Wildlife Health Australia

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Wildlife Health Australia

Wildlife Health Australia (WHA)[4] is the coordinating body for wildlife health in Australia. WHA was established as the Australian Wildlife Health Network in 2002 as an Australian Government initiative to coordinate wildlife health surveillance information across Australia, to support Australia's animal health industries, human health, biodiversity, trade and tourism. WHA collates information from multiple sources into a national database — the electronic Wildlife Health Information System (eWHIS)[5] — including submissions by WHA subscribers, state and territory WHA coordinators, researchers, and university, zoo and sentinel clinic veterinarians.

During the quarter, 190 wildlife disease investigation events were reported in eWHIS (Table 1 and Figure 5), and samples were collected from 1415 wild birds for avian influenza (AI) surveillance.

This report details some of the disease and mortality events in

Table 1 Number of disease investigations reported in eWHIS, 1 April to 30 June 2020[a]

Mammals					Birds[d,e,f]	Reptiles[f]	Amphibians	Fish[f]
Bats[b]	Marsupials	Monotremes	Marine mammals	Feral mammals[c]				
100	39	1	3	6	37	4	1	1

a Disease investigations may involve a single animal or multiple animals (e.g. mass mortality event).
b The majority of bat disease investigations are single bats submitted for Australian bat lyssavirus testing.
c Feral pig (*Sus scrofa*), European rabbits (*Oryctolagus cuniculus*) and Buffalo (*Bubalus bubalis*).
d Additional sampling for targeted AI surveillance is presented elsewhere in this report.
e Includes free-ranging birds (native or feral species) and a small number of events involving birds from zoological collections and captive breeding programs.
f One disease investigation involved birds, reptiles and fish, so the total number of events reported is not equal to the sum of events under each taxonomic group.

4 www.wildlifehealthaustralia.com.au/Home.aspx

5 www.wildlifehealthaustralia.com.au/ProgramsProjects/eWHIS-WildlifeHealthInformationSystem.aspx

