

# WILDLIFE DISEASE SURVEILLANCE

Wildlife surveillance is an important part of New Zealand's national surveillance system for exotic and emerging pests and disease. The purpose of the Ministry for Primary Industries' (MPI's) wildlife surveillance programme is to:

- facilitate early detection of exotic and emerging diseases;
- support New Zealand's statements of freedom from specific pests or diseases;
- provide baseline information on endemic disease occurrence in New Zealand wildlife; and
- support fulfilment of New Zealand's international reporting obligations.

The MPI national exotic pest and disease notification system provides for the reporting and investigation of unusual disease events in all animals, including wildlife. The MPI pest and disease emergency hotline (0800 80 66 99) assists New Zealanders to meet their obligations under section 44 of the Biosecurity Act 1993, which requires every person to report to MPI any suspected cases of organisms not normally seen or otherwise detected in New Zealand. This legal requirement enables the appropriate investigation of suspected cases of exotic or emerging diseases identified in wildlife by organisations or individuals outside of MPI surveillance programmes.

In addition to investigating reported events, MPI undertakes monitoring to detect changes in disease occurrence that may indicate an emerging disease requiring further investigation. As well as using MPI's own data, this work also draws on key disease occurrence information created by other organisations undertaking surveillance in, or working with wildlife, in particular the Department of Conservation (DOC). Trends in calls received through the MPI pest and disease emergency hotline are analysed by veterinary epidemiologists. Primarily bird reports, these also contribute to MPI's Avian Influenza Surveillance Programme (see page 19). Routine disease diagnoses in wildlife by veterinary diagnostic laboratories are also monitored. The results of samples from feral animals, captive, or free-living native animals meeting a sick animal case criterion that are submitted to veterinary diagnostic laboratories by veterinary practitioners, DOC field workers, research workers or others, are provided to MPI as anonymous summary data.

Reports of particular interest are summarised in the *Quarterly review of diagnostic cases* article in each edition of *Surveillance*. In addition, causes of mortalities of threatened or critically endangered native species are monitored. As part of a DOC contract undertaken by Wildbase Pathology (part of the Institute of Veterinary, Animal and Biomedical Sciences (IVABS), Massey University, Palmerston North), animals found dead in the field or in captive facilities are collected and sent for post-mortem examination by veterinary wildlife pathologists. In 2012 MPI trialled a contract to provide for ancillary laboratory testing to help determine the cause of death in these cases, and this has been maintained in 2013.

Details of wildlife cases held in the Huia database and investigated by MPI disease investigators are discussed below.

## Wildlife cases processed by veterinary laboratories

Records of wildlife mortality and morbidity are held in the Huia database, which is jointly owned by DOC and Massey University and maintained by Wildbase Pathology at IVABS. Most of the cases involve mortalities in indigenous birds, particularly threatened species submitted by DOC for diagnosis by Wildbase Pathology. The database also holds some case records from surveillance activities, private veterinary laboratories, and researchers. **Figure 1** shows avian cases compared to cases involving other types of wildlife over the period 2008–2012. This year the number of avian cases returned to more usual levels following the peak in 2011 after the container ship *Rena* was wrecked on Astrolabe Reef, Bay of Plenty, in October of that year.

In 2012, birds comprised 91 percent of submissions, with lizards 3 percent, cetaceans (whales and Hector's dolphins, *Cephalorynchus hectori*) 2.5 percent, pinnipeds 1.5 percent and fish 1 percent. Tuatara (*Sphenodon punctatus*), bats and other wild animals totalled less than 1 percent. No amphibians were submitted. There was a slight carryover of mortalities in seabirds undergoing rehabilitation after treatment for oiling as a result of the *Rena* oil-spill response, which lasted from October to December 2011. Early in the year mortalities also occurred in fluttering shearwaters (*Puffinus* spp.) undergoing translocation, probably due to heat stress and dehydration. Towards the end of 2012 there was a recurrence of diphtheritic

stomatitis in yellow-eyed penguin (*Megadyptes antipodes*) chicks in their mainland breeding grounds of coastal Otago.

