

CASE STUDY:

AVIAN BORNAVIRUSES

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A case study of a neglected disease risk in captive parrots that could threaten wild birds.

Species

Avian bornaviruses (ABV) that cause proventricular dilatation disease (PDD).¹ Two genotypes (ABV 2 and 4) have been introduced into Australia (through the importation of parrots) and are present in avicultural collections.² Other genotypes could also be present, either as introduced pathogens or naturally occurring viruses in native birds.³

Origin

Well established as a disease of captive parrots in North America, Europe and elsewhere.⁴ Parrot genotypes of ABV have been documented in North America, South America, Europe, Africa, the Middle East and Japan.⁵

Australian occurrence

There was one reported case in 1997 in a green wing macaw (legally imported in 1993). Then a cluster of cases in captive parrots occurred in southeast Queensland in 2005 to 2006 (the source of infection was not established).⁶ So far, PDD has been detected in five imported parrot species but there have been no reports in Australian wild birds.

Potential environmental impacts

The impacts of bornoviruses on captive-raised parrots are sometimes 'catastrophic'. According to Wildlife Health Australia, these viruses threaten captive breeding and reintroduction programs for threatened parrots, and their escape from captive birds into wild populations would pose 'a significant risk to native parrot and passerine species'.⁷

Many avian bornovirus infections are asymptomatic. But some infections (after an incubation period that could be up to seven years⁸) result in inflammation of the nervous system, which leads to the often fatal proventricular dilation disease. It has caused deaths in wild birds overseas.



The importation of parrots into Australia has had unintended outcomes, introducing avian bornaviruses into the country. Photo: Tom Woodward | CC BY-SA 2.0

Because of the ability of these viruses to cause long-term subclinical infections, multiple genotypes have spread globally with the trade in cage birds.⁹ PDD is the most serious viral disease in captive parrots in Europe and North America.¹⁰ Globally, avian bornaviruses have been detected in or suspected to occur (based on histology) in over 80 parrot species. Australian species known to develop PDD or that have been detected with ABV infection include the sulphur-crested cockatoo, palm cockatoo, red-tailed black cockatoo, galah, gang-gang cockatoo, cockatiel, red-capped parrot, and eclectus parrot. It is highly likely that many Australian parrot species are susceptible.¹¹ There have also been reports of this or a similar disease in toucans, honeycreepers, canaries, weaver finches, Canada geese, roseate spoonbills and a peregrine falcon.

BIOSECURITY ISSUES

Summary

This disease infecting captive parrots could threaten a wide range of parrots and other bird species if it spills over into wild populations. But the risks have been neglected. The disease is not notifiable, there has been no risk assessment or

contingency planning, and there is no official surveillance or monitoring. The case would be very different if this was a commercial threat. It highlights the critical need to provide Wildlife Health Australia with resources to focus on wildlife disease risks in addition to the diseases that are a focus because they are also a commercial or human health risk. It also highlights the need for an environmentally focused biosecurity body such as the proposed Environment Health Australia.

Risk assessment and contingency planning

Despite PDD (i) being prevalent overseas including in Australian parrots, (ii) having been recorded in Australia and (iii) being an obvious risk to wild populations of native parrots (and other bird species) including threatened species, it is not a notifiable disease in Australia. There is no AUSVETPLAN for PDD.¹² There has been no risk assessment or contingency planning (as far as we are aware).

Quarantine

Avian Bornavirus 2 and 4 were probably introduced into Australia with imported



Native Australian parrots known to develop PDD or that have been detected with ABV infection include the gang-gang cockatoo. Photo: Jenny Barnett

or smuggled parrots, and it is likely that other ABVs have been introduced with species including canaries and ducks.¹³ Because diagnostic tests are not very sensitive for bornaviruses, the viruses could have arrived through legal imports. There are diagnostic tests for ABV infected birds, 'but even in combination, they are not sufficiently sensitive to detect many infected birds'.¹⁴ Bornoviruses may have been introduced into Australia with smuggled birds or eggs (though it is not known whether PDD can be transmitted by eggs, which are thought to be the main item smuggled).¹⁵

Surveillance and monitoring

As PDD is not a notifiable disease in Australia, there are no requirements for veterinarians to report occurrences and no formal surveillance programs for captive or wild populations. The Australian Wildlife Health Network (2013) noted that if cases are detected in wildlife they would fit within the general surveillance category of 'Interesting or unusual cases' and could be captured by AWHN wildlife coordinators.¹⁶ There is no guarantee of any biosecurity response to detections in the wild.

