

Quarterly report of investigations of suspected exotic diseases

Exotic vesicular diseases ruled out

A veterinarian in Blenheim called the MPI exotic pest and disease hotline to report oral mucosal erosions, coronary band separation, corneal oedema and bloody urine in a single animal from a mob of 1-year-old cattle. The mob had been in contact with sheep within the previous few weeks. Oral erosions and coronary band lesions can be caused by exotic vesicular diseases such as foot-and-mouth disease, but also by endemic diseases such as malignant catarrhal fever (MCF) caused by ovine herpesvirus-2 (OHV-2). The animal was moribund and subsequently euthanased. A full set of tissues were taken for histology and additionally blood was tested by ELISA for bovine viral diarrhoea virus (BVDV) and by PCR for OHV-2. Histologically, perivascular inflammation was present within the kidney, mucosa and haired skin, consistent with clinical MCF. BVDV ELISA was negative. PCR for OHV-2 was positive. The clinical and epidemiological picture, histological results, and molecular results supported a diagnosis of MCF, and enabled rule-out of exotic disease. The investigation was closed.

A non-farming member of the public called the MPI exotic pest and disease hotline to report having heard secondhand of an outbreak of foot-and-mouth disease on a local orphan lamb-rearing farm. Reportedly one staff member had also contracted the disease. The duty Incursion Investigator identified the veterinary practice servicing the farm. Discussion with two veterinarians who had attended the farm in the previous days and weeks confirmed the Incursion Investigator's suspicion that the notifier was describing an outbreak of orf. Foot-and-mouth disease was ruled out and the investigation closed.

An MPI meat plant veterinarian in Wairoa called the MPI exotic pest and disease hotline to report a burst vesicle-like ulcer on the nose of a single cow from a mob of 29 beef animals. Exotic causes of vesicular disease in cattle include foot-and-mouth disease virus, among others. Endemic causes of ulcers

Exotic disease investigations are managed and reported by the Ministry for Primary Industries (MPI) Diagnostic and Surveillance Services Directorate, Wallaceville. The following is a summary of investigations of suspected exotic disease during the period from October to December 2018.

in cattle are many, including infectious and toxic diseases, and trauma. The farmer confirmed that the 29 cattle had been housed together, with no foreign visitors or imports to the farm within the past 3 weeks, and he had seen no disease in any other animal on the farm. The farmer had not noticed the lesion prior to load-out. The notifying veterinarian provided photographs of the affected animal, and closely examined it and the remaining animals, which were all healthy with no lameness or drooling. The affected animal had only the one nasal lesion and no oral or foot lesions. Exotic vesicular disease was excluded based on history and clinical signs in both the affected animal and herdmates, together with epidemiology. The animals were re-checked the following morning and were still all healthy, with no signs of exotic vesicular disease. The mob was slaughtered as per usual practice, and skin from the lesion was collected into formalin for microscopic examination. Blood samples were also collected for exclusion of endemic disease if needed. Histology supported a traumatic cause of the lesion, and no evidence of infectious disease agents was evident. Exotic disease was excluded as a cause of the lesion; trauma was confirmed as the likely cause, and the investigation was closed.

Lumpy skin disease ruled out

A veterinarian called the MPI exotic disease hotline to report a farm where about six out of 400 3-year-old cows were affected with nodular lesions in their hides. An exotic disease investigation was initiated to exclude lumpy skin disease virus (LSDV) as a possible causative agent.

On affected animals multiple lesions were present, which were generally

circular in shape, 1–5 cm in diameter) and distributed around the body, but particularly on the neck, shoulder and flank. Another animal had been affected with similar lesions at the same time the previous year.

Several biopsies (fixed and fresh) were collected from three of the affected animals. PCR tests were negative for LSDV and bovine herpesvirus type 2 (the cause of pseudo-lumpy skin disease). Histological sections indicated that demodectic mites could have been responsible for some or all of the lesions seen. The most significant feature from all sections was a variable, mixed, often eosinophilic inflammation in the dermis and a nodular granulomatous inflammation with furunculosis. On several sections from one affected cow, demodectic parasites were observed in the dermal layers. Exotic LSDV was excluded and investigators concluded that demodectic mites was the likely cause of the lesions observed.

