenetic patterns.** *International Journal for Parasitology* 34(10): 1113-1119. ISSN: 0020-7519.

**Abstract:** Differences in dispersal abilities have been implicated for causing disparate evolutionary patterns between *Columbicola* and *Phyconelloides* lice (Insecta: Phthiraptera). However, no study has documented straggling (when lice are found on atypical hosts) rates within these lineages. We used the fact that the Galapagos Hawk, *Buteo galapagoensis* (Gould) (Falconiformes) feeds on the Galapagos Dove *Zenaida galapagoensis* Gould (Columbiformes) within an ecologically simplified setting. The Galapagos Dove is the only typical host of *Columbicola macrourae* (Wilson) and *Phyconelloides galapagensis* (Kellogg and Huwana) in Galapagos. We quantitatively sampled and found these lice on both bird species. A DNA barcoding approach confirmed that stragglers were derived from Galapagos doves. We also collected a *Bovicola* sp. louse, likely originating from a goat (*Capra hircus*). On hawks, *C. macrourae* was significantly more prevalent than *P. galapagensis*. On doves, the two lice were equally prevalent and abundant. Differences in prevalence on hawks was a function of differences in straggling rate between lice, and not a reflection of their relative representation within the dove population. This provides further evidence that differences in dispersal abilities may drive differences in the degree of cospeciation in *Columbicola* and *Phyconelloides* lice, which have become model systems in evolutionary biology.

**Descriptors:** Philopteridae, *Columbicola*, lice, dispersal behavior, insect behavior, doves, Columbiformes, hawks, host-parasite relationships, population genetics, nucleotide sequences, phylogeny, coevolution, Galapagos Islands, *Phyconelloides galapagensis*, *Columbicola macrourae*, *Zenaida galapagoensis*, *Buteo galapagoensis*, straggling behavior, molecular sequence data.

Wilhelms, K.W., S.A. Cutler, J.A. Proudman, R.V. Carsia, L.L. Anderson, and C.G. Scanes (2006). **Lack of effects of atrazine on estrogen-responsive organs and circulating hormone concentrations in sexually immature female Japanese quail (*Coturnix coturnix japonica*).** *Chemosphere* 65(4): 674-681. ISSN: 0045-6535.

**Descriptors:** Japanese quail, hormone concentrations, estrogen responsive organs, atrazine, effects, sexually immature.

Wood, A.M. and H.V. Smith (2005). **Spironucleosis (Hexamitiasis, Hexamitosis) in the ring-necked pheasant (*Phasianus colchicus*): detection of cysts and description of *Spironucleus meleagridis* in stained smears.** *Avian Diseases* 49(1): 138-143. ISSN: 0005-2086.

**Abstract:** Trophozoites and cysts of *Spironucleus (Hexamita) meleagridis* were detected in the intestinal fluid and mucus of pheasant poults with spironucleosis

(hexamitiasis, hexamitosis) following staining with Heidenhain iron hematoxylin (HIH) and the Romanowsky-type stain Hemacolor. Their morphology was consistent with that of flagellates of the genus *Spirionucleus*, and bright-field morphologic observations were confirmed by transmission electron microscopy. Cysts occurred mostly within intestinal mucus, which was firmly compressed between microscope slides prior to staining. The internal structures of cysts were similar to those of trophozoites, allowing them to be confidently recognized. Hemacolor provided differential color staining of trophozoites and cysts, allowing accurate identification of *S. meleagridis* life cycle stages, even in smears in which there was heavy background staining. While HIH often produced clearer and more detailed staining of protozoan structures, in the context of a diagnostic laboratory its use was outweighed by the ease of use, rapidity of results, and differential color staining provided by Hemacolor. The possible significance of a resistant cystic stage in the life cycle of *S. meleagridis* is discussed.

**Descriptors:** *Phasianus colchicus*, game birds, bird diseases, Hexamita, protozoal infections, cysts (developmental-stages), trophozoites, pathogen identification, life cycle, intestinal mucosa, histopathology, differential staining, *Hexamita meleagridis*, *Spirionucleus meleagridis*.

**Language of Text:** Summary in Spanish.

Wu, C.P., Y.M. Horng, K.T. Yang, C.W. Huang, and M.C. Huang (2006). **Female-specific DNA sequences in ostriches.** *Molecular and Cellular Probes* 20(5): 307-10.

**Abstract:** Ostrich absence of heteromorphic sex chromosomes, unique sequences or markers located in the ostrich W-chromosome. Random amplified polymorphic DNA (RAPD) fingerprinting was carried out to investigate the sex-specific DNA sequence for sexing in ostrich. One hundred and forty random primers were used for random amplified polymorphic DNA-polymerase chain reaction (RAPD-PCR). One of these primers, OPAJ-13, produced a sex-specific band only found in tested females, which was isolated and constructed into plasmids for nucleotide sequencing. A 760bp novel female-specific sequence was obtained. Two primers (OstSexOPAJ-3-F and -R) were designed according to the cloned female sequence to amplify the female-specific fragment from genomic DNA of ostriches for sexing by PCR. The sex-specific band was represented in females but none were found in the males. This result showed that the sex of ostrich could be easily and effectively identified using the female-specific primers for PCR technique.

**Descriptors:** sex determination analysis, Struthioniformes genetics, base sequence, DNA primers, molecular sequence data, random amplified polymorphic dna technique.

- Yildiz, H., B. Yilmaz, I. Arican, M. Petekli, and A. Bahadir (2006). **Effects of cage systems and feeding time on the morphological structure of female genital organs in pharaoh quails (*Coturnix coturnix pharaoh*)**. *Veterinarski Arhiv* 76(5): 383-391. ISSN: 0372-5480.  
**Descriptors:** pharaoh quail, female genital organs, morphological structure, cage systems, feeding time, effects.
- Yildiz, H., B. Yilmaz, and I. Arcan (2005). **Morphological structure of the syrinx in the Bursa Roller Pigeon (*Columba livia*)**. *Bulletin of the Veterinary Institute in Puvawy* 49(3): 323-327. ISSN: 0042-4870.  
**Descriptors:** Bursa Roller Pigeon, syrinx, morphological structure, anatomy, histological.
- Yuan JianXia, Zhang Lao and Li Ning (2005). **Chromosome karyotype and G-banding analysis of the male ostrich**. E. Carbajo *Proceedings of the 3rd International Ratite Science Symposium of the World's Poultry Science Association WPSA and 12th World Ostrich Congress, Madrid, Spain, 14th 16th October, 2005*, World Poultry Science Association (WPSA): Beekbergen, Netherlands, p. 229-232. ISBN: 8460963535.  
**Descriptors:** ostrich, male, chromosome, karyotype, G banding, analysis, conference proceedings.  
**Notes:** Meeting Information: Proceedings of the 3rd International Ratite Science Symposium of the World's Poultry Science Association (WPSA) and 12th World Ostrich Congress, Madrid, Spain, 14th-16th October, 2005.
- Zhang Yong Qiang, Wang Ning, Zhan Xiang Jiang, and Zhang Zheng Wang (2006). **A method for dna extraction from incubated eggshells of pheasants**. *Chinese Journal of Zoology* 41(6): 76-81. ISSN: 0250-3263.  
**Descriptors:** pheasants, eggshells, incubated, DNA, extraction, method, noninvasive.  
**Language of Text:** Chinese.



# Stress

Diverio, S., C. Canali, A. Barone, C. Federici, C. Pelliccia, and F. Parillo (2004). **Capture stress in ostriches: a comparison between two methods.** *Animal Welfare* 13(Supplement): S240. ISSN: 0962-7286.

**Descriptors:** ostriches, capture stress, comparison between two methods, meeting.

**Notes:** Meeting Information: Universities Federation for Animal Welfare (UFAW) Symposium on Science in the Service of Animal Welfare, Edinburgh, UK; April 02-04, 2003.

Greenacre, C.B. and A.L. Lusby (2004). **Physiologic responses of Amazon parrots (Amazona species) to manual restraint.** *Journal of Avian Medicine and Surgery* 18(1): 19-22. ISSN: 1082-6742.

**Descriptors:** Amazon parrots, manual restraint, physiologic responses, body temperature, heart rate, respiratory rate, stress response.

Honarmand, M. and M. Naguib (2006). **Effects of stress on sexually selected traits in zebra finches at different stages of development.** *Journal of Ornithology* 147(5, Suppl. 1): 182. ISSN: 0021-8375.

**Descriptors:** zebra finches, stress effects, sexually selected traits, different stages of development, meeting.

**Notes:** Meeting Information: 24th International Ornithological Congress, Hamburg, Germany; 2006.

Lindstrom, K.M., D.M. Hawley, A.K. Davis, and M. Wikelski (2005). **Stress responses and disease in three wintering house finch (*Carpodacus mexicanus*) populations along a latitudinal gradient.** *General and Comparative Endocrinology* 143(3): 231-9. ISSN: 0016-6480.

**Abstract:** In laboratory studies, stress hormones have been shown to impair immune functions, and increase susceptibility to diseases. However, the interactions between stress hormones and disease have rarely been studied in free-ranging populations. In this study, we measured concentrations of the avian stress hormone corticosterone across four winter months (December-March) over two years in three eastern North American house finch populations (*Carpodacus mexicanus*) along a latitudinal gradient. Because *Mycoplasma gallisepticum* infections appear in these populations in late winter, we hypothesized that the timing of the disease outbreaks could be mediated by changes in corticosterone concentrations. We found a significant increase in baseline and stress-induced plasma corticosterone concentrations in house finches without *Mycoplasma* symptoms in late winter; when the prevalence of *Mycoplasma*

infection peaks. We also found that house finches with *Mycoplasma* symptoms had elevated stress-induced corticosterone concentrations. High baseline concentrations were associated with a low body condition and a high fat load. We found that the relationship between corticosterone concentrations and the latitude of the study population changed between years. The first year, corticosterone concentrations were lowest in the southern latitude, but became higher in the second year when average winter temperatures were low. A causal understanding of the implications for this variation in corticosterone concentrations for *Mycoplasma* disease dynamics awaits further studies.

**Descriptors:** house finch, stress response, diseases, winter, *Mycoplasma*, corticosterone, plasma, concentration, immune functions, impair, North America.

Minka, N.S. and J. Ayo (2007). **Road transportation effect on rectal temperature, respiration and heart rates of ostrich (*Struthio camelus*) chicks.** *Veterinarski Arhiv* 77(1): 39-46. ISSN: 0372-5480.

**Descriptors:** ostrich chicks, road transportation, effect, rectal temperature, respiration, heart rates.

Mohan, L. and S.P. Dhiman (2005). **Stress management - an important factor in the effective breeding of the cheer pheasant *Catreus wallichii*.** *Avicultural Magazine* 111(2): 83-90. ISSN: 0005-2256.

**Descriptors:** cheer pheasant, *Catreus wallichii*, effective breeding, stress management, important factor.

Moniello, G., F. Bovera, I.L. Solinas, G. Piccolo, W. Pinna, and A. Nizza (2005). **Effect of cage and blood collection site on the metabolic profile of ostriches.** *South African Journal of Animal Science* 35(4): 268-272. ISSN: 0375-1589.

**Descriptors:** ostriches, blood collection site, cage, metabolic profile, effect.

Naguib, M. and D. Gil (2005). **Transgenerational effects on body size caused by early developmental stress in zebra finches.** *Biology Letters* 1(1): 95-7. ISSN: 1689-1392.  
**Abstract:** The nutritional and social conditions that individuals experience during early development can have profound effects on their morphology, physiology, behaviour and life history. Experimental increases in brood size in birds can result in reduced offspring condition and survival, indicating that developmental deficits in enlarged broods have negative fitness consequences within the affected generation. To study long-term effects (i.e. transgenerational effects of developmental stress), we conducted a two-step breeding experiment in which we manipulated early developmental conditions in zebra finches *Taeniopygia guttata*. We raised zebra finches by manipulating brood sizes and controlled for maternal and genetic effects by cross-fostering. In a previous study, we showed that offspring condition and body size decreased with

increasing brood size. Here we show that this effect was carried over to the next generation. Body size in nestlings and at nutritional independence was affected by the brood size in which the mothers were raised. Female offspring did significantly worse than male offspring when the mother had been raised in large broods, suggesting a sex-specific influence of maternal effects. These findings link early developmental stress in females with the phenotype of the next generation via maternal effects.

**Descriptors:** zebra finches , captive birds, growth, development, developmental stress, body size, morphology, behavior, brood size, effects.

Owen, D.J. and J.M. Lane (2006). **High levels of corticosterone in feather-plucking parrots (*Psittacus erithacus*)**. *Veterinary Record Journal of the British Veterinary Association* 158(23): 804-805. ISSN: 0042-4900.

**Descriptors:** *Psittacus*, corticosterone levels, animal stress, parrots, feather plucking, high levels.

Ozbey, O., N. Yildiz, and F. Esen (2006). **The effects of high temperature on breeding characteristics and the living strength of the Japanese quails (*Coturnix coturnix japonica*)**. *International Journal of Poultry Science* 5(1): 56-59. ISSN: 1682-8356.

**Descriptors:** Japanese quail, high temperature, effects, breeding characteristics, living strength.

Piccione, G., A. Costa, E. Giudice, and G. Caola (2005). **Preliminary investigation into thermal stress during diurnal road transportation of young ostriches (*Struthio camelus*)**. *Archiv Fur Tierzucht* 48(2): 194-200. ISSN: 0003-9438.

**Descriptors:** ostriches, thermal stress effect, road transportation, young, investigation, body temperature, physical signs.

**Language of Text:** German.

Sahin, N., M. Onderci, K. Sahin, G. Cikim, and O. Kucuk (2005). **Magnesium proteinate is more protective than magnesium oxide in heat-stressed-quail**. *Journal of Nutrition* 135(7): 1732-1737.

**Abstract:** We evaluated the effects of dietary supplementation with Mg-oxide and Mg-proteinate on performance; nutrient digestibilities; malondialdehyde (MDA) concentrations in serum, liver, and thigh meat; and serum cholesterol and triacylglycerol concentrations in Japanese quail (*Coturnix coturnix japonica*) exposed to high ambient temperature. The birds (n = 360; 10 d old) were randomly assigned to 12 treatment groups consisting of 6 replicates of 5 birds each in a 2 x 2 x 3 factorial arrangement (temperature, Mg source, Mg level). Birds were maintained in temperature-controlled rooms at 22degrees C for 24 h/d or 34degrees C for 8 h/d (0900-1700 h) and fed a basal diet or that diet supplemented with 1 or 2 g Mg-oxide or Mg-proteinate/kg of diet. Heat exposure decreased (P = 0.0001) live weight gain,

feed intake, feed efficiency, and carcass weight in quail fed the basal diet. A linear increase in feed intake ( $P = 0.008$ ) and body weight ( $P = 0.001$ ), and improvements in feed efficiency ( $P = 0.001$ ), carcass weight ( $P < 0.0001$ ), digestibility of dry matter, organic matter, crude protein, and ether extract were found in Mg-supplemented, heat-stressed quail. The effects of Mg-proteinate were greater than those of Mg-oxide ( $P \leq 0.0001$ ). Serum Mg ( $P = 0.001$ ) concentration increased, whereas the concentration of MDA in serum ( $P = 0.0001$ ), liver ( $P = 0.04$ ), and thigh meat ( $P = 0.0001$ ) and serum triglyceride and cholesterol concentrations decreased linearly ( $P = 0.001$ ) with the level of Mg in the diet. Interactions between dietary Mg source, temperature, and level of supplementation ( $P \leq 0.05$ ) were found for several variables. Results of the present study suggest that supplementation with Mg-proteinate is more protective than Mg-oxide in reducing the negative effects of heat stress in quail.

**Descriptors:** Japanese quails, magnesium oxide, magnesium, heat stress, animal growth, digestibility, liver, lipid peroxidation, poultry meat, dietary mineral supplements, malondialdehyde, blood chemistry, thighs, cholesterol, triacylglycerols, feed intake, liveweight gain, feed conversion, carcass weight, protective effect, magnesium proteinate.

Sahin, N., K. Sahin, M. Onderci, M.F. Gursu, G. Cikim, J. Vijaya, and O. Kucuk (2005).

**Chromium picolinate, rather than biotin, alleviates performance and metabolic parameters in heat-stressed quail.** *British Poultry Science* 46(4): 457-463. ISSN: 0007-1668.

**Abstract:** 1. The effects of chromium picolinate and biotin supplementation alone and in combination on performance, carcass characteristics, malondialdehyde (MDA), vitamin C, vitamin E, glucose and cholesterol levels were evaluated in Japanese quail exposed to high ambient temperature. 2. Two hundred and forty quails (10 d old) were assigned randomly to 4 dietary treatments at room temperature (22 degrees C; thermoneutral, TN) or ambient (34 degrees C for 8 h/d; heat stress, HS). Both TN and HS were fed either on a basal (control) diet or the basal diet supplemented with 400 microgram of Cr/kg (Cr group), 0.5 mg of biotin/kg of diet (biotin group) or both (Cr + Biotin group). 3. Supplementing the diet of heat-stressed quails with chromium picolinate improved live weight gain, feed intake, feed efficiency and carcass traits. Biotin supplementation during TN and HS conditions did not have any beneficial effects on body weight gain, feed intake, feed efficiency or carcass traits. 4. Either in combination or alone, chromium picolinate increased serum concentrations of vitamins C and E, but decreased MDA, glucose and cholesterol concentrations in birds kept at high ambient temperature. There was no difference in vitamins C and E and MDA concentrations between birds given chromium picolinate and birds receiving chromium picolinate plus biotin, while glucose and cholesterol levels were significantly lower in all groups. The lowest concentrations of

cholesterol and glucose were found in the combination group under both TN and HS conditions. An interaction between diet and temperature was detected for glucose and cholesterol concentrations. 5. Excretion rates for zinc, iron and chromium were lower in TN groups than in the corresponding HS groups. Supplementing diet with chromium picolinate and chromium picolinate plus biotin decreased excretion of minerals while biotin alone did not effect excretion of minerals. 6. Chromium supplementation, but not biotin supplementation, attenuated the decline in performance and antioxidant status resulting from heat stress.

**Descriptors:** Japanese quails, food animals, feed supplements, poultry feeding, heat stress, ambient temperature, picolinic acid, biotin, carcass characteristics, animal performance, malondialdehyde, ascorbic acid, vitamin E, glucose, cholesterol, liveweight gain, feed intake, feed conversion, carcass quality, blood chemistry, zinc, iron, chromium, excretion, chromium picolinate.

Sandkc, M., U. Eren, A.G. Onol, and S. Kum (2004). **The effect of heat stress and the use of *Saccharomyces cerevisiae* or (and) bacitracin zinc against heat stress on the intestinal mucosa in quails.** *Revue De Medecine Veterinaire* 155(11): 552-556. ISSN: 0035-1555.

**Descriptors:** quails, heat stress, effect, intestinal mucosa, use of *Saccharomyces cerevisiae*, bacitracin, against heat stress.

**Language of Text:** French.

Suchy, P., I. Bedanova, V. Vecerek, E. Voslarova, V. Pistekova, P. Chloupek, and F. Vitula (2007). **Effects of transport stress and floor space reduction on selected biochemical indices in common pheasant (*Phasianus colchicus*).** *Archiv Fuer Gefluegelkunde* 71(2): 56-61. ISSN: 0003-9098.

**Descriptors:** common pheasant, *Phastanus colchicus*, transport stress, floor space reduction, effect, biochemical indicies.



# Veterinary

Abu Basha, E.A., N.M. Idkaidek, and T.M. Hantash (2006). **Pharmacokinetics and bioavailability of doxycycline in ostriches (*Struthio camelus*) at two different dose rates.** *Journal of Veterinary Science Suwon Si, Korea* 7(4): 327-32. ISSN: 1229-845X.

**Abstract:** A bioavailability and pharmacokinetics study of doxycycline was carried out on 30 healthy ostriches after a single intravenous (IV), intramuscular (IM) and oral dose of 15 mg/kg body weight. The plasma doxycycline concentration was determined by HPLC/UV at 0 (pretreatment), 0.08, 0.25, 0.5 1, 2, 4, 6, 8, 12, 24 and 48 h after administration. The plasma concentration-time curves were examined using non-compartmental methods based on the statistical moment theory for only the higher dose. After IV administration, the elimination half-life ( $t_{1/2\beta}$ ), mean residence time (MRT), volume of distribution at the steady-state ( $V_{ss}$ ), volume of distribution ( $V_d(\text{area})$ ) and total body clearance ( $Cl(B)$ ) were  $7.67 \pm 0.62$  h,  $6.68 \pm 0.86$  h,  $0.86 \pm 0.16$  l/kg,  $1.67 \pm 0.52$  l/kg and  $2.51 \pm 0.63$  ml/min/kg, respectively. After IM and oral dosing, the mean peak plasma concentrations ( $C_{max}$ ) were  $1.34 \pm 0.33$  and  $0.30 \pm 0.04$  microgram/ml, respectively, which were achieved at a postadministration time ( $t_{max}$ ) of  $0.75 \pm 0.18$ ,  $3.03 \pm 0.48$  h, respectively. The  $t_{1/2\beta}$ ,  $V_d(\text{area})$  and  $Cl(B)$  after IM administration were  $25.02 \pm 3.98$  h,  $23.99 \pm 3.4$  l/kg and  $12.14 \pm 1.71$  ml/min/kg, respectively and  $19.25 \pm 2.53$  h,  $61.49 \pm 7$  l/kg and  $40.19 \pm 3.79$  ml/min/kg after oral administration, respectively. The absolute bioavailability (F) of doxycycline was 5.03 and 17.52% after oral and IM administration, respectively. These results show that the dose data from other animals particularly mammals cannot be extrapolated to ostriches. Therefore, based on these results along with those reported in the literature, further studies on the pharmacokinetic/pharmacodynamic, in vitro minimum inhibitory concentration values and clinical applications of doxycycline in ostriches are required.