Post-border biosecurity

Brisbane-based bird veterinarian Adrian Gallagher has diagnosed six cases of PDD, as he related to Radio National Background Briefing.¹⁷

Adrian Gallagher: The first case we had – which is the first case that was comprehensively diagnosed in Australia – we said to the client that, 'Look, this is an exotic disease' – at that point we knew less about it than we know now – and we said, 'Look, we really need to shut your aviary down, because we just don't know what this disease is going to do.' And this client had a very mixed collection. It was in a big, fully flighted, planted aviary; it was something like 30 sqm. And there was a whole mixture of doves, quail, ducks, parrots, finches – everything in this aviary. Now, as soon as he knew he had a potential problem in that aviary, he actually sold all of his collection.

Hagar Cohen: So that person has potentially sold a whole lot of diseased parrots and birds to other people who've got no idea about it.

Adrian Gallagher: Exactly, and they could be disseminated right round Australia.

Hagar Cohen: Dr Gallagher couldn't enforce the quarantine in that case because the exotic virus isn't officially recognised in Australia as infectious. It has no legal status; it's not officially monitored.

OUR MISSION

To protect the environment from harmful new invasive species through prevention and early action.



Stronger biosecurity is vital to protect the highly endemic wildlife of Australia and its many special wild places. This is Lord Howe Island, where invasive species have already caused several extinctions. Photo: Robert Whyte

Research

With so little known about this disease in Australia – the extent of its spread in aviculture, the susceptible species, the risks to wild bird populations, the range of genotypes in Australia – there is an urgent need for research.

CHANGES NEEDED

Risk reduction

- A national program is needed to eliminate or reduce the risks of avian bornoviruses from escaping into wild bird populations.

Surveillance and monitoring

- Adequate resources should be provided for Wildlife Health Australia to effectively monitor and report on wildlife diseases of biodiversity importance.
- Exotic diseases of relevance to nature conservation should be identified and listed as notifiable diseases,

REFERENCES

Australian Wildlife Health Network. 2013. Avian Bornavirus and Proventricular Dilation Disease. Fact sheet.

Background Briefing. 2012. The parrot smugglers. Transcript . ABC Radio National. (<http://www.abc.net.au/radionational/programs/backgroundbriefing/2012-11-18/4370820#transcript>)

Doneley R, Miller R, Fanning T. 2007. Proventricular dilatation disease: an emerging exotic disease of parrots in Australia. Australian Veterinary Journal 85 (3): 119-23.

Gallagher A. 2014. Senate inquiry submission regarding Proventricular Dilatation Disease (PDD) in psittacine birds.

ENDNOTES

- 1 Australian Wildlife Health Network (2013). There is 'increasing proof' that proventricular dilatation disease is caused by ABVs. In a small study of experimentally infected parrots, Koch's postulates were fulfilled.
- 2 Australian Wildlife Health Network (2013).
- 3 Australian Wildlife Health Network (2013).
- 4 Australian Wildlife Health Network (2013).



Australia needs a national program to eliminate or reduce the risks of bornoviruses escaping into wild bird populations. Photo: Ralph Green | CC BY-NC-ND 2.0

- 5 Australian Wildlife Health Network (2013).
- 6 Doneley et al. (2007).
- 7 Australian Wildlife Health Network (2013).
- 8 Gallagher (2014).
- 9 Australian Wildlife Health Network (2013).
- 10 Gallagher (2014).
- 11 Australian Wildlife Health Network (2013).
- 12 Australian Wildlife Health Network (2013).
- 13 Doneley et al. (2007), Background Briefing (2012), Australian Wildlife Health Network (2013).
- 14 Australian Wildlife Health Network (2013).
- 15 Doneley et al. (2007), Background Briefing (2013) citing Gallagher.
- 16 Australian Wildlife Health Network (2013).
- 17 Background Briefing (2012). Note that Adrian Gallagher has made a submission to this inquiry about PDD.