

ZEBRA PROJECT ABSTRACTS

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ULTRASONOGRAPHIC ANATOMY OF THE ASIAN ELEPHANT

(Elephas maximus) EYE

Priya Bapodra

The purposes of this study were to describe the normal ultrasonographic appearance and measurements of the Asian elephant (*Elephas maximus*) eye, to compare these findings with measurements reported in a previous ultrasound study and for cadaver specimens and to assess the relationship between the ocular dimensions (axial length, equatorial diameter, corneal thickness, anterior segment depth, lens diameter, lens thickness and posterior segment depth) and the explanatory variables gender, height, age and species (*E. maximus* and *Loxodonta africana*). Bilateral transpalpebral ultrasonography was performed using a 4-7 MHz broadband curvilinear transducer on fifty-three captive Asian elephants and six captive African elephants in the United Kingdom, Germany and Sri Lanka. Both males and females were included in the study and ages ranged from 14 months to 65 years. The ultrasonographic appearance of the globe and intraocular structures of the Asian elephant eye is similar to that in other species. Biometry measurements recorded for adult Asian elephants (n=41) were axial length 3.45 ± 0.20 cm (mean \pm standard deviation), equatorial diameter 3.88 ± 0.29 cm, corneal thickness 0.17 ± 0.02 cm, anterior segment depth 0.45 ± 0.08 cm, lens diameter 1.90 ± 0.14 cm, lens thickness 1.01 ± 0.12 cm and posterior segment depth 1.83 ± 0.18 cm. Differences were detected between biometry measurements recorded in this study and those reported in the previous ultrasound study and cadaver specimen measurements. Multiple linear regression analysis indicated a significant relationship between the explanatory variables (gender, height and age) and the dependent variables (axial length, equatorial diameter, corneal thickness, anterior segment depth, lens diameter and lens thickness). The use of transpalpebral ultrasonography was found to be a useful imaging modality in the evaluation of the Asian elephant eye.

Key words: Asian elephant, *Elephas maximus*, eye, ultrasonography, veterinary anatomy.

**SCREENING A POPULATION OF SMOOTH NEWTS (*Triturus vulgaris*) FOR
CHYTRIDIOMYCOSIS IN COWDEN, UK**

Hanna Javed

Chytridiomycosis is arguably the most important emerging infectious disease in any taxon worldwide. Its causative pathogen, *Batrachochytrium dendrobatidis* (BD), has been associated with widespread amphibian population declines. Recent work at the Institute of Zoology (IOZ) has discovered apparent transient infections in a population of smooth newts (*Triturus vulgaris*) from Holywich Farm, Cowden, UK. Reversals in BD status from positive to negative and negative to positive were found by swab real-time polymerase chain reaction assays (RT-PCR) in 2007. The majority of newts which became negative were beginning to show terrestrial behaviour at the time of detection of the status change. It was thus hypothesised that the morphology or microbiological flora of the skin differs between the terrestrial and aquatic skin of smooth newts, which results in an inability of the growth or swab RT-PCR detection of BD on terrestrial skin.

In this study, smooth newts have been collected from both the land and the water at Holywich Farm. Animals have been screened for BD by swab RT-PCR and histology, as well as undergoing skin microbiological screening. All animals were found to be negative for BD by both diagnostic techniques and no significant difference was found between the microbiological flora of terrestrial and aquatic skin. Therefore, we are unable to accept or reject the hypotheses based on these results. However, this work at the IOZ is, to the author's knowledge, the first study of chytridiomycosis in this species and is part of a long-term study, which aims to further characterise this disease and skin morphology the smooth newt.