**Descriptors:** antibacterial agents pharmacokinetics, doxycycline pharmacokinetics, *Struthioniformes* metabolism, administration oral, anti bacterial agents administration, dosage, anti bacterial agents blood, area under curve, biological availability, dose response relationship, drug, doxycycline administration, dosage, doxycycline blood, half life, injections, intramuscular, veterinary care, injections, intravenous.

Al Mulhim, I.A., E.M.E. Abu Elzein, A.A. Gameel, A.I. Al Afaleq, R. Manvell, and D.J. Alexander (2006). **Comparative study on the clinico-pathological response of the collared dove (*Streptopelia roseogrisea arabica*) and pigeons (*Columba livia*) to experimental infection with the pigeon paramyxovirus-1.** *Journal of Animal and Veterinary Advances* 5(5): 395-400. ISSN: 1680-5593.

**Descriptors:** collard dove, *Streptopelia roseogrisea arabica*, pigeons, *Columba livia*, viral diseases, pigeon paramyxovirus-1, clinico-pathological response, comparative study.

Albuquerque, G.R., A.D. Munhoz, F.C.R. Oliveira, A.R.S. Pinto, and C.W.G. Lopes (2002). **Alteracoes patologicas na infeccao experimental de codornas (*Coturnix japonica*) com taquizoitas de *Toxoplasma gondii* (Apicomplexa: Toxoplasmatinae).** [Pathological alterations in the Japanese quails (*Coturnix japonica*) by experimental infection with *Toxoplasma gondii* tachyzoites (Apicomplexa: Toxoplasmatinae)]. *Revista Brasileira De Parasitologia Veterinaria* 11(1): 43-46. ISSN: 0103-846X.

**Descriptors:** Japanese quail, *Toxoplasma gondii*, experimental infection, pathological alterations.

**Language of Text:** Portuguese, summary in English.

Amann, O., M.J.L. Kik, M.H.A.C. Passon Vastenburger, I. Westerhof, J.T. Lumeij, and N.J. Schoemaker (2007). **Chronic pulmonary interstitial fibrosis in a blue-fronted Amazon Parrot (*Amazona aestiva aestiva*).** *Avian Diseases* 51(1): 150-153. ISSN: 0005-2086.

**Abstract:** A 30-yr-old blue-fronted Amazon parrot (*Amazona aestiva aestiva*) was presented to the clinic with a history of sneezing more often during the last 2 mo. Physical examination revealed only a mild nasal discharge. Complete hematologic and plasma biochemical examination showed no abnormalities. Computerized tomography (CT) of the complete bird showed generalized lung alterations consistent with lung fibrosis. Two lung biopsies were taken. The results of the histologic examination of the biopsies confirmed the tentative CT diagnosis of pulmonary interstitial fibrosis. To our knowledge this is the first reported case of chronic pulmonary interstitial fibrosis diagnosed by means of a lung biopsy in an avian species. The histologic characteristics are discussed and compared with those of human idiopathic pulmonary fibrosis.

**Descriptors:** Amazon parrot, disease, chronic pulmonary interstitial fibrosis, first reported case, sneezing, biopsies, lung biopsy, case study, compared to human disease.

**Language of Text:** Summary in Spanish.

Antarasena, C., R. Sirimujalin, P. Prommuang, N. Promkuntod, P. Prommuang, and S. Blacksell (2007). **The indirect immunofluorescence assay using cardiac tissue from chickens, quails and ducks for identification of influenza A virus during an outbreak of highly pathogenic avian influenza virus (H5N1): a rapid and simple screening tool for limited resource settings.** *Research in Veterinary Science* 83(2): 279-81. ISSN: 0034-5288.

**Abstract:** Here we describe the diagnostic utility of the indirect immunofluorescence assay (IFA) during a recent outbreak of highly pathogenic avian influenza (HPAI)

subtype H5N1 virus in southern Thailand and demonstrate the usefulness of the cardiac tissue from infected chickens, quail, and ducks for diagnosis. The most reliable sample for IFA diagnosis of influenza A virus was cardiac tissue (83.0%; 44/53) which when divided by species (chicken, quail and duck cardiac tissues) gave respective positivity rates of 88% (22/25), 88.9% (16/18) and 60.0% (6/10). Cardiac tissue also gave the highest IFA intensity for the three species. We believe that the IFA method has wide applicability in developing countries or remote settings where clinically similar avian diseases with high morbidity and mortality such as Newcastle disease and fowl cholera are common and could be rapidly excluded thereby conserving valuable reference laboratory capacity for true HPAI outbreaks.

**Descriptors:** chickens, quail, ducks, influenza A virus H5N1, immunofluorescence assay, cardiac tissue, avian flu virus, screening tool, outbreaks.

Bastianello, S., P.B. McKenna, J. Hunter, and A. Julian (2005). **Clinical and pathological aspects of *Libyostrongylus* infection in ostriches**. *Surveillance Wellington* 32(3): 3-6. ISSN: 0112-4927.

**Descriptors:** ostriches, parasites, infection, clinical, pathological, aspects, *Libyostrongylus*.

Bavelaar, F.J. and A.C. Beynen (2004). **The relationship between diet, plasma cholesterol and atherosclerosis in pigeons, quails and chickens**. *International Journal of Poultry Science* 3(11): 671-684. ISSN: 1682-8356.

**Descriptors:** quails, pigeons, chickens, diet effects, plasma, cholesterol, atherosclerosis.

Bedard, C., S. Lair, and I. Langlois (2007). **Coelomic mass in a rock dove (*Columba livia*)**. *Veterinary Clinical Pathology American Society for Veterinary Clinical Pathology* 36(3): 303-5. ISSN: 0275-6382.

**Abstract:** A 15-year-old domestic rock dove (*Columba livia*) was presented to the Service de Medecine Zoologique of the Universite de Montreal with a 10-day history of lethargy and chronic weight loss of 1-year duration. Ultrasonographic evaluation of the coelomic cavity revealed the presence of effusion and a well-defined mass containing variably sized hypoechoic nodules of unknown origin. Cytologic evaluation of fine-needle aspirates of the mass indicated a malignant epithelial tumor consisting of round cells arranged individually and in clusters, with large nuclei, prominent nucleoli, moderate anisocytosis and anisokaryosis, atypical mitoses, occasional binucleation and multinucleation, and large numbers of ruptured cells. A diagnosis of seminoma was established on histologic sections obtained at necropsy. The cytologic features of this tumor were similar to those of canine seminomas except for the presence of lymphocytes, which were not observed in significant numbers in cytologic smears or histologic sections. Seminoma should be included in the differential diagnosis for

a space-occupying mass causing organ displacement within the coelomic cavity of a male bird.

**Descriptors:** captive rock dove, coelomic mass, coelomic cavity, untrasonographic evaluation, seminoma, diagnosis, case study.

Bolson, J., R.C. Ornes, M.L. Flores, J.E.W. Schossler, A.J.A. Denardin, and R.P. Fontoura (2005). **Esofagotomia para retirada de corpo estranho em ema (*Rhea americana*) - relato de dois casos.** [Esophagostomy to remove strange body from *Rhea americana* - report of two cases]. *A Hora Veterinaria* 25(146): 47-50. ISSN: 0101-9163.

**Descriptors:** rhea, *Rhea americana*, esophagostomy, foreign body, removal, case reports.

**Language of Text:** Portuguese, summary in English.

Boris, M. and F. Huchzermeyer (2002). **Megabacteriosis como causa de alta mortalidad en charabones de nandu (*Rhea americana*): primer diagnostico en Uruguay.** [Megabacteriosis as cause of high mortality of chicks of nandu (*Rhea americana*): first diagnosis in Uruguay]. *Veterinaria Montevideo* 37(149): 9-12. ISSN: 0376-4362.

**Descriptors:** rhea, *Rhea americana* chicks, megabacteriosis, high mortality, bacteria, diagnosis, Uruguay .

**Language of Text:** Spanish, summary in English.

Boris, M., A. Sanmartin, G. Solari, and P. Zunino (2005). **Diagnostico de aspergilosis en charabones de *Rhea americana* (nandu).** [Diagnosis of aspergillosis in *Rhea americana* (nandu) chicks]. *Veterinaria Montevideo* 40(158): 13-17. ISSN: 0376-4362.

**Descriptors:** rhea, *Rhea americana*, aspergillosis, chicks, diagnosis, air sacs, infected.

**Language of Text:** Spanish, summary in English.

Bouda, J., G.F. Quiroz Rocha, E. Sanchez Ramirez , J. Esquivel Pena, and J.L. Davalos Flores (2004). **Selected biochemical values in blood plasma of ostriches of different age and sex.** *Veterinaria Mexico* 35(1): 45-54. ISSN: 0301-5092.

**Descriptors:** ostriches, different age and sex, selected biochemical values, blood plasma, reference data, disease diagnosis.

**Language of Text:** Spanish.

Bouda, J., G.F. Quiroz Rocha, E. Sanchez Ramirez , J. Esquivel Pena, and J.L. Davalos Flores (2004). **Valores bioquimicos selectos en plasma sanguineo de avestruces de diferentes edades y sexo.** [Selected biochemical values in blood plasma of ostriches of different age and sex]. *Veterinaria Mexico* 35(1): 45-54. ISSN: 0301-5092.

**Descriptors:** ostriches, *Struthio camelus*, selected blood plasma values, age, sex,

venous blood plasma, reference data, disease diagnosis.

**Language of Text:** Spanish, summaries in English and Spanish.

Bougiouklis, P.A. (2007). **Avian circoviruses of the genus *Circovirus*: A potential trigger in Pigeon breeder's lung (PBL)/bird fancier's lung (BFL)**. *Medical Hypotheses* 68(2): 320-3. ISSN: 0306-9877.

**Abstract:** Pigeon breeder's lung (PBL) or bird fancier's lung (BFL) is one of the most common extrinsic allergic alveolitis or hypersensitivity pneumonitis. It is caused after prolonged inhalation of avian antigens and provokes a hypersensitivity reaction in the lungs of sensitised people. Although the pathogenic mechanism is unclear, the epidemiology of BFL shows that it occurs worldwide, and has been described in adults keeping birds and also in their children. Laboratory findings associated with the disease classified as a type III immunologic reaction that produces blood precipitin antibodies against birds' serum, feathers, intestinal mucin and/or faeces. In particular, the fine dust from pigeon feathers has strong antigenic properties. There is an interaction between host and antigen that seems to be influenced by both genetic and environmental factors. Avian circoviruses (ACV) of the genus *Circovirus*, has been detected in free-ranging and captive birds worldwide, such as pigeons, canaries, psittacines, Senegal doves, finches, gulls, Australian ravens and geese. T lymphocytes are the main target cells of the ACV and in the above avian species circovirus-like particles were detected in blood, macrophages, feathers, crop secretions, intestinal contents and/or faeces. Most of the ACV was demonstrated that are pantropic and viral antigen in pigeon tissues was most commonly detected in respiratory organs, including the trachea, pharynx and lung. The transmission of the circovirus between the birds usually occurs through inhalation of feathers dust. There is evidence that animal circoviruses may originate when vertebrates become "infected" with DNA from a plant nanovirus. So, it seems that further investigation for the avian circoviruses is needed to determine if they are host specific or not. This study attempts to demonstrate ACV or ACV-like particles as potential triggers in the BFL aetiology, and the possible involvement in BFL's pathogenic mechanism.

**Descriptors:** pigeon diseases virology, Circoviridae infections diagnosis, human immunological disease allergies, agricultural workers' diseases virology, Circoviridae infections transmission, Circoviridae infections veterinary, Circovirus, Columbidae, allergic alveolitis.

Bunbury, N., D. Bell, C. Jones, A. Greenwood, and P. Hunter (2005). **Comparison of the InPouch TF culture system and wet-mount microscopy for diagnosis of *Trichomonas gallinae* infections in the pink pigeon *Columba mayeri***. *Journal of Clinical Microbiology* 43(2): 1005-6. ISSN: 0095-1137.

**Descriptors:** pink pigeon, *Columba mayeri*, bird diseases, diagnosis, Columbidae microbiology, *Trichomonas gallinae* isolation, purification, *Trichomonas* infections,

bird diseases microbiology, culture media, microscopy methods, sensitivity, specificity, *Trichomonas* growth, development.

Cannon, M.J. (2006). **Unusual tracheal foreign body in an African grey parrot.** *Veterinary Clinics of North America. Exotic Animal Practice* 9(3): 551-6. ISSN: 1094-9194.

**Abstract:** This case report documents an unusual tracheal foreign body (a moth) in Congo African grey parrot (*Psittacus erithacus erithacus*). Gross postmortem signs and histopathology results are presented. A discussion of the peculiar avian anatomy that may have contributed to the aspiration of the moth is provided.

**Descriptors:** African grey parrot, bird diseases diagnosis, foreign bodies, veterinary, diagnosis differential, fatal outcome, foreign bodies diagnosis, case study.

Caruana, M., K.S. Cornish, S. Bajada, C.F. Jones, and J. Cacciottolo (2005). **Rosella parrot exposure as a cause of bird fancier's lung.** *Archives of Environmental and Occupational Health* 60(4): 187-92. ISSN: 0003-9896.

**Abstract:** A case of a 30-year-old man who presented with a 2-month history of progressively worsening dyspnoea, cough, and reduced exercise tolerance is discussed. A chest x-ray and computerized tomography of the chest suggested interstitial lung disease, which was confirmed on histology of an open lung biopsy. Careful questioning revealed that the patient had sustained close exposure to a rosella parrot acquired as a pet 9 months prior to presentation, which led to the diagnosis of bird fancier's lung. The case, investigations, and outcome are presented. This is followed by a discussion on extrinsic allergic alveolitis with particular emphasis on the importance of a complete social and environmental history in patients presenting with similar respiratory symptoms.

**Descriptors:** bird fancier's lung diagnosis, inhalation exposure adverse effects, parrots, adult, bird fancier's lung drug therapy, pathology, prednisolone therapeutic use, respiratory function tests, risk assessment, risk factors, tomography, x ray computed, allergic alveolitis.

Chen YiengHow, Feng ChingWang, Kuo MingJung, Lin DerTyan, Shiau JongRong, and Tsang ChauLoong (2003). **The changes in haematology of ostrich from 4 to 12 weeks of age.** *Taiwan Veterinary Journal* 29(4): 347-352. ISSN: 1682-6485.

**Descriptors:** ostrich, age, 4 to 12 weeks, hematology changes, normal values, white blood cells, blood samples.

**Language of Text:** Chinese, summary in English.

Chitty, J. (2005). **Hospitalisation of parrots and raptors.** *VN Times* 5(5): 4-6. ISSN: 0922-8012.

**Descriptors:** parrots, raptors, hospitalisation, veterinary care.

Ciboto, R., S.R.G. Cortopassi, M.A.E. Lopes, R.C. Carvalho, and C.G. Baitelo (2006). **Comparison of chemical restraint techniques in ostrich (*Struthio camelus*)**. *Brazilian Journal of Poultry Science* 8(2): 119-123. ISSN: 1516-635X.

**Descriptors:** ostriches, chemical restraint, techniques, comparison of anesthetic drugs, combinations.

Circella, E., A. Camarda, V. Martella, G. Bruni, A. Lavazza, and C. Buonavoglia (2007).

**Coronavirus associated with an enteric syndrome on a quail farm.** *Avian Pathology* 36(3): 251-8. ISSN: 0307-9457.

**Abstract:** An enteric syndrome was observed in quail (*Coturnix coturnix*) semi-intensively reared for restocking in Apulia (southern Italy). The birds showed depression, severe diarrhoea, dehydration and reduced growth. Mortality occurred particularly in young birds. At necropsy the prominent lesion was enteritis. A coronavirus was detected by electron microscopy and reverse transcriptase-polymerase chain reaction in the faeces and in the intestinal content of the dead quails. The virus could not be cultivated in chicken embryos. By sequence analyses of a fragment (409 nucleotides) of region 1b of the polymerase gene, the quail coronavirus displayed <or=93% nucleotide identity to avian coronaviruses (group 3 coronaviruses)--whereas by analysis of the S1 portion of the spike protein-encoding gene, the quail coronavirus displayed 16% to 18% amino acid identity with infectious bronchitis virus, and 79% to 81% identity with turkey coronavirus. Altogether, the findings suggest the existence of a novel coronavirus genetically related to turkey coronavirus.

**Descriptors:** Japanese quail, quail farm, coronavirus, enteric syndrome, electron microscopy, reverse transcriptase polymerase chain reaction, Italy.

Cooper, R.G. (2007). **Differences in stride between healthy ostriches (*Struthio camelus*) and those affected by tibiotarsal rotation.** *Journal of the South African Veterinary Association* 78(1): 52-3. ISSN: 0038-2809.

**Abstract:** Twenty healthy ostriches (ten cocks and ten hens), and twenty birds with tibiotarsal rotation (nine cocks and 11 hens) (14 months old) were isolated, hooded and weighed. A run (50 m x 2.5 m) was divided into sections marked 5 m, 10 m, 15 m and 20 m. Time taken for each bird to pass these points was recorded and speed computed. The degree of tibiotarsal rotation in the right foot was mean +/- SEM, 156 +/- 2.69 degrees. Comparisons between left and right foot length in healthy birds showed no significant differences. Foot length was significantly lower in tibiotarsal rotation (P = 0.03). The right foot in tibiotarsal rotation was significantly shorter than the left foot. The number of strides per each 5 m division were significantly (P < 0.05) greater in tibiotarsal rotation by comparison with healthy birds. At 20 m, healthy cocks had more strides than hens. The stride length in hens was significantly (P < 0.05) greater than cocks at 5, 10 and 15 m, respectively, but lower throughout in tibiotarsal rotation (P = 0.001). The speed of hens was significantly

( $P < 0.05$ ) greater than cocks. Tibiotarsal rotation resulted in significantly ( $P < 0.05$ ) reduced speeds. Hens may be able to escape danger faster than cocks. The occurrence of tibiotarsal rotation necessitates consideration of genetics, management, sex, nutrition and growth rates.

**Descriptors:** ostriches, healthy, tibiotarsal rotation, stride differences, right foot, speed.

Cooper, R.G. (2005). **Bacterial, fungal and parasitic infections in the ostrich (*Struthio camelus* var. *domesticus*)**. *Animal Science Journal* 76(2): 97-106. ISSN: 1344-3941.

**Descriptors:** ostrich, *Struthio camelus*, infections, bacterial, fungal, parasitic, veterinary, diseases, parasites.

Cooper, R.G. and H.A. El Doumani (2006). **The presence of quill mites (*Gabucinia bicaudata*) and lice (*Struthiolipeurus struthionis*) in ostrich wing feathers.**

*Journal of the South African Veterinary Association* 77(1): 9-11. ISSN: 0038-2809.

**Abstract:** Quill mites (*Gabucinia bicaudata*) and lice (*Struthiolipeurus struthionis*) may infest ostrich feathers, resulting in skin damage, pruritis and excessive feather preening and loss. Four different feather types (prime white, femina extra wide, femina class 1, and femina short;  $n = 10$ ) were collected. The quill mites and lice were removed with fine forceps, studied using a photographic optical microscope and counted microscopically at  $\times 100$  magnification following collection by sedimentation. They were placed in separate Petri dishes containing lactophenol solution and examined ( $\times 40$  magnification). Anatomical features are described. The density of quill mites in all feather types of both wings was higher than that of the lice. There was no significant difference between the counts of both arthropods on the left wing and the right wing, respectively, except for the femina class 1 quill mites ( $P = 0.01$ ). The femina extra wide feathers were a preferred habitat in both wings. Large standard deviations (quill mites left wing:  $73 \pm 8$ ; quill mites right wing:  $69 \pm 7$ ) suggested variations in the degree of migration between feather shafts or as a response to escape preening. It is recommended that ostriches be treated with an oral preparation of Ivermectin administered per os at a dosage rate of 0.2 mg/kg at 30-day intervals for quill mites, and with a 1-5 % Malathion dust at 14-day intervals for lice.

**Descriptors:** ostriches, antiparasitic agents, therapeutic use, bird parasites, parasitology, lice ultrastructure, mites ultrastructure, Struthioniformes parasitology, drug therapy, epidemiology, feathers parasitology, Ivermectin therapeutic use, lice anatomy, histology, lice infestations, drug therapy, epidemiology, Malathion therapeutic use, mite infestations drug therapy, epidemiology, mites anatomy, histology.

Cooper, R.G. and J.O. Horbanczuk (2006). **Crooked beak in a 14-month-old ostrich (*Struthio camelus*) hen.** *Journal of the South African Veterinary Association* 77(4): 170. ISSN: 0038-2809.

**Descriptors:** young ostrich nutrition, physiology, beak abnormalities, Struthioniformes abnormalities, selenium deficiency, vitamin D deficiency, complications.

Cortright, K.A., S.E. Wetzlich, and A.L. Craigmill (2007). **Plasma pharmacokinetics of midazolam in chickens, turkeys, pheasants and bobwhite quail.** *Journal of Veterinary Pharmacology and Therapeutics* 30(5): 429-36. ISSN: 01490-7783.

**Abstract:** In vivo plasma pharmacokinetics of midazolam hydrochloride (5 mg/kg i.v.) were determined in commercially raised broiler chickens, turkeys, ring-necked pheasants and bobwhite quail. Pharmacokinetic profiles of midazolam were similar for all four species, especially with regard to the area under the plasma drug concentration-time curve. Estimates of the half-life of elimination of midazolam were 0.42, 1.45, 1.90, and 9.71 h for turkeys, chickens, bobwhite quail, and pheasant, respectively. This was similar to the major metabolite (1-hydroxymidazolam). Elimination half-lives for 1-hydroxymidazolam were 1.35, 1.86, 1.97, and 13.97 h for turkey, chicken, bobwhite quail and pheasant, respectively. Elimination half-lives for 4-hydroxymidazolam were 0.76, 1.23, 2.85, and 13.82 h for chicken, turkey, pheasant, and bobwhite quail, respectively. In addition to traditional pharmacokinetic approaches to parameter estimation, a bootstrapping technique was employed to attempt to achieve more realistic approximations of the concentrations at later time-points.

