ZOONOSES

ANONYMOUS 2007. World Poultry Science Association, 18th European Symposium on the quality of poultry meat and 12th European Symposium on the quality of eggs and egg products of WPSA, Prague, Czech Republic, 2-5 September, 2007. : unpaginated.
This proceedings contains topics on trends in the European poultry and egg market and the impact of European Union enlargement; factors driving consumer response to information on the avian influenza; approaches on food safety along the poultry chain; application of genomic approaches in egg quality research; bacteriological contamination of eggs and eggshell quality in furnished cages and non-cage systems for laying hens; estimation of the vertical and horizontal bacterial infection of hen's table eggs; vaccination of poultry against Salmonella; contaminants in eggs; egg and egg shell quality during experimental infectious bronchitis virus infection in laying hens; dynamical stiffness (Kdyn) in an egg quality monitoring scheme; present and future of IgY-Technology; effects of age on lipid deposition in breast muscle of mule ducks; stunning systems of poultry species; effect of natural antioxidant into the marinated broiler meat; use of fat co- and by-products in poultry nutrition; effect of EU zoonosis and other legislation on European poultry meat production; Polybrominated diphenylether (PBDE) and dioxins in meat and meat products; Campylobacter contamination during broiler processing; effects of lipid levels on sensory properties of duck meat; harmonization of methodology of assessment of meat quality; oxidative stability of chicken meat with natural and synthetic feed antioxidants; breeding for poultry meat quality traits; marketing strategies and consumption of ostrich meat in Birmingham, UK; effects of crating on blood stress indicators, nutrient composition and meat quality traits of broilers reared at two rearing temperatures; and on-farm poultry welfare programmes.

ABOLNIK, C., LONDT, B.Z., MANVELL, R.J., SHELL, W., BANKS, J., GERDES, G.H., AKOL, G. & BROWN, I.H. 2009. Characterisation of a highly pathogenic influenza A virus of subtype H5N2 isolated from ostriches in South Africa in 2004. *Influenza and other Respiratory Viruses,* 3: 63-68.
Objectives: The HPAI H5N2 strain that caused an outbreak in ostriches of the Eastern Cape Province, South Africa in 2004 was characterized. Design: Haemagglutination inhibition (HI) and agar gel immunodiffusion (AGID) were performed on sera from ostrich farms in the outbreak region, and intravenous pathogenicity (IVPI) tests, reverse-transcriptase-polymerase-chain reaction (RT-PCR), nucleic acid sequencing and phylogenetic comparisons were performed on the HPAI H5N2 virus isolated during the outbreak. Results: The deduced amino acid sequence at the HA0 cleavage site determined by RT-PCR and nucleotide sequencing was PQREKRRKKRGLF and thus the virus fell within the definition of a highly pathogenic virus, but in an IVPI test in chickens on the virus isolated from the index case and a value of 0.63 was recorded, which is below the criterion for highly pathogenic viruses in this in vivo test. After a further passage in embryonated eggs a second IVPI was carried out and an elevated value of 1.19 was obtained. Cloacal swabs were taken from the initial IVPI birds, inoculated into embryonated chickens eggs and a third IVPI was then performed on the resulting haemagglutinating, infective allantoic fluid. An index of 2.73 was recorded. Conclusions: HI tests appeared to be the more sensitive test compared to AGID when testing for antibodies to avian influenza in sera. An ostrich-derived virus with a virulent HA0 cleavage site was not initially virulent in chickens but after passage in the latter the virulence increased. Phylogenetic analyses demonstrated the link between AI viruses carried by wild ducks and those infecting ostriches.

BELLO, M., LUKSHI, B.M. & SANUSI, M. 2008. Outbreaks of highly pathogenic avian influenza (H5N1) in Bauchi State, Nigeria. *International Journal of Poultry Science,* 7: 450-456.
Natural outbreaks of highly pathogenic avian influenza disease were recorded in 19 farms in Bauchi State, Nigeria, between February and May, 2006. The disease was diagnosed by the National Veterinary Research Institute, Vom, Nigeria and the Food and Agriculture Organisation Reference Laboratory in Padova, Italy. Nine avian species of different ages and sexes involved in the outbreaks included commercial and local chickens, ostriches, emus, guinea fowls, geese, pigeons, turkeys, ducks and crowned cranes. A total number of 176,426 birds were lost, which constituted about 1.5% of the total poultry population in the state. Of

these, 67â€‰058 (38%) died naturally of the disease, while 109,368 (62%) were destroyed in order to stamp out the disease. Clinical signs and post-mortem findings of the disease included cyanotic comb and wattles, dyspnoea,subcutaneous haemorrhages, regression and necrosis of ovaries. All blood samples obtained from personnel involved in the containment of the disease in the state and screened for H5N1 virus were negative. In conclusion, the potential risk of human infection by the virus in the state exists and the present outbreaks caused serious socio-economic damage, which adversely affected the livelihood of poultry farmers and the poultry business in the state.