Malignant catarrhal fever confirmed

A veterinarian called the MPI exotic pest and disease hotline to report an outbreak of malignant catarrhal fever (MCF) in a group of 162 heifers. MCF usually presents as sporadic mortality, but outbreaks resulting in a number of affected animals have been recorded (Pardon et al. 2009; Moore et al. 2010). In this outbreak 7 percent (12/162) of animals died over a period of 16 days (9–25 September 2018). A characteristic of the outbreak was that cattle presented with clinical signs after a change in the weather, e.g. following a cold snap. There was no indication that a concurrent condition formed part of the sequelae. No significant changes were seen in CBC or blood biochemistry carried

out on several of the affected animals, and gross pathology and histology of tissues collected were consistent with MCF as a sole diagnosis. Blood from several affected cattle was negative for bovine viral diarrhoea (BVD) by PCR. Conventional PCR for herpesvirus was carried out on the buffy coat of blood in EDTA collected from affected animals. DNA sequencing from the PCR product produced from the reaction confirmed ovine herpesvirus 2.

Anthrax ruled out

A veterinarian contacted MPI about a mixed-age ewe that had died suddenly in transit to a slaughter plant. The ewe was one of 350 in the shipment, with none of the other animals displaying any signs of disease. A blood smear was collected from the dead ewe. No organisms consistent with *Bacillus anthracis* were seen after staining with polychrome methylene blue.

Haemorrhagic septicaemia ruled out

A veterinarian notified MPI via the exotic disease hotline of a farm where cattle were affected with pneumonia that could fit the clinical picture of disease caused by *Mycoplasma bovis* or exotic strains of *Pasteurella multocida* (haemorrhagic septicaemia). Five from a group of 14 three-year-old beef cattle had signs of pneumonia. They had rectal temperatures of > 40°C and appeared to have lost condition. Samples (serum, whole blood and nasal swabs) were collected from the affected cattle but tested negative by PCR for both *M. bovis* and *P. multocida*. Hence, exotic causes of pneumonia were excluded. The animals were later determined to have been affected by lungworm and improved after anthelmintic treatment.

Ischaemic teat necrosis excluded

A dairy veterinarian called the MPI exotic pest and disease hotline to discuss teat lesions in a dairy heifer. The veterinarian was considering whether ischaemic teat necrosis (ITN), an emerging condition in the UK but not yet reported in New Zealand, should be considered as a differential.

One heifer of 70 in a 350-head spring-calving herd developed lesions on two rear teats 7–10 days after calving. Bruise-like lesions commenced at the

teat ends before turning black and falling off. There was no smell associated with the lesions and the heifer was not seen to chew or lick at her teats. The heifer did have unusual udder and rear teat conformation. There were no other teat conditions in the herd. Based on the clinical signs and the progression of the lesions, the duty Incursion Investigator and farm veterinarian agreed that the presentation was inconsistent with ITN and the lesions were attributable to cup damage caused at milking by poor sealing which was due to teat and udder conformation. Exotic disease was ruled out and the investigation closed.

ITN was first reported in 2004 (Blowey 2004) and there has been an anecdotal increase during 2014–2015 in mainland UK, where it is seen primarily in heifers during the first 2–3 months of lactation (Clegg et al. 2016). It can affect just a single animal in a herd (Hayley Crosby-Durrani, pers. comm.). Red-to-black lesions develop on the medial aspect of the base of the teat and then may extend down the teat (University of Liverpool, n.d.). There can be intense irritation, with cows licking or chewing at the teats and more severely affected animals removing entire teats. Some report a fetid smell associated with the lesions (Clegg et al. 2016). The pathogenesis and epidemiology of ITN is poorly understood. Digital dermatitis treponemes may be involved (Clegg et al. 2016).

An epidemiological study is currently being conducted in the UK with a view to determining incidence and risk factors. Samples from affected and unaffected animals are also being subjected to metagenomic analysis to attempt to ascertain the potential for an aetiological agent Hayley Crosby-Durrani, pers. comm.