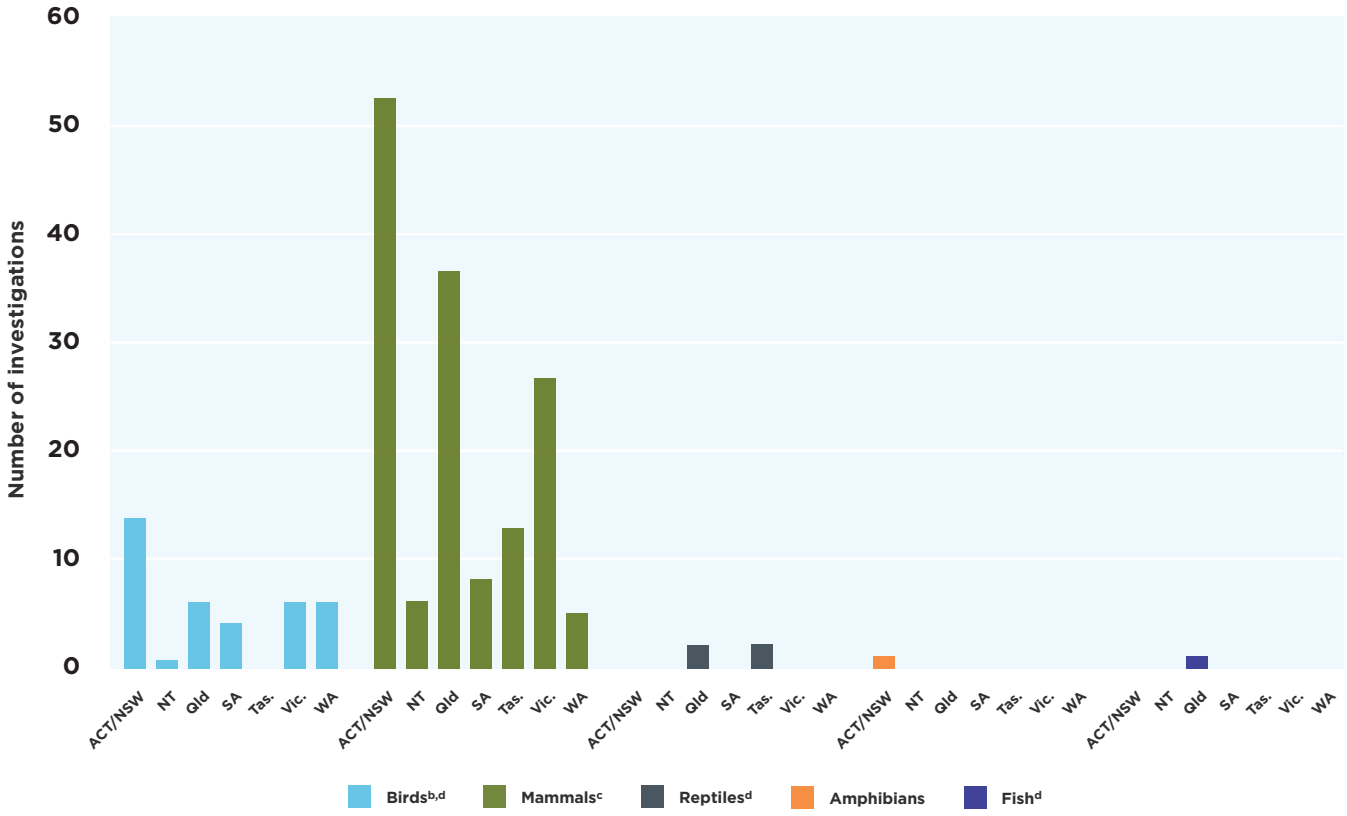

Figure 5 Number of disease investigations reported, by jurisdiction, in eWHIS, 1 April to 30 June 2020[a]

a The chart shows the number of disease investigation events reported in eWHIS. Each investigation may involve one or multiple animals.
b 'Birds' includes free-ranging birds (native or feral species) and a small number of events involving birds from zoological collections and captive breeding programs.
c Investigations involving mammals include individual bats submitted for Australian bat lyssavirus testing.
d One disease investigation involved birds, reptiles and fish, so the total number of events reported is not equal to the sum of events by taxonomic group.

free-living wildlife recorded in eWHIS this quarter. WHA thanks all those who submitted information for this report.

Wild bird mortality event summary — Newcastle disease and avian influenza exclusion

WHA received 37 reports of wild bird mortality or morbidity investigations from around Australia during the quarter; investigations may involve a single animal or multiple animals (e.g. a mass mortality event). A breakdown of wild bird events by taxonomic order is given in Table 2. Reports and samples from sick and dead birds are received from members of the public, private practitioners, universities, zoo wildlife clinics and wildlife sanctuaries. Avian influenza virus (AIV) was excluded by polymerase chain reaction (PCR) testing for influenza A in 23 events as part of Australia's general (sick and dead bird) avian influenza (AI) surveillance program. Disease caused by AIV was also excluded in the remaining 14 events, based on clinical signs, history, histopathology, prevailing environmental conditions or other diagnoses. Avian orthoavulavirus 1 (AOAV-1; also known as Newcastle disease virus or APMV-1) was excluded in 23 events by PCR testing specific for AOAV-1 and/or the pigeon paramyxovirus type 1 variant (PPMV-1).

Also this quarter, mass mortalities of feral pigeons in Beveridge were reported to a chemical standards officer at Agriculture Victoria in April; domesticated pigeons were also present in the same neighbourhood. Two rock pigeons were submitted to AgriBio for investigation. One bird tested positive for PPMV-1 by PCR on pooled cloacal and choanal swabs and histological findings included necrotising lymphocytic nephritis and pancreatitis, which are characteristic lesions for the disease. Both birds were PCR-positive for pigeon rotavirus on cloacal swabs, but one pigeon was too autolysed for further examination. The other bird had mild hepatic lesions of uncertain significance and it is presumed this bird was a carrier of rotavirus, but that death was caused by PPMV-1.

Wild bird disease investigations this quarter also found aspergillosis, botulism, *Chlamydia psittaci* infection, clostridial enteritis, parasitism, poisoning, psittacine beak and feather disease, toxoplasmosis and trauma.