BURT, F.J., GROBBELAAR, A.A., LEMAN, P.A., ANTHONY, F.S., GIBSON, G.V.F. & SWANEPOEL, R. 2002. Phylogenetic relationships of Southern African West Nile virus isolates. *Emerging Infectious Diseases,* 8: 820-826.
Phylogenetic relationships were examined for 29 southern African West Nile virus (formal name West Nile virus (WNV)) isolates from various sources in 4 countries between 1958 and 2001. In addition sequence data were retrieved from GenBank for another 23 WNV isolates and Kunjin and Japanese encephalitis viruses. All isolates belonged to 2 lineages. Lineage 1 isolates were from central and North Africa, Europe, Israel, and North America; lineage 2 isolates were from central and southern Africa and Madagascar. No strict correlation existed between grouping and source of virus isolate, pathogenicity, geographical distribution, or year of isolation. Some southern African isolates have been associated with encephalitis in a human, a horse, and a dog and with fatal hepatitis in a human and death of an ostrich chick.

CONTENTE, A.P.A., DOMINGUES, P.F. & SILVA, R.C. 2009. Prevalence of Toxoplasma gondii antibodies in ostriches (Struthio camelus) from commercial breeding facilities in the state of Sao Paulo, Brazil. *Brazilian Journal of Veterinary Research and Animal Science,* 46: 175-180.
Toxoplasmosis is widespread zoonosis caused by Toxoplasma gondii, a protozoan that may infect mammals and birds. The aim of the present study was to assess the prevalence of T. gondii in ostriches (Struthio camelus) from commercial breeding facilities in the state of Sao Paulo, Brazil, in a way to increase the knowledge on the behavior and importance of the parasite in this animal species. A total of 195 serum samples were collected. These samples were analyzed by means of the Modified Agglutination Test (MAT) in order to investigate the occurrence of Toxoplasma gondii antibodies. The test showed that 14.36% of the animals were seropositive to Toxoplasma gondii. Minimum titer was considered to be equal or greater than 1:16, and the greatest dilution observed was 1:16,384. No statistically significant differences were found between males and females. Seronegative animals occurred in only two regions (Sao Paulo and Sao Jose do Rio Preto). These results point out the importance of further studies on this infection in ostriches, and on management practices that may minimize the risk of toxoplasmosis transmission in these birds which would, in their turn, decrease the risk for the final consumer.

COOPER, R.G. 2005. Bacterial, fungal and parasitic infections in the ostrich (Struthio camelus var. domesticus). *Animal Science Journal,* 76: 97-106.
The ostrich is susceptible to microorganisms of bacterial, fungal and parasitic origin. Anthrax, caused by Bacillus anthracis, is dangerous to other livestock and humans. Salmonella is transmitted from rodents or wild bird reservoirs. Pausterellosis caused by Pasteurella multocida results in air sac infections in ostriches. Colibacillosis is caused by Escherichia coli. Tuberculosis caused by Mycobacterium avium, is very rare in ostriches. Aspergillosis principally afflicts chicks. Zygomycosis, a secondary fungal infection of the upper gastrointestinal tract, is caused by Basidia, Mucor and Rhizopus. Leucocytozoon struthionis and Plasmodium spp. are harmless protozoa transmitted from flying arthropods. The tapeworm, Houttuynia struthionis, is dangerous in young ostriches. The adult ratite fluke (Philophthalmus gralli) is transmitted to ostriches following ingestion of infected freshwater crustaceans. Tick infestations of ostrich skin in Africa include Amblyomma spp., Haemaphysalis punctata, Hyalomma spp., Rhipicephalus turanicus and Argus spp. The ostrich quillmite (Pterolichus bicaudatus) and louse (Struthioliperus struthionus) may lower skin and leather quality via pruritis and/or excessive preening and feather loss. Nematode infections are rare.