INVESTIGATION INTO USING QUANTITATIVE URINALYSES AS A MEASURE OF RENAL DYSFUNCTION IN CALIFORNIA SEA LIONS (*Zalophus californianus*) NATURALLY INFECTED WITH LEPTOSPIROSIS

Lynsay Doody

Leptospirosis can have devastating effects on the renal system of the California sea lion (*Zalophus californianus*). To attempt to enhance current knowledge of diagnosis, therapy and prognosis of leptospirosis in this species, urine specific gravity, urine protein: creatinine ratio, urine creatinine: serum creatinine ratio, urinary activities of N-acetyl- β -D-glucosaminidase, γ -glutamyl-transferase, and alkaline phosphatase, and fractional excretion of the electrolytes; sodium, potassium, calcium and phosphorus were measured/calculated on samples from 36 California sea lions that had stranded along the central coast of California. Urine specific gravity was significantly lower ($p < 0.0001$), urine protein: creatinine ratio was significantly higher ($p = 0.0007$) and urine creatinine: serum creatinine ratio was significantly lower in California sea lions diagnosed with leptospirosis ($p < 0.0001$). Urinary alkaline phosphatase activity was found to be significantly higher in animals affected with leptospirosis ($p = 0.0274$). Fractional excretion of the electrolytes potassium ($p = 0.0112$), calcium ($p < 0.0001$) and phosphorus ($p = 0.004$) were significantly raised in animals with leptospirosis. Urine creatinine: serum creatinine was significantly lower ($p = 0.0095$) and urinary γ -glutamyl-transferase ($p = 0.0200$), and fractional excretions of potassium (0.0190), calcium ($p = 0.0238$) and phosphorus ($p = 0.0476$) were significantly higher in sea lions with leptospirosis that were subsequently euthanised when compared to those that were released. Results suggest that urine specific gravity, urine protein: creatinine ratio, urinary alkaline phosphatase activity and fractional excretions of potassium, calcium and phosphorus are of diagnostic use in leptospirosis in the California sea lion. Urine creatinine: serum creatinine ratio and urine specific gravity could be of use in differentiating pre-renal from renal azotaemia in California sea lions with leptospirosis. Fractional excretion of electrolytes appears to be a sensitive method for identifying tubular dysfunction in California sea lions with leptospirosis. Urine creatinine: serum creatinine, urinary γ -glutamyl-transferase and fractional excretions of potassium, calcium and phosphorus are useful in the determination of prognosis and decision to euthanise in California sea lions with leptospirosis.

INVESTIGATION OF THE AFRICAN BUSHMEAT TRAFFIC IN FRANCE

A THREAT TO BOTH BIODIVERSITY AND PUBLIC HEALTH

Anne-Lise Chaber

Bushmeat hunting is a major threat to conservation in West and Central Africa, but most studies have focussed on only national trade. This project presents data showing that there is also a significant international trade in wildlife species from West and Central Africa into France. The data show that bushmeat is not only brought for personal consumption but is probably part of a lucrative and organized traffic. We show that a range of species, some of which are endangered and whose population trends are unknown, are transported on passenger flights and are also found in African markets in France. Given the range of illegal imports in this study period, and the fact that trade probably occurs in all countries where residents have ethnic and cultural (West and Central) African origins, it is highly probable that on a global scale, international bushmeat trade has a negative impact on conservation. Bushmeat handling and consumption may also have serious implications for human health in a range of ways. Food-borne pathogens such as *Listeria monocytogenes* and carcinogenic concentrations of benzo(a)pyrene in smoked food were observed in this study. Exotic bacteria were not found, while the final identification of isolated viruses is still under investigation.

Despite being a constant threat, the extent of pathogen pollution was difficult to observe during study period due to technical restrictions. Despite the fact that most of the imported bushmeat was preserved by smoking, the presence of some of the resistant viruses such as Monkeypox raises human health concerns. However most viruses are sensitive to preserving methods and their risk is mainly linked to fresh meat. As regards livestock, illegal imports of fresh livestock meat from foreign countries pose the highest risk. Lack of information to passengers by air carriers, misleading certificates from African sanitary officers, misunderstanding of the necessity of preserving biodiversity and inadequate resources of French Customs preventing prosecutions of offenders under penal law, are all contributing factors for the illegal French bushmeat trade.

Key words: Bushmeat, illegal international traffic, pathogen pollution, sanitary risk, ecological threat, biodiversity.