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

Gram-negative Bacterial Diseases

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Department of the Environment and Heritage

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Note

This document describes Gram-negative Bacterial Diseases, 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.

Gram-negative Bacterial Diseases

The presence of *Enterobacteriaceae* is abnormal in psittacine birds. The bacteria of significance are *Escherischia coli*, *Salmonella* spp, *Yersinia* spp and *Campylobacter* spp., and all of these have the ability to be opportunistic pathogens. They may multiply in birds that are stressed by transport or excessive handling, and can be transmitted to birds by their handlers. Diagnosis is by demonstration of Gram-negative organisms in a faecal smear.

E. Coli infection, Colibacillosis

Birds are continuously exposed to contaminated faeces, water and dust. "Normal" *E. coli* commensals may cause disease in an immunocompromised or stressed host, as may any Gram-negative organism. Secondary infections often follow viral or mycoplasmal infections or adverse environmental conditions. The isolation of *E. coli* from the intestine or faeces of a psittacine bird with signs of enteritis should be regarded as significant.

Clinical signs

- **Airsacculitis and pneumonia**: Severe respiratory disease can occur associated with dusty litter, excessive ammonia or other adverse environmental conditions. With these conditions, *E. coli* is a secondary pathogen in association with *Mycoplasma* spp.
- **Omphalitis** due to *E. coli* infection results in a moist navel and a retained infected yolk sac. A peritonitis is often present. The gall bladder is often distended indicating that the chick had not eaten. Common in ostrich chicks.
- **Salpingitis**: Adult layers can get a distended oviduct filled with caseous exudate which has a foul odour
- **Coligranulomas** (Hjaerre's disease) occur in the liver, spleen or other organs and rarely in the intestinal wall. They are often confused with mycobacteriosis. Common in ostrich chicks.
- **Arthritis** is a rare manifestation of colibacillosis.

Diagnosis

Clinical signs and culturing E. Coli from infected tissue.
Eliminate the possibility of other pathogens acting as primary infections.
The presence of Gram-negative organisms in a faecal smear requires treatment

Prognosis

There is usually a low incidence in a flock situation. However, for small hobby farms and ostrich rearing units the prognosis for individual affected birds is poor.

Salmonellosis

Salmonellosis is an acute febrile septicaemic disease of chickens and poults and a chronic enteritis of birds of all ages, caused by a serotype of the genus Salmonella. The genus is divided into two species (*S. enterica* and *S. bongori*), several subspecies, and more than 2,000 serotypes. While some serotypes are very highly host-adapted (*S. pullorum* and *S gallinarum*), others are pathogenic to a wide range of animals and birds (e.g., *S. typhimurium*). In psittacine birds, *S. typhimurium* is the most common isolate and the most dangerous for birds and their handlers.

Transmission of salmonellae is via contaminated equipment, feed, water, litter, carrier birds, rodents, pets, flies and humans. Vertical transmission occurs by eggshell contamination (not transovarial). Once established, organisms may be shed in faeces for the life of the bird.

Clinical signs in lories include acute disease and high mortality, while in African grey parrots the signs are more chronic, including a suppurative subcutaneous infection, granulomatous dermatitis, arthritis and tenovaginitis (Gerlach, 1994).

Acute lesions include dehydration, gastroenteritis and enlarged liver and spleen. Chronic lesions include fibrinous polyserositis and arthritis.

Diagnosis

Clinical signs and isolation and identification of the causative salmonella.

Yersiniosis (Pseudotuberculosis)

Yersinia pseudotuberculosis and *Y. enterocolitica*. Infection in psittacine birds is rare. The clinical signs and treatment are as for salmonellosis, but in addition the organism may gain access to the body via skin abrasions.

Campylobacteriosis

Campylobacteriosis is caused by *Campylobacter jejuni*. This organism can rarely affect psittacine birds, and may be isolated from clinically ill as well as from clinically normal birds. Clinical signs include weakness, diarrhoea, weight loss and mortality. Lesions include enlarged liver and spleen, enteritis and dehydration.

Treatment of Gram-negative Infections

- If granulomas are present, the drug may not be able to penetrate and kill contained bacteria.
- Oral antibiotics are effective in treating E. coli infections limited to the intestinal mucosa.
- Lactulose may be used to reduce intestinal pH
- *Lactobacilli* (preferably isolates from normal psittacine birds) may lower intestinal pH and establish a normal flora.
- For psittacine birds, treatment is required because of the possible public health hazard.
- Handlers should wash hands thoroughly (the organism may transfer both ways).
- Control of flies, vermin, cleaning and disinfection of the aviary.
- Proper storage of food
- Fluid therapy for dehydrated birds
- Appropriate antibiotics based on culture and sensitivity of the causative organism

Reference

- Gerlach, H. 1994a. Bacteria In *Avian Medicine: Principles and Application.* Editors B. W. Ritchie, G. J. Harrison, and L. R. Harrison, 949-983. Lake Worth, Florida: Wingers Publishing Inc.