GAEDIRELWE, O.G. & SEBUNYA, T.K. 2008. The prevalence and antibiotic susceptibility of Salmonella sp. in poultry and ostrich samples from slaughter houses in Gaborone, Botswana. *Journal of Animal and Veterinary Advances,* 7: 1151-1154.
The prevalence and antibiotic susceptibility of Salmonella species in poultry and ostrich samples from slaughterhouses in Gaborone, Botswana were determined [date not given]. A total of 128 chicken and 124 ostrich tissue samples were collected and cultured for Salmonella isolation. The chicken samples consisted of 32 samples each of liver, gall bladder, small intestine and large intestine, while the ostrich samples consisted of 31 samples each of liver, small intestine, large intestine and cloacae. Chicken liver had the highest Salmonella prevalence of 50%, followed closely by the large intestine with a prevalence of 43.8%. The small intestine and the gall bladder had Salmonella prevalence of 37.5 and 35.5%, respectively. The ostrich cloacae had the highest Salmonella prevalence of 51.6% followed by the large intestine with a prevalence of 29%. The ostrich small intestine and the liver had Salmonella prevalence of 16 and 12.9%, respectively. All of the rinse/cooling water samples from the chicken slaughterhouse were positive for Salmonella species. Isolates from poultry and those from the ostriches were serologically confirmed to be S. muenchen and S. arizonae, respectively. All the S. muenchen and S. arizonae isolates were sensitive to gentamicin, but resistant to tetracycline, ampicillin and sulphatriad.

GLINSKI, Z. & KOSTRO, K. 2008. Crimean-Congo haemorrhagic fever. *Zycie Weterynaryjne,* 83: 471-474.
Crimean-Congo haemorrhagic fever (CCHF) of the Nairovirus group (Bunyaviridae family) is a tickborne disease that may affect a wide range of domestic and wild animals and also humans. CCHF is distributed widely throughout the arid regions of Africa, Eastern Europe and Asia. The most efficient and common vectors for CCHF appear to be members of the Hyalomma species. Humans acquire CCHF virus from direct contact with blood and tissues of infected livestock or from a tick bite. The disease may also be transmitted among people. Clinical disease is rare in animals. Cattle, sheep and goats suffer from a moderate viraemia occasionally characterized by a mild fever. Ostriches may also become viraemic. Most species of birds are seronegative. The majority of cases in humans involve those in the livestock industry, such as agricultural workers, slaughterhouse workers and veterinarians. Infected people become severely diseased and the mortality rate can reach 30-50%. CCHF has been classified as an OIE list disease.

HOVE, T. & MUKARATIRWA, S. 2005. Seroprevalence of Toxoplasma gondii in farm-reared ostriches and wild game species from Zimbabwe. *Acta Tropica,* 94: 49-53.
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 seropositve ostriches by subinoculation in BALB/c mice were unsuccessful.

HUSSEIN, M.F. & AL-MUFARREJ, S. 2004. II. Prion diseases in man and animals. *Scientific Journal of King Faisal University (Basic and Applied Sciences),* 5: 139-166.
To date, a total of 13 prion diseases have been recognized in man and animals. The human diseases are: Kuru, Creutzfeldt-Jakob disease (CJD), variant CJD, Gertmann-Straussler-Scheinker Syndrome, fatal familial insomnia and Alpers' disease. The animal diseases are: scrapie, transmissible mink encephalopathy, chronic wasting disease, bovine spongiform encephalopathy, feline spongiform encephalopathy, wild ungulates encephalopathy and spongiform encephalopathy of the ostrich. Early diagnosis and treatment of these diseases have bewildered the scientific community. The fact that the prion protein (PrP) is derived from the host - given that PrP is the sole cause of disease - makes it almost impossible to develop

direct serologic tests and vaccines for the diagnosis and prevention of these diseases. At present, diagnosis is largely based on clinical and post-mortem findings, detection of abnormal prion protein by immunocytochemistry, Western blot, infra-red spectroscopy and biochemical examination of cerebrospinal fluid and blood of suspected patients. Methods are currently being evaluated for the identification of "capture" agents that specifically bind to misfolded prion protein (PrPSC), and for amplification of the interconversion of normal prion protein into PrPSC. No treatment is available yet for prion diseases, but several candidate drugs are being investigated that could prevent PrPSC formation, interfere with its conversion and/or metabolism or reverse it into the normally folded, harmless form.

JOANNIS, T., LOMBIN, L.H., BENEDICTIS, P., CATTOLI, G. & CAPUA, I. 2006. Confirmation of H5N1 avian infuenza in Africa. *Veterinary Record,* 158: 309-310.