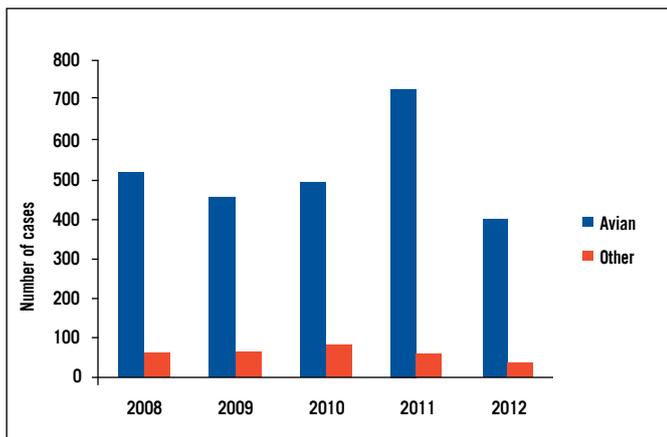


Figure 1: Numbers of wildlife cases in birds and other taxonomic groups recorded in the Huia database, 2008–2012

Disease surveillance was undertaken by DOC in highly threatened species such kakapo (*Strigops habroptilus*), black stilts (*Himantopus novaezelandiae*) hihi/stitchbirds (*Notiomystis cincta*) and the endangered species of kiwi (*Apteryx* spp.) throughout the year. A small number of wild introduced birds were examined because of the interest in preventing transmission of diseases such as malaria, beak and feather disease and salmonellosis, from introduced birds to native species.

The geographic distribution of avian wildlife cases examined in 2012 is shown in **Figure 2**. The highest numbers of cases submitted were from the Manawatu/Whanganui and Otago regions. The Manawatu/Whanganui cases included those from National Wildlife Centre at Mt Bruce/Pukaha and from Tongariro National Park. The Otago submissions included those from the highly endangered population of yellow-eyed penguins of coastal Otago. The Canterbury region includes Mount Cook National Park, and has threatened species in captive breeding centres at Willowbank and Peacock Springs. Many cases submitted from the Auckland region were from threatened species populations on offshore islands such as Tiritiri Matangi, Great Barrier and Little Barrier. Locally administered wildlife sanctuaries including Mangatautari, Cape Kidnappers and Zealandia/Karori also contributed a significant number of cases.

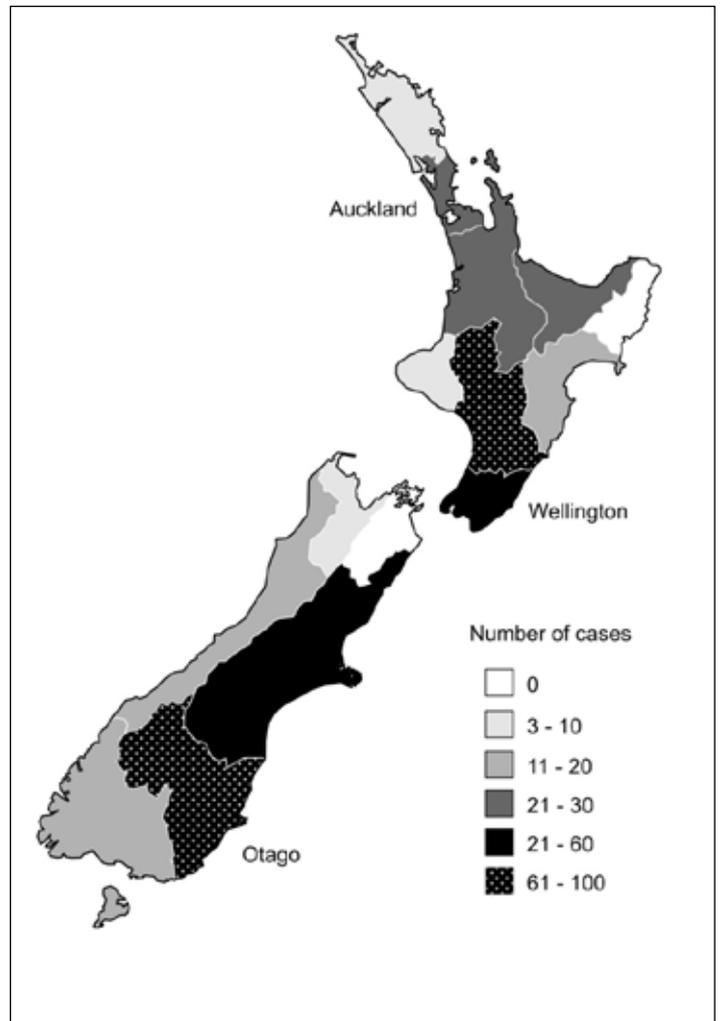


Figure 2: Map of number of bird cases recorded in the Huia database by region, 2012