**Descriptors:** pheasants, quail, chickens, turkeys, midazolam, plasma pharmacokinetics, half life.

Cousquer, G. and D. Parsons (2007). **Veterinary care of the racing pigeon.** *In Practice.* 29((6)): 344-355 . ISSN: 0263-841X.

**Descriptors:** racing pigeon, veterinary care.

Cousquer, G.O., E.J. Dankoski, and J.C. Patterson Kane (2007). **Metabolic bone disease in wild collared doves (*Streptopelia decaocto*).** *Veterinary Record* 160(3): 78-84. ISSN: 0042-4900.

**Abstract:** The records of 666 casualty collared doves examined at a wildlife hospital in south-west England over a period of five years were reviewed. Signs of metabolic bone disease were recorded in 51.2 per cent of the juvenile birds but in only 9.6 per cent of the adults. The incidence of the condition was highest between December and February and decreased almost to zero between June and August. Histological lesions in 11 of the juvenile doves were consistent with vitamin D deficiency, possibly as a result of inadequate exposure to uvb light during the short winter days.

**Descriptors:** bird diseases epidemiology, bone diseases, metabolic, Columbidae, vitamin D deficiency, age factors, wild bird diseases, pathology, epidemiology, pathology, incidence, retrospective studies, seasons, sunlight, complications, England.

- D' Agostino, J.J., T. Snider, J. Hoover, and G. West (2006). **Use of laser ablation and cryosurgery to prevent primary feather growth in a pigeon (*Columba livia*) model.** *Journal of Avian Medicine and Surgery* 20(4): 219-224 . ISSN: 1082-6742.  
**Descriptors:** pigeon primary feather growth, laser ablation, cryosurgery, model, Diode laser, minimal tissue damage.
- de Lucas, J.J., C. Rodriguez, S. Waxman, F. Gonzalez, M.L. de Vicente, and M.I. San Andres (2004). **Pharmacokinetics of enrofloxacin after single intravenous and intramuscular administration in young domestic ostrich (*Struthio camelus*).** *Journal of Veterinary Pharmacology and Therapeutics* 27(2): 119-22. ISSN: 0140-7783.  
**Descriptors:** young domestic ostrich, enrofloxacin, pharmacokinetics, single administration, intravenous, intramuscular.
- de Lucas, J.J., C. Rodriguez, S. Waxman, F. Gonzalez, I. Uriarte, and M.I. San Andres (2005). **Pharmacokinetics of marbofloxacin after intravenous and intramuscular administration to ostriches.** *Veterinary Journal* 170(3): 364-8. ISSN: 1090-0233.  
**Abstract:** The pharmacokinetics of marbofloxacin was investigated after intravenous (IV) and intramuscular (IM) administration, both at a dose rate of 5 mg/kg BW, in six clinically healthy domestic ostriches. Plasma concentrations of marbofloxacin was determined by a HPLC/UV method. The high volume of distribution (3.22+/-0.98 L/kg) suggests good tissue penetration. Marbofloxacin presented a high clearance value (2.19+/-0.27 L/kg/h), explaining the low AUC values (2.32+/-0.30 microg/h/mL and 2.25+/-0.70 microg/h/mL, after IV and IM administration, respectively) and a short half life and mean residence time ( $t_{1/2\beta}$ )=1.47+/-0.31 h and 1.96+/-0.35 h; MRT=1.46+/-0.02 h and 2.11+/-0.30 h, IV and IM, respectively). The absorption of marbofloxacin after IM administration was rapid and complete (C(max)=1.13+/-0.29 microg/mL; T(max)=0.36+/-0.071 h; MAT=0.66+/-0.22 h and F (%)=95.03+/-16.89).  
**Descriptors:** ostriches, marbofloxacin, intravenous, intramuscular, administration, pharmacokinetics, dose rate, plasma concentrations.
- Dehghani, S., M. Mohammadi, and H. Nadda (2005). **Anaesthetic protocol for pigeon undergoing orthopaedic operation.** *Indian Journal of Veterinary Surgery* 26(1): 47. ISSN: 0254-4105.  
**Descriptors:** pigeon, orthopedic operation, anesthetic protocol.
- DeLucas, J.J., C. Rodriguez, M. Marin, F. Gonzalez, C. Ballesteros, and M.I. SanAndres (2007). **Pharmacokinetics of Intramuscular Ketamine in Young Ostriches Pre-medicated with Romifidine.** *Zentralblatt Fur Veterinarmedizin, Journal of Veterinary Medicine Series A Physiology Pathology Clinical Medicine Reihe A* 54(1): 48-50. ISSN: 0514-7158.

**Abstract:** Ketamine is a short-acting dissociative anaesthetic for chemical restraint and surgical anaesthesia in domestic and non-domestic animals. The present study was designed to determine the pharmacokinetics of a single dose of ketamine (10 mg/kg) after intramuscular (i.m.) administration to young ostriches premedicated with romifidine. Ketamine was rapidly absorbed after i.m. administration. Maximal ketamine concentration ( $C_{max}$ ) of 2.93  $\pm$  0.61 (So/Bg/ml) was reached at 12.5  $\pm$  2.50 min and thereafter ketamine concentrations decreased rapidly. The elimination half-life ( $t_{1/2}$ ) obtained was 62.37  $\pm$  17.37 min and mean residence time (MRT) was 77.33  $\pm$  19.12 min. The area under the curve (AUC) was 114.19  $\pm$  15.76 (So/Bg.min/ml).

**Descriptors:** ostriches, ketamine, intramuscular, pharmacokinetics, premedication, romifidine, chemical restraint, surgical anaesthesia.

Deshmukh, S., R.K. Asrani, N. Jindal, D.R. Ledoux, G.E. Rottinghaus, M. Sharma, and S.P. Singh (2005). **Effects of *Fusarium moniliforme* culture material containing known levels of fumonisin B1 on progress of *Salmonella gallinarum* infection in Japanese quail: clinical signs and hematologic studies.** *Avian Diseases* 49(2): 274-280. ISSN: 0005-2086.

**Abstract:** To study the individual and combined effects of fumonisin B1 (FB1) toxicity and *Salmonella* serotype *Gallinarum* infection, Japanese quail (*Coturnix coturnix japonica*) were fed *Fusarium moniliforme* culture material (2.5%), 150 mg FB1/kg ration, and were subsequently challenged orally with *Salmonella Gallinarum* organisms ( $2 \times 10^4$  colony-forming units) at 21 days of age. The chicks were fed culture material containing FB1 from day 5 till the end of the experiment. After being infected with *Salmonella Gallinarum*, observations were made 1, 2, 3, 5, 7, 10, 14, and 21 days postinfection. The clinical signs of diarrhea with bloody discharges were more pronounced in the *Salmonella*-infected birds on the FB1 diet. Mortality caused by *Salmonella Gallinarum* increased by 12% in the presence of FB1. Mean body weights in both the *Salmonella*-infected and FB1-fed groups were significantly lower than those of the controls at almost all intervals. Mean values of hemoglobin, packed cell volume, and total erythrocyte count were slightly higher in birds fed FB1 but were lower in the *Salmonella Gallinarum* groups fed FB1 and plain chick mash. Anemia was evident, between 5 and 10 days postinfection, in quail chicks infected with *Salmonella Gallinarum* alone. Total leukocyte counts were higher in *Salmonella*-infected and FB1-fed groups because of an increase in the number of heterophils and lymphocytes. However, the increase in lymphocyte response to infection was lower by 4.27%-30.09% between 3 and 21 days postinfection in the FB1-fed chicks compared with chicks infected with *Salmonella Gallinarum*. Alanine transaminase and total serum protein were slightly higher in both the infected and FB1-fed groups. This study revealed that the continuous presence of fumonisins in the diets of quail chicks

might increase the susceptibility to or the severity of *Salmonella Gallinarum* infection. **Descriptors:** Japanese quails, *Salmonella enterica* subsp. *Enterica* serovar *Gallinarum*, salmonellosis, animal pathogenic bacteria, fumonisin B1, *Gibberella fujikuroi*, disease course, symptoms, diarrhea, mortality, hematocrit, hemoglobin, erythrocyte count, leukocyte count, lymphocytes, heterophils, blood proteins, alanine transaminase. **Language of Text:** Summary in Spanish.

Dhondt, A.A., K.V. Dhondt, D.M. Hawley, and C.S. Jennelle (2007). **Experimental evidence for transmission of *Mycoplasma gallisepticum* in house finches by fomites.** *Avian Pathology* 36(3): 205-8. ISSN: 0307-9457.

**Abstract:** Ever since *Mycoplasma gallisepticum* emerged among house finches in North America, it has been suggested that bird aggregations at feeders are an important cause of the epidemic of mycoplasmal conjunctivitis because diseased birds could deposit droplets of pathogen onto the feeders and thereby promote indirect transmission by fomites. In this paper we bring the first experimental evidence that such transmission (bird-to-feeder-to-bird) does actually take place. House finches infected via this route, however, developed only mild disease and recovered much more rapidly than birds infected from the same source birds but directly into the conjunctiva. While it is certainly probable that house finch aggregations at artificial feeders enhance pathogen transmission, to some degree transmission of *M. gallisepticum* by fomites may serve to immunize birds against developing more severe infections. Some such birds develop *M. gallisepticum* antibodies, providing indication of an immune response, although no direct evidence of protection.

**Descriptors:** house finches bird diseases, transmission, finches microbiology, fomites, mycoplasma infections, *Mycoplasma gallisepticum*, isolation, purification, antibodies, bacterial blood, conjunctivitis, bacterial microbiology, bacterial transmission, epidemiology.

Diaz Figueroa, O., T.N.J. Tully, J. Williams, and D. Evans (2006). **Squamous cell carcinoma of the infraorbital sinus with fungal tracheitis and ingluvitis in an adult solomon ecleetus parrot (*Ecleetus roratus solomonensis*).** *Journal of Avian Medicine and Surgery* 20(2): 113-119. ISSN: 1082-6742.

**Descriptors:** ecleetus parrot, squamous cell carcinoma, infraorbital sinus, fungal tracheitis, ingluvitis.

Doneley, B. (2006). **Pigeon medicine and surgery.** *Small animal and exotics Proceedings of the North American Veterinary Conference., January 7, 2006-January 11, 2006, Orlando, FL*, The North American Veterinary Conference: Gainesville, USA, Vol. 20, p. 1525-1530.

**Descriptors:** pigeon, surgery, anesthesia, breeding, feeding, housing, husbandry, bacterial diseases, congenital abnormalities, diet, metabolic disorders, mycoses, neo-

plasms, parasites, racing pigeons, trauma, viral diseases.

**Notes:** Meeting Information: Small animal and exotics - Proceedings of the North American Veterinary Conference, Volume 20, Orlando, Florida, USA, 7-11 January, 2006.

Doneley, B. (2002). **Acute pancreatitis in parrots.** *Exotic DVM* 4(3): 13-16. ISSN: 1521-1363.

**Descriptors:** parrots, acute pancreatitis, conference, symptoms, treatment.

**Notes:** Meeting Information: 4th Annual International Conference on Exotics (ICE2002), Key West, Florida, USA, 2002.

Draycott, R.A.H., M.I.A. Woodburn, D.E. Ling, and R.B. Sage (2006). **The effect of an indirect anthelmintic treatment on parasites and breeding success of free-living pheasants *Phasianus colchicus*.** *Journal of Helminthology* 80(4): 409-415. ISSN: 0022-149X.

**Descriptors:** *Phasianus colchicus*, pheasants, game birds, helminths, helminthiasis, anthelmintics, drug evaluation, animal reproduction, population density, chemoprevention, worm burden, England .

Durgun, Z., E. Keskin, R. Col, and B. Atalay (2005). **Selected haematological and biochemical values in ostrich chicks and growers.** *Archiv Fur Geflugelkunde* 69(2): 62-66. ISSN: 0003-9098.

**Descriptors:** ostrich, chicks, growers, hematological values, biochemical values, selected.

**Language of Text:** German.

Durrani, U.F., M. Ashraf, and A. Khalid (2005). **Comparative efficacy of detomidine and detomidine - ketamine cocktail in quails.** *Pakistan Veterinary Journal* 25(4): 197-199. ISSN: 0253-8318.

**Abstract:** Twenty adult healthy quails (*Coturnix coturnix*) were divided into two equal groups. One group was administered detomidine (2.4 mg/kg, 1/M) and other group was administered detomidine-ketamine cocktail (1.2 mg/kg + 30 mg/kg, 1/M). Detomidine slowly and smoothly induced a light sedation accompanied by superficial analgesia, hypoventilation, hypothermia and bradycardia in all birds. Detomidine-ketamine cocktail rapidly and smoothly induced a deep anaesthesia accompanied by deep analgesia, hypoventilation, hypothermia and bradycardia and complete loss of all reflexes in all birds. In both groups, recovery from sedation and anaesthesia was smooth and of short duration. From this study it was concluded that for minor and least painful procedures in quails detomidine can be used alone, while for major and painful surgical procedures detomidine- ketamine combination should be preferred.

**Descriptors:** Japanese quails, anesthetics, analgesics, anesthesia, birds, domestic animals, drugs, Galliformes, livestock, neurotropic drugs, poultry.

**Language of Text:** Summary in English.

Eatwell, K. (2006). **Approach to the dyspnoeic parrot.** *Veterinary Times* 36(47): 25-27. ISSN: 1352-9374.

**Descriptors:** parrot, dyspnoeic, approach, allergies, antifungal, diagnosis, therapy, respiratory diseases.

El Shabiny, L.M., M.M. Shaker, and S.E. Ouda (2005). **The application of a recent technique for diagnosis of *Mycoplasma gallisepticum* infection from migratory quail.** *Veterinary Medical Journal Giza* 53(1): 143-152. ISSN: 1110-1423.

**Descriptors:** migratory quail, *Mycoplasma gallisepticum*, diagnosis, recent technique, application.

Elias, M.Z., T.A. Aire, and J.T. Soley (2007). **Macroscopic features of the arterial supply to the reproductive system of the male ostrich (*Struthio camelus*).** *Anatomia, Histologia, Embryologia* 36(4): 255-62. ISSN: 0340-2096.

**Abstract:** The macroscopic features of the arterial supply to the reproductive system of the male ostrich was studied in 16 pre-pubertal and eight sexually mature and active birds. The left and right cranial renal arteries arise from the aorta, between the cranial divisions of the kidneys. These vessels supply the cranial divisions of the kidneys, the testes, the epididymides and the cranial segments of the ducti deferentia. Accessory testicular arteries which arise directly from the aorta are present in 45.8% of the specimens. They supply the testes and cranial parts of the ducti deferentia. They are variable in number and origin, and four variants are identified. A cranial ureterodeferential branch originates from the cranial renal artery, supplies the cranial portion of the ductus deferens and ureter, and runs caudally to anastomose with the middle renal artery. The sciatic artery arises laterally from the aorta, just caudal to the acetabulum, and gives rise, ventrally, to a common trunk, the common renal artery, which divides into the middle and caudal renal arteries. The middle renal artery gives rise to the middle ureterodeferential branch which supplies the middle part of the ductus deferens and ureter. A few centimetres caudal to the kidney, the aorta terminates in three branches, namely, the left and right internal iliac arteries and the median caudal artery. The internal iliac artery divides into the lateral caudal artery and the pudendal artery; the latter gives off caudal ureterodeferential branches that supply the caudal segments of the ductus deferens and ureter. In addition, the pudendal artery gives off vessels that supply the cloaca, some of which continue to the base of the phallus, where they form an arterial network. In conclusion, the pattern of the blood supply to the reproductive organs of the male ostrich is, in general, similar to that of the domestic fowl and pigeon, although there are a few highlighted distinctive

features.

**Descriptors:** ostrich, male, arteries, anatomy, histology, Struthioniformes, testis, blood supply, epididymis, epididymis, regional blood flow, sexual maturation, physiology, vas deferens, blood supply.

Faki, A.E. and A.E. Amin (2005). **Red-necked ostrich (*Struthio camelus*) normal clinical and clinico-chemical values.** E. Carbajo *Proceedings of the 3rd International Ratite Science Symposium of the World's Poultry Science Association WPSA and 12th World Ostrich Congress, Madrid, Spain, 14th 16th October, 2005*, World Poultry Science Association (WPSA): Beekbergen, Netherlands, p. 203-208. ISBN: 8460963535.

**Descriptors:** red-necked ostrich, normal clinico, clinico-chemical values, conference proceedings.

**Notes:** Meeting Information: Proceedings of the 3rd International Ratite Science Symposium of the World's Poultry Science Association (WPSA) and 12th World Ostrich Congress, Madrid, Spain, 14th-16th October, 2005.

Ferrell, S.T. (2004). **Mycoplasmosis of house finches.** *Small Animal and Exotics Book Two: Pain Management-Zoonosis Proceedings of the North American Veterinary Conference, Volume 18, Orlando, Florida, USA, 17 21 January 2004*, Eastern States Veterinary Association: Gainesville, USA, p. 1449-1450.

**Descriptors:** house finches, mycoplasmosis, book chapter, conference.

**Notes:** Meeting Information: Small Animal and Exotics. Book two: Pain Management - Zoonosis. Proceedings of the North American Veterinary Conference, Volume 18, Orlando, Florida, USA, 17-21 January 2004.

Ferrell, S.T. (2004). **Husbandry and clinical medicine of finches.** *Small Animal and Exotics Book Two: Pain Management-Zoonosis Proceedings of the North American Veterinary Conference, Volume 18, Orlando, Florida, USA, 17 21 January 2004*, Eastern States Veterinary Association: Gainesville, USA, p. 1443-1445.

**Descriptors:** finches, husbandry, clinical medicine, book chapter, conference.

**Notes:** Meeting Information: Small Animal and Exotics. Book two: Pain Management - Zoonosis. Proceedings of the North American Veterinary Conference, Volume 18, Orlando, Florida, USA, 17-21 January 2004.

Flammer, K. and M. Papich (2006). **Pharmacokinetics of fluconazole after oral administration of single and multiple doses in African grey parrots.** *American Journal of Veterinary Research* 67(3): 417-22. ISSN: 0002-9645.

**Abstract:** OBJECTIVE: To determine the pharmacokinetics and effects of orally administered fluconazole in African grey parrots. ANIMALS: 40 clinically normal Timneh African grey parrots (*Psittacus erithacus timneh*). PROCEDURE: In single-dose trials, parrots were placed into groups of 4 to 5 birds each and fluconazole was

administered orally at 10 and 20 mg/kg. Blood samples for determination of plasma fluconazole concentrations were collected from each group at 2 or 3 of the following time points: 1, 3, 6, 9, 12, 24, 31, 48, and 72 hours. In multiple-dose trials, fluconazole was administered orally to groups of 5 birds each at doses of 10 and 20 mg/kg every 48 hours for 12 days. Trough plasma concentrations were measured 3 times during treatment. Groups receiving 20 mg/kg were monitored for changes in plasma biochemical analytes, and blood samples were collected on days 1 and 13 of treatment to allow comparison of terminal half-life. **RESULTS:** Peak plasma concentrations of fluconazole were 7.45 and 18.59 microg/mL, and elimination half-lives were 9.22 and 10.19 hours for oral administration of 10 and 20 mg/kg, respectively. Oral administration of fluconazole for 12 days at 10 or 20 mg/kg every 48 hours did not cause identifiable adverse effects or change the disposition of fluconazole. **CONCLUSIONS AND CLINICAL RELEVANCE:** Oral administration of fluconazole to parrots at 10 to 20 mg/kg every 24 to 48 hours maintains plasma concentrations above the minimum inhibitory concentration for several common yeast species. The prolonged dosing interval is an advantage of this treatment regimen.

**Descriptors:** African grey parrots, antifungal agents, administration, dosage, pharmacokinetics, fluconazole, administration, dosage, pharmacokinetics, parrots metabolism, absorption, administration, oral, dose response, half life, suspensions, tablets.

Fukui, D., G. Bando, and M. Kosuge (2005). **Stifle luxation repair by articular stabilization technique with non-absorbable suture in a white-fronted goose and therapeutic trial in a domestic pigeon.** *Japanese Journal of Zoo and Wildlife Medicine* 10(1): 49-52. ISSN: 1342-6133.

**Descriptors:** stifle luxation, domestic pigeon, goose, repair, articular stabilization, non-absorbable suture, dislocation, ligaments rupture.

**Language of Text:** Japanese, summary in English.

Gal, J. (2006). **Papagajok legezese zavarainak elkulonito korjelzese kortani szemponbol.** [Pathological aspects of the differential diagnosis of respiratory diseases in parrots]. *KisallatPraxis* 7(3): 108...113. ISSN: 1585-9142.

**Descriptors:** parrots, respiratory diseases, differential diagnosis, pathological aspects, overview.

**Language of Text:** Hungarian, summary in English.

Gal, J. (2006). **Papagajok egyes majelvaltozasainak klinikopatologiaja.** [Clinicopathology of some hepatic diseases of parrots]. *KisallatPraxis* 7(4): 158-161. ISSN: 1585-9142.

**Descriptors:** parrots, hepatic diseases, clinicopathology, veterinary.

**Language of Text:** Hungarian, summary in English.

Gartrell, B.D., M.R. Alley, and A.H. Mitchell (2005). **Fatal levamisole toxicosis of captive kiwi (*Apteryx mantelli*)**. *New Zealand Veterinary Journal* 53(1): 84-6. ISSN: 0048-0169.

