

Trichomoniasis in Australian wild birds

Fact sheet

Introductory statement

Trichomoniasis is a parasitic disease primarily of pigeons that has been introduced into Australia and has spread through a wide range of wild bird species. There is virtually no information available on the prevalence or significance of this parasite in native Australian bird populations. Given the fact that infections have caused large outbreaks of mortality in pigeons in the US further study is warranted (Forrester and Foster 2008).

Aetiology

Trichomoniasis is caused by *Trichomonas gallinae*, a pear shaped to round flagellated protozoan 12.5 to 20 μm in length. The organism has four anterior flagella, no free posterior flagellum, an axostyle that protrudes posteriorly, and a well-developed undulating membrane (Forrester and Foster 2008).

Natural hosts

The rock pigeon (*Columba livia*) is considered to be the primary host of *T. gallinae* in the US. However, infection has been recorded in a wide range of species including columbiforms, falconiforms, strigiforms, psittacines, passerines, galliforms, gruiforms and anseriforms (Forrester and Foster 2008). Based on limited survey information the situation is likely to be similar in Australia (Park 2011, McKeon et al 1997).

World distribution

The disease occurs worldwide.

Occurrences in Australia

The disease occurs Australia wide.

Epidemiology

T. gallinae has a direct life cycle, the organism being passed from one host to another without an intermediate or paratenic host. There are no cyst stages.

T. gallinae can live for 20 minutes to several hours in water depending on its salinity and for at least five days in moist grain. It will survive for up to 48 hours in dove carcasses (Forrester and Foster 2008).

In columbiforms the organism is transmitted directly from the adult to the squab by regurgitation of crop milk. Transmission can also occur during courtship, by uninfected birds picking up seed that has been dropped by infected birds and through contaminated drinking water. Most other species are infected by using the same feeding and watering areas as infected columbiforms. However, raptors contract the infection by feeding on infected prey.

Birds can die as early as four days after infection. However, there are different strains of the organism, which vary in virulence. Infection with a moderately virulent or avirulent strain will confer protection against the pathogenic effects of subsequent infection with a virulent strain. Consequently, it is possible for birds to have asymptomatic infections and become carriers. This carrier state has been documented to last as long as 620 days in pigeons (Forrester and Foster 2008).

Clinical signs

Clinical signs include anorexia, weight loss and depression related to the yellow caseous lesions found attached to the oral and crop mucosa. Vomiting and difficulty swallowing leading to dropping of seeds can also occur. Dyspnoea and asphyxiation may result if the lesions block the trachea.

Diagnosis

A diagnosis can be made by observing the characteristic oral lesions and finding motile flagellated protozoa in a wet smear of the oropharyngeal mucous. Alternatively, culture or PCR can also be used.

Pathology

Typical lesions are yellow caseous masses found on the palate or floor of the oral cavity. These can extend down the throat to the crop and completely block the passage of food leading to death by starvation.

Histologically the caseous masses correspond to necrotic pharyngeal tissue, large numbers of trichomonads and a marked heterophil and mononuclear cell infiltrate. In some cases, infection can spread to internal organs, especially the lung and liver, which also develop abscesses containing organisms and mixed inflammatory cells.

Differential diagnoses

Similar oral lesions can occur in aspergillosis, candidiasis, poxvirus infection, *Capillaria* sp. infection or vitamin A deficiency.

Laboratory diagnostic specimens

Fresh wet smears are required to check for motility. Fresh tissue can be submitted for culture or PCR. Formalin fixed tissue can be examined histologically for the presence of trichomonads.

Laboratory procedures

Diamond's medium can be used for culture. A commercial product (InPouch TF, JCU Tropical Biotechnology, Townsville) designed to culture *Trichomonas foetus* from cattle will also culture *Trichomonas gallinae*. There was no significant difference between the two culture methods in recovering organisms but the InPouch system was more convenient to use (Cover et al 1994). One study found culture on Diamond's medium to be much more sensitive than wet mount with only 36.4% of culture positive samples testing positive by wet mount (McKeon et al 1997). A second study found the InPouch system to be more than twice as sensitive as wet mount examination (Bunbury et al 2005).

Treatment

A number of drugs are available for treatment: carnidazole 20-30 mg/kg PO once or 20 mg/kg PO SID twice, metronidazole 10-30 mg/kg PO BID for five to ten days, ronidazole 10 mg/kg PO SID for six days or ronidazole 100 mg/L drinking water for seven days (Hawkins et al 2013). Caseous plaques can be debrided, if possible, and birds should receive supportive care.

Prevention and control

Prevention and control are difficult in wild populations. Bird feeders should be discouraged or else the food should be changed daily and feeders disinfected with a 10% bleach solution.