Avian influenza surveillance

Australia's National Avian Influenza Wild Bird Surveillance Program[6] comprises two sampling components. The first is

6 www.wildlifehealthaustralia.com.au/ProgramsProjects/WildBirdSurveillance.aspx

Table 2 Wild bird disease investigations, by taxonomic order, reported into eWHIS, 1 April to 30 June 2020

Bird order	Common name/s for bird order[a]	Events reported[b]
Accipitriformes	Osprey, hawks and eagles	4
Anseriformes	Magpie geese, ducks, geese and swans	6
Caprimulgiformes	Frogmouth, nightjars, owlet-nightjars, swifts	1
Charadriiformes	Shorebirds	1
Ciconiiformes	Storks	1
Columbiformes	Doves and pigeons	1
Galliformes	Brush turkeys, scrubfowls and quail	2
Gruiformes	Rails, gallinules, coots and cranes	2
Passeriformes	Passerines or perching birds	5
Pelecaniformes	Ibis, herons and pelicans	1
Psittaciformes	Parrots and cockatoos	20

a del Hoyo J, Collar NJ 2014. *Handbook of the birds of the world and BirdLife International illustrated checklist of the birds of the world. Volume 1 — Non-passerines*, Barcelona: Lynx Editions.

b Disease investigations may involve a single bird order or multiple orders (e.g. a mass mortality event). The number of events reported against each bird order does not equal the total number of investigations due to multi-species events. This quarter, five wild bird events involved multiple bird orders. One event involved orders Anseriformes, Gruiformes and Pelecaniformes, the second event involved Anseriformes and Gruiformes, the third event involved Galliformes and Psittaciformes, the fourth event involved Passeriformes and Psittaciformes and the fifth event involved Psittaciformes and Pelecaniformes.

pathogen-specific, risk-based surveillance, by sampling of apparently healthy, live and hunter-shot wild birds. The second is general surveillance, by investigating significant unexplained morbidity and mortality events in wild birds, including captive and wild birds within zoo grounds (with a focus on exclusion testing for AIV subtypes H5 and H7).

Samples from sick or dead birds were discussed earlier. Sources for targeted wild bird surveillance data include state and territory government laboratories, universities and samples collected through the Northern Australia Quarantine Strategy.[7]

During the quarter, pathogen-specific, risk-based surveillance occurred at sites in New South Wales, the Northern Territory, Queensland, Tasmania, Victoria and Western Australia. All of the 1415 faecal environmental swabs collected from waterbirds were tested for AIVs. Based on results received to date, no highly pathogenic AIVs were identified. However, targeted surveillance activities this quarter continued to find evidence of low pathogenicity avian influenza (LPAI) viruses.

Molecular analyses of AIVs detected through the targeted surveillance activities:[8]

- contribute to the understanding of AIV dynamics in Australia
- help maintain the currency of diagnostic tests
- serve as a point of comparison when novel AIV strains of importance emerge overseas.

The findings highlight the need for poultry producers to remain alert and ensure that appropriate biosecurity arrangements and effective risk reduction measures for AI are in place at their premises.

Australian bat lyssavirus

Reports to WHA for the six months from January to July 2020 included 252 bats tested for Australian bat lyssavirus (ABLV) from all states and territories.

Bat submissions were made for a variety of reasons:

- 60 cases involved contact with the potential for ABLV transmission to humans; of these
  - 17 were also associated with trauma (e.g. entanglement in barbed-wire fence or fruit-tree netting, vehicle collision with car, fractures)
  - 5 displayed neurological signs (e.g. depression, difficulty hanging, aggression, frequent vocalising, paralysis, biting)
  - 4 displayed other (non-neurological) signs or presentations (e.g. heat stress, orphaned, metabolic disorder)
  - 3 also involved contact with a pet dog or cat
  - the remainder had no further history reported

7 www.agriculture.gov.au/biosecurity/australia/naqs

8 Haynes L, Arzey E, Bell C, Buchanan N, Burgess G, Cronan V et al. 2009. Australian surveillance for avian influenza viruses in wild birds (July 2005 to June 2007). *Australian Veterinary Journal*; 87(7): 266–272; Grillo VL, Arzey KE, Hansbro PM, Hurt AC, Warner S, Bergfeld J et al. 2015. Avian influenza in Australia: a summary of 5 years of wild bird surveillance. *Australian Veterinary Journal*; 93(11): 387–393.