**Abstract:** CASE HISTORY: Nine of 24 captive kiwi treated with oral levamisole at a dose between 25-43 mg/kg showed signs of respiratory distress. Six died within 4 h of treatment and the remaining three made a full recovery within 24 h. CLINICAL AND PATHOLOGICAL FINDINGS: Within 3-4 h of treatment, the affected birds had an elevated respiratory rate, mucoid nasal discharge and rapidly became comatose. Post mortem examination revealed accumulation of thick mucus in the oral cavity and trachea. There was severe pulmonary congestion and oedema and early bronchopneumonia in the lungs of five of the birds. In two birds, there was acute hepatic degeneration and necrosis and one bird had acute pancreatic degeneration and necrosis. DIAGNOSIS: Acute levamisole toxicity. CLINICAL RELEVANCE: Kiwi were acutely sensitive to levamisole toxicity at doses that are well within the safe range for domestic poultry. Levamisole should not be used as an anthelmintic in kiwi.

**Descriptors:** kiwi, antinematodal agents, adverse effects, bird diseases, diagnosis, oral levamisole, toxicosis, hepatitis, toxic etiology, fatalities.

Gartrell, B.D., S.R. Raidal, and S.M. Jones (2003). **Renal disease in captive swift parrots (*Lathamus discolor*): clinical findings and disease management**. *Journal of Avian Medicine and Surgery* 17(4): 213-223. ISSN: 1082-6742.

**Descriptors:** swift parrots, captive, renal disease, clinical findings, disease management, *Lathamus discolor*, neurologic signs, gout, nephropathy.

Gartrell, B.D. and C. Reid (2007). **Death by chocolate: a fatal problem for an inquisitive wild parrot**. *New Zealand Veterinary Journal* 55(3): 149-51. ISSN: 0048-0169.

**Abstract:** CASE HISTORY: An adult male kea (*Nestor notabilis*) in good body condition was found dead at Aoraki/Mt Cook Village, in the Southern Alps of New Zealand. The bird had previously been involved in behavioural tests of problem-solving ability. CLINICAL AND PATHOLOGICAL FINDINGS: The bird had substantial subcutaneous and abdominal reserves of fat. The crop contained 20 g of what appeared to be dark chocolate; a conservative estimate of the dose of methylxanthines ingested by the bird was 250 mg/kg theobromine, 20 mg/kg caffeine and 3 mg/kg theophylline. Histopathological examination revealed acute degenerative changes to hepatocytes, renal tubules, and cerebrocortical neurons. DIAGNOSIS: Acute combination methylxanthine toxicity after opportunistic ingestion of chocolate. CLINICAL RELEVANCE: This is the first report of the pathological findings of methylxanthine toxicity in a wild parrot, and illustrates the need to ensure that kea are protected from the toxic by-products of human habitation, and the difficulties in ensuring this against a neophilic, inquisitive and innovative parrot.

**Descriptors:** wild parrot, chocolate poisoning, xanthines, methylxanthine toxicity, dosage levels, caffeine, fatal outcome, theobromine, theophylline, adverse effects, New Zealand.

Gelis, S. and S.R. Raidal (2006). **Microsporidiosis in a flock of tricolor parrot finches (*Erythrura tricolor*)**. *Veterinary Clinics of North America. Exotic Animal Practice* 9(3): 481-6. ISSN: 1094-9194.

**Abstract:** The lesions caused by a microsporidian infection in a flock of tricolor parrot finches (*Erythrura tricolor*) are described. Affected birds had a widespread nodular to diffuse granulomatous inflammation of the serosal surfaces of the gastrointestinal tract, peritoneum, perirenal airsacs and connective tissue, bone marrow, dura, and conjunctiva. This was composed predominantly of foamy macrophages containing numerous intracytoplasmic microsporidia measuring 1 to 2 microm. Ultrastructural features consistent with microsporidia were the presence of a coiled polar filament and an electron-dense outer surface and thick electron-lucent capsule. Differential diagnoses included infection with intracellular organisms, including coccidian and other apicomplexan parasites, such as *Isoospora*, *Eimeria*, and blood parasites; Chlamydophilosis; disseminated mycobacteriosis; and other bacterial and fungal species.

**Descriptors:** tricolor parrot finches, bird diseases, pathology, microbiology, microsporidia isolation, purification, microsporidiosis, diagnosis, infection.

Gerhold, R.W., C.M. Tate, S.E. Gibbs, D.G. Mead, A.B. Allison, and J.R. Fischer (2007). **Necropsy findings and arbovirus surveillance in mourning doves from the southeastern United States**. *Journal of Wildlife Diseases* 43(1): 129-35. ISSN: 0090-3558.

**Abstract:** Mourning doves (*Zenaidura macroura*) are the most abundant and widespread native member of the columbid family, as well as a major migratory game species, in the United States. However, there is little information on mortality factors in mourning doves. Records of necropsy accessions at the Southeastern Cooperative Wildlife Disease Study (SCWDS) from 15 southeastern states, from 1971 through 2005, were reviewed. One hundred thirty-five mourning doves were submitted from nine states during the 35-yr period. Trichomonosis constituted 40% (n = 54) of all diagnoses and was the most frequent diagnosis. Toxicoses and avian pox constituted 18.5% (n = 25) and 14.8% (n = 20) of all diagnoses, respectively. Remaining diagnoses included trauma, suspected toxicosis, *Ascaridia columbae* infection, suspected tick paralysis, and undetermined. Adults were observed more frequently with trichomonosis (94.1%) and toxicoses (68%) as compared to juveniles, but a gender predisposition was not apparent for either disease. Age and gender predilections were not apparent for cases of avian pox. The majority of the trichomonosis and avian pox cases were observed in the spring-summer, whereas the majority of the toxicosis cases were observed in the winter-spring. Additionally, the Georgia Department of Human

Resources-Division of Public Health and West Virginia Department of Health and Human Resources submitted 809 mourning doves to SCWDS from 2001 through 2005 for West Nile virus surveillance efforts. West Nile virus was isolated from 2.1% (n = 17) and eastern equine encephalitis virus (EEEV) was isolated from 0.2% (n = 2) of the submitted birds.

**Descriptors:** mourning doves, arbovirus surveillance, necropsy findings, columbid family, diseases, parasites, viruses, southeastern USA.

Giunchi, D., N.E. Baldaccini, G. Sbragia, and C. Soldatini (2007). **On the use of pharmacological sterilisation to control feral pigeon populations.** *Wildlife Research* 34(4): 306-318. ISSN: 1035-3712.

**Descriptors:** feral pigeon populations, control, sterilization, pharmacological, adverse effects, breeding season, reproduction, sterilization, wildlife management.

Glatz, P.C. (2005). **Best practice methods to declaw ostriches to improve skin quality.** E. Carbajo *Proceedings of the 3rd International Ratite Science Symposium of the World's Poultry Science Association WPSA and 12th World Ostrich Congress, Madrid, Spain, 14th 16th October, 2005*, World Poultry Science Association (WPSA): Beekbergen, Netherlands, p. 397-400. ISBN: 8460963535.

**Descriptors:** ostriches, declaw, best practice methods, skin quality, skin damage, conference proceedings.

**Notes:** Meeting Information: Proceedings of the 3rd International Ratite Science Symposium of the World's Poultry Science Association (WPSA) and 12th World Ostrich Congress, Madrid, Spain, 14th-16th October, 2005.

Glatz, P.C. (2005). **Effect of declawing on behaviour and skin quality of ostriches.** E. Carbajo *Proceedings of the 3rd International Ratite Science Symposium of the World's Poultry Science Association WPSA and 12th World Ostrich Congress, Madrid, Spain, 14th 16th October, 2005*, World Poultry Science Association (WPSA): Beekbergen, Netherlands, p. 157-162. ISBN: 8460963535.

**Descriptors:** ostriches, declawing, effect, behavior, aggression, emus, conference proceedings.

**Notes:** Meeting Information: Proceedings of the 3rd International Ratite Science Symposium of the World's Poultry Science Association (WPSA) and 12th World Ostrich Congress, Madrid, Spain, 14th-16th October, 2005.

Gomez Meda, B.C., A.L. Zamora Perez, J. Luna Aguirre, A. Gonzalez Rodriguez, M.L. Ramos Ibarra, O. Torres Bugarin, C.M. Batista Gonzalez, and G.M. Zuniga Gonzalez (2006). **Nuclear abnormalities in erythrocytes of parrots (*Aratinga canicularis*) related to genotoxic damage.** *Avian Pathology* 35(3): 206-210. ISSN: 0307-9457.

**Abstract:** Nuclear abnormalities in erythrocytes, as micronuclei and nuclear buds (BE), are considered potential biomarkers of genotoxic exposure. We described previously the frequency of spontaneous micronucleated erythrocytes (MNE) in the species *Aratinga canicularis*. Here, we have used this species to evaluate the induction of MNE and BE by mitomycin-C. Animals were given a single intracoelomic injection of 0, 2, 3 or 4 mg/kg mitomycin-C on two consecutive days. A drop of blood was obtained after 0, 24, 48 and 72 h, and stained smears were used to count micronucleated polychromatic erythrocytes (MNPCE) and polychromatic erythrocytes with buds (BPCE)/1000 polychromatic erythrocytes. The number of MNE and BE in 10 000 total erythrocytes was also counted. MNPCE and BPCE frequencies were elevated at 24, 48, and 72 h after the administration of the lower dose ( $P < 0.03$ ). At a 3 mg/kg dose, the frequency of MNPCE increased at 48 and 72 h ( $P < 0.04$ ) whereas the number of BPCE increased, but not significantly. Administration of 4 mg/kg mitomycin-C increased the number of MNE observed at 72 h ( $P < 0.03$ ), the number of MNPCE at 48 h ( $P < 0.01$ ) and 72 h ( $P < 0.006$ ), the BE frequency at 72 h ( $P < 0.05$ ), and the frequency of BPCE at 48 and 72 h ( $P < 0.001$ ). While mitomycin-C appears to produce a parallel increase in MNPCE and BPCE frequencies, the MNE seemed to be a more sensitive indicator of genotoxicity than the BE. This suggests that evaluating BE and MNE in routine haematological analysis should be considered to evaluate environmental genotoxic exposure.

**Descriptors:** parrots, *Aratinga canicularis*, erythrocytes, cell nucleus, genotoxicity, mitomycin, dosage, symptoms, biomarkers, diagnostic techniques, screening, hematologic tests, micronuclei, nuclear buds.

Graham, J.E., C. Kollias Baker, A.L. Craigmill, S.M. Thomasy, and L.A. Tell (2005). **Pharmacokinetics of ketoprofen in Japanese quail (*Coturnix japonica*)**. *Journal of Veterinary Pharmacology and Therapeutics* 28(4): 399-402. ISSN: 0140-7783.

**Descriptors:** Japanese quails, pharmacokinetics, nonsteroidal anti inflammatory agents, intravenous injection, intramuscular injection, oral administration, injection site, dosage, drug toxicity, adverse effects, drug therapy, liquid chromatography, mass spectrometry, bioavailability, half life, ketoprofen.

Grizzle, J.M., D.B. Kersten, M.D. McCracken, A.E. Houston, and A.M. Saxton (2004).

**Determination of the acute 50% lethal dose T-2 toxin in adult bobwhite quail: additional studies on the effect of T-2 mycotoxin on blood chemistry and the morphology of internal organs.** *Avian Diseases* 48(2): 392-9. ISSN: 0005-2086.

**Abstract:** Three experiments were conducted to assess mortality rate, blood chemistry, and histologic changes associated with acute exposure to T-2 mycotoxin in adult bobwhite quail. In Experiment 1, adult quail were orally dosed with T-2 toxin to determine the lethal dose that resulted in 50% mortality of the affected population (LD50), and that dose was determined to be 14.7 mg of T-2 toxin per kilogram

of body weight (BW). A second experiment was performed to study the effects of 12-18 mg/kg BW T-2 toxin on blood chemistry and liver enzyme profiles. Post-treatment uric acid, aspartate aminotransferase, lactic dehydrogenase, and gamma glutamyltransferase increased as compared with pretreatment values. In contrast, posttreatment plasma total protein, cholesterol, and triglyceride levels numerically decreased as compared with pretreatment values. Changes in blood chemistry values were consistent with liver and kidney damage after T-2 toxin exposure. In Experiment 3, histologic analyses of bone marrow, spleen, liver, small intestine, kidney, and heart were conducted on birds dosed in Experiment 2. Marked lymphocyte necrosis and depletion throughout the spleen, thymus, bursa, and gut-associated lymphoid tissue in the small intestine were observed in birds dosed with 15 and 18 mg/kg BW T-2 toxin. Necrosis of liver and lipid accumulation as a result of malfunctioning hepatocytes were also observed. Little or no morphologic change was observed in bone marrow and heart tissue. The LD50 for adult bobwhite quail as found in this study is two to three times higher than that reported for other species of commercial poultry. Results from these data confirm previous reports of immunosuppressive and/or cytotoxic effects of T-2 toxin in other mammalian and avian species. T-2 toxin may have a negative impact on the viability of wild quail populations.

**Descriptors:** bobwhite quail, *Colinus*, blood, T-2 toxin toxicity, blood chemical analysis, enzyme tests, heart drug effects, intestines drug effects, kidney drug effects, lethal dose 50, liver drug effects, lymphocytes pathology, mortality.

Gumussoy, K.S., F. Uyanik, A. Atasever, and Y. Cam (2004). **Experimental *Aspergillus fumigatus* infection in quails and results of treatment with itraconazole.** *Journal of Veterinary Medicine. B, Infectious Diseases and Veterinary Public Health* 51(1): 34-8. ISSN: 0931-1793.

**Abstract:** This study was performed to investigate (i). the clinical, histopathological and biochemical changes in quails (*Coturnix coturnix japonica*) with experimentally induced aspergillosis; and (ii). the efficiency of itraconazole treatment on these infected birds. A total of 18021-day-old male quails was randomly divided into three groups (control, infected untreated and infected treated), each containing 60. The experimental infection was set by intratracheal inoculation of 0.2 ml inoculum of *Aspergillus fumigatus* (CBS 113.26 strain) consisting of approximately  $2.7 \times 10^6$  spores/ml. Two days after the inoculation, general clinical signs of aspergillosis in the respiratory tract were observed. In the histopathological examination, caseous foci were found in lungs, trachea and on airsacs. All quails died in the infected untreated group. *Aspergillus fumigatus* was isolated from the various organs of all dead quails. There was no significant change in serum aspartate aminotransferase (AST) and gamma-glutamyltransferase (GGT) activities in infected untreated birds compared with controls. However, alanine aminotransferase (ALT) activity, albumin and

calcium levels, and albumin/globulin (A/G) ratio were lower while phosphorus and globulin levels were higher in the infected untreated group than in controls. Each quail in the infected treated group was given 10 mg/kg/day itraconazole via drinking water for 7 days immediately after the first clinical findings. Although all quails died in the infected untreated group, 41 quails survived in the itraconazole treatment group. Biochemical values also returned approximately to the control levels after the treatment. The conclusion was drawn that aspergillosis in the quails might cause economical losses because of high mortality. Oral itraconazole treatment of aspergillosis might lower the mortality rate in quails.

**Descriptors:** Japanese quail, *Coturnix coturnix japonica*, antifungal agents, therapeutic use, aspergillosis, bird diseases, *Aspergillus fumigatus*, drug therapy, coturnix, itraconazole therapeutic use, oral administration, administration and dosage, drug therapy, pathogenicity, treatment outcome.

Gurel, A., A. Gulcubuk, and N. Turan (2004). **A granulomatous conjunctivitis associated with *Morexella phenylpyruvica* in an ostrich (*Struthio camelus*)**. *Avian Pathology* 33(2): 196-199. ISSN: 0307-9457.

**Abstract:** The aim of study was to evaluate a case of granulomatous conjunctivitis, clinically and pathologically, in the right eye of a 2-year-old, female ostrich. A mass measuring 5 cm x 3 cm x 4 cm was removed surgically from the eye of the ostrich. *Morexella phenylpyruvica* was recovered from the mass. On histopathological examination, hyperplasia or squamous metaplasia in some area of conjunctival palpebra, and a granulomatous inflammation in the submucosa were observed. The lesion was described as a granulomatous conjunctivitis caused by *M. phenylpyruvica*. The lesion was located in the lower eyelid conjunctiva and was not only restricted to the gl. lacrimalis, but also present in the connective tissue. After excision of the mass, the ostrich was treated with topical and systemic antibiotics and corticosteroid. The ostrich recovered fully and the function of the eye appeared to be normal.

**Descriptors:** ostriches, conjunctivitis, bacterial infections, *Morexella phenylpyruvica*, granulomatous conjunctivitis, lower eyelid, case study.

Haag Wackernagel, D. and R. Spiewak (2004). **Human infestation by pigeon fleas (*Ceratophyllus columbae*) from feral pigeons**. *Annals of Agricultural and Environmental Medicine AAEM* 11(2): 343-6. ISSN: 1232-1966.

**Abstract:** The report concerns a married couple who were repeatedly invaded by pigeon fleas (*Ceratophyllus columbae*) over a period of 2 months. The source of the fleas was a pair of breeding feral pigeons (*Columba livia*). The birds' nest was located in the attic immediately above the couple's apartment, and the fleas found their way along an unsealed heating pipe. The people encountered up to 40 bites per night. With invasions repeated almost every night, the man gradually developed an allergic urticarial reaction. The most traumatic experience for the couple, however, was to

learn that they were invaded by fleas (initially, they had presumed they were bothered by mosquitoes). This information resulted in severe psychological distress with phobic reactions and insomnia. Despite the successful removal of the fleas and the pigeons that were source of the pest, parasitophobia of the man persisted over the following 4 months. This case is discussed from the broader aspect of health risks related to feral pigeons and animal fleas. Also summarised are previous observations on people invaded by pigeon fleas.

**Descriptors:** feral pigeons, bird parasites, transmission, Columbidae parasitology, ectoparasitic, home infestations, transmission, fleas, ectoparasitic infestations, pathology, house invaded by fleas, stress, zoonoses, Switzerland.

Hanley, C.S., G.H. Wilson, K.S. Latimer, P. Frank, Hernandez Divers, and Stephen J (2005). **Interclavicular hemangiosarcoma in a double yellow-headed Amazon parrot (*Amazona ochrocephala oratrix*)**. *Journal of Avian Medicine and Surgery* 19(2): 130-137. ISSN: 1082-6742.

**Descriptors:** yellow headed Amazon parrot, hemangiosarcoma, interclavicular, anorexia, respiratory distress, right carotid artery, diagnostic samples.

Harcourt Brown, N.H. (2002). **Surgical correction of a deformed tibiotarsus in a grey parrot**. *Exotic DVM* 4(3): 17-19. ISSN: 1521-1363.

**Descriptors:** grey parrot, deformed tibiotarsus, surgical correction, conference report.

**Notes:** Meeting Information: 4th Annual International Conference on Exotics (ICE2002), Key West, Florida, USA, 2002.

Harkinezhad, T., K. Verminnen, C. Van Droogenbroeck, and D. Vanrompay (2007). ***Chlamydophila psittaci* genotype E/B transmission from African grey parrots to humans**. *Journal of Medical Microbiology* 56(Pt 8): 1097-100. ISSN: 0022-2615.

**Abstract:** Thirty-six birds from a parrot relief and breeding centre, as well as the manager, were examined for the presence of *Chlamydophila psittaci*. In the relief unit, 5 of 20 African grey parrots showed depression, ruffled feathers, loss of weight and mild dyspnoea. The birds received no antibiotic treatment. Birds of the breeding unit, 14 blue and gold macaws and 2 green-winged macaws, were healthy. They received doxycycline at the start of each breeding season. The manager complained of shortness of breath but took no medication. Using a nested PCR enzyme immunoassay (EIA), *Cp. psittaci* was detected in the faeces of all five sick birds, as well as in a nasal and pharyngeal swab from the manager. The veterinarian and her assistant became infected while sampling the parrots, as pharyngeal and nasal swabs from both were positive by nested PCR/EIA after visiting the parrot relief and breeding centre, but they showed no clinical signs of infection. Bacteria could be isolated from three of five nested PCR/EIA-positive birds, the manager and the veterinarian, but not from

the veterinary assistant. Using an ompA genotype-specific real-time PCR, *Cp. psittaci* genotype E/B was identified as the transmitted strain. All breeding birds tested negative for *Cp. psittaci*. This is believed to be the first report on *Cp. psittaci* genotype E/B transmission from parrots to humans. In contradiction to genotype A strains, which are thought to be highly virulent to both birds and men, the currently described genotype E/B strain apparently caused no severe clinical symptoms in either parrots or humans.

**Descriptors:** African grey parrots, *Chlamydophila psittaci*, genotype E, B, transmission, humans, diagnosis, strain, symptoms, treatment, doxycycline, zoonotic disease, case study.

Hauptmanova, K., M. Maly, and I. Literak (2006). **Changes of haematological parameters in common pheasant throughout the year.** *Veterinarni Medicina* 51(1): 29-34. ISSN: 0375-8427.

**Descriptors:** common pheasant, hematological parameters, changes, throughout year, blood count, cell volume, hemoglobin.

Hawkins, M.G., B.M. Crossley, A. Osofsky, R.J. Webby, C.W. Lee, D.L. Suarez, and S.K. Hietala (2006). **Avian influenza A virus subtype H5N2 in a red-lored Amazon parrot.** *Journal of the American Veterinary Medical Association* 228(2): 236-41. ISSN: 0003-1488.