LANDMAN, W.J. & SCHRIER, C.C. 2004. [Avian influenza: eradication from commercial poultry is still not in sight]. *Tijdschrift voor Diergeneeskunde,* 129: 782-796.
Avian influenza viruses are highly infectious micro-organisms that primarily affect birds. Nevertheless, they have also been isolated from a number of mammals, including humans. Avian influenza virus can cause large economic losses to the poultry industry because of its high mortality. Although there are pathogenic variants with a low virulence and which generally cause only mild, if any, clinical symptoms, the subtypes H5 and H7 can mutate from a low to a highly virulent (pathogenic) virus and should be taken into consideration in eradication strategies. The primary source of infection for commercial poultry is direct and indirect contact with wild birds, with waterfowl forming a natural reservoir of the virus. Live-poultry markets, exotic birds, and ostriches also play a significant role in the epidemiology of avian influenza. The secondary transmission (i.e., between poultry farms) of avian influenza virus is attributed primarily to fomites and people. Airborne transmission is also important, and the virus can be spread by aerosol in humans. Diagnostic tests detect viral proteins and genes. Virus-specific antibodies can be traced by serological tests, with virus isolation and identification being complementary procedures. The number of outbreaks of avian influenza seems to be increasing - over the last 5 years outbreaks have been reported in Italy, Hong Kong, Chile, the Netherlands, South Korea, Vietnam, Japan, Thailand, Cambodia, Indonesia, Laos, China, Pakistan, United States of America, Canada, South Africa, and Malaysia. Moreover, a growing number of human cases of avian influenza, in some cases fatal, have paralleled the outbreaks in commercial poultry. There is great concern about the possibility that a new virus subtype with pandemic potential could emerge from these outbreaks. From the perspective of human health, it is essential to eradicate the virus from poultry; however, the large number of small-holdings with poultry, the lack of control experience and resources, and the international scale of transmission and infection make rapid control and long-term prevention of recurrence extremely difficult. In the Western world, the renewed interest in free-range housing carries a threat for future outbreaks. The growing ethical objections to the largescale culling of birds require a different approach to the eradication of avian influenza.

LUDWIG, H. & BODE, L. 2000. Borna disease virus: new aspects on infection, disease, diagnosis and epidemiology. *Revue Scientifique et Technique,* 19: 259-288.
A 'disease of the head' affecting horses, as described in the 17th Century is now known as Borna disease. Research over the past 100 years has established that the aetiological agent, Borna disease virus (BDV), is an unsegmented, single- and negative-stranded, enveloped ribonucleic acid (RNA) virus which represents the family Bornaviridae in the order Mononegavirales. The virus exists world-wide in horses, sheep, cattle, cats, dogs and ostriches. The infection can be fatal, but the majority of carriers are persistently infected without showing symptoms. The association with psychiatric diseases in humans led to an international explosion of research on BDV, with centres established in Germany, the United States of America and Japan. Experimental infections of tree shrews and rats served to examine the effects of persistent and overt disease, most excitingly, virus-induced behavioural changes, and emotional and learning deficits. This 'emerging' virus infection shows complex pathogenetic mechanisms in the nervous system, but also spreads through myelo-monocytic cells. Diagnosis can be made serologically, but detection of antigen markers in peripheral white blood cells, combined with nucleic acid amplification is more profitable. Comparative

RNA studies reveal an unusually high genetic homology of viruses. Isolates recovered from humans and equines suggest species-specificity. Vaccination is not an advisable strategy, but antiviral therapy, especially with amantadine sulphate, promises efficacy in human mood disorders, and is effective in vitro. Infections with BDV follow a vulnerability principle to cause disease. Although cross-species transmission of this commensal virus has not been proven, zoonotic aspects of BDV should be carefully considered.

PIENAAR, A.C.E. 2008. Notifiable avian influenza: government preparedness measures. *Pluimvee Poultry Bulletin*, April : 194...196.

PIERGILI FIORETTI, D., MORETTI, A., MARINI, C., GRELLONI, V. & ANTOGNONI, M.T. 2001. Trichinella spp. in ostrich meat: a public health risk? *Parasite* 8: (2) Suppl. S203-S205.
In the present work, the biological behaviour of Trichinella spiralis and T. pseudospiralis in ostriches is reported. Oral infections were performed in eight ostriches with two infective doses (10â€‰000 and 80â€‰000 larvae) for each species of Trichinella. On day 0, 30 and 60 post infection (p.i.), blood samples were collected to evaluate serum changes of specific muscle enzyme activities and total proteins. An immunological study to determine specific IgG in sera was also conducted, employing a monoclonal blocking ELISA. From the carcasses of sacrificed animals, samples of various muscle tissues were examined by the digestion method and by standard histopathological procedures. Results showed a low susceptibility of the ostriches to T. pseudospiralis; preferential sites of larval distribution were muscle tissues of the legs. T. spiralis could be found in muscle tissues only when a high number of larvae were inoculated. Immunological reactivity was found only in animals infected with higher doses of T. pseudospiralis.