Exotic causes of sheep abortion excluded

A veterinarian from North Canterbury called the MPI exotic pest and disease hotline to report an outbreak of abortions in a large mob of Romney sheep, concurrent with a non-specific lameness in some ewes. Ewes began aborting 2–3 weeks prior to expected lambing, and continued throughout lambing. There was no disease in the ewes. Outbreaks of lameness can be associated with foot-and-mouth disease (FMD) but this was ruled out by negative

FMD virus PCR tests on serum from 60 ewes before proceeding with other testing. Outbreaks of abortion can be caused by several exotic agents, including *Chlamydia abortus* (the agent of ovine enzootic abortion disease) and *Coxiella burnetti* (the agent of Q fever), and by endemic infectious agents such as border disease virus (a pestivirus) and the agent of hairy shaker disease, *Campylobacter fetus*. Other possibilities include *Listeria monocytogenes* infection, *Helicobacter* spp., and *Toxoplasma gondii*. Abortion in sheep may also be related to *Leptospira* serovars, particularly *L. interrogans* serovar Pomona.

Serum samples from 60 ewes were tested by ELISA for *Chlamydia* spp. antibodies and for Q fever antibodies, with 12/60 (20 percent) and 36/60 (60 percent) positive respectively. Placental and fetal tissues did not show lesions consistent with Q fever, and tissues from three fetuses were negative for *Coxiella burnetti* by PCR, and it was concluded that the low reactor rate was most likely representative of cross-reaction. The positive reaction to *Chlamydia* did not differentiate between *C. abortus* (exotic) and *C. pecorum* (endemic; the cause of sporadic bovine encephalomyelitis and an occasional cause of sheep abortion). Serology of 25 ewes was also negative for *L. Pomona*. Stomach contents of five fetuses were negative on culture for *Salmonella*, *Listeria* and *Campylobacter*, and two fetuses were negative by PCR for *Toxoplasma* and *Helicobacter*. Towards the end of the outbreak, a few spindly lambs were identified, and these tested positive by serum PCR for hairy shaker disease, but other fetuses earlier in the outbreak were negative. PCR tests on heart, blood, lung, and placenta of three fetuses were positive for a *C. pecorum*-specific PCR, as were liver, lung, stomach contents and placenta from four fetuses. Immunohistochemistry for *Chlamydia* spp. was positive on the fixed placentas from two aborted lambs, showing *Chlamydia*-like inclusion bodies with positive staining, often associated with areas of inflammation and necrosis. *C. pecorum* was confirmed as the probable agent of this abortion storm, and exotic agents were excluded. The investigation was closed.

EVA ruled out

An MPI Animal Health Laboratory scientist called the exotic pest and disease

hotline to report that one of 18 horses in pre-export quarantine had tested positive for equine viral arteritis (EVA), with a virus neutralisation test (VNT) titre of 1:12. A titre of less than 1:4 is considered negative. New Zealand is free of EVA. Re-testing of the horse at 10-day intervals was unrewarding as serum cytotoxicity impaired test interpretation. In the meantime a review of the horse's history pointed to the test result being a false positive. The horse had been imported from Australia 15 months prior, with a negative EVA VNT. It had not been vaccinated for EVA and had tested negative along with 29 in-contact horses 3 months prior to the positive test. Seventeen horses that had been in contact in the months leading up to the positive test were negative when this horse tested positive. The horse had not displayed any clinical signs consistent with EVA. Another serum sample submitted 5 weeks after the initial positive test yielded an EVA VNT titre of 1:3, confirming that the previous test was most likely a false positive. After natural infection, EVA titres would be expected to remain elevated for years. Exotic disease was ruled out and the investigation closed.

Theileria equi excluded

A racehorse bound for Hong Kong tested positive for *Theileria equi* on pre-export serum antibody testing. A repeat blood was collected and tested for antigen by PCR, and antibody by IFAT. Both tests were negative. The investigation was closed.

An AHL scientist contacted the duty Incursion Investigator to report a *T. equi*-positive indirect fluorescent antibody Test (IFAT) in pre-export testing of a 3-year-old Thoroughbred. The horse had been born in Australia and imported into New Zealand a year earlier. *T. equi*, one of the agents of equine piroplasmiasis, is exotic to New Zealand and Australia. The IFAT had been subcontracted to an overseas commercial laboratory. Using competitive enzyme-linked immunosorbent assay (cELISA) testing, the same blood sample had tested negative at the AHL. However, to meet importing country requirements a negative IFAT test was required. Given the inherent difficulties of interpreting the IFAT test, the original blood sample and a repeat blood sample from the horse were submitted to an OIE reference laboratory for piroplasmiasis but negative

results for *T. equi* were returned on both cELISA and IFAT tests from both samples. Exotic disease was ruled out and the investigation closed.