**Abstract:** CASE DESCRIPTION: A 3-month-old red-lored Amazon parrot (*Amazona autumnalis autumnalis*) was evaluated for severe lethargy. CLINICAL FINDINGS: Avian influenza virus hemagglutinin subtype H5N2 with low pathogenicity was characterized by virus isolation, real-time reverse transcriptase PCR assay, chicken intravenous pathogenicity index, and reference sera. The virus was also determined to be closely related to a virus lineage that had been reported only in Mexico and Central America. TREATMENT AND OUTCOME: The chick was admitted to the hospital and placed in quarantine. Supportive care treatment was administered. Although detection of H5 avian influenza virus in birds in the United States typically results in euthanasia of infected birds, an alternative strategy with strict quarantine measures and repeated diagnostic testing was used. The chick recovered from the initial clinical signs after 4 days and was released from quarantine 9 weeks after initial evaluation after 2 consecutive negative virus isolation and real-time reverse transcriptase PCR assay results. CLINICAL RELEVANCE: To the authors' knowledge, this is the first report of H5N2 avian influenza A virus isolated from a psittacine bird and represents the first introduction of this virus into the United States, most likely by illegal importation of psittacine birds. Avian influenza A virus should be considered as a differential diagnosis for clinical signs of gastrointestinal tract disease in psittacine birds, especially in birds with an unknown history of origin. Although infection with avian influenza virus subtype H5 is reportable, destruction of birds is

not always required.

**Descriptors:** Amazon parrot, Avian influenza type A, H5N2, virus isolation, pathogenicity, differential diagnosis, introduction, United States Department of Agriculture.

Hawkins, M.G., P.H. Kass, J.G. Zinkl, and L.A. Tell (2006). **Comparison of biochemical values in serum and plasma, fresh and frozen plasma, and hemolyzed samples from orange-winged Amazon parrots (*Amazona amazonica*).** *Veterinary Clinical Pathology American Society for Veterinary Clinical Pathology* 35(2): 219-25. ISSN: 0257-6382.

**Abstract:** BACKGROUND: To the authors' knowledge, on the basis of sample type, storage condition, or hemolysis, differences in serum and plasma biochemical values have not been evaluated in orange-winged Amazon parrots (*Amazona amazonica*). OBJECTIVES: The purpose of this study was to compare values for biochemical analytes in serum vs plasma, fresh vs frozen plasma, and nonhemolyzed vs hemolyzed samples in orange-winged Amazon parrots. We also compared differences in serum and plasma yield from whole-blood aliquots. METHODS: Fifteen biochemical analytes were evaluated in paired serum and plasma, fresh and frozen plasma, non-hemolyzed and hemolyzed serum and plasma samples from orange-winged Amazon parrots (n = 10) using a wet reagent analyzer. Hemolysis was assessed qualitatively (visually) and quantitatively (hemoglobin [Hgb] measured spectrophotometrically). Serum and plasma yields from 500-microl whole-blood aliquots were determined from centrifuged samples. RESULTS: Analyte values significantly differed among sample groups, but were still within published reference intervals, with the exception of increases in potassium concentration in markedly hemolyzed serum and plasma samples. Clinically important changes in hemolyzed serum and plasma samples included increases in potassium, phosphorus, and albumin concentrations and lactate dehydrogenase activity. The degree of hemolysis assigned qualitatively did not correlate with quantitative Hgb concentration. A significantly greater yield of plasma (288 +/- 13 microL) than serum (241 +/- 44 microL) was obtained. CONCLUSIONS: Significant differences may occur in different sample types, however, only changes in potassium, phosphorus, albumin, and lactate dehydrogenase values in hemolyzed samples were considered clinically relevant. Lack of agreement between qualitative and quantitative Hgb concentration indicates the unreliability of visual estimation. Based on higher sample yield, and lack of clinically relevant differences from serum, plasma is a better sample choice for clinical chemistry analysis in birds.

**Descriptors:** Amazon parrots blood, blood chemical analysis veterinary, freezing, plasma chemistry, serum chemistry, specimen handling veterinary.

Headley, S.A. (2005). **Intrathoracic haemangiosarcoma in an ostrich (*Struthio camelus*)**. *Veterinary Record Journal of the British Veterinary Association* 156(11): 353-354.

**Descriptors:** ostriches, *Struthio camelus*, hemangiosarcoma, intrathoracic.

Hendrix, D.V.H. and M.H. Sims (2004). **Electroretinography in the Hispaniolan Amazon parrot (*Amazona ventralis*)**. *Journal of Avian Medicine and Surgery* 18(2): 89-94. ISSN: 1082-6742.

**Descriptors:** Amazon parrot, electroretinography, retinal function, evaluation, cataracts, isoflurane, electroretinograms, light adapted.

Herraez, P., F. Rodriguez, A. Espinosa de los Monteros, B. Acosta, J.R. Jaber, J. Castellano, and A. Castro (2005). **Fibrino-necrotic typhlitis caused by *Escherichia fergusonii* in ostriches (*Struthio camelus*)**. *Avian Diseases* 49(1): 167-169. ISSN: 0005-2086.

**Abstract:** Two adult ostriches developed anorexia, prostration, and severe hemorrhagic diarrhea, dying 24 hr after the onset of clinical signs. On postmortem examination, the cecal mucosa showed locally extensive areas of hemorrhages and fibrino-necrotic typhlitis with a white-yellowish material covering the mucosal surface. Multiple serosal petequeal hemorrhages and fibrinous peritonitis were present. Histologic examination revealed an intense mononuclear infiltration in the lamina propria and submucosa of the cecum and extensive superficial necrosis associated with fibrin and serocellular deposits. Several gram-negative bacterial colonies were observed within the necrotic areas. Samples from intestinal lesions were collected, and pure growth of *Escherichia fergusonii* was obtained. *Escherichia fergusonii* is a member of Enterobacteriaceae, closely related to *Escherichia coli* and *Shigella* sp., established as a new species of the genus *Escherichia* in 1985. In veterinary medicine, *E. fergusonii* has been reported in calves and sheep from clinical cases suggestive of salmonellosis. To our knowledge, this report represents the first description of *E. fergusonii* associated with enteritis in ostrich.

**Descriptors:** ostriches, alternative livestock, *Escherichia fergusonii*, animal pathogenic bacteria, bird diseases, symptoms, cecum, case studies, *Escherichia* infections, intestinal mucosa, histopathology, necrosis, new host records, enteritis, case study.

**Language of Text:** Summary in Spanish.

Heryford, A.G. and S.A. Seys (2004). **Outbreak of occupational campylobacteriosis associated with a pheasant farm**. *Journal of Agricultural Safety and Health* 10(2): 127-32. ISSN: 1074-7583.

**Abstract:** A cluster of campylobacteriosis cases occurred at a pheasant farm in rural Wyoming during the summer of 2000. This study examined the potential causes of the outbreak. A cohort study of all farm workers was conducted to assess foodborne and occupational exposures at the facility. Eight of fifteen workers (53%) became ill, and four were stool-culture positive for *Campylobacter jejuni*. High attack rates

were noted among workers who had direct contact with pheasant feces and first-time workers at the farm. This investigation suggests an association between campylobacteriosis and occupational animal exposure to pheasants. Enhanced educational efforts targeting occupations with direct animal contact are critical, particularly in rural communities.

**Descriptors:** pheasant, campylobacteriosis, agricultural workers' diseases, epidemiology, bird diseases, epidemiology, *campylobacter* infections, disease outbreaks, transmission, feces microbiology, occupational exposure, zoonoses.

Horbanczuk, J.O., R. Parada, F.W. Huchzermeyer, and K. Plaza (2004). **Four-legged ostrich (*Struthio camelus*) chick.** *Veterinary Record* 154(23): 736. ISSN: 0042-4900.

**Descriptors:** ostrich, chick, four legged, abnormalities, Struthioniformes, multiple diagnosis, pathology, diagnosis.

Hove, T. and S. Mukaratirwa (2005). **Seroprevalence of *Toxoplasma gondii* in farm-reared ostriches and wild game species from Zimbabwe.** *Acta Tropica* 94(1): 49-53. ISSN: 0001-706X.

**Abstract:** One hundred and seventy one serum samples from 10 game species from Zimbabwe were tested for IgG antibodies to *Toxoplasma gondii* infection using the modified agglutination test (MAT). Significantly higher seroprevalences were found in the felidae (*Panthera leo*) (92% of 26), bovidae (*Tragelaphus* species) (55.9% of 34) and farm-reared struthionidae (*Struthio camelus*) (48% of 50) compared to the other groups tested. Among the bovidae, the nyala (*Tragelaphus angasi*) had the highest seroprevalence of 90% (9/10). Anti-*Toxoplasma* antibody prevalences in browsers [greater kudu (*Tragelaphus strepsiceros*) (20% of 10), giraffe (*Giraffa camelopardalis*) (10% of 10) and elephant (*Loxodonta africana*) (10% of 20)] were generally in the lower range. No antibodies were detected in the wild African suidae [warthog (*Phacochoerus africanus*) and bushpig (*Potamochoerus larvatus*)]. Attempts to isolate *T. gondii* from the heart muscles of seropositive ostriches by subinoculation in BALB/c mice were unsuccessful.

**Descriptors:** ostriches, *Toxoplasma gondii*, seroprevalence, wild game species, *Panthera*, nyala, giraffe, elephant, warthog, bushpig, Zimbabwe.

Howard, L.L., P.H. Kass, N. Lamberski, and R.F. Wack (2004). **Serum concentrations of ionized calcium, vitamin D3, and parathyroid hormone in captive thick-billed parrots (*Rhynchopsitta pachyrhyncha*).** *Journal of Zoo and Wildlife Medicine* 35(2): 147-53. ISSN: 1042-7260.

**Abstract:** Serum collected from 68 thick-billed parrots (*Rhynchopsitta pachyrhyncha*) from 15 institutions was analyzed for ionized Ca (iCa), total Ca (tCa), P, total protein (TP), albumin (Alb), parathyroid hormone (PTH), and vitamin D3. Values were not distributed normally; 95% frequency intervals were as follows: iCa (0.82-1.3

mmol/L), tCa (1.37-2.09 mmol/L), P (0.35-1.75 mmol/L), TP (21-39 g/L), Alb (9-13 g/L), PTH (0-65.68 pmol/L), and vitamin D3 (5.2-51 nmol/L). Sixty percent (+/-7.5%) of tCa was ionized. Female thick-billed parrots had significantly higher mean iCa (1.11 mmol/L, n = 22) than male thick-billed parrots (1.05 mmol/L, n = 32). tCa and iCa values in thick-billed parrots were lower than the reported values for other psittacine species. A significant positive linear relationship existed between Alb-TP and iCa-tCa ratios. A significant inverse linear relationship was also identified between the tCa-P ratio and PTH. These findings are consistent with known domestic avian Ca physiology.

**Descriptors:** thick-billed parrots, calcium blood, cholecalciferol blood, parathyroid hormone blood, parrots blood, blood proteins analysis, parrots physiology, reference values, serum albumin analysis, sex factors.

Jakhar, K.K. and J.R. Sadana (2004). **Sequential pathology of experimental aflatoxicosis in quail and the effect of selenium supplementation in modifying the disease process.** *Mycopathologia* 157(1): 99-109. ISSN: 0301-486X.

**Abstract:** Feeding of aflatoxin B1 @ 1 ppm to 2-week old Japanese quail for a period of 8 weeks produced gross and microscopic changes in the liver, skeletal muscles, heart and bursa of Fabricius. These included fatty changes, bile duct hyperplasia and lymphoid aggregation in liver; haemorrhages in thigh, breast muscles and myocardium; mild depletion of lymphocytes, cystic degeneration and fibrous tissue proliferation in bursa of Fabricius. More or less similar lesions were seen in quail chicks fed on aflatoxin with sodium selenite @ 5 ppm but these were of lesser intensity and appeared at later stages of the experiment thereby indicating that supplementation of selenium had some protective action against the toxic effect of aflatoxin B1 in Japanese quail.

**Descriptors:** Japanese quail, *coturnix*, aflatoxin B1 metabolism, poultry diseases, drug therapy, diseases pathology, selenium pharmacology, aflatoxin B1 toxicity, bursa of Fabricius pathology, dietary supplements, liver pathology, lung pathology, lymphoid tissue pathology, skeletal muscle pathology, myocardium pathology.

Jepson, M.H. and B. Wilton (2004). **Pigeon healthcare.** S.B.J.M.H. Kayne *Veterinary Pharmacy*, Pharmaceutical Press: London, UK, p. 475-498. ISBN: 0853695342.

**Descriptors:** pigeon, health care, parasites, drugs, vaccines, disease, nutrition, book chapter.

Jimenez Baigorria, M.V.L. (2004). **Balanced anesthesia in rhea for abdominal surgery.** *Internet Journal of Veterinary Medicine* 1(1): unpaginated. ISSN: d000-1004.

**Descriptors:** rhea, abdominal surgery, anesthesia balanced, veterinary.

Johnston, M.S., T.T. Son, and K.L. Rosenthal (2007). **Immune-mediated hemolytic anemia in an eclectus parrot.** *Journal of the American Veterinary Medical Association* 230(7): 1028-31. ISSN: 0003-1488.

**Abstract:** CASE DESCRIPTION: A 2-year-old female Solomon Island eclectus parrot (*Eclectus roratus*) was evaluated by a veterinarian because of a 4-day history of progressive lethargy, weakness, poor appetite, and inactivity. The bird was referred to a veterinary teaching hospital for further examination. CLINICAL FINDINGS: Clinicopathologic analyses revealed that the parrot had marked regenerative anemia, autoagglutination, and biliverdinuria. Small, rounded RBCs (thought to be spherocytes) were detected in blood smears. The abnormal findings met the diagnostic criteria for dogs with primary immune-mediated hemolytic anemia. However, analyses of blood samples for lead and zinc concentrations and plasma bile acids concentrations; the use of PCR assays for *Chlamydophila psittaci*, psittacine circovirus 1 (causative agent of beak and feather disease), and polyomavirus; and microbial culture and Gram staining of feces did not reveal a cause for the hemolytic anemia. TREATMENT AND OUTCOME: Although administration of immunosuppressive doses of cyclosporine was initiated, there was a rapid progression of disease, which led to death of the parrot before this treatment could be continued long-term. Lack of an identifiable underlying disease (confirmed by complete histologic examinations at necropsy) supported the diagnosis of primary immune-mediated hemolytic anemia. CLINICAL RELEVANCE: Primary immune-mediated hemolytic anemia has not been widely reported in psittacine birds. A comprehensive evaluation and complete histologic examination of tissues to rule out underlying disease processes are required to definitively establish a diagnosis of primary immune-mediated hemolytic anemia in parrots. Primary immune-mediated hemolytic anemia should be considered as a differential diagnosis for regenerative anemia in a parrot.

**Descriptors:** eclectus parrot, immune mediated hemolytic anemia, symptoms, diagnostic criteria, differential diagnosis, regenerative anemia., case study.

Jyoti Markan, Kuldeep Gupta, N.K. Sood, Jaswinder Kaur, and Amarjit Singh (2004). **Miscellaneous pathological conditions in Japanese quail (*Coturnix coturnix japonica*).** *Journal of Research, Punjab Agricultural University* 41(4): 501-503. ISSN: 0048-6019.

**Descriptors:** Japanese quail, coturnix, pathological conditions, miscellaneous, veterinary.

Klaphake, E., S.L. Beazley Keane, M. Jones, and A. Shoieb (2006). **Multisite integumentary squamous cell carcinoma in an African grey parrot (*Psittacus erithacus erithacus*).** *Veterinary Record* 158(17): 593-6. ISSN: 0042-4900.

**Abstract:** A 22-year-old male African grey parrot (*Psittacus erithacus erithacus*) had had episodes of chronic feather picking and self-mutilation for 10 years; it had a 5 cm diameter right axillary wound and a 2 cm left dorsal patagial wound. Initial

treatment with azithromycin and wound management was unsuccessful. Biopsies of both masses indicated squamous cell carcinoma. The left patagial tumour was removed completely by electrocautery. Cisplatin was administered weekly into multiple sites on the right axillary tumour and it initially appeared to regress; however, the bird's condition deteriorated after a month of treatment, and it was euthanased. The tumour was confirmed postmortem to be squamous cell carcinoma, which had invaded local tissues. The aetiology of the carcinoma may have been secondary to chronic focal trauma.

**Descriptors:** African grey parrot, integumentary squamous cell carcinoma, multisite, self-mutilation, biopsies, postmortem., chronic focal trauma.

Klaphake, E., J. Schumacher, C. Greenacre, M.P. Jones, and N. Zagaya (2006). **Comparative anesthetic and cardiopulmonary effects of pre-versus postoperative butorphanol administration in Hispaniolan amazon parrots (*Amazona ventralis*) anesthetized with sevoflurane.** *Journal of Avian Medicine and Surgery* 20(1): 2-7. ISSN: 1082-6742.

**Descriptors:** Amzon parrots, butorphanol, sevoflurane, anesthetic, postoperative, cardiopulmonary effects, comparative.

Kondiah, K., J. Albertyn, and R.R. Bragg (2005). **Beak and feather disease virus haemagglutinating activity using erythrocytes from African Grey parrots and Brown-headed parrots.** *Onderstepoort Journal of Veterinary Research* 72(3): 263-5. ISSN: 0030-2465.

**Abstract:** Psittacine beak and feather disease (Pbfd) is a common viral disease of wild and captive psittacine birds characterized by symmetric feather loss and beak deformities. The causative agent, beak and feather disease virus (BFDV), is a small, circular single-stranded DNA virus that belongs to the genus Circovirus. BFDV can be detected by PCR or the use of haemagglutination (HA) and haemagglutination inhibition (HI) assays that detect antigen and antibodies respectively. Erythrocytes from a limited number of psittacine species of Australian origin can be used in these tests. In South Africa, the high cost of these birds makes them difficult to obtain for experimental purposes. Investigation into the use of erythrocytes from African Grey parrots and Brown-headed parrots yielded positive results showing the haemagglutinating activity of their erythrocytes with purified BFDV obtained from confirmed clinical cases of the disease. The HA activity was further confirmed by the demonstration of HI using BFDV antiserum from three different African Grey parrots previously exposed to the virus and not showing clinical signs of the disease.

**Descriptors:** grey parrots, brown-headed parrots, beak and feather diseases, diagnosis, Circoviridae infections, parrots virology, antibodies, viral blood, diagnosis, erythrocytes virology, hemagglutination inhibition tests methods, hemagglutination, sensitivity, specificity.

Kumar, K.S., Y.R. Reddy, S. Shakila, S.T.V. Rao, and K. Veerabrahmaiah (2001).

**Behavioural, clinical and biochemical parameters of emu (*Dromaius novaehollandiae*).** *Intas Polivet* 2(2): 270-272. ISSN: 0972-1738.

**Descriptors:** emu, *Dromaius novaehollandiae*, behavioral, clinical, biochemical, parameters.

**Notes:** Wildlife Health.

Kurtul, I. and R.M. Hazroglu (2004). **Horoz, erkek ordek ve guvercinde aorta**

**descendens'in seyri ve dallanmas uzerinde karstlrmal makroanatomik ara-trmular. [Comparative macroanatomical investigations on the pattern and branches of the descending aorta among the rooster, drake and pigeon].** *Ankara Universitesi Veteriner Fakultesi Dergisi* 51(1): 1-6. ISSN: 1300-0861.

**Descriptors:** pigeon, anatomy, aorta, blood circulation, species differences, rooster, drake.

**Language of Text:** Turkish, summary in English.

Lancker, S.v., K. Chiers, G. Janssens, W.v.d. Broeck, and P. Simoens (2006). **Conjunctival**

**granuloma in a racing pigeon.** *Vlaams Diergeneeskundig Tijdschrift* 75(1): 41-44. ISSN: 0303-9021.

**Descriptors:** racing pigeon, conjunctival granuloma, biopsy, case report, clinical aspects, eyes, histopathology, surgery.

**Language of Text:** Dutch.

Latshaw, J.D., T.Y. Morishita, C.F. Sarver, and J. Thilsted (2004). **Selenium toxicity in**

**breeding ring-necked pheasants (*Phasianus colchicus*).** *Avian Diseases* 48(4): 935-939. ISSN: 0005-2086.

**Abstract:** A flock of breeding ring-necked pheasants received feed with a high selenium content. Within 4 days of eating the toxic feed, the rate of egg production began to decrease, and bird aggression increased. Approximately 12% of the hens died within a week. Necropsy of the hens revealed colorless fluid around the heart and a friable, but otherwise normal, liver. The rapid onset of the problem and signs noted at necropsy suggested toxicosis. Based on analysis, the feed contained 9.3 ppm of selenium. Selenium toxicity was consistent with the histologic diagnosis of degenerative cardiomyopathy, vacuolar degeneration of hepatocytes, and centrilobular hepatic necrosis. After 8 days, the toxic feed was removed and replaced with fresh feed. Egg production, which had dropped to 50%, returned to normal within 10 days of feed replacement. Hatchability of eggs laid from days 8 to 14 after delivery of the toxic feed was 35%. Approximately 10% of the chicks that hatched had deformed beaks and abnormal eyes. Many of the chicks that died in the shell had deformities, bringing the total to more than 50% of all embryos that developed. The selenium content of eggs that had no embryonic development was 2.05 ppm. Hatch-

ability of eggs laid from days 21 to 28 after the toxic feed was delivered was almost 80%, which was slightly lower than normal. The selenium content of these eggs was 0.30 ppm. These results show the rapid onset and correction of selenium toxicity and suggest that specific embryologic defects are diagnostic for selenium toxicity.

**Descriptors:** Pheasants, *Phasianus colchicus*, ring-necked pheasants, game birds, breeding stock, selenium toxicity, selenosis, feeds, fecundity, animal fertility, animal behavior, aggression, liver, heart, symptoms, egg hatchability, embryogenesis, embryonic mortality, deformed embryos.