## Wildlife cases of special interest in 2012

### AVIAN TUBERCULOSIS IN PENGUINS

An outbreak of avian tuberculosis occurred in captive little blue penguins (*Eudyptes minor*) being kept for public display in an enclosure that had been replanted with the use of potting mix. The two affected penguins both presented with respiratory forms of the disease. The first case occurred in an adult female bird that had been kept for several years in captivity before presenting with an acute onset of respiratory distress. At first the illness was suspected to be aspergillosis but the bird failed to respond to treatment and died 10 days later. At necropsy, it was in poor body condition and showed hydropericardium, cardiomegaly and

severe caseous granulomatous pneumonia involving both lungs.

A second case of respiratory distress and regurgitation occurred seven months later in a 10-year-old male penguin. In this case the left thoracic air sac contained a large multinodular mass occupying most of the lung and extending to the cranial pole of the left kidney.

Microscopically, both cases contained extensive coalescing heterophil granulomas surrounded by epithelioid macrophages, which contained numerous acid-fast bacteria resembling mycobacteria within their cytoplasm. Samples of the affected tissue from the first case grew *Mycobacterium avium*. Avian tuberculosis is rare in native birds in New Zealand, with previous reports in a kiwi, *Apteryx mantelli* (Davis *et al.*, 1984), two parakeets (*Cyanoramphus* spp.) and a harrier (*Circus approximans*) (Alley *et al.*, 2004). Avian tuberculosis most often presents as a chronic wasting disease, with or without chronic or intermittent diarrhoea and/or abdominal enlargement caused by hepatomegaly and ascites, indicating primarily gastrointestinal involvement. However, with these birds and the seven penguins that died in an outbreak in Nebraska, the main clinical signs and pathology involved the respiratory tract (Napier *et al.*, 2009).

### AVIAN MALARIA IN KIWI

Avian malaria caused mortality in two great spotted kiwi (*Apteryx haastii*). Both were juvenile captive-reared birds that had been released into the wild in two different regions of the South Island. The first case was seen a month after release. Initially it was in poor condition and wheezing, then it appeared gradually to improve but was found dead a few months later. At necropsy it had an enlarged spleen and liver and there were numerous haemorrhages over the heart and lungs.

The second case was a seven-week-old bird that had been released into a kiwi crèche, where it lost weight and eventually died despite supplementary feeding. At necropsy the spleen was enlarged to 28 x 20 mm and congested.

In both cases the histopathological lesions indicated extensive capillary endothelial damage, particularly in the lungs, liver and spleen. This was associated with the presence of intracytoplasmic plasmodium-like organisms in Kupffer cells, hepatocytes and splenic histiocytes. Both birds showed an interstitial pneumonia, and in the latter

there was also microthrombus formation and vasculitis in small pulmonary blood vessels. Molecular sequencing of fresh tissues of both birds identified the presence of *Plasmodium* spp. of the AFTUR5/LINN1 lineages. These cases have highlighted the potential virulence of *Plasmodium* spp. in juvenile birds in stressful situations.

### AVIPOX IN WILD BIRDS

Sporadic cases of avipoxvirus infection were the cause of mortalities in shore plovers (*Thinornis novaeseelandiae*), a kereru (*Hemiphaga novaeseelandiae*) and a variable oystercatcher (*Haematopus* sp.). Avipox infection is an ongoing problem in both wild and captive shore plovers and has also been reported previously in kereru (Alley, 2002) and oystercatchers (Johnstone and Cork, 1993).