Streptococcus parauberis confirmed

A commercial veterinary pathologist contacted MPI to report finding an apparently new-to-New Zealand species, *Streptococcus parauberis*, in a culture from an equine hoof abscess by MALDI-TOF. *S. parauberis* had apparently also recently been detected in mastitic bovine milk. This agent is not commonly reported in the veterinary literature, but has been occasionally reported as a pathogen of various species of fish. It is not reportedly emerging, and this detection is considered to be a report of an agent that has been present in New Zealand for some time. The isolate was verified by the AHL and subsequently banked for future reference. The investigation was closed.

Brucella canis excluded

A veterinarian in the Bay of Plenty called the exotic pest and disease hotline to report orchitis in a canine patient. The major exotic cause of orchitis to exclude is the exotic bacterial agent *Brucella canis*. Severe clinical signs required removal of the testicle, which was submitted for histology and revealed the presence of bacterial colonies within the spermatid cord of the testis. This was not suggestive of the patterns expected with infection by *B. canis*. Serology was negative for antibodies to *B. canis* on a *B. canis* card test, further supporting exclusion of this agent as a cause of the orchitis. The investigation was closed.

A veterinary pathologist called the exotic pest and disease hotline to report possible *B. canis* infection in a Wellington-based laboratory Retriever dog. A swollen, painful testicle had been submitted for histological examination. The dog was diagnosed with suppurative and necrotising epididymitis, which can be caused by a variety of endemic bacterial and non-infectious causes, but also be caused by *B. canis*. A serum sample from the dog tested negative to antibodies for *B. canis*, and the investigation was closed.

Canine heartworm excluded

A veterinarian notified MPI via the exotic disease hotline of a 13-year-old dog

with suspected canine heartworm as a potential differential diagnosis for heart disease. The dog had been imported from China 1 year previously. Blood submitted to the AHL (Wallaceville) tested negative for canine heartworm antigen and microfilariae by ELISA and Knotts concentration test respectively.

Canine distemper investigation inconclusive

A veterinary pathologist called the exotic pest and disease hotline to report finding lesions in a dog that were consistent with canine distemper virus infection. The 8-month-old Huntaway presented to his veterinarian with parvovirus-like melaena and distemper-like muscle fasciculations, especially of the front limbs. Autopsy showed frank haemorrhage throughout stomach and gut, and extra-dural haemorrhage in the brain. Microscopically there were regions of inflammation within the lungs and the gastrointestinal system, including intranuclear and cytoplasmic inclusions resembling distemper virus inclusions. PCR of formalin-fixed paraffin-embedded tissues was negative for canine distemper virus, but this assay is not optimised for this sample type, and it was considered it might be a false negative result. Unstained slides were sent overseas for immunohistochemistry (IHC), an assay which stains antibody-specific proteins within fixed tissue. IHC showed clear, strong staining for CDV within lesions of the gastrointestinal system and lungs, confirming the likely causative role of a distemper virus in this dog. The owner did not know whether the dog was vaccinated, as no records had been kept and it had been treated with the other farm dogs. Canine distemper virus is notifiable under the Biosecurity Act 1993, and the virus is considered not to be present in its wild type in New Zealand. The causative agent of the current case is not known but there was speculation that the dog might have had access to seals, which can carry phocine distemper virus; or to mustelids, which have their own distemper virus. A separate case of distemper virus, from January 2018 in Auckland, was likewise confirmed by IHC but had also been negative on PCR. More work remains to be done on these sporadic, suspect cases of distemper in dogs, to clarify the causative agent and whether they are related to vaccination.

Canine distemper excluded

A practicing veterinarian called the MPI exotic pest and disease hotline to report a 5-year-old supposedly unvaccinated entire male Collie/Huntaway dog that had presented with a 3-day history of anorexia, vomiting, diarrhoea, nasal discharge and neurological signs – all consistent with canine distemper virus (CDV) infection. However, the dog was afebrile, haematological exam was unremarkable, it had not been imported and it had had no contact with imported dogs. A nasal swab, EDTA blood, and serum samples were submitted to the Animal AHL (Wallaceville). PCR tests conducted on the EDTA and nasal swabs were CDV-negative. At the same time the one in-contact dog began to display similar signs and was euthanased by the owner. The presented dog recovered after 4 days of symptomatic treatment. Therefore a toxic ingestion event was raised as the most likely cause of the clinical signs in both dogs.