- 110 cases involved contact with a pet dog (92), cat (16) or both (2)
- 42 cases were associated with trauma (e.g. entanglement in barbed-wire fence or fruit-tree netting, electrocution, vehicle collision, intentional abuse, fractures, wing-membrane damage)
- 21 bats displayed neurological signs (e.g. seizures, twitching, poor coordination, depression, nystagmus, inability to fly, protruding tongue, difficulty swallowing, leg weakness, change in voice)
- 10 bats displayed other (non-neurological) signs (e.g. heat stress, emaciation, dehydration)
- 8 bats were found dead
- 1 bat had no further history reported.

In the first half of the year, ten bats were confirmed positive for ABLV by fluorescent antibody test and PCR testing for pteropid ABLV ribonucleic acid (RNA). Eight of these were grey-headed flying foxes (*Pteropus poliocephalus*) and two were unspecified flying foxes (*Pteropus* sp.). Four were from New South Wales, four from Victoria and two from Queensland. Six bats showed neurological signs such as tremors, change of voice, leg weakness and aggression. One bat was submitted for testing after potential contact with pet dogs. The other three bats presented with non-neurological signs or trauma. Potentially infectious human contact was reported for one of the cases, and clinical advice was provided by an experienced public health official.

More information on ABLV testing of bats in Australia is available in ABLV Bat Stats.[9] ABLV is a nationally notifiable disease in Australia. Cases of suspect ABLV infection or exposure should be reported to the Emergency Animal Disease Watch Hotline on 1800 675 888.

9 www.wildlifehealthaustralia.com.au/ProgramsProjects/BatHealthFocusGroup.aspx

Francisella tularensis excluded in possums; two probable cases in humans

Reported in collaboration with Claire Harrison and Ofir Schwarzmann, NSW Department of Primary Industries; Keira Glasgow, NSW Health; Louise Hatton, NSW National Parks and Wildlife Service; and Karrie Rose, Australian Registry of Wildlife Health.

The bacterium *Francisella tularensis* is found in a range of wildlife species across the northern hemisphere. The bacterium causes the disease tularaemia and can be transmitted to humans following contact with infected wildlife or via ticks, biting insects and mosquitoes. In 2016, tularaemia was identified for the first time in Australian animals in two ringtail possums (*Pseudocheirus peregrinus*), following next-generation molecular analysis of archived samples collected from two separate clusters of common ringtail possum deaths that had occurred in New South Wales in 2002 and 2003.[10] Two human cases of tularaemia had been confirmed in Tasmania in 2011; both people had a history of contact with possums. The infective agent identified in the ringtail possums in 2016 was one of the four subspecies of *F. tularensis* (*Francisella tularensis* subsp. *holartica*) and was very similar to the genomic material identified in the 2011 human cases in Tasmania.[11]

Since 2011, tularaemia has been excluded by gross, histological and/or molecular diagnostic in 27 mortality and/or morbidity events involving possums (*Pseudocheirus* sp. and *Trichosurus* sp.) in Australia. This quarter, tularaemia was excluded in two possum mass-mortality events.

In the first event, in May 2020, two adult and two sub-adult captive ringtail possums (*Pseudocheirus peregrinus*) out of five in a sanctuary enclosure in South Australia were found dead overnight. On gross post-mortem, the two adult possums showed multiple white spots all over the surface of the liver. Subsequent histopathology at Gribbles Veterinary Pathology revealed multi-focal necro-suppurative hepatitis. There were no significant histological lesions seen in the heart, lung or kidney samples submitted. Samples sent to the Australian Centre for Disease Preparedness (CSIRO-ACDP; previously the CSIRO Australian Animal Health Laboratory) were negative for *Francisella tularensis* via PCR on fresh (n=1) and fixed lung samples (n=2). The liver samples available were not suitable for *F. tularensis* PCR. The cause of the hepatitis was not determined, due to limited samples.

The second event was in Tasmania, also in May 2020. One of three ringtail possums found dead at the base of a peppermint gum over a three-day period was submitted to the Tasmanian Animal Health Laboratories (AHL). Histopathology revealed multi-organ streptococcal septicaemia. *Francisella tularensis* was excluded via PCR on frozen liver, lung, heart, brain, spleen and lymph node samples sent to the CSIRO-ACDP.

There have been two probable cases of tularaemia in people this quarter in New South Wales. In early March 2020, a woman was bitten and scratched by a ringtail possum in a Northern Sydney suburb and subsequently developed symptoms including swollen lymph glands, fatigue and sore throat. Further testing was pursued, but was unable to

10 Eden JS, Rose K, Ng J, Shi M, Wang Q, Sintchenko V, Holmes EC (2017) *Francisella tularensis* ssp. *holarctica* in ringtail possums, Australia. *Emerging Infectious Diseases*; 23: 1198–1201.

