Quarterly report of investigations of suspected exotic diseases

Salmonella Emek confirmed

A veterinary pathologist reported the isolation of Salmonella Emek from the faeces of an adult dairy cow that presented recumbent with pyrexia and diarrhoea. The isolate was identified by the Enteric Reference Laboratory at the Institute of Environmental Science and Research Limited (ESR). Salmonella Emek has been identified previously in New Zealand but this is the first report in farmed animals. The cow initially improved with antibiotic, anti-inflammatory and supportive treatment but three days later became recumbent again and was euthanased by the farmer. A history of mild self-limiting diarrhoea had affected a small number of calves on the farm through the early spring but this had resolved after improved management of colostrum feeding to calves. No other cases of diarrhoea in adult cattle were seen. The farmer reported milk production comparable with that of the previous year, despite drought-associated feed restrictions. Lactating dairy cows on the farm were fed maize silage and imported palm kernel extract (PKE) as supplements to pasture. Seven other isolations of Salmonella Emek are recorded in the ESR database:

- from bio-waste (1): September 2005. This sample is likely to be treated human sewerage/effluent from the South Island, but details are confidential and not recorded by ESR;

Note that a causal association between this agent and the presenting clinical signs cannot be proven and other factors may have affected clinical progression in this animal. However, if this was a clinical case of salmonellosis, the impact on the affected farm was considered negligible with a single cow affected and no demonstrable effects on production.

Worldwide, the serovar Salmonella Emek is considered rare. In humans it causes non-typhoidal salmonellosis although the first isolation was from a folliculitis that developed on the hands and forearms of a veterinary surgeon after attending an aborting cow(1). In animals it has been associated with diarrhoea in calves(2) and incriminated in reduced hatchability of duck embryos(3).

References


Exotic disease investigations are managed and reported by MAF’s Investigation and Diagnostic Centre (IDC) Wallaceville. The following is a summary of investigations of suspected exotic disease during the period from April to June 2008.

Anthrax ruled out

A farmer in the Wairarapa sought veterinary help following discovery near a water trough of four dead beef heifers with blood from the anus and nostrils. Seven 15-month-old cohort animals died over the following three days and three more showed clinical signs including bloody nasal discharge and frank blood in their faeces. The veterinarian contacted the Ministry of Agriculture and Forestry (MAF) using the 0800 number. A MAF incursion investigator visited the property. Blood smears collected from the most recently dead animal were negative for the presence of anthrax. A postmortem examination was carried out and samples collected for histology, microbiology and virology. Blood samples were collected from affected, in-contact and similar aged cohort animals. Laboratory testing of blood and histology of tissues indicated kidney failure as the cause of death. The kidney lesions were consistent with acorn poisoning. The animals had grazed under oak trees in the previous month.

Chronic wasting disease ruled out

A veterinarian reported the death of a 15-year-old bull elk imported from Canada in 1996. Prior to death the deer had shown progressive weight loss. Chronic wasting disease was ruled out after histological examination by MAF’s reference pathologist and a negative Prionics western blot test.

Hogget abortions investigated

A Manawatu veterinarian informed MAF of an abortion episode in hoggets during the 2006 lambing season. Routine investigation of aborted fetuses by Gribbles Veterinary Laboratories identified histological lesions typical of toxoplasmosis in the homebred hogget group but histological findings were inconclusive in the abortions from a group of purchased hoggets.
An investigation undertaken to rule out potential exotic agents *Coxiella burnetii* (Q-fever), *Salmonella* Abortusovis and *Chlamyphilia abortus* (enozoic abortion) was started late in the lambing season of 2006. Tissues from seven aborted lambs were submitted to the Investigation and Diagnostic Centre (IDC) at Wallaceville for molecular testing, and to the Institute of Veterinary Animal and Biomedical Sciences (IVABS), Massey University, for molecular testing and histology.