Meanwhile, serology subcontracted to an overseas lab returned a significant titre (384) for CDV in the serum neutralisation test (SNT). A 4-week repeat serum sample was collected and sent to the same overseas lab. Subsequently both the initial serum and the repeat sample were run on the same plate and returned significant but stable SNT titres of 256 and 128 respectively. For antibody titres to be considered significantly different, a fourfold difference must be demonstrated in paired serum samples tested at the same time. The stable titre suggested that the recent clinical episode in the dog could not be attributed to CDV. Only historical infection or vaccination could explain the stable titres. The MPI investigating veterinarian spoke to the dog owner, who then recalled that in fact the dog had been vaccinated. Exotic disease was ruled out and the investigation closed.

Leptospira interrogans serovar Canicola excluded

An MPI veterinarian contacted the Incursion Investigation team to report a dog possibly infected with *Leptospira interrogans* serovar Canicola, which had died in quarantine after a short illness including vomiting, reduced appetite, and pale mucous membranes. Clinical pathology indicated renal failure was the

likely cause of the illness. *L. Canicola* is an exotic cause of renal disease in dogs, and serum from this dog was positive (2:400) to the microscopic agglutination test. This result was followed up by PCR testing for antigen in the urine, which was negative. This indicates that no active shedding was occurring, and makes it unlikely that the dog succumbed to *L. Canicola* infection. The owners refused autopsy of the dog, precluding investigation into the cause of the sudden renal failure. The investigation was closed.

Outbreak of feline vomiting investigated

A Wellington-based veterinarian called the MPI exotic pest and disease hotline to report having been notified about at least 14 cats with self-limiting vomiting lasting a few days to a week, including occasional mild diarrhoea, no other clinical illness and no haematology changes. One month prior to this notification, MPI was notified about vomiting in cats that had occurred immediately after the Canterbury cat show (late August 2018), where up to 55 cats were reportedly affected. As the Wellington case presented with a similar clinical syndrome it was assumed that the two outbreaks were related. Causes of vomiting in cats are not well defined but can potentially include any agent causing inflammation of the gastrointestinal tract and/or metabolic diseases affecting nausea centres. This condition was assumed to be infectious owing to the large number of animals affected and the apparently rapid spread. Worldwide, infectious causes of vomiting in cats include endoparasitism, bacterial infection (e.g. *Helicobacter*-associated disease) and viral infection (e.g. feline panleukopenia). A syndrome matching this one, with acute onset of self-limiting vomiting, is not described in the literature. According to the Wellington veterinarian, there were no significant abnormalities in four cats for which haematology and blood chemistry had been done. Most of the affected cats were reportedly up to date on vaccination. The veterinarian was asked to collect samples for rule-out of common infectious agents but only one faecal sample was collected, probably because sampling took place after the main epidemic. This sample, from an affected cat with blood-tinged vomitus,

tested negative by commercial panel for *Clostridia perfringens*, feline coronavirus, feline panleukopaemia, *Giardia* spp., *Salmonella* spp., *Trichomonas* spp., *Campylobacter coli* and *C. jejuni*, but was positive for *Cryptosporidium* spp. Two other affected cats reportedly also tested positive for *Cryptosporidium* spp. on faecal testing. *Cryptosporidium* has not been reportedly associated with vomiting in cats, although it can be associated with diarrhoea in some (Santin 2013). This outbreak of apparently infectious self-limiting vomiting in domestic cats apparently propagated widely at the cat show, and spread thereafter through populations of non-show cats in several regions. However, no cats were reported to have died or experienced any other significant clinical signs. No aetiological agent was identified, although laboratory testing was limited by numbers of samples and the speed and resolution of the outbreak. If further cases occur, they should be reported to MPI in order to facilitate diagnosis. The investigation was closed.

