

Hygiene Protocols for the Prevention
and Control of Diseases
(Particularly Beak and Feather Disease)
in Australian Birds

External and Internal Parasitism



Australian Government

Department of the Environment and Heritage

Copyright

© Commonwealth of Australia 2006

Information contained in this publication may be copied or reproduced for study, research, information or educational purposes, subject to inclusion of an acknowledgment of the source.

The views and opinions expressed in this publication are those of the authors and do not necessarily reflect those of the Australian Government or the Minister for the Environment and Heritage.

While reasonable efforts have been made to ensure that the contents of this publication are factually correct, the Commonwealth does not accept responsibility for the accuracy or completeness of the contents, and shall not be liable for any loss or damage that may be occasioned directly or indirectly through the use of, or reliance on, the contents of this publication.

This publication is available online at:

<http://www.deh.gov.au/about/publications/index.html>

For additional hard copies, please contact the Department of the Environment and Heritage, Community Information Unit at ciu@deh.gov.au or 1800 803 772.

Disclaimer

Note

This document describes the disease External and Internal Parasitism, and has been developed with the involvement and cooperation of a broad range of stakeholders, but the making of this document does not necessarily indicate the commitment of individual stakeholders to undertaking any specific actions. The attainment of objectives and the provision of funds may be subject to budgetary and other constraints affecting the parties involved. Proposed actions may be subject to modification over the life of the document due to changes in knowledge.

External and Internal Parasitism

EXTERNAL PARASITISM

Mites

Feather mites (family *Analgesidae*) often show specific preferences for different locations on the feathers or for specific types of feather. Quill mites (*Syringophilus*, *Dermoglyphus*) burrow into the feather shaft resulting in a powdery-white appearance. After the feather has been eaten away the calamus remains within the follicle which may fail to regenerate normal feathers. The mites can be demonstrated amongst the powdery debris squeezed out of an affected feather shaft.

Many species of *Cnemidocoptes* mites cause **mange** in birds. The most common are *C. mutans* of poultry and *C. pilae* in budgerigars (and many other parrots) and canaries. The mites spend their entire life on the bird. The lesions can occur on any featherless part of the skin and are characterised by raised honeycombed encrustations on the cere, beak, eyelids and feet. Occasionally it becomes generalised and affects feather follicles. Cnemidocoptic mange is easily controlled with 2 treatments of moxidectin or ivermectin (200 µg/kg) 4 weeks apart. The drug can diluted and administered directly to the skin or in the drinking water.

Dermanyssus gallinae and *Ornithonyssus sylvarium* are large mites which attack poultry and other bird species. They are blood sucking mites which may be found on or off the host. *Dermanyssus* lay eggs off the host, *Ornithonyssus* on the host. Their life cycle is completed in 7 days. Heavy infection causes irritation and anaemia. Both mites may infect humans causing pruritis. Wild birds (particularly sparrows and starlings) nesting in houses are sometimes the source of mites which attack humans.

Mites are probably the most common ectoparasite that affect birds. They are usually smaller than 2 mm and transmit many diseases

Feather mite – *Dermanyssus gallinae* (red mite)

- White when fasting, red when eating
- Can affect all birds, not so much raptors and psittacine birds
- Does not live on bird - visits at night
- Feeds at night. Female lays eggs 12 hours after a feed, hatch in 48 hours
- Adults survive 8-12 months without feeding
- Not common on raptors and psittacine birds

Northern Mite – *Ornithonyssus sylvarium*

- Life cycle entirely on host
- Can survive only a few days off host
- Most bird species susceptible
- Direct transmission
- *Ornithonyssus* sp commonly found on nestling psittacine birds.
- Mites can survive up to 4 weeks off the host (Arends, 1997).

Quill Mites: *Syringophilus bipectinatus*, *Dermoglyphus elongatus*

- Live inside quills - body narrow and elongated
- Not host-specific
- Many birds suit
- Skin Mites: *Epidermoptes bilobatus*, *Michrolichus avus*
- Small mites, affect most birds
- Life cycle on host

Visceral mites: *Sternostoma tracheacolum* (rhinonyssid mites)

- Affects many birds
- Canaries commonly affected
- Gouldian finch – species not known

Subcutaneous mites: *Laminosioptes cysticola* and *Hypodectes* sp.

- Look like small white grains of rice
- Mites are usually dead and surrounded by connective tissue
- Eventually calcify
- Life cycle unknown

Skin mites - *Epidermoptes bilobatus* and *Michrolichus avus* (epidermoptic mites)

- Soft, rounded body
- found on many birds
- Life cycle unknown, probably on host
- Lesions can become secondarily infected

Trombiculid mite larvae

- Can infect the skin of canaries, pigeons, and psittacine birds.
- Affected birds are usually non-pruritic
- Oedematous skin of the leg (dorsal to the hocks) and abdomen.
- Secondary infections often occur.