Serology ruled out *C. burnetii* as the cause of abortion in the hogget group (n= 70 non-aborted, 57 aborted) but 10/127 (7.9%) hoggets had low positive titres (3/4 – 4/16) on the complement fixation test (CFT) for *Chlamyphilia abortus*. Polymerase chain reaction (PCR) tests for *C. abortus* were negative following testing of vaginal swabs from 20 aborted and nine seroconverted hoggets, as were eye or joint swabs from lambs with conjunctivitis or joint ill. Some of the 2006 ovine abortion tissues were PCR positive for *Neospora caninum* DNA, pointing to the possible involvement of this agent alone or in combination with *Toxoplasma*.

As a result of late involvement in the 2006 lambing season, and therefore the inability to collect ideal specimens for *C. abortus* testing, an investigation was undertaken during the 2007 lambing season to clarify the *Chlamyphilia abortus* status of the farm. The 2007 hogget group (116) underwent serum sampling pre- and post-lambing. During lambing the flock was closely monitored with all abortions recorded. Lambs and placent material were submitted to IVABS for testing, which included postmortem, histology and bacteriology, with fresh tissues and thoracic fluid stored frozen.

Only four abortions occurred during 2007. Placent samples from these and six further ewes underwent molecular testing for *Coxiella burnetii* and *C. abortus*, and specific culture for *Salmonella*, all with negative results. All sera were tested for *Chlamydia* antibodies by CFT with a low prevalence (pre-lambing bleed: 17/116, 14.7%; post-lambing bleed: 8/111, 7.2%) of low titre positives (3/4 – 4/32) identified. Findings were within the published specificity of the CFT (83.6%) determined by Buendía and co-workers (1). There was no evidence of seroconversion and all aborted ewes were seronegative (all titres <1:4). The weak serological reactions to *C. abortus* identified in 2006 and 2007 appear to be false-positive reactions due to either a non-specific reaction or a cross-reaction with *C pectorum* or various Gram-negative bacteria such as *Acinetobacter*.

Reference


*Mycoplasma mycoides* mycoides Large Colony ruled out

Serum from a clinically normal two-year-old Dorper ewe was anti-complementary positive (4:40) to *Mycoplasma mycoides* mycoides Large Colony (MmmLC) using the CFT. The test was part of routine testing of animals for export to the UK. No in-contact animals were clinically diseased and the source flock had a low incidence of arthritis (incidence of lameness was approximately 0.001%) and mastitis (0.005%). A second serum sample collected approximately two weeks later also tested anti-complementary positive (3:80). The second serum sample was sent to Weybridge, UK (OIE reference laboratory), for retest using the confirmatory western blot (WB) test. The serum tested negative by the WB and negative to an unvalidated ELISA but gave a titre of 2:40 to the CFT. The investigation concluded there was no evidence of exposure to MmmLC and that positive CFTs were a result of test non-specificity.

**Exotic diseases ruled out in imported goat**

A Canterbury farmer reported the death of an aged male Boer goat that had been imported from South Africa in 2001. The cause of death was not known but the farmer observed no sickness prior to death. A New Zealand Food Safety Authority Verification Agency (NZFSA VA) veterinarian collected the brain for TSE testing, and checked the liver and lungs for hydatids. There was no evidence of hydatids on gross inspection. A sample of brain tissue submitted to the IDC was negative for scrapie on western blot Prionics testing.

**Horn disease in chamois investigated**

A member of the Deer Stalkers Association notified the IDC of a condition in Westland chamois colloquially referred to as ‘horn rot’, which is not described in the literature. Association members were asked to obtain samples from an affected animal. A skull including horns was made available but was of poor quality because of the length of time between the animal being shot and the tissues fixed. In addition, the skin had been removed from the coronet with only horn and bone remaining. Grossly there did not appear to be infection. The animal was mature and in good body condition. There was no evidence of pathology in any other keratinised tissues submitted, including hoof horn and hair. Slides for histology were of poor quality and not able to be interpreted. At this point the cause of the condition is unknown. A request has been made for further samples.