Infectious bursal disease excluded

As part of routine infectious bursal disease (IBD) surveillance carried out by the Poultry Industry of New Zealand, serum reactors in the screening ELISA are tested by VNT at the AHL (Wallaceville). As part of routine monitoring, a free-range broiler barn was found to have 10 serum reactors (from a sample of ten birds collected at processing) in the IDEXX IBD ELISA. Samples were referred to the AHL, where a number of low-positive titres in the VNT (2 x 1:3; 1 x 1:4; 1 x 1:6; 1 x 1:8; 2 x 1:12; 2 x 1:16; 1 x 1:64) were identified. Mortality monitoring and daily bursal evaluation of any mortalities was also carried out by the farm's veterinarian, with no abnormalities detected. At processing, serum samples (25), and fresh (80) and fixed (10) bursae were collected from all barns. Serological screening using the IDEXX IBD ELISA was followed up with VNT testing, with all titres low (predominantly < 1:16). Histopathology of bursas from seropositive flocks showed that follicles were of expected cellularity and organisation, with no evidence of collapse or inflammation as would be expected from pathogenic IBD infection. Testing of all the fresh bursae (pools of 10) from

VNT-positive barns was carried out using real-time PCR for IBD serotypes 1 and 2 (Hein & Trinidad 2006). Follow-up of PCR-suspicious pools was carried out using conventional reference PCRs as described in the OIE Terrestrial Manual (Etteradossi et al. 1998; Le Nouën et al. 2006; Wu et al. 2007) and thereafter using full genomic sequencing of segment A. The full nucleotide sequence when blasted in GenBank had 88–89 percent nucleotide identity to IBDV serotype 2, and 84 percent identity to IBDV serotype 1 viruses. These findings were considered to have excluded IBD serotype 1 viruses, and to indicate the presence of a poorly characterised avibirnavirus. The OIE IBD Reference Laboratory (Ploufragan-Plouzane, France) was engaged to assist with further characterisation of the virus, and identified that the sequence clustered together with both European and American strains of IBDV serotype 2. The investigation excluded the presence of IBD serotype 1 viruses and identified the presence of an IBDV serotype 2 virus (non-pathogenic). See also the further report on p. 4)

In another case of suspect IBD identified during routine surveillance, a free-range broiler barn was identified with two serum reactors (from a sample of 10 birds collected at processing) in the IDEXX IBD ELISA. Samples were referred to the AHL, where low-positive titres (1:6, 1:12) were identified by VNT. MPI's Incursion Investigation team followed up with a cross-sectional survey of the next batch of birds placed in all barns on the farm (25 sera per barn). Mortality monitoring and bursal evaluation of daily mortalities was carried out by the farm's veterinarian, with no abnormalities detected.

Serological testing of sera from all barns, carried out at AHL using the IDEXX IBD ELISA, identified no reactors, negating the need for further follow-up serological or molecular assessments. Exotic disease was excluded and the investigation was stood down.

Avian mortalities investigated

A Waikato veterinarian called MPI via the exotic pest and disease hotline to discuss two deaths in a backyard chicken flock consisting of fifteen 5-year old Red Shavers. The chickens were noticed to be unwell one morning after having been fine the previous evening. One

presented in respiratory distress and was described as making a rattling noise when breathing. Another was hunched over with its head lowered and eyes closed, and had a darkened comb. Both died within 4 hours. Unfortunately the chickens were disposed of and unsuitable for necropsy. Aged modern brown layers are prone to developing a variety of tumours that can present as these did, but two deaths among 15 birds on one day is unusual, so exotic diseases such as avian influenza and Newcastle disease had to be ruled out. The absence of clinical signs among the 13 in-contact birds suggested against exotic disease, but nevertheless cloacal and oropharyngeal swabs from the in-contact birds were requested by the duty Incursion Investigator. These swabs were submitted to the AHL in avian transport medium, and avian Influenza and Newcastle disease were ruled out by PCR testing. The investigation was closed.

Lake Sinai virus variant 2 confirmed

An MPI scientist called the exotic pest and disease hotline to report finding that up to 45 percent of samples tested positive for Lake Sinai virus variant 2 during honey bee hive background disease surveillance. There has been an increase in detections of new or previously unreported bee viruses in New Zealand, as a result of increased research and more sensitive laboratory tests. This is not the first detection of Lake Sinai Virus variant 2 in New Zealand bees, but it is the first time this virus has been found in large numbers of hives. This finding is most likely to indicate a background level of the virus, which has been tenuously but not convincingly associated with disease overseas. The investigation was closed.