PONCE GORDO F. MARTÍNEZ DÍAZ RA. HERRERA S. 2004. Entamoeba struthionis n.sp. (Sarcomastigophora: Endamoebidae) from ostriches (Struthio camelus). *Veterinary Parasitology,* 119: 327-335.
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.

RIGONI, M., SHINYA, K., TOFFAN, A., MILANI, A., BETTINI, F., KAWAOKA, Y., CATTOLI, G. & CAPUA, I. 2007. Pneumo- and neurotropism of avian origin Italian highly pathogenic avian influenza H7N1 isolates in experimentally infected mice. *Virology,* 364: 28-35.
An experimental infection of mice was performed in order to investigate the potential for interspecies transmission in mammals of Italian HPAI viruses of the H7N1 subtype. Three avian origin isolates were selected, two strains obtained from ostrich (one of which contained a PB2-627 Lysine residue) and one from a chicken. Following intranasal infection of mice, clinical signs and mortality were recorded in the experimental groups challenged with the two ostrich isolates, while only weight loss was observed in those receiving the chicken strain. Viruses were recovered to a varying extent from respiratory and nervous tissues of infected animals. These results suggest that HPAI viruses, other than H5N1 and H7N7, may have zoonotic implications, and support the consensus that AI infections in poultry are to be eradicated rather than contained.

SOMMARIVA, M., CORONA, A., GRILLI, G., FONTANA, E. & GALLAZZI, D. 2000. Observations on bacterial agents associated with food-borne human illnesses in wild and back-yard birds. *Selezione Veterinaria*, 8/9: 771-781.

50 specimens of caecal contents of Anas platyrhynchos were analysed to evaluate the presence of Yersinia, Campylobacter and Salmonella frequently associated with food-borne human illnesses. Birds shot during the hunting season of 1998 in Northern Italy were examined. 78 specimens of caecal contents or faeces of 21 species of birds, including A. platyrhynchos were also examined for Yersinia spp. The following species were isolated: Y. enterocolitica (7), Yersinia frederiksenii (1), Campylobacter jejuni (4), Campylobacter spp. (2) and Salmonella spp. serogroup D1 (6). The role of wild and game birds in human food-borne illness is illustrated. Hunters are advised to prevent their dogs from eating viscera of game birds.

VERWOERD, D.J. 2000. Ostrich diseases. *Revue Scientifique et Technique,* 19: 638-661. Scientific knowledge of ostrich diseases is incomplete and very fragmented, with specific details on technical aspects of diagnostic and/or screening tests completely absent in most cases. Crimean-Congo haemorrhagic fever is transmitted to domestic animals including ostriches, principally by ticks of the genus Hyalomma. In the ostrich, the disease causes no clinical symptoms during a viraemia of approximately four days. Spongiform encephalopathy has not been reliably reported in ostriches, while anthrax has occurred rarely in modern times but was reportedly an important cause of death approximately 100 years ago in South Africa. Ostriches of all ages are susceptible to Newcastle disease virus. The viraemic period in vaccinated slaughter ostriches is between nine and eleven days and there are no indications of a carrier state or presence of the virus in the meat or any other tissues after this period, with peak immunoglobulin G response reached on day fourteen post infection. All avian influenza isolates reported from ostriches have been non-pathogenic to poultry, even the H5 and H7 subtypes. Some of the latter have been associated with mortality of ostrich chicks in localised outbreaks during periods of inclement weather and with significant wild bird (waterfowl) contact. Borna disease causes a nervous syndrome in ostrich chicks, but to date, has only been reported in Israel. Eastern and Western equine encephalomyelitides cause fatal disease in ostriches and other ratites, with mortality ranging from less than 20% to over 80% in affected flocks. These diseases are present in North, Central and South America where the associated ornithophilic mosquito vectors occur. Equine and human vaccines are apparently safe and efficacious in ratites. Wesselsbron disease, infectious bursal disease (type 2), adenovirus and coronavirus infections have been reported from ostriches but the significance of these diseases is unclear. Due to the paucity of data regarding ostrich diseases and the unvalidated state of most poultry tests in this unique group of birds, strict observation of a pre-slaughter quarantine of thirty days is strongly advised, whilst live exports and fertile eggs should be screened through the additional use of sentinel chickens and/or young ostriches.