**Exotic equine diseases ruled out**

A colt was observed to have a transitory temperature elevation of 41°C and slightly pale gums. The signs were non-specific but the possibility of a viral infection was considered and tests undertaken to rule out equine viral arteritis (EVA), equine infectious anaemia (EIA) and Ross River virus (RRV). Serum tested for antibodies to EVA, EIA and RRV using a virus neutralisation test (VNT), agar gel diffusion (AGID) test, and ELISA, respectively, were negative. The horse made a complete recovery.

**Trichinella spiralis ruled out**

A hunter reported multiple, white, rice-grain-sized lesions in the muscle of a wild pig. Possible causes were sarcocystosis, cystercerosis,
and *Trichinella spiralis*. *Trichinella spiralis* was ruled out following a pepsin digest test. Sarcocysts have been reported in feral pigs in New Zealand.

### Exotic pig diseases ruled out

A veterinarian reported abortion and neonatal mortality affecting a number of sows. The herd was comprised of approximately 30 boars, 300 sows and 1,000 young pigs. Performance was found to be low at 16 piglets weaned per sow per year. The main presenting sign was piglet mortality in the first three to five days of life in younger sows. Nine litters had been affected and the problem had commenced four weeks before the notification. Three exotic diseases – porcine reproductive and respiratory syndrome (PRRS), classical swine fever (CSF) and Aujeszky’s disease (AUD) – were ruled out by ELISAs on serum from 29 pigs, and PCR tests on whole blood from 15 pigs. Three pigs were necropsied and a range of tissues collected. Tissues (tonsil, kidney, ileum, spleen, lung, brain) were negative on virus isolation using PK15 and vero cell culture, and were negative to PCR tests for the three diseases. Grossly no abnormalities were noted other than a pale yellow liver. Histological examination showed no evidence of infectious disease, and specifically no evidence of the pneumonia, encephalitis, myocarditis or vasculitis expected in PRRS. Ileum and tonsils were negative for *Salmonella* on culture. It was noted that the quality of fish meal being fed during the period of neonatal mortality was poor, and the problem resolved when better quality feed was introduced. It was concluded that the problem was likely to be feed related and not of an infectious nature.

### Mortalities in yellow-eyed penguin chicks investigated

The yellow-eyed penguin (*Megadyptes antipodes*) is a large distinctive bird found on Stewart, Auckland and Campbell Islands and along the southeast coast of the South Island. During the 2006 breeding season high mortality was observed in chicks on Stewart Island. There was 100% mortality in chicks up to four weeks of age at some locations. IDC investigated the possible causes of this mortality in the 2007 breeding season in cooperation with the Department of Conservation (DOC), the Yellow-eyed Penguin Trust and Massey University. The aim was to determine the causes of high chick mortality in the first few weeks of life, and in particular to establish the causative agent of a novel diphtheritic stomatitis that had been observed in chicks the previous year. The data suggested that nutrition was the primary cause of chick mortality with disease playing a significant role in some years. This investigation will be the subject of a future Surveillance magazine article.

### Pacheco’s disease ruled out

The overnight death of a short-billed corella (*Cacatua sanguinea*) was reported to the 0800 freephone by its owner. The bird was 23 years old and had been imported into New Zealand from Australia when it was a year old. The bird was housed alone in an outside aviary and had shown no signs of illness before its death. Massey University’s veterinary pathology staff conducted a postmortem and ruled out Pacheco’s disease on gross and histopathological findings. The liver, which is the main organ affected in Pacheco’s disease, showed no disease changes or signs indicative of herpesvirus infection. The cause of death was attributed to severe haemorrhagic enteritis with terminal head trauma, and the body condition of the bird pointed to an underlying chronic condition rather than a sudden death event. The cause of the enteritis was not diagnosed; histology of the intestines showed no evidence of infectious disease, although there was a freezing artefact that may have limited interpretation. *Salmonella* spp cultures were negative.