Surveillance and management

There is no targeted surveillance program, AUSVETPLAN or Import Risk Analysis for *T. gallinae*. There are only three studies, which have examined the prevalence of *T. gallinae* in birds in Australia. The first study surveyed a mix of captive and wild bird species in Perth, Western Australia. The authors found a prevalence of 46% in wild Senegal doves (*Streptopelia senegalensis*), 71% in racing pigeons, 32% in captive native columbids (species not reported) and 0.7% in captive budgerigars (*Melopsittacus undulatus*) (McKeon et al 1997). The second study found a 14% prevalence in racing pigeons and 8% prevalence in captive budgerigars (Reece et al 1992). The most recent survey examined a mix of captive and wild birds that were presented to two Sydney veterinary clinics over a ten year period (1997-2006). Of the captive birds, the two clinics examined 143 budgerigars, one purple-crowned lorikeet (*Glossopsitta porphyrocephala*), one cockatiel (*Nymphicus hollandicus*), 91 domestic pigeons, two canaries (*Serinus canaria domestica*), one chicken, one peacock, and one scrub turkey (*Alectura lathamii*) that tested positive for trichomoniasis. Of the wild birds they saw one rainbow lorikeet (*Trichoglossus haematodus*), two crested pigeons (*Ocyphaps lophotes*), 14 doves, three spotted turtle-doves (*Spilopelia chinensis*), 11 southern boobook owls (*Ninox boobook*), one Australian hobby falcon (*Falco longipennis*), two brown goshawks (*Accipiter fasciatus*), two black-shouldered kites (*Elanus notatus*), one little eagle (*Hieraaetus morphnoides*), six pied currawongs (*Strepera graculina*), two Australian ravens (*Corvus coronoides*), two Australian magpies (*Gymnorhina tibicen*), two channel-billed cuckoos (*Scythrops novaehollandiae*) and one tawny frogmouth (*Podargus strigoides*) with trichomoniasis (Park 2011). Anecdotally, between 2000 and 2009, 2.7% of brown goshawks, 5.2% of southern boobook owls and 5.7% of

powerful owls (*Ninox strenua*) presenting to the Healesville Sanctuary wildlife hospital in Victoria had clinical evidence of trichomoniasis.

Wildlife disease surveillance in Australia is coordinated by the Wildlife Health Australia. The National Wildlife Health Information System (eWHIS) captures information from a variety of sources including Australian government agencies, zoo and wildlife parks, wildlife carers, universities and members of the public. Coordinators in each of Australia's States and Territories report monthly on significant wildlife cases identified in their jurisdictions.

Statistics

Limited information is available in the National Wildlife Health Surveillance Database (eWHIS). Cases reported in eWHIS include a little penguin (*Eudyptula minor novaehollandiae*), black kite (*Milvus migrans*), peregrine falcon (*Falco peregrinus*), powerful owls (*Ninox strenua*), galahs (*Eolophus roseicapilla*), and crested pigeons from New South Wales, southern boobook owls, a brown goshawk, Australian raven, powerful owl and collared sparrowhawk (*Accipiter cirrhocephalus*) from Victoria, large numbers of rock pigeons, common bronzewings (*Phaps chalcoptera*), pied currawongs, a brown cuckoo-dove (*Macropygia amboinensis*), crested pigeons, black kite, brahminy kite (*Haliastur indus*), spotted turtle-doves, rainbow lorikeet, and peregrine falcon from Queensland, and bar-shouldered doves (*Geopelia humeralis*), black kite and unspecified falconiforms from the Northern Territory.

Research

There are anecdotal reports of large numbers of black kites dying of trichomoniasis in the Northern Territory and Queensland in 2013. The organism is also believed to be a significant cause of pink pigeon mortality in Mauritius (Bunbury et al 2005). However, very little information is available concerning the prevalence of both the infection and the disease in wild birds in Australia and whether or not the organism could threaten wild bird populations. Research is also required to determine which strains of *Trichomonas* exist in Australia and if different strains are more pathogenic for or carried by different bird species.

Human health implications

There are no reports of *T. gallinae* infections in humans.

Conclusions

Trichomoniasis appears to be a relatively common disease of both captive and wild birds in Australia. Its impact on wild populations is unknown but it has the potential to cause population declines especially if combined with other factors such as habitat loss, overcrowding (as often occurs at bird feeders), or the translocation of non-endemic columbiforms into new areas.

References and other information

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Acknowledgements

The following people have had input into this document: Peter Holz and R. Woods.

Updated: 23 Jun 2014.

To provide feedback on this fact sheet

We are interested in hearing from anyone with information on this condition in Australia, including laboratory reports, historical datasets or survey results that could be added to the National Wildlife Health Information System. If you can help, please contact us at admin@wildlifehealthaustralia.com.au.

Wildlife Health Australia would be very grateful for any feedback on this fact sheet. Please provide detailed comments or suggestions to admin@wildlifehealthaustralia.com.au. We would also like to hear from you if you have a particular area of expertise and would like to produce a fact sheet (or sheets) for the network (or update current sheets). A small amount of funding is available to facilitate this.

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