Cnemidocoptic mites - *Cnemidocoptes pilae* and *Cnemidocoptes mutans*

Domestic fowl: *C mutans*

- Transmission direct and indirect
- Scaly face in budgerigar
- Scaly leg in domestic chicken
- Raised white-yellow honeycomb-like encrustations on the cere, beak and around the eyes
- Elbows, legs and skin around the cloacal opening
- The lesion can look like flour on the skin, especially in SCC
- Eventual deformity in the budgerigar
- Malocclusion of the beak
- Treatment moxidectin 200 micrograms/kg once a week

Canary: Tassel foot, also featherless parts of skin.

Sulphur Crested Cockatoo - may look like flour. Disfigurement of beak

Domestic fowl: *C mutans*

- Scaly leg
- Burrows under scales of legs, inducing a rough, raised, powdery appearance

- Proliferation of the scales of the legs and digits
- Lameness or loss of skin may result

Control of mites

Applying a pyrethrum spray (Avian Insect Liquidator concentrate (Vetafarm products)) to the birds, their nest material, nest box and the walls of the aviary. The insecticide should be applied to the skin, not the feathers, as this is where the mites reside.

The insecticide should be applied weekly for three times (ie, over 2 weeks).

Mites can spread on people and other fomites.

Prevention of mite infection

Regular monitoring of the aviary and nestboxes for evidence of mites.

Treatment of adult birds prior to breeding

New nest boxes each year, treated with pyrethrum spray and allowed to dry before being used for breeding.

Moxidectin administered to each bird at 200 µg/kg will kill blood sucking mites.

Lice

Many species of lice can affect the skin of birds usually without feather damage. Lice are larger than mites and are usually apathogenic although they may cause a mild pruritis. Dull, damaged feathers, presence of eggs.

- Very common external parasites of birds - larger than mites.
- Dorso-ventrally flattened body.
- No wings, legs have hooks at the end
- Eggs laid on feathers
- Heaviest infections on sick birds
- They tend to be *HOST*-specific - transmission direct
- Pruritis, damaged feathers, dull plumage
- Lice can be seen with eyes – but do you observe them????
- Presence of eggs – some look like wasp nests around calamus
- Treatment - once a week, 2-3 times:
 - ▶ pyrethrin-based insecticides
 - ▶ Ivermectin/moxidectin for BITING lice
 - ▶ Lice cannot survive away from the host so treatment of the environment is not absolutely essential.

Ticks (Argasidae, Ixodidae)

- Oval flattened body when fasting, round after eating.
- *Argas persicus* – the fowl tick. Can affect many bird species by causing blood loss and is a vector for avian spirochaetes. In tropical areas they can be the most important ectoparasites of poultry.
- The life cycle may be completed within 8 weeks in warm weather. In temperate climates the ticks remain inactive off the bird in crevices during cold weather. Nymphs live up to 15 months without a feed and adults can survive many years off the host!
- Pale yellow to grey 15mm long – adults 8 legs, larvae 6 legs
- Shelter in dark in day, feed at night
- Larvae stay on fowl in day

- Transmits *Borrelia anserina*, the cause of tick fever
- The presence of these ticks is an aid to diagnosis

Ixodes ticks have been reported as a cause of paralysis but are more likely to cause anaemia due to blood loss.

***Fleas* (*Ceratophyllus gallinacea*, *Echidnophagia gallinacea* [the "stick-fast flea"])**

- Small insects with laterally flattened body
- Adults have no wings – they can run and jump
- Fix mouth to skin and suck blood
- Poultry and nesting birds
- Vectors of infectious diseases
- Seen mainly in free range poultry in tropical areas.
- The mouthparts of the adults are buried in the skin which prevents them from moving around.
- Eggs drop off and the developing stages are found in the soil.

Hippoboscid **flies** live between the feathers in many species. They fly out briefly and then dart back into the plumage. They are non-pathogenic but may transmit *Haemoproteus* and viral pathogens.

Mosquitoes can irritate nestlings. It may be necessary to control mosquitoes in specific situations to prevent the transmission of poxviruses (and other viruses) and blood parasites. Mosquito netting, Shelltox ministrips and mossie zappers may be necessary.

Many **filarioids** inhabit the subcutaneous connective tissue of birds often without causing an inflammatory response. *Aviosempens taiwana* infects ducks in Asia, and induces granulomas in the skin of the submandibular area and thighs. Skin **flukes** (*Collyriclidae*) produce granulomas and fibrous cysts around the cloaca of many bird species.