**Language of Text:** Summary in Spanish.

Lima, F.S., E. Santin, A.C. Paulillo, L. Doretto Junior, V.M.B.d. Moraes, and R.P. Schocken Iturrino (2004). **Japanese quail (*Coturnix coturnix japonica*) as a Newcastle disease virus carrier.** *International Journal of Poultry Science* 3(7): 483-484. ISSN: 1682-8356.

**Descriptors:** Japanese quail, Newcastle disease virus, carrier.

Lloyd, S. and J.S. Gibson (2006). **Haematology and biochemistry in healthy young pheasants and red-legged partridges and effects of spironucleosis on these parameters.** *Avian Pathology* 35(4): 335-340. ISSN: 0307-9457.

**Abstract:** Plasma biochemical and haematological parameters were examined in 4-week-old to 12-week-old game birds. Healthy, uninfected pheasants and partridges had similar levels of total protein, albumin, osmolality, Na<sup>+</sup>, Cl<sup>-</sup>, K<sup>+</sup>, Mg<sup>2+</sup> and glucose. Triglyceride, globulin and Ca<sup>2+</sup> were significantly higher and PO<sub>4</sub><sup>3-</sup> was lower in the partridges. Pheasants carrying a light to moderate infection with *Spiro-nucleus* had significantly lower total protein, albumin, osmolality, Na<sup>+</sup>, Cl<sup>-</sup>, Ca<sup>2+</sup> and PO<sub>4</sub><sup>3-</sup>. In severely affected pheasants, the osmolality, Na<sup>+</sup> and Cl<sup>-</sup> fell further. Triglyceride and glucose were significantly lower than in healthy birds, and Mg<sup>2+</sup> was higher. Similar data were obtained from infected partridges. Red cell parameters rose significantly in pheasants severely affected by spironucleosis, and the percent of heterophils was significantly higher and lymphocytes and basophils lower in their blood smears. The breast and leg muscle wet weight from severely affected pheasants was 22.2 and 37.7% that of uninfected birds, although the water content of the breast muscle was significantly higher.

**Descriptors:** pheasants, *Phasianus colchicus*, *Alectoris rufa*, game birds, hematologic tests, blood chemistry, *Spiro-nucleus*, bird diseases, blood glucose, blood lipids, disease severity, infection, blood proteins, albumins, osmolarity, sodium, chlorides, potassium, magnesium, calcium, phosphates, heterophils, lymphocytes, basophils, protozoal infections.

Lopez Murcia, M.M., L.J. Bernal, A.M. Montes, J.D. Garcia Martinez, and I. Ayala (2005). **The normal electrocardiogram of the unanaesthetized competition 'Spanish Poulter' pigeon (*Columba livia gutturosa*).** *Journal of Veterinary Medicine Series A* 52(7): 347-349. ISSN: 0931-184X.

**Descriptors:** racing pigeons, *Columba livia*, electrocardiography, adult animals, gender differences, males, females, heart rate, electrical conductivity, monitoring, heart.

Lucas, J.J.d., C. Rodriguez, M. Marin, F. Gonzalez, C. Ballesteros, and M.I. San Andres (2007). **Pharmacokinetics of intramuscular ketamine in young ostriches premedicated with romifidine.** *Journal of Veterinary Medicine Series A* 54(1): 48-50. ISSN: 0931-184X.

**Descriptors:** ostriches, ketamine, intramuscular, premedicated, romifidine, pharmacokinetics, young birds.

Lucas, J.J.d., C. Rodriguez, M.B. Martella, M.C. Labaque, J.L. Navarro, and M.I. San Andres (2005). **Pharmacokinetics of enrofloxacin following intravenous administration to greater rheas: a preliminary study.** *Research in Veterinary Science* 78(3): 265-267. ISSN: 0034-5288.

**Abstract:** The pharmacokinetic behaviour of enrofloxacin (ENR) and its active metabolite ciprofloxacin (CIP) were determined in six greater rheas following a single intravenous (i.v.) dose of 15 mg/kg bw. Plasma concentrations of ENR and CIP were simultaneously determined by a HPLC/u.v. method. Following i.v. administration, the plasma drug concentrations were best fitted by an open two-compartment model with a rapid distribution phase. The high volume of distribution ( $V_{ss} = 5.01$  L/Kg) suggests good tissue penetration. ENR presents a high clearance (3.95 L/kg h) explaining the low AUC values (3.57 mg h/L) and a short permanence ( $t_{1/2\beta} = 2.66$  h and  $MRT = 1.23$  h). Ciprofloxacin comprised 14% of the total fluoroquinolone (ENR + CIP).

**Descriptors:** rheas, pharmacokinetics, enrofloxacin, intravenous injection, ciprofloxacin, dosage, blood plasma, high performance liquid chromatography, ultraviolet visible spectroscopy, young animals.

Lucas, J.J.d., C. Rodriguez, S. Waxman, F. Gonzalez, I. Uriarte, and M.I. San Andres (2005). **Pharmacokinetics of marbofloxacin after intravenous and intramuscular administration to ostriches.** *Veterinary Journal* 170(3): 364-368. ISSN: 1090-0233.

**Abstract:** The pharmacokinetics of marbofloxacin was investigated after intravenous (IV) and intramuscular (IM) administration, both at a dose rate of 5 mg/kg BW, in six clinically healthy domestic ostriches. Plasma concentrations of marbofloxacin was determined by a HPLC/UV method. The high volume of distribution ( $3.22 \pm 0.98$  L/kg) suggests good tissue penetration. Marbofloxacin presented a high clearance

value (2.19 +/- 0.27 L/kg h), explaining the low AUC values (2.32 +/- 0.30 microgram h/mL and 2.25 +/- 0.70 microgram h/mL, after IV and IM administration, respectively) and a short half life and mean residence time ( $t(1/2\beta) = 1.47 \pm 0.31$  h and  $1.96 \pm 0.35$  h;  $MRT = 1.46 \pm 0.02$  h and  $2.11 \pm 0.30$  h, IV and IM, respectively). The absorption of marbofloxacin after IM administration was rapid and complete ( $C(\max) = 1.13 \pm 0.29$  microgram/mL;  $T(\max) = 0.36 \pm 0.071$  h;  $MAT = 0.66 \pm 0.22$  h and  $F (\%) = 95.03 \pm 16.89$ ).

**Descriptors:** ostriches, pharmacokinetics, quinolones, intravenous injection, intramuscular injection, dosage, blood plasma, high performance liquid chromatography, ultraviolet visible spectroscopy, half life, alternative livestock, marbofloxacin.

Lucas, J.J.d., C. Rodriguez, S. Waxman, F. Gonzalez, M.L.d. Vicente, and M.I. San Andres (2004). **Pharmacokinetics of enrofloxacin after single intravenous and intramuscular administration in young domestic ostrich (*Struthio camelus*)**. *Journal of Veterinary Pharmacology and Therapeutics* 27(2): 119-122. ISSN: 0140-7783.

**Descriptors:** ostrich, domestic, pharmacokinetics, enrofloxacin, single intravenous, intramuscular, administration.

Luo Feng, Wing YaBiao, Zhang JianFei, Zhu XingQuan, and Li GuoQing (2006). **Efficacy of common antitrichomonal drugs against *Trichomonas gallinae* from pigeon in vitro**. *Veterinary Science in China* 36(12): 980-982. ISSN: 1673-4696.

**Descriptors:** pigeon, *Trichomonas gallinae*, common antitrichomonal drugs, efficacy, against, antiprotozoal drugs, parasites.

**Language of Text:** Chinese, summary in English.

Mazzullo, G., G. Montalbano, A. Augello, A. Germana, and B. Macri (2007). **A case of conjoined cephalopagus twinning in an ostrich (*Struthio camelus*)**. *Anatomia, Histologia, Embryologia* 36(4): 263-5. ISSN: 0340-2096.

**Abstract:** Conjoined twinnings have been reported in most domestic animal species and in some avian species. Cases of conjoined twins have not been reported in the ostrich so far. A hybrid Blue neck x African black male ostrich conjoined twinning was born at the end of artificial egg incubation and died spontaneously 24 h after the hatching. It was frozen and sent to the Unit of Veterinary Pathology of the University of Messina for gross examination. The most important gross findings involved the external body and most of the internal organs. On the basis of the duplication, the conjoined twins were classified as a cephalopagus. Radiological features included: development of one head containing a single brain, two spinal cords, deviated vertebral columnae with fusion of the two first cervical vertebrae. In one twin, the synsacrum was absent as well as portions of the vertebral column. Grossly, both twins showed two upper and lower limbs each. The gastro-enteric apparatuses of the twins were not completely developed and fused at different levels. One liver and one heart

localized in the centre of the conjoined twins were observed. The authors conclude that the possible causes of the malformation could be related to a genetic factor.

**Descriptors:** ostrich, twinning, conjoined cephalopagus, male, gross examination, artificial egg incubation, pathology, malformation, genetic.

Minet, D. (2004). **Veterinary ostrich inspection.** *Proceedings of the 11th Ostrich World Congress, Island Great Brijun, Croatia, 15-17 October 2004:* 36-39.

**Descriptors:** ostriches, health problems, veterinary inspection, diseases, observation, conference proceedings.

**Notes:** Meeting Information: Proceedings of the 11th Ostrich World Congress, Island Great Brijun, Croatia, 15-17 October 2004.

Moniello, G., F. Bovera, I.L. Solinas, G. Piccolo, W. Pinna, and A. Nizza (2005). **Effect of cage and blood collection site on the metabolic profile of ostriches.** *South African Journal of Animal Science* 35(4): 268-272. ISSN: 0375-1589.

**Descriptors:** ostriches, blood collection site, cage, metabolic profile, effect.

Morrisey, J.K., J. Paul Murphy, J.P. Fialkowski, A. Hart, and B.J. Darien (2003). **Estimation of prothrombin times of Hispaniolan Amazon parrots (*Amazona ventralis*) and umbrella cockatoos (*Cacatua alba*).** *Journal of Avian Medicine and Surgery* 17(2): 72-77. ISSN: 1082-6742.

**Descriptors:** Amazon parrot, umbrella cockatoos, prothrombin times, estimation, plasma samples, non-domestic avian species.

Mostafa, M.B. and B. Galiwango (2004). **Traumatic oesophageal perforation in a male ostrich (*Struthio camelus australis*).** *Veterinary Record Journal of the British Veterinary Association* 154(21): 669. ISSN: 0042-4900.

**Descriptors:** ostriches, esophagus, animal injuries, oesophageal perforation, traumatic, male.

Munhoz, A.D., G.R. Albuquerque, F.C.R.d. Oliveira, and C.W.G. Lopes (2004). **Studies of clinical signs and hematological alterations in Japanese quails (*Coturnix japonica*) due to *Toxoplasma gondii* Nicolle and Manceaux, 1909 (Apicomplexa: Toxoplasmatinae) experimental infection.** *Revista Brasileira De Parasitologia Veterinaria* 13(1): 1-5. ISSN: 0103-846X.

**Descriptors:** Japanese quail, *Toxoplasma gondii*, clinical signs, hematological alterations, experimental infection.

**Language of Text:** Portuguese.

Murakami, T., K. Uchida, H. Naito, and S. Shinohara (2000). **Ventricular septal defects in an ostrich (*Struthio camelus*) and a Chinese goose (*Cygnopsis cygnoid* var. *orientalis*)**. *Advances in Animal Cardiology* 33(1): 33-37. ISSN: 0910-6537.

**Descriptors:** ostrich, Chinese goose, ventricular septal defects.

**Language of Text:** Japanese, summary in English.

Musulin, S.E. and D.B. Adin (2006). **ECG of the Month. Sinus arrhythmia in an African grey parrot**. *Journal of the American Veterinary Medical Association* 229(4): 505-7. ISSN: 0003-1488.

**Descriptors:** African grey parrot, sinus arrhythmia, ECG, diagnosis, electrocardiography, veterinary, parrots, anesthetics, diagnosis, heart rate, case study.

Naeini, A.T., H. Dadras, and B.A. Naeini (2006). **Myelography in the Pigeon (*Columba livia*)**. *Journal of Avian Medicine and Surgery* 20(1): 27-30. ISSN: 1082-6742.

**Descriptors:** pigeon, myelography, anesthesia, evaluated, contrast medium, cerebellomedullary cistern, potential application in avian.

Nilson, P.C., I. Teramitsu, and S.A. White (2005). **Caudal thoracic air sac cannulation in zebra finches for isoflurane anesthesia**. *Journal of Neuroscience Methods* 143(2): 107-15. ISSN: 0165-0270.

**Abstract:** Small songbirds such as the zebra finch are commonly used for studies on the neural mechanisms that underlie vocal learning. For these studies, survival surgeries are often performed that involve animal anesthesia and stereotaxic stabilization for localization of specific brain regions. Here we describe air sac cannulation as a novel method for delivering isoflurane gas to zebra finches for anesthesia during neurosurgery. Advantages of this method include that it leaves the bird's head free for stereotaxic targeting and does not interfere with the beak clamps that are often used to position and stabilize the head. It additionally allows for the use of the inhalant anesthetic, isoflurane, which is an appealing alternative to injectable anesthetics because it provides fast, minimally stressful induction, and low subject and personnel toxicity. The use of isoflurane also prevents overdosing and lengthy postoperative recovery times.

**Descriptors:** zebra finches, isoflurane anesthesia, caudal thoracic air sac, cannulation, neurosurgery, inhalant anesthesia, injectable, recovery.

Novak, I.L., M. Simpraga, and H. Mazija (2004). **Humoral immune reaction of ostriches vaccinated against Newcastle disease by different routes**. *Proceedings of the 11th Ostrich World Congress, Island Great Brijun, Croatia, 15-17 October 2004* 82-88

**Descriptors:** ostriches, vaccinated, Newcastle disease, humoral immune reaction, different routes, spraying, drinking, conference proceedings.

**Notes:** Meeting Information: Proceedings of the 11th Ostrich World Congress, Island Great Brijun, Croatia, 15-17 October 2004.

Ocal, N., S. Karahan, and T. Atmaca (2006). **Proliferative response by the ostrich proventriculus in idiopathic gastric stasis: a case report.** *Acta Veterinaria Hungarica* 54(2): 213-20. ISSN: 0236-6290.

**Abstract:** In this report, the late clinical, necropsy, and histopathological findings of idiopathic gastric stasis in an ostrich are described, with special attention to the proventriculus. An ostrich with clinical signs of gastric stasis was brought to our clinic in a state of impending death that could not be reversed with emergency medical care. At necropsy, the koilin layer of the gizzard was uneven without ulcerations. The proventriculus was distended with food items without impaction and mucosal lesions. None of the most typical aetiological factors including foreign objects, *Macrorhabdus ornithogaster* and parasitic infection with *Libyostrongylus douglassii* was present. Histologically, the proventriculus was characterised by hyperplastic mucosa with luminal buds and necrotic cells in the lumen. Immunohistochemistry for proliferating cell nuclear antigen (PCNA) revealed a high rate of proliferation in epithelial cells of the glandular and mucosal lining in the proventriculus neighbouring the affected gizzard: approximately 88.6% of the cells were immunoreactive as compared to 34.4% of the cells in control ostriches used for comparison. In conclusion, in the absence of gizzard contraction, the mucosal lining of the proventriculus is hyperplastic with a high rate of proliferation that may help compensate the distension due to the accumulation of food items.

**Descriptors:** ostrich, proventriculus, proliferative response, idiopathic gastric stasis, case report, necropsy, clinical signs.

Olayemi, F.O., E.O. Ojo, and O.A. Fagbohun (2006). **Haematological and plasma biochemical parameters of the Nigerian laughing dove (*Streptopelia senegalensis*) and the Nigerian duck (*Anas platyrhynchos*).** *Veterinarski Arhiv* 76(2): 145-151. ISSN: 0372-5480.

**Descriptors:** Nigerian laughing dove, Nigerian duck, plasma biochemical, haematological parameters, blood profiles, studies, white blood counts, hemoglobin.

**Language of Text:** Croatian and English.

Osofsky, A., L.A. Tell, P.H. Kass, S.E. Wetzlich, J. Nugent Deal, and A.L. Craigmill (2005). **Investigation of Japanese quail (*Coturnix japonica*) as a pharmacokinetic model for cockatiels (*Nymphicus hollandicus*) and Poicephalus parrots via comparison of the pharmacokinetics of a single intravenous injection of oxytetracycline hydrochloride.** *Journal of Veterinary Pharmacology and Therapeutics* 28(6): 505-13. ISSN: 0140-7783.

**Abstract:** The purpose of this study was to determine whether Japanese quail

(*Coturnix japonica*) would serve as a pharmacokinetic animal model for two small companion parrots: cockatiels (*Nymphicus hollandicus*) and Poicephalus parrots. Oxytetracycline (OTC) was the pharmacologic agent chosen for this study as it is eliminated primarily by renal glomerular filtration and undergoes minimal metabolism. A single intravenous injection of 20 mg/kg oxytetracycline hydrochloride was administered to the three study groups and blood samples were obtained at 5, 10, 15, and 30 min post-OTC injection as well as 1, 2, 4, 8, 12 and 24 h post-OTC injection. Quantification of plasma OTC was accomplished using a standardized microbial inhibition assay. Naive-pooled data (NPD) analysis of the plasma concentration-time profile of OTC best fit a two-compartment open model for all three avian species. Noncompartmental analysis of the mean data yielded the following parameters for quail, cockatiels and Poicephalus parrots respectively:  $\lambda(z) = 3.14, 4.57, 3.71$  h; AUC = 38.9, 42.7, 49.6 microg x h/mL; and Cl = 514, 468, 403 mL/h/kg. Based on the similarity of these pharmacokinetic parameters, it appears that quail could be used as a model species to predict the appropriate OTC dosing regimen for small psittacine birds. A bootstrap procedure was also applied to these sparse data sets for both compartmental and noncompartmental analysis. The bootstrap procedure allowed for the calculation of variability of parameters; however, the estimates of the parameters were very similar to those calculated using the NPD and the data mean values.

**Descriptors:** quail, anti bacterial agents pharmacokinetics, *Coturnix* metabolism, oxytetracycline pharmacokinetics, administration, dosage, anti bacterial agents blood, anti bacterial agents urine, cockatoos metabolism, glomerular filtration rate, intravenous injections, kidney metabolism, animal models, oxytetracycline administration, dosage.

Padilla, L.R., K. Flammer, and R.E. Miller (2005). **Doxycycline-medicated drinking water for treatment of *Chlamydophila psittaci* in exotic doves.** *Journal of Avian Medicine and Surgery* 19(2): 88-91. ISSN: 1082-6742.

**Descriptors:** exotic doves, *Chlamydophila psittaci*, treatment, drinking water, antibiotic treatment, Doxycycline medicated.

Papahn, A.A., H. Naddaf, A. Rezakhani, and M. Mayahi (2006). **Electrocardiogram of homing pigeon.** *Journal of Applied Animal Research* 30(2): 129-132. ISSN: 0971-2119.

**Descriptors:** homing pigeon , electrocardiogram, normal baseline data, clinical use.

Partridge, S.J., J.C. Pepperell, C. Forrester Wood, N.B. Ibrahim, A. Raynal, and C.R. Swinburn (2004). **Pheasant rearer's lung.** *Occupational Medicine* 54(7): 500-3. ISSN: 0962-7480.

**Abstract:** A 47-year-old gamekeeper presented with an 8 month history of variable

breathlessness, cough and clinical features of severe interstitial lung disease. Open lung biopsy showed an extrinsic allergic alveolitis, which we believe related to his work rearing pheasants. Initially he was resistant, despite advice, to changing his occupation but subsequently, although ceasing exposure to pheasants and beginning treatment with corticosteroids, his disease progressed to the point where he developed respiratory failure and was referred for lung transplantation. Sadly, he died of progressive respiratory failure and cor pulmonale complicated by bronchopneumonia before this could be achieved.

**Descriptors:** pheasants, animal husbandry, bird fancier's lung, etiology, occupational diseases, poultry, bird fancier's lung diagnosis, bird fancier's lung pathology, fatal outcome, occupational diseases, diagnosis, pathology, allergic alveolitis.

Paul Murphy, J. and J.P. Fialkowski (2004). **Pharmacokinetic properties of a single intramuscular dose of buprenorphine in African grey parrots (*Psittacus erithacus erithacus*)**. *Journal of Avian Medicine and Surgery* 18(4): 224-228. ISSN: 1082-6742.

**Descriptors:** African grey parrots, buprenorphine, single I.M dose, pharmacokinetic properties, analgesic, dose, plasma concentration.

Paulman, A., C.A. Lichtensteiger, and L.J. Kohrt (2006). **Outbreak of herpesviral conjunctivitis and respiratory disease in Gouldian finches**. *Veterinary Pathology* 43(6): 963-970. ISSN: 0300-9858.

**Abstract:** An outbreak of tracheitis, sinusitis, and conjunctivitis, originating in recently imported birds, caused high morbidity and mortality in a flock of finches in Central Illinois. Although several species were present, Gouldian finches (*Erythrura [Chloebeia] gouldiae*) were most commonly and severely affected. Birds submitted for necropsy displayed microscopic lesions characteristic of herpesviral infection, including epithelial cytomegaly and karyomegaly with basophilic, intranuclear inclusion bodies in the nasopharynx, sinuses, trachea, parabronchi, conjunctiva, and occasionally the lacrimal gland or proximal proventricular glands. Viral particles consistent with herpesvirus were visualized within affected epithelial cells with electron microscopy. Based on a partial sequence of the viral DNA polymerase gene, this virus was found to be identical to a herpesvirus previously implicated in a similar outbreak in Canada and is most likely an alphaherpesvirus.

**Descriptors:** Fringillidae, birds, disease outbreaks, Herpesviridae, viral diseases of animals and humans, conjunctivitis, respiratory tract diseases, tracheitis, sinusitis, histopathology, epithelial cells, pathogen identification, DNA directed DNA polymerase, nucleotide sequences, *Erythrura (Chloebeia) gouldiae*, Alphaherpesvirus, Illinois.