Small hive beetle ruled out

An apiary expert phoned MPI to report that a beekeeper had found a beetle resembling small hive beetle (*Aethina tumida*) on the bottom of a beehive in the Marlborough Sounds. A scraping from the bottom of the hive contained many beetles of multiple species but PHEL entomologists determined they were all endemic. The investigation was closed.

EFB ruled out

A beekeeper in Auckland reported a suspect occurrence of half-moon

disease in one of his hives. The clinical presentation of half-moon disease is very similar to that of the exotic disease European foulbrood (EFB). The Incursion Investigator arranged for an AsureQuality Apicultural Officer (AO) to discuss the finding with the notifier and assess the likelihood of EFB, which could then be tested for if it was considered a possibility. The AO determined that the hive had lost its queen and now had a laying worker bee in its place. None of the signs observed were consistent with EFB so the investigation was closed.

Exotic ticks investigated

A hospital laboratory technician called the MPI exotic pest and disease hotline to report having received a specimen of a tick from a local doctor. The tick had been removed from the chest of a holidaymaker who had recently returned from rural Queensland. The un-engorged tick was submitted to PHEL (Tamaki) and identified morphologically as belonging to the genus *Ixodes*. Unfortunately it could only be identified to genus level, as it was damaged (mouthparts missing) and the use of formalin to preserve the specimen meant that molecular assays failed. No further ticks were found. Establishment was prevented and the investigation was stood down.

A member of the public in Auckland called the exotic pest and disease hotline to report finding a tick on her dog after a walk at a local reserve. She was concerned that the tick might have transmitted a disease to her dog. The tick was sent to PHEL, where it was identified as the endemic longhorn cattle tick, *Haemaphysalis longicornis*. This tick is not known to be a viable vector for canine disease in New Zealand. This country is free of Lyme disease (caused by *Borrelia burgdorferii*) and many other tick-vectoring rickettsial diseases, and the notifier was reassured that her dog was very unlikely to have acquired any disease from this tick. The investigation was closed.

A Marlborough medical centre called the exotic pest and disease hotline to report finding a tick on a New Zealand resident who had returned 2 weeks previously from an 11-day holiday in Queensland. At the request of the duty Incursion Investigator the tick was submitted to the PHEL (Christchurch), where it was identified as an adult female Australian

paralysis tick, *Ixodes holocyclus*. This is the tick most commonly encountered on humans returning from Australia, where its normal range spans almost the entire east coast (Heath & Hardwick 2011). It can cause life-threatening paralysis in domestic animals through envenomation, and in humans it can cause localised swellings, anaphylactic reactions and tick paralysis. It can also transmit *Rickettsia australis*, the agent of Queensland tick typhus, and *Rickettsia honei*, the agent of Flinders Island spotted fever. Recent research has also identified it as a carrier of two novel “*Candidatus Neoehrlichia*” spp. and a novel *Ehrlichia* species (Gofton et al. 2015). The medical practice was advised to raise any human health concerns with a Medical Officer of Health. Rarely is more than one tick found on a returning traveller, and even if there was more than one present, or even tick eggs, the strict bioclimatic requirements of *I. holocyclus* mean that survival or establishment are highly unlikely (Heath & Hardwick, 2011). Therefore with the destruction of this tick the incursion event was terminated and the investigation was closed.

Swine exotic diseases excluded

An Auckland-based veterinarian called the MPI exotic pest and disease hotline to report that a 4-month-old Kunekune piglet was showing clinical signs consistent with several exotic pig diseases. The piglet had been obtained along with a healthy littermate 4 days previously from a breeder. Clinical signs included a fever and cyanotic (blue) ears. Exotic rule-outs for ear cyanosis in pigs include porcine respiratory and reproductive syndrome virus, classical swine fever virus, and African swine fever virus. Endemic causes of ear cyanosis include septicaemia from a number of bacterial causes. Serum and whole blood were submitted to the AHL for antibody and antigen tests respectively, for all three exotic differential diagnoses. All tests were negative and the investigation was closed. The piglet recovered with supportive therapy and was doing well at last re-check.

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