11 *F. tularensis tularensis* (Type A) has not been detected in animals in Australia.

confirm the diagnosis. This is the first probable case of locally acquired tularaemia in a person in New South Wales.[12] A second probable case of tularaemia in a person was identified in June, in a laboratory setting in New South Wales. Exposure to the bacterium likely occurred during necropsy of Australian wildlife, none of which were possum species.[13] The source of the infection in this second case has not yet been identified. As at 24 July 2020, further laboratory testing is ongoing to confirm the diagnosis. NSW Health, NSW Department of Primary Industries (NSW DPI), NSW National Parks and Wildlife Service and the Australian Registry of Wildlife Health — Taronga Conservation Society Australia (the Registry) worked together to provide information to members of the public, wildlife rehabilitators and veterinarians regarding the necessary precautions and personal protective equipment required when interacting and/or working with wildlife. The Registry, NSW Health and NSW DPI are collaborating in research to better understand the wildlife host(s), and the geographic and temporal distribution of tularaemia in the Sydney basin.

Australia is home to several native and feral mammal species that are likely to be susceptible to tularaemia. Whilst *F. tularensis* is considered to be extremely rare in Australia, tularaemia should be considered in any acute mortality events in wildlife, in particular in possums, rabbits, hares and rodents (species known to be susceptible to infection based on overseas studies) or species that inhabit similar ecological niches to ringtail possums (see Appendices 1 and 2 in Guidelines for Sample Submission: Tularaemia).[14] Wildlife carers and those working closely with Australian wildlife should be aware of tularaemia and take appropriate hygiene and infection control precautions. More information can be found in the WHA fact sheet and on the NSW DPI website.

Chlamydiosis and other causes of mortality in wild birds in New South Wales

Reported in collaboration with Claire Harrison and Ofir Schwarzmann, NSW Department of Primary Industries; Keira Glasgow, NSW Health; Louise Hatton, NSW National Parks and Wildlife Service; and Karrie Rose, Australian Registry of Wildlife Health.

There have been a number of reported bird mortalities this quarter, with over 80 birds from several species found by members of the public across multiple locations in the Blue Mountains, Central Tablelands and Riverina regions of New South Wales. Many birds in these events were emaciated, possibly related to reduced food availability due to the impact of the significant and widespread bushfires in December 2019 and January 2020.

Diagnostic samples were submitted via wildlife carer networks, and the Registry investigated the mortality events. Findings included avian chlamydiosis, psittacine beak and feather disease (PBFD), organophosphate poisoning, trauma, and enterocolitis with concurrent cryptosporidiosis. Samples sent to NSW Elizabeth Macarthur Agricultural Institute (EMAI) were negative for AIV and AOAV-1.

Avian chlamydiosis, caused by the bacteria *Chlamydia psittaci*, is a contagious, systemic and occasionally fatal disease of wild birds, with infection detected in at least 30 orders and 460 species of birds worldwide. Avian strains of *C. psittaci* can also infect humans, causing disease varying from mild flu-like illness to severe pneumonia. It can be transmitted from pet or wild birds to humans directly, or via exposure to aerosolised particles e.g. from gardening activities.[15] Avian chlamydiosis was confirmed in a number of Australian king parrots (*Alisterus scapularis*) and crimson rosellas (*Platycercus elegans*) during investigations into the wild bird mortalities outlined above. Diagnosis was made on the basis of clinical and gross post-mortem presentation, histologic findings and PCR detection of *C. psittaci* in samples of fresh spleen, liver or cloacal swabs at EMAI. *C. psittaci* was also detected by PCR in the liver or spleen of a number of the wild birds investigated as part mortalities outlined above, but found to have other diagnoses (e.g. PBFD or enterocolitis) or no histological lesion, including Australian king parrots and crimson rosellas. In the absence of histologic findings consistent with avian chlamydiosis, the clinical significance of the detection of *C. psittaci* is uncertain.

