



1. Notifiable Disease – Tuberculosis

From January to the end of March 2010, *Mycobacterium bovis* was isolated from submissions from nine alpaca herds, all located in endemic bovine TB areas. These included, two herds with infection originally detected in 2009 and one small herd that remained under permanent movement restrictions since 2008 due to the owners' refusal to test their animals.

2. Zoonotic Diseases

Salmonellosis

Salmonella Enteritidis was isolated from the liver of a 14-week-old Burchell's zebra (*Equus burchellii*) foal from a zoological collection that died following a two-day illness characterised by weakness, malaise, diarrhoea and recumbency. Post mortem findings included emaciation, diarrhoea, aspiration bronchopneumonia and septicaemia. An advisory visit has been carried out to evaluate the extent of spread of this organism, the possible origin and further risk to human and animal health. *S. Enteritidis* was isolated from a number of environmental samples collected and advice was given with regard to isolation of infected stock, cleansing and disinfection and reducing the risk from possible sources of infection.

Salmonella Dublin was recovered, in mixed growth with *Pasteurella multocida*, from both the liver and peritoneal fluid of a 4-month-old female lion cub from a zoological collection that had died suddenly with peritonitis and toxæmia secondary to perforation of the ileum. The significance of the bacterial isolates in the disease process was not clear. The submitting veterinary surgeon was asked to make clear to the owners the potential zoonotic risks associated with *Salmonella* infections and the need for basic hygienic precautions.

Toxoplasmosis

A further case of toxoplasmosis was reported in a meerkat this quarter, a six-year-old animal submitted after it exhibited neurological signs. The gross pathology was unremarkable apart from moderately congested lungs. A Latex Agglutination Test on pericardial fluid showed a high titre to *Toxoplasma gondii* and histopathology showed a

sub-acute to chronic non-suppurative panencephalitis. Protozoal tissue cysts were detected and the findings were consistent with infection with *Toxoplasma gondii*.

Avian tuberculosis

Histopathology revealed granulomatous inflammation in the intestine, kidney, heart and liver of a two-year-old Cape Dove pigeon (*Oena capensis*), that died after a two day period of lethargy. Ziehl-Neelson stained sections detected large numbers of acidfast bacilli within macrophages, likely to be consistent with avian tuberculosis.

Psittacosis

Chlamydophila psittaci infection was confirmed on PCR after submission of a psittacine bird in which gross findings including splenomegaly and hepatomegaly. Acidfast inclusion bodies were seen on Modified Ziehl-Neelson stained smears of spleen and liver. An inconclusive *Chlamydophila* PCR also was reported from a second psittacine submitted from the same aviary, which had a congested liver but unremarkable spleen. Precautions were taken to minimise zoonotic risk and further testing within the collection revealed no evidence of excretion of *Chlamydophila* by in-contact birds.

3. Endemic New and Emerging Diseases: South American Camelids

PARASITIC DISEASES

Intestinal parasitic disease, affecting both adults and juveniles, was confirmed on eight premises at several Regional Laboratories. Coccidiosis was diagnosed on six of these and nematode infections, including *Ostertagia*, *Trichostrongylus*, unspicated trichostrongyles, *Nematodirus* and *Trichuris*, on four. Ill-thrift was the main clinical sign. In one case, an ill-thrifty seven-month-old alpaca died two days after the onset of severe diarrhoea. Only a low oocyst count for *Eimeria macusaniensis* (100 opg) was detected on faecal examination, but coccidial enteritis was diagnosed by histopathology, indicating that faecal oocyst counts are difficult to interpret in relation to clinical disease. The long prepatent period for *E. macusaniensis* means that clinical disease may be observed well before oocysts are detected in the faeces (Rosadio *et al.* 2010). In another case, two six-month-old crias with significant endoparasite burdens (including *Nematodirus* and *E. macusaniensis*) also had polyserositis from which *Streptococcus equi zooepidemicus*, the cause of 'alpaca fever', was cultured (see below). The same organism was also isolated from an adult alpaca, which had concurrent coccidial infection (see below). Gastric *Prevotella* infection was a concurrent finding in a six-month-old alpaca, in which numerous nematodes were identified by histopathology of the stomach wall and diffuse necrosis of the C3 stomach compartment was associated with invasion by filamentous bacteria.