### ERYSIPELAS IN YELLOW-EYED PENGUINS

Erysipelas infection was diagnosed for the first time in two yellow-eyed penguins (*Megadyptes antipodes*). Both cases were in juvenile birds but one was from Oamaru and the other from Codfish Island. One of the birds had characteristic ecchymotic haemorrhages over its epicardium and in the other there was swelling of the liver, spleen and kidneys, together with severe pulmonary congestion and oedema. Numerous gram-positive intracellular bacteria were found in many tissues throughout the bodies of both birds, together with evidence of an acute inflammatory reaction. *Erysipelothrix rhusiopathiae* was recovered from the liver of both birds.

### MALIGNANT NEOPLASMS

Malignant neoplasms were detected in two free-living native birds. The first case was a disseminated lymphoma in a kingfisher (*Halcyon sancta*) from the Manawatu. The bird was admitted to the Wildbase Hospital in a very weak and emaciated state and died before any stabilisation could be initiated. At necropsy the bird showed marked diffuse hepatosplenomegaly, with both the right and left liver lobes so enlarged that they were compressing and surrounding the proventriculus and gizzard. The left ovary was also enlarged and there was bilateral enlargement of the thyroid and parathyroid glands. Cytology and histopathology of the liver and ovary showed marked infiltration and replacement of the parenchyma with neoplastic lymphoid cells. As with domestic poultry, viral oncogenesis of lymphoid neoplasms is often suspected but has not yet been demonstrated in pet and wild birds.

A squamous cell carcinoma was diagnosed in a tui (*Prosthemadera novaeseelandiae*) that presented with a 20-mm-diameter soft tissue mass between the mandibles. After surgical removal the mass was found to be composed of poorly differentiated epithelial cells showing marked anaplastic changes. The mass was nonencapsulated and seen to be invading the surrounding salivary gland and lingual tissues.

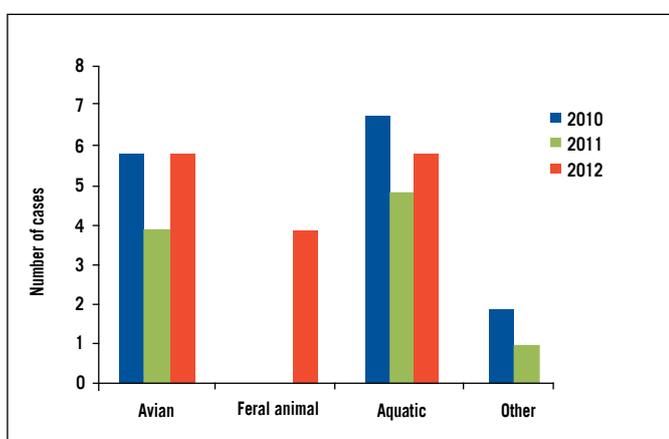


Figure 3: Annual number of suspected unwanted disease cases of wildlife investigated by IDC during 2010–2012, by broad taxonomic groups

## Wildlife cases notified via the MPI exotic disease hotline

Exotic causes of disease were ruled out in all wildlife investigations conducted by MPI in the past year (Figure 3). Avian investigations included but were not limited to avian influenza, West Nile virus and Newcastle disease testing.

In one such avian mortality event, an outbreak of botulism was suspected to be the cause of death. Botulinum neurotoxin typing was carried out on proximal gut contents from birds necropsied and determined to be positive for *Clostridium botulinum* type C. The clinical presentation, negative infectious disease testing, lack of consistent pathological lesions, and indirect detection of botulinum toxin provided strong evidence that this was an outbreak of botulism.

In another event, toxicosis with alphachoralose was identified as the cause of an avian mortality by identifying the toxin in crop contents from affected animals. A third event was identified as a malicious poisoning following examination of affected animals and exotic disease screening.

Aquatic disease events investigated in the past year included a fish mortality event in which histopathological examination and laboratory testing led to the conclusion that this was a natural event associated with the decomposition of plant material affecting water quality. In an eel mortality event, infectious disease was excluded and the cause found to be heavy rains causing changes to previously stagnant water, which combined with warm temperatures has in other cases caused eel mortality.

*Francisella tularensis*, a disease exotic to New Zealand, was excluded by PCR testing in a case of pale multifocal liver lesions in a feral rabbit. Lesions diagnostic of hepatic coccidiosis (*Eimeria stiedae*) were present on histopathological examination.

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