### Avian influenza and Newcastle disease ruled out

A Gribbles veterinary pathologist informed MAF of a mute swan (*Cygnus olor*) submitted for routine postmortem. The five-month-old male was one of two cygnets, from a family group of eight, that had died three weeks apart. The two adult swans, the remaining four cygnets and wild ducks in the vicinity of the pond all appeared healthy; The dead cygnet was in good body condition and all organs appeared grossly normal. Histology revealed widespread focal areas of supplicative to granulomatous inflammation in the liver, intestine, peritoneum and heart, with scattered focal non-suppurative inflammatory lesions affecting the brain and meninges. All other tissues were unremarkable. Liver lead levels were normal and bacterial culture of a liver sample revealed a heavy mixed growth. Notifiable avian influenza virus and Newcastle disease virus were not detected using PCR assays on tissue samples, cloacal and pharyngo-tracheal swabs. The distribution and nature of the histological lesions were considered highly suggestive of a recent bacteraemia or septicaemia. Enteric, peritoneal and air sac lesions were of longer duration than those in liver, heart and brain, suggesting a possible source of infection from the gut. No further deaths were reported from the property.

A member of the public phoned the MAF 0800 number on discovery of many dead paradise shelducks (*Tadorna variegata*) at a pond near their Hamilton residence. An AsureQuality authorised person visited the site and reported at least 40 dead birds, which had been shot. A nearby maimai contained sacks of maize and it appeared that ducks were being fed in preparation for the duck shooting season. The allowed period for shooting ducks in 2008 was 3 May to 29 June; this case was reported to Fish and Game New Zealand, because the shooting was outside of the season.

A member of the public reported several hundred sparrows found dead along the shop frontages of a busy city address. A substantial amount of grain was also found scattered in the street suggesting the birds may have been poisoned. The necropsies of six birds were unremarkable. Cloacal swabs were negative on PCR testing for avian influenza. Liver and brain tissues submitted for histology showed inflammatory changes consistent with a bacterial disease
such as salmonellosis. However, intestinal samples were negative on bacterial culture for *Salmonella* species. Grain was tested for a variety of toxicological agents. Pirimiphos-methyl was detected at a very low level (0.014 mg/kg), below the LD50 for birds (10–50 mg/kg). However, there had been torrential rain during the period the birds were discovered and it is possible that any toxicological agent had been washed off. Deaths stopped following the initial report. The cause of death was not determined but neither salmonellosis nor poisoning can be excluded.

**Exotic bee mite ruled out**

A HortResearch bee researcher noticed a number of small insects on the bottom board of hives used in a varroa research programme. An IDC Lincoln entomologist identified the specimen as *Melittiphis alvearius*, pollen mite (Family: Laelapidae). *Melittiphis* is believed to feed on stored pollen grains in the bee hive and uses worker bees for dispersal. It is regularly found in samples from the apiculture surveillance programme run by MAF Biosecurity New Zealand and is not considered parasitic.

**Tracheal mite ruled out**

A hobbyist beekeeper reported a dead beehive, with no live bees present and the honey discoloured to a cloudy grey. There was one other hive at the property and this appeared healthy. An AsureQuality apiary officer visited the property and found no evidence of disease in the frames and was of the opinion that the hive had lost its queen. Evidence pointed to the queen dying probably six weeks earlier. Diagnostic testing for *Varroa destructor*, tracheal mite (*Acarapis woodi*), small hive beetle (*Aethina tumida*) and exotic external mites (*Trpilaelaps clarea* and *T koenigerum*) was negative. The apiary had undergone routine surveillance screening about one month earlier, as part of the MAF Biosecurity New Zealand programme for exotic diseases and pests of honey bees. The screening identified a moderate number of *Melittiphis alvearius* (pollen) mites, and single *Oribatid* and *Pneumonyssus* mites, all of which are of no significance to bee health.