Over the same period of time as the above outlined wild bird mortalities, NSW Health was notified of 15 cases of human psittacosis (*C. psittaci* infection). Eleven cases were either local residents of the Blue Mountains region or the Central Tablelands region or had reported visiting these areas during their exposure period. Of the remaining four cases, one occurred in each of the Northern Tablelands, Southern Tablelands, Northern Sydney and Western Sydney regions. Fourteen cases were able to be contacted for interview. All but one reported contact with one or more birds during their exposure period: two had pet birds and the other 11 cases had contact (direct and indirect)

12 NSW Health. Rare infection from possum scratch prompts warning. 20 May 2020. Downloaded from: www.health.nsw.gov.au/news/Pages/20200520_01.aspx

13 NSW Department of Primary Industries. CVO bulletin Tularaemia veterinarians. 19 June 2020. Downloaded from: www.dpi.nsw.gov.au/__data/assets/pdf_file/0011/679619/CVO-Bulletin-vets-and-paravets-19-June-2020.pdf

14 www.wildlifehealthaustralia.com.au/Portals/0/Documents/ProgramProjects/National_Guidelines_Sample Submission_Tularaemia_Dx_Testing_v1.0_June17.pdf

15 WHA Fact Sheet, May 2017: Chlamydia in Australian wild birds. www.wildlifehealthaustralia.com.au/FactSheets.aspx

with wild birds. No wild birds directly associated with human disease were submitted for testing. Nepean Blue Mountains Local Health District advised people to avoid contact with wild birds and to use protective equipment where contact is unavoidable and when gardening or mowing lawns where bird droppings could be present.[16] New South Wales agencies worked together to provide information to those interacting with wild birds regarding appropriate measures to reduce the risk of infection.

Although unrelated to this event, a human psittacosis case was also confirmed in Adelaide, SA in late May after prolonged contact with two sick yellow-tailed black cockatoos. Both birds exhibited wasting, weakness, and dark green faeces, and one had pneumonia on gross post-mortem. No samples from the birds were collected for *Chlamydia* testing from this event.

It should be noted that surveillance for avian chlamydiosis in wild birds is often carried out opportunistically alongside other disease investigations and, as noted in the recent events, the presence of concurrent disease makes it difficult to interpret *C. psittaci* infection and disease in wild birds. In NSW, *C. psittaci* has been detected as part of diagnostic investigations of both individual and mass bird-mortality events, including but not limited to the following species: galahs (*Eolophus roseicapilla*), sulphur-crested cockatoos (*Cacatua galerita*), rainbow lorikeets (*Trichoglossus haematodus moluccanus*), Major Mitchell's cockatoos (*Lophochroa leadbeateri*), red-rumped parrots (*Psephotus haematonotus*), tawny frogmouths (*Podargus strigoides*) and feral pigeons (*Columba livia*).

It is generally considered that the prevalence of avian chlamydiosis in wild birds is low. One study found *C. psittaci* at a prevalence of 6.2% in free-ranging (apparently healthy) crimson rosellas across southeastern Australia sampled over a two-year period and also identified several risk factors for infection in this species.[17] In a second study, *Chlamydia* DNA was detected in 0.7% (n=2) of 299 wild birds, a superb lyrebird (*Menura novaehollandiae*) and a crimson rosella, opportunistically sampled when presented for veterinary diagnosis and treatment over a one-year period.[18] Further research is required to better understand the risk factors leading to infection and clinical disease in wild birds and humans.

These events highlight the need for comprehensive post-mortem and diagnostic investigations of wild bird mortality events, and the importance of sharing results between public health and animal health agencies.

16 Nepean Blue Mountains Local Health District, 7 May 2020. www.nbmlhd.health.nsw.gov.au/nbmlhd-news/from-the-expert/parrot-fever-alert-in-blue-mountains-and-lithgow

17 Stokes HS, Martens JM, Jelocnik M, Walder K, Segal Y, Berg ML, Bennett AT 2020. Chlamydial diversity and predictors of infection in a wild Australian parrot, the Crimson Rosella (*Platycercus elegans*). *Transboundary and Emerging Diseases*. doi.org/10.1111/tbed.13703

18 Amery-Gale J, Legione AR, Marenda MS, Owens J, Eden PA, Konsak-Ilievski BM et al. 2020. Surveillance for *Chlamydia* spp. with multilocus sequence typing analysis in wild and captive birds in Victoria, Australia. *Journal of Wildlife Diseases*; 56(1): 16–26.