HELMINTH PARASITES OF THE ALIMENTARY SYSTEM

Nematodes

Ascariasis

Ascarids are not uncommon in psittacine bird collections in Australia. The species has not been determined. Ascarids have a direct life cycle (no intermediate host required). In the domestic fowl, infective eggs hatch in the proventriculus and duodenum and spend the first nine days living free in the posterior part of the duodenum (Ruff and Norton, 1997). The worms then penetrate the mucosa of the duodenum, causing bleeding. By day 17-18 after ingestion of the eggs, they re-enter the lumen and grow to maturity and lay eggs, usually in about another 10-12 days (the time from ingestion to maturity being about 28-30 days). Ruff and Norton (1997) stated that under optimal conditions, the eggs in the droppings became infective in 10-12 days, but under adverse conditions this could be longer.

Control

For those birds that need to feed on the ground, the usual method of control for internal parasitism, namely, housing in a suspended cage after eradication of the nematode, is not an option. If the birds are housed so that they can feed on the ground, then a concrete floor should be provided. Sand or other relatively fine and inert material should be spread over the concrete,

and this should be removed every 7 days, the concrete cleaned and disinfected and residual disinfectant removed, and new clean material spread over the concrete. The birds should be treated with moxidectin 200 micrograms/kg and again 3 weeks later (to remove any worms that might have hatched and grown to pre-maturity since the first treatment). Presuming that the life cycle for domestic fowl ascarids applies, then if this regime is followed, then the life cycle of the OBP ascarid would be broken. Treatment with moxidectin would also kill blood sucking external parasites..

Prevention

The management practices described above should interrupt the life cycle of the worm, and it is one pathogen that can be controlled merely by management. The birds may be treated with moxidectin 200 µg/kg if evidence of infection is seen (eg, faecal examination whenever they are handled), and investigations carried out to determine where the infection was re-introduced.

Treatment:

Fenbendazole	Panacur 25 Intervet Australia P/L. Fenbendazole 25 g/L 25-50 mg/kg PO SID x 3-7 days, or 100 mg/kg PO once
Mebendazole	25-50 mg/kg PO once
Levamisole	15 mg/kg PO once
Oxfendazole	Oxfen LV Virbac Australia P/L Oxfendazole 45.3 g/L. 20 mg/kg PO once. 2.5 mL/L DW.
Thiabendazole	100-200 mg/kg PO BID x 10 days
Albendazole	Valbazen broad spectrum lamb, sheep and goat drench (Coopers Animal Health) 19 mg/mL. 5 mL/L DW x 3 days (or 0.1mL/50g BW x 3 days.

Capillaria may be a problem in psittacine birds. Affected birds lose weight, sometimes with diarrhoea. Adult capillaria burrow into and beneath the intestinal epithelium causing haemorrhage and inflammation. They are small and easily overlooked at necropsy. The eggs can incite an inflammatory reaction and are released when the mucosa sloughs.

Detection of capillaria oocysts in the faeces is best done by repeated faecal wet-preps because excretion of oocysts is intermittent and they often fail to float on salt solutions. The oocysts have bipolar caps. Adult nematodes may sometimes be seen in faecal wet-preps.

Anthelmintics which are poorly absorbed have little effect on the adult nematodes because of their protected position beneath the mucosa.

Moxidectin - Cydectin oral drench for sheep 1g/L Fort Dodge Australia P/L. Dose 400 µg/kg BW. Some practitioners use 1000 µg/kg.
Oxfendazole - (Oxfen LV) 20 mg/kg PO once. 2.5 mL/L DW.

Cestodes

Tapeworms are an uncommon problem, but can occur in psittacine birds. The adult tapeworm consists of a length of segments which live within the intestinal tract. These segments are shed in the droppings and are ingested by insects or earthworms.

Most cases of tapeworm infestation go unnoticed. However, relatively large lengths of tapeworm can sometimes be seen in the droppings or hanging down from the vent of infected birds. A single treatment

is usually effective for individual pet birds. Eradication of tapeworms from infected flocks of finches and pigeons may be difficult because part of the life cycle is within insects or earthworms. Common species include *Raillietiaenia*, *Choanataenia*, *Gastronemia*, *Idiogenes*, *Amoebataenia*.

Many anthelmintics do not kill tapeworms. Niclosamide Panacur 2.5 and Netobimin are effective drugs for treating tapeworms but are difficult to administer to a flock of finches. Praziquantel is available in water-soluble powder form from Vetafarm P/L in 100g and 1kg packages.

References

1. Arends, JJ. 1997. External Parasites and Poultry Pests, in *Diseases of Poultry*, 10th Ed. Eds Calnek BW, Barnes HJ, Beard CW and Saif YM. Iowa State University Press, Ames, Iowa. Pp 785-813.
2. Ruff MD and Norton RA. 1997. Internal Parasites, in *Diseases of Poultry*, 10th Ed. Eds Calnek BW, Barnes HJ, Beard CW and Saif YM. Iowa State University Press, Ames, Iowa. Pp 815-864.