**Honeycomb parasite investigated**

A member of the public reported finding a small (3 mm) caterpillar in comb honey bought at a Nelson market from a hobbyist beekeeper. The specimen was identified by an entomologist at IDC Lincoln as the first or second stage instar of a wax moth, with the lesser wax moth (Order: Lepidoptera; Family: Pyralidae). *Achroia grisella*, the lesser wax moth (Order: Lepidoptera; Family: Pyralidae). The early developmental stage presented did not have all the characteristics necessary to make a more precise identification. The lesser wax moth is a relatively common pest in bee hives.

**Abalone viral ganglioneuritis ruled out**

A member of the public collected 10 paua (*Haliotis iris*) from Pukerua Bay, Wellington, in February 2008. One was described as having a large fluid-filled blister covering approximately one-quarter of its foot, with a couple of small blisters around it. The paua was removed from its shell, refrigerated and submitted for testing. The IDC Wallaceville used histology to rule out abalone viral ganglioneuritis, and culture to screen for bacterial and fungal causes of disease. No histopathological evidence of clinical abalone viral ganglioneuritis was found. Bacterial growth of *Vibrio* sp and *Flavobacterium* sp was found although these organisms are likely to be a secondary infection. While fungal culture was negative, the blister area was also found to contain small pear-shaped structures, and an apparently early lesion appeared to have structures resembling fungal hyphae. These findings suggest the primary lesion is fungal but the diagnostician noted that a microsporidian parasitic infection was not ruled out. The results were inconclusive but no evidence of an exotic disease agent was found. No further reports of diseased paua have been received from the region.

**Exotic marine algae ruled out**

A member of the public submitted an empty paua shell to the Department of Conservation (DOC) office in Picton. The paua had been collected in Tory Channel, Marlborough Sounds, and had what was described as an unusual algal growth, which the informant was concerned may be an exotic alga. The DOC office reported it to MAF, and the paua shell was submitted to the Marine Invasives Taxonomic Service (provided by NIWA) for identification. The sample was in a decayed state when it arrived, so a definitive identification was not possible. The ‘growth’ appeared to be a type of encrusting sponge. It was not suspected to be an exotic species, and no further action was taken.

**Myxozoan parasite confirmed**

An ex-commercial fisherman observed a school of approximately 1,000 12 cm yellow-eyed mullet (*Aldrichetta forsteri*), and estimated 80% had white lesions covering their head. The fish were in an estuary of the Awanui River. Two fish were collected and submitted to the Ministry of Fisheries office in Kaitaia, who contacted the MAFBNZ IDC marine investigator. The fish had been frozen prior to being submitted. Histopathology revealed a severe myxosporean parasite infestation covering the epidermis over the cranium. The epidermis was heavily infiltrated with numerous, large cystic structures containing myxospores. Wet preparations were used to identify the spores to the genus *Myxobolus*. The parasite was further identified as *Myxobolus aldrichetti*, due to host identity. While the infestation was reportedly highly prevalent in the school of fish observed, it was not associated with mortalities. This is the first New Zealand report of this parasite, which has only ever been reported from yellow-eyed mullet in Australia. It is likely this parasite occurs naturally in New Zealand, reflecting its host range, but has gone undetected or unreported until now. While some species of *Myxobolus* have had notable impacts on aquaculture and fisheries, for example *Myxobolus cerebralis* (the causative agent of whirling disease in salmonids; present in New Zealand), this species has not been associated with significant disease in Australia, and it is not
likely to be of significance to the yellow-eyed mullet fishery in New Zealand.

**Myxozoan parasite ruled out**

An ex-commercial fisherman caught a 29 cm snapper (*Pagrus auratus*), which when filleted appeared to have soft milky flesh. The fish was of one of ten fish line-captured from Orewa Beach, Auckland. Other snapper caught on the day appeared normal. Concerned it may be a diseased fish, the person contacted the Ministry of Fisheries, who passed the call on to MAFBNZ. A myxozoan or microsporidian parasite was suspected. The frozen fillets and carcass of the affected fish were submitted to IDC Wallaceville. No parasitic cysts were detected on microscopic examination.

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