Pees, M., J. Straub, and M.E. Krautwald Junghanns (2004). **Echocardiographic examinations of 60 African grey parrots and 30 other psittacine birds.** *Veterinary Record* 155(3): 73-6. ISSN: 0042-4900.

**Abstract:** The aim of this study was to establish reference values for the assessment of cardiac function in birds by measuring structures in the heart of healthy psittacine birds; 60 grey parrots, 10 Amazon parrots, 10 cockatoos and 10 Senegal parrots were anaesthetised with isoflurane and examined echocardiographically. The heart was visualised in two planes (vertical and horizontal views). Depending on the quality of the images, several dimensions of the heart could be measured and various parameters calculated. On the basis of these values, it was possible to establish reference values for each parrot genus. Some relative parameters showed no significant difference between the genera, independent of the bird's size.

**Descriptors:** echocardiography, heart anatomy, histology, Psittaciformes anatomy, histology, parrots anatomy, histology, reference values.

Pereira, R.A., J.L. Maria, L.B. Moraes, L.C.B. Fallanena, N.C. Rodrigues, M.d.C. Allgayer, A.T. Esmeraldino, V.M. Pinto, and L.C.B. Fallavena (2003). **Carcinoma espinoceular em papagaio verdadeiro (*Amazona aestiva*): relato de caso. [Spindle cell carcinoma in a parrot (*Amazona aestiva*): case report].** *Veterinaria Em Foco* 1(1): 29-33. ISSN: 1679-5237.

**Descriptors:** Amazon parrot, spindel cell carinoma, case report.

**Language of Text:** Portuguese, summary in English.

Perelman, B. (2004). **Control and prevention of hatchery related infectious diseases in ostriches.** *Proceedings of the 11th Ostrich World Congress, Island Great Brijun, Croatia, 15 17 October 2004* 63-65 ISSN: 1520-8052 (online).

**Descriptors:** ostriches, infectious diseases, hatchery related, control, prevention, incubator, bacteria, fungus, conference proceedings.

**Notes:** Meeting Information: Proceedings of the 11th Ostrich World Congress, Island Great Brijun, Croatia, 15-17 October 2004.

Phalen, D. (2004). **Steps to preventing avian polyomavirus in aviaries breeding non-budgerigar parrots.** *Exotic DVM* 5(6): 21-22. ISSN: 1521-1363.

**Descriptors:** non-budgerigar parrots, breeding, avian polyomavirus, preventing, steps, aviaries.

Polat, U., M. Cetin, O. Turkyilmaz, and A. Yalcin (2004). **Reference serum protein and lipoprotein fractions of ostriches (*Struthio camelus*) in Turkey.** *Onderstepoort Journal of Veterinary Research* 71(1): 77-9. ISSN: 0030-2465.

**Abstract:** The aim of this study was to determine for reference purposes the values of serum albumin, alpha 1-globulin, alpha 2-globulin, beta-globulin, gamma-glob-

ulin, and alpha-lipoprotein (high density lipoprotein), pre-beta-lipoprotein (very low density lipoprotein) and beta-lipoprotein (low density lipoprotein) fractions of normal ostriches (*Struthio camelus*) in Turkey. Five male and five female ostriches, 18 months old, were used. All the ostriches were fed on a diet that contained 15.14% crude protein and 2,950 Kcal/kg of metabolizable energy. The serum protein and lipoprotein fractions were measured using agarose gel electrophoresis. The fractions were found to be 60.96% albumin, 0.24% alpha 1-globulin, 15.91% alpha 2-globulin, 13.34% beta-globulin, 9.55% gamma-globulin, 53.77% HDL, 0.60% VLDL and 48.09% LDL.

**Descriptors:** ostriches, serum protein, lipoprotein, fractions, reference, values, globulin, diet, agarose gel electrophoresis, Turkey.

Promkuntod, N., C. Antarasena, P. Prommuang, and P. Prommuang (2006). **Isolation of avian influenza virus A subtype H5N1 from internal contents (albumen and allantoic fluid) of Japanese quail (*Coturnix coturnix japonica*) eggs and oviduct during a natural outbreak.** *Annals of the New York Academy of Sciences* 1081: 171-3. ISSN: 0077-8923.

**Abstract:** Avian influenza virus (AIV) was recovered from the internal contents of eggs, including mixture of albumen and allantoic fluid, and from the oviduct of naturally infected Japanese quail (*Coturnix coturnix japonica*) flocks in the southern part of Thailand. The virus titers of 10(4.6)-10(6.2) ELD(50)/mL were directly measured from the internal content of infected eggs. The virus was isolated by chorioallantoic sac inoculation of embryonating chicken eggs. Infected allantoic fluid was identified as hemagglutinating virus and then was indicated the presence of H5 hemagglutinin. The virus was confirmed to be H5N1 subtype influenza A virus by reverse transcriptase-polymerase chain reaction. Additionally, real-time reverse transcriptase-polymerase chain reaction assay could specifically detect influenza virus subtype H5. Furthermore, indirect fluorescent antibody (IFA) test by using specific anti-influenza A monoclonal antibody indicated that virus antigens were detected in the parenchyma of multiple tissues. Systemic localization of viral antigen detected was certainly considered to be viremic stage. In addition, influenza virus antigen was also detected by IFA in allantoic fluid sediments isolated from internal content of egg or oviduct. The conclusion of isolated AIV type A subtype H5N1 from these two infected materials was correlated to the viremic stage of infection because the virus antigens could be observed in almost all tissues. Conclusively, the need for adequate safeguards to prevent contamination and spread of the virus to the environment during movement of eggs--including hatching eggs, cracked eggs, and other relevant infected materials--or egg consumption from area of outbreak is emphasized and must not be ignored for the reasons of animal, public, and environmental health.

**Descriptors:** Japanese quail, *coturnix*, eggs virology, influenza a virus, H5N1

subtype, isolation, purification, influenza in birds, epidemiology, disease outbreaks, egg proteins, fluorescent antibody technique, influenza transmission, oviducts virology, public health, reverse transcriptase polymerase chain reaction.

Raukar, J. (2004). **Hematoloski pokazatelji u nojeva (*Struthio camelus*)**. [Hematological parameters of the ostrich (*Struthio camelus*)]. *Veterinarska Stanica* 35(1): 33-41. ISSN: 0350-7149.

**Descriptors:** ostrich, hematological parameters, clinically healthy, blood counts, sex and age related.

**Language of Text:** Croatian, summary in English.

Raukar, J. (2003). **Dijagnosticka vrijednost biokemijskih pokazatelja u krvi nojeva**. [Diagnostic value of biochemical indices in the blood in ostriches]. *Veterinarska Stanica* 34(6): 333-339. ISSN: 0350-7149.

**Descriptors:** ostriches, blood, biochemical indices, diagnostic value.

**Language of Text:** Croatian, summary in English.

Raukar, J. and M. Simpraga (2005). **Haematological parameters in the blood of one day old ostriches**. *Israel Journal of Veterinary Medicine* 60(4): 112-116. ISSN: 0334-9152.

**Descriptors:** ostriches, one day old, blood, hematological parameters, hemoglobin, erythrocyte count, leukocyte count, hematocrit, newly hatched.

Razmyar, J., O. Dezfoulian, B. Shojadoost, M. Masoudifard, and S.M. Peighambari (2005). **Sertoli cell tumor in a pigeon (*Columba livia*)**. *Journal of Avian Medicine and Surgery* 19(4): 286-288. ISSN: 1082-6742.

**Descriptors:** pigeon sertoli cell tumor, anorexia, emaciation, abdominal distention, soft tissue mass, histopathology.

Reddy, Y.R., S.T.V. Rao, K. Veerabrahmaiah, K.S. Kumar, and S. Shakila (2003). **Haematological parameters of emu**. *Indian Veterinary Journal* 80(12): 1308-1309. ISSN: 0019-6479.

**Descriptors:** emu, hematological parameters, blood count, white cells, red cells, hemoglobin.

Reed, K.L., M.G. Conzemius, R.A. Robinson, and T.D. Brown (2004). **Osteocyte-based image analysis for quantitation of histologically apparent femoral head osteonecrosis: application to an emu model**. *Computer Methods in Biomechanics and Biomedical Engineering* 7(1): 25-32. ISSN: 1025-5842.

**Abstract:** Femoral head osteonecrosis is often characterized histologically by the presence of empty lacunae in the affected bony regions. The shape, size and loca-

tion of a necrotic lesion influences prognosis, and can, in principle, be quantified by mapping the distribution of empty lacunae within a femoral head. An algorithm is here described that automatically identifies the locations of osteocyte-filled vs. empty lacunae. The algorithm is applied to necrotic lesions surgically induced in the emu, a large bipedal animal model in which osteonecrosis progresses to collapse, as occurs in humans. The animals' femoral heads were harvested at sacrifice, and hematoxylin and eosin-stained histological preparations of the coronal midsections were digitized and image-analyzed. The algorithm's performance in detecting empty lacunae was validated by comparing its results to corresponding assessments by six trained histologists. The percentage of osteocyte-filled lacunae identified by the algorithm vs. by the human readers was statistically indistinguishable.

**Descriptors:** emu, hip joint pathology, animal models, osteocytes pathology, osteonecrosis pathology, algorithms, Dromaiidae, femoral head, algorithm.

Rezakhani, A., H. Komali, M.R. Mokhber Dezfoul, M. Zarifi, M. Ghabi, N. Alidadi, and M.G. Nadalian (2007). **A preliminary study on normal electrocardiographic parameters of ostriches (*Struthio camelus*)**. *Journal of the South African Veterinary Association* 78(1): 46-8. ISSN: 0038-2809.

**Abstract:** Electrocardiograms were taken from 100 normal healthy male and female ostriches which were 1 to 15 months old using a base apex lead. The heart rate of those less than 3 months old ranged from 107 to 250 beats per minute with a mean of 171.47 +/- 9.03 and that of ostriches of more than 3 months old ranged from 43 to 167 with a mean of 90.52 +/- 2.64 beats/minute. The P-waves were positive in all cases except in 1 ostrich which it was isoelectric. The ORS complexes were mainly negative and either monophasic (QS) or biphasic (rS or RS). The T-wave showed more variation than other waves. The durations of P P-R, QRS, Q-T and T-waves of chicks and of those more than 3 months of age (4-15-month-old) were 0.04 +/- 0.00, 0.06 +/- 0.00; 0.14 +/- 0.04, 0.16 +/- 0.00; 0.04 +/- 0.00, 0.06 +/- 0.00; 0.18 +/- 0.00, 0.27 +/- 0.00 and 0.06 +/- 0.00, 0.09 +/- 0.01 s, respectively, and amplitudes of the main direction of P-, QRS and T- waves of 2 groups were 0.29 +/- 0.02, 0.26 +/- 0.01; 1.87 +/- 0.17, 2.21 +/- 0.08; and 0.34 +/- 0.06, 0.37 +/- 0.02 mV, respectively. Ten cases showed cardiac dysrhythmias of which 9 showed sinus arrhythmia and 1 showed premature atrial contractions (PAC). This study showed that the base apex lead can be a suitable monitoring lead for electrocardiographic examination of ostriches.

**Descriptors:** ostriches, electrocardiography, heart physiology, Struthioniformes, age factors, heart rate, reference values, sex factors.

Ritzman, T.K. and M.M. Garner (2005). **Differential diagnosis proventricular dilatation disease: pyloric adenocarcinoma in a red-lored Amazon parrot**. *Exotic DVM* 7(1): 13-17. ISSN: 1521-1363.

**Descriptors:** amazon parrot, proventricular dilatation disease, pyloric adenocarcinoma, differential diagnosis.

Sakai, K., G. Sakabe, O. Tani, M. Nakamura, and K. Takehara (2006). **Antibody responses in ostriches (*Struthio camelus*) vaccinated with commercial live and killed Newcastle disease vaccines.** *Journal of Veterinary Medical Science the Japanese Society of Veterinary Science* 68(6): 627-9. ISSN: 0916-7250.

**Abstract:** Three ostriches (*Struthio camelus*) were immunized with commercially available live and killed Newcastle disease (ND) vaccines for chickens and the antibody responses to the ND vaccines were evaluated by a virus-neutralization (VN) test. Primary vaccination with the live vaccine, B1, by eye drop was followed with two shots of alum-precipitated killed vaccine via subcutaneous injection in the neck. As a final booster, another live vaccine, Clone 30, was used by eye drop. A VN antibody titer, more than 1:10 was observed for 6 months. This is the first report on the use of a live vaccine by eye drop as a booster in ostriches as well as evaluating responses to ND vaccines using the VN test in this avian species.

**Descriptors:** ostriches, antibody responses, Newcastle disease vaccines, live, killed, immunology, viral vaccines immunology, newcastle disease prevention, control, ophthalmic solutions, viral vaccines, administration, dosage.

Santos, M.M.A.B., J.R. Peiro, and M.V. Meireles (2005). **Cryptosporidium infection in ostriches (*Struthio camelus*) in Brazil: clinical, morphological and molecular studies.** *Revista Brasileira De Ciencia Avicola* 7(2): 113-117. ISSN: 1516-635X.

**Descriptors:** ostriches, cryptosporidium, infection, clinical, morphological, molecular, studies, Brazil.

Schulze, C., E. Grossmann, and O. Krone (2006). **Fallbericht: *Libyostrongylus douglassii*-assoziierte Magenentzündungen bei Straussen (*Struthio camelus*) in Deutschland. [Case report: *Libyostrongylus douglassii*-associated proventriculitis in ostriches in Germany].** *Deutsche Tierärztliche Wochenschrift* 113(6): 240-242. ISSN: 0341-6593.

**Descriptors:** ostriches, *Libyostrongylus douglassii*, proventriculitis, adult, female, wireworm, infection, case report, nematodes.

**Language of Text:** German, summary in English.

Sen, S. and M.K. Albay (2003). **Fatal impaction of the stomach in two farmed ostriches.** *Irish Veterinary Journal* 56(6): 317-318. ISSN: 0368-0762.

**Descriptors:** ostriches, stomach, impaction, fatal, farmed, clinical signs, necropsy, foreign objects, young.

- Seok, S.H., J.H. Park, S.A. Cho, and J.H. Park (2005). **Idiopathic intranuclear inclusion bodies in the renal tubular epithelia of Japanese quail (*Coturnix coturnix japonica*)**. *Journal of Veterinary Science Suwon Si, Korea* 6(1): 75-6. ISSN: 1229-845X.  
**Abstract:** We report idiopathic intranuclear inclusion bodies in the renal tubular epithelia of two cases of among the 960 Japanese quail (*Coturnix coturnix japonica*) in the course of the acute oral toxicity and dietary toxicity test. Basophilic inclusion bodies were seen only in the nuclei of renal tubular epithelia. We could not classify our case into any adenovirus infection by clinical signs and lesions. The inclusion bodies were only identified as adenovirus-like particles based upon the electronmicroscopical features.  
**Descriptors:** Japanese quail, *coturnix*, epithelial cells, ultrastructure, intranuclear inclusion bodies, kidney tubules ultrastructure.
- Shaw, S.D. and T. Billing (2006). **Karaka (*Corynocarpus laevigatus*) toxicosis in North Island brown kiwi (*Apteryx mantelli*)**. *Veterinary Clinics of North America. Exotic Animal Practice* 9(3): 545-9. ISSN: 1094-9194.  
**Abstract:** From 2001 to 2004, Westshore Wildlife Reserve observed five incidences of a vestibular syndrome in North Island brown kiwi (*Apteryx mantelli*). These were suspected to be the result of ingesting the karaka berry (*Corynocarpus laevigatus*), which contains a neurotoxin (karakin).  
**Descriptors:** brown kiwi, toxicosis, karaka, diagnosis, bird diseases, glucose analogs, derivatives, Palaeognathae, toxic plants, pathology, differential diagnosis, glucose toxicity.
- Simpraga, M., J. Raukar, and I.L. Novak (2004). **Calcium, phosphorus and magnesium levels and alkaline phosphatase activity in the blood of one-day-old ostriches**. *Veterinarski Arhiv* 74(3): 177-188. ISSN: 0372-5480.  
**Descriptors:** ostriches, one day old, calcium, phosphorus, magnesium, levels, alkaline phosphatase activity, reference values.  
**Language of Text:** Croatian and English.
- Singh, I.M., S. Singh, F. Mills Robertson, M.A. McMurphy, R.D. Applegate, and S.S. Crupper (2004). **Antibiotic susceptibility of *Edwardsiella hoshinae* isolated from northern bobwhite quail (*Colinus virginianus*)**. *Veterinary Record Journal of the British Veterinary Association* 155(1): 29. ISSN: 0042-4900.  
**Descriptors:** bobwhite quail, *Colinus virginianus*, *Edwardsiella hoshinae*, antibiotic resistance.
- Sladky, K.K., L. Krugner Higby, E. Meek Walker, T.D. Heath, and J. Paul Murphy (2006). **Serum concentrations and analgesic effects of liposome-encapsulated and standard butorphanol tartrate in parrots**. *American Journal of Veterinary Research* 67(5):

775-81. ISSN: 0002-9645.

**Abstract:** OBJECTIVE: To compare serum concentrations of liposome-encapsulated butorphanol tartrate (LEBT) and standard butorphanol tartrate (STDBT) following SC and IM administration, respectively, and to evaluate analgesic effects of LEBT and STDBT after parenteral administration to Hispaniolan parrots. ANIMALS: 11 adult Hispaniolan parrots. PROCEDURE: The ability of LEBT to prolong the duration of analgesia in an avian species was tested. Blood samples were collected at serial time points after SC administration of LEBT (10 mg/kg or 15 mg/kg) or IM administration of STDBT (5 mg/kg). Serum concentrations of butorphanol tartrate were determined by use of a commercial immunoassay that measured parent drug and metabolites. Analgesic efficacy was evaluated in parrots exposed to electrical and thermal stimuli. Foot withdrawal thresholds were recorded at baseline and at serial time points after LEBT (15 mg/kg), liposome vehicle, STDBT (2 mg/kg), or physiologic saline (0.9% NaCl) solution administration. RESULTS: LEBT had a prolonged in vivo release for up to 5 days. Negligible serum butorphanol and butorphanol metabolite concentrations were obtained at 24 hours after IM administration of STDBT. Analgesic efficacy of LEBT as measured by foot withdrawal threshold to noxious thermal and electrical stimuli persisted for 3 to 5 days following SC administration of LEBT. CONCLUSIONS AND CLINICAL RELEVANCE: SC administration of LEBT provided analgesia and detectable serum butorphanol concentrations in Hispaniolan parrots for up to 5 days. The use of LEBT may allow for substantial improvement in long-term pain relief without subjecting birds to the stress of handling and multiple daily injections.

**Descriptors:** parrots, analgesia, butorphanol, therapeutic use, liposomes, administration, dosage, pain, drug therapy, analgesics, opioid, serum concentrations, analgesic effects, pharmacokinetics, therapeutic use, butorphanol administration, dosage, dose response relationship.

Smith, K.M., S. Murray, and C. Sanchez (2005). **Successful treatment of suspected exertional myopathy in a rhea (*Rhea americana*)**. *Journal of Zoo and Wildlife Medicine* 36(2): 316-20 . ISSN: 1042-7260.

**Abstract:** A 7-yr-old, adult, female greater rhea (*Rhea americana*) from the National Zoological Park presented with a 24-hr history of severe left leg lameness that progressed to an inability to stand. Blood work revealed creatine phosphokinase (CPK) above 50,000 U/L and elevated lactate dehydrogenase. The bird's condition deteriorated over the next week. The bird's CPK increased to over 208,400 U/L. Aggressive intravenous fluids and physical therapy along with oral anxiolytic and muscle-relaxant drugs were instituted. After 2 wk of aggressive therapy, initial signs of improvement were noted. By day 28, the bird was able to walk unassisted with no noticeable lameness. This is one of the few reported cases of successful treatment

of suspected ratite exertional myopathy. It is believed that success in this case can be attributed to persistent, aggressive physical therapy, muscle relaxants, and anxiolytics aimed to counteract the hyperexcitable nature of these birds.

**Descriptors:** rhea, exertional myopathy, treatment, left leg lameness, blood phosphokinase, lactate dehydrogenase, iv fluids, physical therapy, muscle relaxant drugs, oral anxiolytic drugs.

Smith, N.C., R.C. Payne, K.J. Jaspers, and A.M. Wilson (2007). **Muscle moment arms of pelvic limb muscles of the ostrich (*Struthio camelus*)**. *Journal of Anatomy* 211(3): 313-24. ISSN: 0021-8782.

**Abstract:** Muscle moment arms were measured for major muscles of the pelvic limb of the ostrich (*Struthio camelus*) in order to assess specific functional behaviour and to apply this to locomotor performance. Pelvic limbs of six juvenile ostriches were used for this study. The tendon travel technique was used to measure moment arms of 21 muscles at the hip, knee, ankle and metatarsophalangeal joints throughout the ranges of motion observed during level running. Six of the 21 muscles measured were found to have moment arms that did not change with joint angle, whilst the remainder all demonstrated angle-dependent changes for at least one of the joints crossed. Moment arm lengths tended to be longest for the large proximal muscles, whilst the largest relative changes were found for the moment arms of the distal muscles. For muscles where moment arm varied with joint angle: all hip muscles were found to have increasing moment arms with extension of the joint, knee flexors were found to have moment arms that increased with extension, knee extensor moment arms were found to increase with flexion and ankle extensor moment arms increased with extension. The greatest relative changes were observed in the flexors of the metatarsophalangeal joint, for which a three-fold increase in moment arm was observed from flexion to full extension. Changes in muscle moment arm through the range of motion studied appear to optimize muscle function during stance phase, increasing the effective mechanical advantage of these muscles.