Rosadio R *et al.* (2010). *Eimeria macusaniensis* associated lesions in neonate alpacas dying from enterotoxaemia. *Veterinary Parasitology* 168, 116-120.

Fasciolosis was confirmed on six premises, mostly from carcase submissions of adult camelids. There were no consistent clinical signs associated with these. Characteristic liver pathology, including fibrosis and nodular changes, was associated with fluke parasites in the bile ducts. One animal also had endocarditis, a lesion commonly associated with fasciolosis in South American camelids.

SEPTICAEMIA AND RELATED DISEASES

Streptococcus equi zooepidemicus (SEZ) the cause of 'alpaca fever', was isolated from three submissions. In the first, it was associated with a fibrinopurulent polyserositis in two six-month-old crias, which also had significant endoparasite burdens (see above). On another holding, it was isolated from the pneumonic lung of an adult alpaca, which had been euthanased after losing weight, and also had a significant coccidia burden (see above). The final submission was an eight-month-old alpaca which had died after two days of malaise, and *S. equi zooepidemicus* septicaemia was diagnosed at necropsy. SEZ is a recognised, albeit uncommon, zoonosis and the owners were made aware of the potential risk of infection.

An adult llama, which had shown a chronic stiff gait and weight loss, died and was submitted for post mortem examination. Gross findings included pericarditis and valvular endocarditis affecting both aortic and left atrioventricular valves. *Erysipelothrix rhusiopathiae* was isolated in pure growth from the aortic heart valve. Interestingly, the llamas were kept in close proximity to a large pig unit which could be a possible source of infection.

Other causes of septicaemia included *Granulicatella adiacens* (this was formerly classified as a *Streptococcus sp.*) in a six-month-old alpaca, which had been small for its age and died after a short illness of two days, and *Corynebacterium sp.* which was isolated from two alpacas where severe skin disease was believed to have been a predisposing factor (see below).

A severe, purulent peritonitis was diagnosed in the carcase of an adult male alpaca that had a history of weight loss and pallor prior to death. *E. coli* and *Arcanobacterium pyogenes* were isolated from pus, but the original source of infection could not be identified. In other herds, peritonitis was also a sequel to gastric ulceration (see below).

Inability to feed was the cause of death in a three-day-old cria, which was born to term but had a low birth weight. Although it had stood after birth, it became progressively weaker and unwilling to move. At necropsy, the C1 and C2 stomach compartments were empty, C3 contained a small amount of clotted milk, small intestine content was minimal, and meconium had been retained. The ZST blood test for gammaglobulins confirmed poor colostrum intake, and the absence of its laxative effect may have also influenced meconium retention.

NEOPLASIA

Lymphosarcoma was diagnosed twice, in six-month-old and fifteen-month-old alpacas, with lesions in multiple tissues associated with severe clinical disease. Gastric ulceration was an additional finding in one of these animals.

An aged female guanaco died after a brief episode of malaise; it was in poor body condition. The cause of death was peritonitis secondary to gastric ulceration. There were large multifocal perforating ulcers in the C1 and C2 stomach compartments, with extensive fibrous adhesions between these compartments. Small multifocal white liver lesions were also identified. Squamous cell carcinoma was confirmed by histopathology, affecting the stomach, gastric lymph node and liver.

KIDNEY DISEASE

Urolithiasis, with urethral obstruction and subsequent bladder rupture, caused the death of a ten-year-old castrated llama.

NERVOUS DISEASES

Cerebrocortical necrosis (CCN, polioencephalopathy) was diagnosed twice, in a four-month-old cria and an adult stud male. Clinical signs included ataxia, opisthotonos, blindness and hyperaesthesia. In the cria, autofluorescence was demonstrated on the cut surface of the cerebral hemispheres and histopathology subsequently confirmed a diagnosis of CCN, with symmetrical haemorrhages also observed in the brain stem. The adult was in poor body condition with nematode and coccidial burdens detected ante mortem. Focal areas of alopecia and crusting of the skin were also observed associated with *Sarcoptes* and *Chorioptes* mites. Histopathology of the brain revealed severe acute to subacute necrotising polioencephalopathy. The cause of this syndrome is not clear in camelids.

