

AN UPDATE ON PSITTACINE CIRCOVIRUS DISEASE (PCD)

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Overview

Psittacine Circovirus Disease (PCD) is a viral disease that can affect all psittacine birds (Parrots, Cockatoos and Lorikeets). Although all members of the parrot family are vulnerable, susceptibility to infection varies with age and species, and between individuals of the same species. Overall cockatoos, lovebirds and African Grey Parrots seem most susceptible and macaws least susceptible.

The Beak and Feather Disease Virus (BFDV) that causes the disease is classified as a circovirus (circoviruses are the smallest known disease-causing viruses) and is believed to have originated in Australia. Beak and Feather Disease Virus is the most common viral disease of both wild and captive parrot populations in Australia and can cause both a high death rate in nestling birds or a chronic condition with progressive beak and feather deformity.

The Effect of the Virus

The virus attacks the cells of the immune system as well as those that produce the feathers and beak. Affected birds gradually lose their feathers and develop beak abnormalities. Because the virus attacks the immune system, affected birds succumb to infection by other diseases. Photo at right shows a Sulphur-crested Cockatoo affected by PCD.



The time taken for disease to develop varies:

- Sudden infection (especially common in nestlings) with signs of pneumonia, enteritis, weight loss and death before feather abnormalities are recognizable. Acute infection occurs in chicks around 28-32 days of age and is characterised by sudden changes in developing feathers including feather loss, fractures or haemorrhage. Crop stasis, diarrhoea, anaemia and death in 1-2 weeks may also occur.

- Chronic infection occurs in birds that survive the acute phase and is characterised by symmetrical feather abnormalities that progress with each moult. Abnormalities include retained feather sheaths, pulp haemorrhage, fractured shafts, circumferential constrictions, stress lines and curled feathers. The first signs in older birds occur in the powder down and contour feathers, then the primary, secondary, tail and crest feathers become abnormal with progression to total baldness if birds survive for long enough. Abnormal coloration of pigmented feathers has also been associated with the disease. The distribution of feather loss depends on the stage of moult when the signs manifest.

Secondary infections associated with immunosuppression are common with PCD, in particular Candidiasis, Aspergillosis, Cryptosporidiosis, Chlamydiosis and Avian Polyoma virus (APV).

Development of beak deformities is variable and may include progressive elongation, and fractures.

This is a disease primarily of young birds, with over 90% of cases recorded in birds under 3 years of age, with chicks less than 7 days of age being most vulnerable. However, birds of up to 20 years of age have been known to develop signs of the disease after years of being clinically normal. As adult birds that have been experimentally infected with the virus do not tend to develop the disease (but do develop antibodies) it is likely that these birds were infected as youngsters and the disease remained dormant for many years. The susceptibility of young birds is due to the presence of the Bursa of Fabricius in the cloaca of immature birds, but not in adults. This organ is an important part of the immune system of young birds, but is also the site where the virus infects and grows.

Incubation Period (from exposure to disease signs)

The minimum incubation period for the appearance of dystrophic feathers in experimental infections is 21-25 days. However, as the virus affects growing feathers, birds that become infected after feather development has finished may not develop obvious feather abnormalities until their next moult six or more months later. The maximum incubation period can be years. This obviously makes decisions on the length of quarantine periods very difficult.

Transmission

Natural infection most likely occurs following ingestion or inhalation of the virus by nestlings in the nest hollow from infected faeces or feather dust from the parents. The virus is excreted in the faeces of diseased birds and is found in very high concentrations in feather dust.

Inhalation and ingestion of the virus can also potentially occur at feeding, roosting and watering points in flocking birds.

Transmission (from parents to young prior to birth) has been reported on only one occasion with artificially incubated chicks from an infected hen developing the disease. Further research on this is required as, up until now, removal of eggs for artificial incubation has been thought to prevent the transmission of the disease to the chicks.

Prevention and Control

As there is no effective anti-viral treatment available, prevention of spread of the disease is the only option. Important factors include:

“Favouring the Host”

This means creating an environment that creates the least amount of stress for birds - stress and overcrowding will encourage spread of the virus. In captivity, critical factors that will favour the host to resist disease include attention to social groupings, aviary design, nest box design, environment and exposure of enclosures, nutrition, and hygiene. In the case of the Orange-bellied Parrot captive-breeding program, moving the aviary in Tasmania to a more settled area from weather conditions such as rain and wind was instrumental in controlling the spread of the disease.

Quarantine

PCD is difficult to quarantine as incubation periods for the disease can be as long as 6 months and carrier birds may appear clinically normal but produce diseased young. Therefore it is necessary to maintain a closed flock or purchase birds from PBFD-free flocks and to breed birds in quarantine for maximum protection.

Disinfection

Circoviruses are incredibly persistent and resistant to disinfection. The best available options are disinfectants such as glutaraldehyde and these should be used for disinfecting contaminated utensils, cages and rooms. Further

research is being carried out on more effective disinfection options. Infected nest boxes are best destroyed.

Pathology

Not all beak or feather abnormalities of parrots are caused by the BFDV. For this reason, correct diagnosis of the disease is an important factor in its management. While there are distinctive clinical signs, confirmation of diagnosis should be carried out using techniques that detect either the virus or the parrot's antibody response to the virus.

The most useful diagnostic tests are the Hemagglutination Inhibition (HI) [which tests for antibody] and Polymerase Chain Reaction (PCR) [which tests for viral DNA] tests.

If Bird Has Abnormal Feathers and you Test Blood for Viral DNA:

If Positive: Suggests Active Infection

Management:

If bird is from a breeding aviary: bird should be removed and all areas that could be contaminated with feather dust from the infected bird should be repeatedly cleaned.

If companion bird: bird should not be exposed to other birds outside of the household and you should be aware that the virus can be transported to other locations on your clothes or in your hair.

If Negative: A feather biopsy (including the feather follicle) should be submitted for histopathologic examination to determine the cause of the feather problems.

If Bird's Feathers are Normal and you Test Blood for BFDV DNA:

If Positive: Indicates that the bird has been exposed to PBFD virus and that the virus is present in the blood. The bird must be retested in 90 days. If the bird is negative when retested, it indicates that the virus was not detected in the blood cells. If the bird is still positive, it indicates that the bird is either clinically infected or that the bird is being repeatedly exposed to the virus.

If Negative: Indicates that PBFD virus was not detected in the blood.

Vaccination

A variety of vaccine options are currently being researched, including one which could be placed in nest boxes and could enter the Bursa of Fabricus through the cloaca. Unfortunately, there are no vaccinations currently available.

Reference:

The Draft Threat Abatement Plan:

<http://www.deh.gov.au/biodiversity/threatened/tap/pubs/p-circoviral.pdf>