**Descriptors:** ostrich, muscle moment arms, pelvic limb muscles, functional behavior, locomotor performance, hip, knee, ankle, flexion, extension.

Smith, N.C., A.M. Wilson, K.J. Jaspers, and R.C. Payne (2006). **Muscle architecture and functional anatomy of the pelvic limb of the ostrich (*Struthio camelus*)**. *Journal of Anatomy* 209(6): 765-79. ISSN: 0021-8782.

**Abstract:** The functional anatomy of the pelvic limb of the ostrich (*Struthio camelus*) was investigated in order to assess musculoskeletal specialization related to locomotor performance. The pelvic limbs of ten ostriches were dissected and detailed measurements of all muscle tendon units of the pelvic limb were made, including muscle mass, muscle length, fascicle length, pennation angle, tendon mass and tendon length. From these measurements other muscle properties such as muscle volume,

physiological cross-sectional area (PCSA), tendon cross-sectional area, maximum isometric muscle force and tendon stress were derived, using standard relationships and published muscle data. Larger muscles tended to be located more proximally and had longer fascicle lengths and lower pennation angles. This led to an expected proximal to distal reduction in total muscle mass. An exception to this trend was the gastrocnemius muscle, which was found to have the largest volume and PCSA and also had the highest capacity for both force and power production. Generally high-power muscles were located more proximally in the limb, while some small distal muscles (tibialis cranialis and flexor perforatus digiti III), with short fibres, were found to have very high force generation capacities. The greatest proportion of pelvic muscle volume was for the hip extensors, while the highest capacity for force generation was observed in the extensors of the ankle, many of which were also in series with long tendons and thus were functionally suited to elastic energy storage.

**Descriptors:** ostrich, functional anatomy, pelvic limb, muscle architecture, locomotion physiology, muscle, skeletal anatomy, histology, biomechanics, hindlimb, muscle contraction, tendons anatomy, histology.

Soderstrom, K., W. Qin, and M.H. Leggett (2007). **A minimally invasive procedure for sexing young zebra finches.** *Journal of Neuroscience Methods* 164(1): 116-9. ISSN: 0165-0270.

**Abstract:** Zebra finches have been widely used to study neurobiology underlying vocal development. Because only male zebra finches learn song, efficient developmental use of these animals requires early determination of sex at ages that precede maturation of secondary sex characteristics. We have developed a sex determination method that combines a forensics method of genomic DNA isolation (from very small blood samples) with PCR amplification from Z and W sex chromosomes (males are ZZ, females ZW). This combination results in a minimally invasive yet highly reliable and convenient genotyping method.

**Descriptors:** zebra finches, sexing, minimally invasive, genomic DNA, blood samples, forensic method, PCR amplification, Z and W sex chromosomes.

Souza, M.J., G.H. Wilson, and K.P. Carmichael (2006). **Multifocal sialoceles and sialoliths in a yellow-naped Amazon parrot (*Amazona ochrocephala auropalliata*) with chronic pytalism .** *Journal of Avian Medicine and Surgery* 20(2): 101-104. ISSN: 1082-6742.

**Descriptors:** yellow-naped Amazon parrot, chronic pytalism, multifocal sialoceles, sialoliths, diagnosis.

Stanford, M. (2004). **Interferon treatment of circovirus infection in grey parrots (*Psittacus e erithacus*).** *Veterinary Record Journal of the British Veterinary Association* 154(14): 435-436. ISSN: 0042-4900.

**Descriptors:** grey parrots, circovirus infection, interferon treatment, *Psittacus erithacus*.

Stanford, M. (2004). **The effect of UV-B lighting supplementation in African grey parrots.** *Exotic DVM* 6(3): 29-32. ISSN: 1521-1363.

**Descriptors:** African grey parrots, UV-B lighting supplementation, effect, deficiency diseases, prevention, vitamin deficiencies, conference.

**Notes:** Meeting Information: Sixth Annual International Conference on Exotics, Naples, Florida, USA, 6-8 May 2004.

Stanford, M. (2002). **Clinical assessment of sevoflurane use in African grey parrots.** *Exotic DVM* 4(6): 9. ISSN: 1521-1363.

**Descriptors:** African grey parrots, anesthesia, anesthetics, dosage effects, sevoflurane, clinical assessment.

Stanford, M. (2003). **Recombinant omega interferon in combination with F10 nebulization for the treatment and prevention of circovirus infection in African grey parrots.** *Exotic DVM* 5(3): 43-46. ISSN: 1521-1363.

**Descriptors:** African grey parrots, circovirus infection, prevention, treatment, recombinant omega interferon, combination, F10 nebulization, conference.

**Notes:** Meeting Information: International Conference on Exotics (ICE2003), Palm Beach, Florida, USA, 2003.

Styles, D.K., E.K. Tomaszewski, L.A. Jaeger, and D.N. Phalen (2004). **Psittacid herpesviruses associated with mucosal papillomas in neotropical parrots.** *Virology* 325(1): 24-35. ISSN: 0042-6822.

**Abstract:** Mucosal papillomas are relatively common lesions in several species of captive neotropical parrots. They cause considerable morbidity and in some cases, result in mortality. Previous efforts to identify papillomavirus DNA and proteins in these lesions have been largely unsuccessful. In contrast, increasing evidence suggests that mucosal papillomas may contain psittacid herpesviruses (PsHVs). In this study, 41 papillomas from 30 neotropical parrots were examined by PCR with PsHV-specific primers. All 41 papillomas were found to contain PsHV DNA. This 100% prevalence of PsHV infection in the papilloma population was found to be significantly higher than PsHV infection prevalence observed in other surveys of captive parrots. PsHV genotypes 1, 2, and 3, but not 4 were found in these lesions. *Psittacus erithacus* papillomavirus DNA and finch papillomavirus DNA were not found in the papillomas. A papilloma from a hyacinth macaw (*Anodorhynchus hyacinthinus*) was found to contain cells that had immunoreactivity to antiserum made to the common antigenic region of human papillomavirus (HPV) L1 major capsid protein. However, four other mucosal papillomas were negative for this immunoreactivity, and negative

control tissues from a parrot embryo showed a similar staining pattern to that seen in the cloaca papilloma of the hyacinth macaw, strongly suggesting that the staining seen in hyacinth macaw papilloma was nonspecific. Based on these findings, it was concluded that specific genotypes of PsHV play a direct role in the development of mucosal papillomas of neotropical parrots and there is no evidence to suggest the concurrent presence of a papillomavirus in these lesions.

**Descriptors:** parrots, psittacid herpesvirus, bird diseases, virology, mucosal papillomas, papilloma virology, DNA primers, genotype, herpesviridae classification, immunohistochemistry, phylogeny, polymerase chain reaction.

Sutherland Smith, M. and P. Morris (2004). **Combination therapy using trimethoprim-sulfamethoxazole, pyrimethamine, and diclazuril to treat sarcocystosis in a pied imperial pigeon (*Ducula bicolor bicolor*)**. *Journal of Avian Medicine and Surgery* 18(3): 151-154. ISSN: 1082-6742.

**Descriptors:** pied imperial pigeon, sarcocystosis, treat, combination therapy, trimethoprim-sulfamethoxazole, pyrimethamine, diclazuril, blood count.

Szymborski, J. and M. Szymborski (2004). **Zespoł sabego strusiecia w Australii. [Ostrich fading syndrome in Australia]**. *Zycie Weterynaryjne* 79(6): 321-322. ISSN: 0137-6810.

**Descriptors:** ostrich, fading syndrome, wasting, young, death, undetermined cause, stress, transport, weather conditions, hygiene, Australia.

**Language of Text:** Polish, summary in English.

Todd, D., J.P. Duchatel, J.C. Bustin, F.T. Scullion, M.G. Scullion, A.N.J. Scott, A. Curry, N.W. Ball, and J.A. Smyth (2006). **Detection of pigeon circovirus in cloacal swabs: implications for diagnosis, epidemiology and control**. *Veterinary Record: Journal of the British Veterinary Association*. 159((10)): 314-317. ISSN: 0042-4900.

**Descriptors:** pigeon circovirus, disease detection, polymerase chain reaction, diagnosis, epidemiology, control.

Tomaszewski, E.K., W. Wigle, and D.N. Phalen (2006). **Tissue distribution of psittacid herpesviruses in latently infected parrots, repeated sampling of latently infected parrots and prevalence of latency in parrots submitted for necropsy**. *Journal of Veterinary Diagnostic Investigation* 18(6): 536-544. ISSN: 1040-6387.

**Descriptors:** parrots, pets, Herpesviridae, bird diseases, latent period, disease prevalence, viral diseases, digestive system diseases, disease transmission, disease reservoirs, digestive tract mucosa, mouth, cloaca, genotype, serotypes, new host records, psittacid herpesviruses.

Tully, T.N.J., A. Osofsky, P.L.H. Jowett, and G. Hosgood (2003). **Acetylcholinesterase concentrations in heparinized blood of Hispaniolan Amazon parrots (*Amazona ventralis*)**. *Journal of Zoo and Wildlife Medicine* 34(4): 411-413. ISSN: 1042-7260. **Descriptors:** Amazon parrots, heparinized blood, acetylcholinesterase concentrations, levels, reference range, pesticides.

Uchiyama, R., T. Moritomo, O. Kai, K. Uwatoko, Y. Inoue, and T. Nakanishi (2005). **Counting absolute number of lymphocytes in quail whole blood by flow cytometry**. *Journal of Veterinary Medical Science the Japanese Society of Veterinary Science* 67(4): 441-4. ISSN: 0916-7250.

**Abstract:** In a previous study, we reported a new method for counting quail blood cells. After quail blood cells were stained with fluorescent lipophilic dye (DiOC6(3)), absolute counts of erythrocytes, granulocytes, and monocytes were obtained by means of flow cytometry (FC). The FC method has the potential for application to avian blood cells count; however, the method was unable to distinguish between lymphocytes and thrombocytes. In the present study, we improved the FC method to obtain separate counts of lymphocytes using DiOC5(3). After quail blood cells were stained with DiOC5(3), the cells were measured with FC. Each blood cell type was distinguished by means of their typical FL-1 (green fluorescence) and SSC (side scatter). Absolute numbers of erythrocytes, granulocytes, monocytes and lymphocytes in whole blood were obtained. The improved FC analysis worked equally well with chicken (*Gallus gallus*) and goose (*Anser cygnoides*) blood.

**Descriptors:** flow cytometry methods, lymphocytes, quail blood, carbocyanines, fluorescent dyes, lymphocyte count methods.

Ushakumary, S. and Geetha Ramesh (2003). **Gross anatomy of pectoral girdle of ostrich (*Struthio camelus*)**. *Cheiron* 32(3/4): 71-72. ISSN: 0379-543X.

**Descriptors:** ostrich, *Struthio camelus*, pectoral girdle, gross anatomy.

Verstappen, F.A.L.M. and G.M. Dorrestein (2005). **Aspergillosis in Amazon parrots after corticosteroid therapy for smoke-inhalation injury**. *Journal of Avian Medicine and Surgery* 19(2): 138-141. ISSN: 1082-6742.

**Descriptors:** Amazon parrots, aspergillosis, post corticosteroid therapy, smoke inhalation injury, *Amazona aestiva aestiva*.

Voslarova, E., Bedanova I, V. Vecerek, Pistekova V, P. Chloupek, and P. Suchy (2006). **Changes in haematological profile of common pheasant (*Phasianus colchicus*) induced by transit to pheasantry**. *DTW (Deutsche Tierärztliche Wochenschrift)* 113(10): 375-378. ISSN: 0341-6593.

**Descriptors:** common pheasant, hematological profile, changes, transit to pheasantry, induced.

Wagner, W.M. (2005). **Small intestinal foreign body in an adult Eclectus parrot (*Eclectus roratus*)**. *Journal of the South African Veterinary Association* 76(1): 46-8. ISSN: 0038-2809.

**Abstract:** A 14-month-old female Eclectus parrot (*Eclectus roratus*) was presented with a 4-week history of bloody diarrhea and depression. No additional information could be gained from physical examination. Only selected diagnostic tests (faecal examination, haematocrit, aspartate aminotransferase, and uric acid) could be performed due to financial constraints, but all were within reference range. Unspecific antibiotic treatment was started and the bird responded well initially, but had to be readmitted 2.5 weeks after initial presentation. Four weeks after initial presentation the owner finally consented to taking whole body radiographs and a diagnosis of an intestinal foreign body could be made. The foreign body was surgically removed 2 days later. The bird recovered uneventfully after surgery and was still in good health 1 year after surgery. This article emphasises the importance of diagnostic imaging in the avian patient. A brief review of avian gastrointestinal foreign bodies is given (concentrating on the psittacine patient) and the importance of distinguishing metallic from non-metallic gastrointestinal foreign bodies are discussed.

**Descriptors:** Eclectus parrot, diagnosis, foreign bodies, small intestine, radiography, surgery, bloody diarrhea, depression, treatment outcome.

Wang, Z.y. and S.j. Hu (2004). **Diagnosis of salmonellosis in parrot**. *Xinan Nongye Daxue Xuebao* 26(2): 230-232. ISSN: 1000-2642.

**Descriptors:** parrot, salmonellosis diagnosis, bacterial diseases.

**Language of Text:** Chinese, summaries in Chinese and English.

Wnukiewicz, A., W. Dobrowolski, and A. Danczak (2005). **Limb diseases in emu (*Dromaius novaehollandiae*) and ostrich (*Struthio camelus*) - prevention and treatment**. *Acta Scientiarum Polonorum Zootechnika* 4(1): 153-162. ISSN: 1644-0714.

**Descriptors:** emu, ostrich, limb diseases, prevention, treatment, lameness.

**Language of Text:** Polish.

Xu FengYu, Yu ShouPing, Shan XiaoFeng, Li TianSong, and Hu GuiXue (2006). **Diagnosis and cure of mixed infection of paramyxovirus type I and *E. coli* in pigeon**. *Journal of Economic Animal* 10(1): 22-24. ISSN: 1007-7448.

**Descriptors:** pigeon, paramyxovirus, *E. coli*, mixed infection, diagnosis, cure, clinical symptoms, drug sensitivity.

**Language of Text:** Chinese, summary in English.

- Yaman, M. and R. Durgut (2005). **Devekuslarinin paraziter hastaliklari ve tedavileri.** [Parasitic infestations in ostriches and therapy]. *Turkiye Parazitoloji Dergisi* 29(2): 103-109. ISSN: 1300-6320.  
**Descriptors:** ostriches, parasitic infections, therapy, *Struthio camelus*, treatment for parasites.  
**Language of Text:** Turkish, summaries in English and Turkish.
- Yang HuiPing, Xu DaXin, and Chen PeiLong (2004). **Diagnosis and prevention of epidemic pigeon paramyxovirus type I disease.** *Acta Agriculturae Shanghai* 20(3): 120-122. ISSN: 1000-3924.  
**Descriptors:** pigeon, paramyxovirus type I disease, prevention, diagnosis, control, oil emulsion inactivated vaccine, antibiotics.  
**Language of Text:** Chinese, summary in English.
- Yilmaz, F., N. Timurkaan, and F. Coven (2004). **Pathological findings in quails infected with Avian Influenza A virus H7 N1 subtype.** *International Journal of Poultry Science* 3(12): 764-767. ISSN: 1682-8356.  
**Descriptors:** Japanese quails, avian influenza virus, infected, H7N1, pathological findings, clinical signs, symptoms.



# Web Resources

*All resources are accessible through the internet and are current as of June 2008. Readers are cautioned as to the dynamic nature of the internet and the fact that addresses and content are subject to change.*

## **Association of Avian Veterinarians.**

**Online:** <http://www.aav.org/>

**Description:** Includes information on finding an avian vet, bird health topics, teachers' resources, public health issues, AAV Position Statements, etc.

## **Bird Statutes.** *Michigan State University College of Law. Animal Legal & Historical Center.*

**Online:** <http://www.animallaw.info/statutes/speciesstatutes/stspbirdc.htm>; <http://www.animallaw.info/statutes/speciesstatutes/stspbirdw.htm>

**Description:** Provides US federal and state statutes for wild and captive birds.

## **Coraciiformes Taxon Advisory Group.** *Association of Zoos and Aquariums.*

**Online:** <http://www.coraciiformestag.com/>

**Description:** Information on birds in the Family Coraciiformes including hornbills, motmots, kingfishers, rollers, woodhoopoes, hoopoes, and bee-eaters. Also includes comprehensive bibliographies, veterinary information, and useful links.

## **Cornell Lab of Ornithology.** *Cornell University.*

**Online:** <http://www.birds.cornell.edu/>

**Description:** Links and fact sheets about birds around the world. Includes a new multimedia bird guide which provides information about feeding, attracting, and watching birds.

## **The Domestic Chicken (PDF | 26KB).** *Australian and New Zealand Council for the Care of Animals in Research and Teaching (ANZCCART).*

**Online:** [http://www.adelaide.edu.au/ANZCCART/publications/dom\\_chicken.pdf](http://www.adelaide.edu.au/ANZCCART/publications/dom_chicken.pdf)

**Description:** Information on chickens as experimental animals.

## **Guidelines to the Use of Wild Birds in Research.** *The Ornithological Council.*

**Online:** <http://www.nmnh.si.edu/BIRDNET/GuideToUse/>

**Description:** These guidelines include current information about techniques relevant to birds and are formulated with consideration to animal welfare and research needs.

**Housing, Husbandry, and Welfare of Selected Birds (Quail, Pheasant, Finches, Ostrich, Dove, Parrot).** *USDA. NAL. Animal Welfare Information Center (AWIC).*

**Online:** <http://www.nal.usda.gov/awic/pubs/oldbib/qb9426.htm>; <http://www.nal.usda.gov/awic/pubs/Birds/birds.htm>

**Description:** Previous AWIC bibliographies on the care and welfare of birds (1994 and 2004).

**Importing Information for Pet Birds.** *USDA. APHIS. Veterinary Services.*

**Online:** [http://www.aphis.usda.gov/import\\_export/animals/live\\_animals.shtml](http://www.aphis.usda.gov/import_export/animals/live_animals.shtml)

**Description:** Provides links to information on procedures for importing pet birds. Includes Bird Leg Band Information, Non-US Origin Pet Birds Entering the United States, Returning US-origin Pet Birds, and Pet Birds from Canada.

**Ornithological Worldwide Literature (OWL).**

**Online:** <http://egizosrv.zoo.ox.ac.uk/OWL/>

**Description:** A searchable compilation of citations and abstracts from the worldwide scientific literature that pertain to the ornithology.

**Palm Cockatoo Husbandry Manual.** *Association of Zoos and Aquariums.*

**Online:** <http://www.funnyfarmexotics.com/PALM/>

**Description:** This manual contains information on general characteristics, management, housing and enclosure requirements, behavior, reproduction, nutrition, health and chick rearing for palm cockatoos (*Probosciger aterrimus*).

**Pet Columns - Bird Articles.** *University of Illinois. College of Veterinary Medicine.*

**Online:** <http://www.cvm.uiuc.edu/petcolumns/showsect.cfm?section=Birds>

**Description:** Provides general information for bird owners. Specific questions about your bird's health should be directed toward your local veterinarian.

**Policy Statement for the Humane Care and Use of Birds.** *Association of Avian Veterinarians.*

**Online:** <http://www.aav.org/careanduse.htm>

**Description:** This policy statement addresses legislation, sampling, laboratory bird management and health, and occupational health for employees working with captive birds.

**Protect Your Pet from Bird Flu (PDF | 345 KB).** *USDA. Animal and Plant Health Inspection Service.*

**Online:** [http://www.aphis.usda.gov/publications/animal\\_health/content/printable\\_version/ProtectYourPetBird2006.pdf](http://www.aphis.usda.gov/publications/animal_health/content/printable_version/ProtectYourPetBird2006.pdf)

**Description:** This brochure describes steps you can take to help prevent the spread of Bird Flu and exotic Newcastle Disease (END).

**Raising Ducks.** *Melvin L. Hamre.*

**Online:** <http://www.extension.umn.edu/distribution/livestocksystems/DI1189.html>

**Description:** Information on incubating, brooding and feeding ducks as well as breeder flock management. Useful for both farmers and pet owners.

**The Ron Sauey Memorial Library for Bird Conservation.** *International Crane Foundation.*

**Online:** [http://www.savingcranes.org/conservation/our\\_projects/prog\\_cat.cfm?id=4](http://www.savingcranes.org/conservation/our_projects/prog_cat.cfm?id=4)

**Description:** This research library supports program of the ICF by collecting and disseminating materials on bird, particularly crane, conservation.

**SORA: Searchable Ornithological Research Archive.** *University of New Mexico.*

**Online:** <http://elibrary.unm.edu/sora/index.php>

**Description:** This is an open access electronic journal archive that provides historical articles in digital format on bird research from international journals over the past 120 years.

**Toucan SSP.** *Association of Zoos and Aquariums. Nashville Zoo.*

**Online:** [http://www.nashvillezoo.org/piciformes/toucan\\_SSP.htm](http://www.nashvillezoo.org/piciformes/toucan_SSP.htm)

**Description:** This site contains a husbandry manual, list of useful links, bibliographies, studbooks, collection plans, and information on the natural history of toucans.

**Traveling Abroad with Your Pet Bird (PDF | 57.2 KB).** *US Fish and Wildlife Service.*

**Online:** <http://www.fws.gov/international/pdf/pe.pdf>

**Description:** Discusses regulations implementing the Wild Bird Conservation Act that provide for permits to allow foreign travel with your pet bird (domestic travel and sales are not affected).

**Understanding Pet Bird Nutrition.** *Gary D. Butcher and Richard D. Miles.*

**Online:** [http://edis.ifas.ufl.edu/BODY\\_VM067](http://edis.ifas.ufl.edu/BODY_VM067)

**Description:** This document may be used as a starting point for beginning pet bird owners while they make decisions about feeding their birds.