CONGENITAL PROBLEMS

Ventricular septal defect (VSD) and cleft palate were diagnosed in a six-month-old and five-month-old cria, respectively. The cria with VSD had a recent deterioration in health which required euthanasia. The other alpaca had been a “poor doer” for most of its life with regular nasal and ocular discharge. It became dyspnoeic, collapsed and was euthanased. At necropsy, there was cranioventral pulmonary consolidation with multiple small abscesses, consistent with chronic aspiration pneumonia secondary to the palate defect.

SKIN DISEASES

Mange was diagnosed on four premises. *Sarcoptes* mites were identified on three of these, with concurrent *Psoroptes* once and *Chorioptes* once (see CCN case above). Concurrent *Sarcoptes* and *Psoroptes* was associated with severe debilitation that necessitated euthanasia in an aged alpaca. Severe lesions were also associated with debilitation and *Corynebacterium* septicaemia (see above) in two alpacas that had been euthanased. In both carcasses there was widespread exudative ulcerative dermatitis, from which *Chorioptes* mites were identified, and histopathology confirmed a severe chronic pustular and crusting dermatitis with folliculitis and furunculosis, consistent with mite infestation and bacterial infection.

MISCELLANEOUS

Gastric ulceration was diagnosed six times in adult camelids. In three cases, perforation of the stomach wall resulted in peritonitis. In another, gastric bleeding resulted in sudden death; *Clostridium perfringens* was isolated from the ulcer, although its aetiological significance was unclear. Ulceration was associated with squamous cell carcinoma in an adult guanaco (see above), acidosis in an alpaca (see below), and was an incidental finding in an alpaca with lymphosarcoma (see above).

Acidosis (grain engorgement) was diagnosed at necropsy of alpacas from two holdings. In one animal, the C3 mucosa was inflamed with superficial ulceration. Clinical signs included inappetance, malaise, weight loss, regurgitation/vomiting, diarrhoea, abdominal discomfort, recumbency, subnormal temperature, abortion, and in one animal it presented as sudden death.

Sarcocystosis was diagnosed in an adult alpaca. A large number of caseous lesions were found throughout the skeletal muscles and also in the oesophagus, which was impacted with dry ingesta. The diagnosis was confirmed by histopathology, which showed a subacute to chronic, multifocal, granulomatous myositis with sarcocysts.

4. Endemic New and Emerging Disease - Zoological/Captive Collections

A 3-4 year old rhea (*Rhea americana*) was submitted having been found dead without showing any premonitory signs. There was gross evidence of a diffuse severe necrotising typhlitis. *Brachyspira hyodysenteriae* was detected in the caecal contents by PCR and culture. Typhlitis in rheas caused by *B. hyodysenteriae* has been reported overseas and occasionally by the VLA. Interestingly the bird was from a farm which also farms wild boar. The bird was also parasitised (small intestine) with many *Deletrocephalus dimidiatus* nematode worms – a reported cause of weakness and diarrhoea in chicks in heavy infections.

References

Buckles EL *et al.* (1997) Case of spirochaete-associated necrotizing typhlitis in captive common rheas (*Rhea americana*). Avian Disease 41, 144-148.
Sagartz JE *et al.* (1992) Necrotizing typhlocolitis associated with a spirochaete in rheas (*Rhea Americana*). Avian Disease 36, 282-289.

5. Publications

Millar *et al.* (2010) Ergot poisoning of water buffaloes in the UK. Veterinary Record 166, 28-9 (Letter).

Schock *et al.* (2010) Nutritional encephalomyelopathy in a group of African lions (*Panthera leo*). Association for Veterinary Teaching and Research Work (AVTRW) annual meeting York, March. Abstract 13.

Schock and van den Burgt (2010) Acute to subacute necrotising cortical encephalopathy in an alpaca (*Vicugna pacos*). AVTRW annual meeting York, abstract 14.

Collins *et al.* (2010) Suspect copper toxicosis in an alpaca herd. AVTRW annual meeting York, abstract 15.