

PSITTACINE BEAK AND FEATHER DISEASE

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Psittacine Beak and Feather Disease is caused by a circovirus and is endemic to Australia and parts of Indonesia. The disease has been identified in a wide range of wild and captive parrot species in Australia. This circovirus is likely to have existed for a long period of time as there are descriptions of the typical Beak and Feather lesions in wild parrots dating back to the 1800's.

Although all parrots are potentially susceptible to this disease, some species are at a far greater risk and develop more severe symptoms. Typically Australian and African species are most easily susceptible.

Clinical Features

The appearance of birds infected with PBFD will vary greatly across the range of bird species and the age these birds are infected by the virus.

The virus has two main clinical features

1. Feather abnormalities and in some cases beak abnormalities
2. Immunosuppression

Feathering Abnormalities

This circovirus will attack growing feathers causing feather dystrophy which can present in a variety of ways.

- Feather loss
- Abnormal feather colouring
- Deformed feathers
- Weak feather attachment
- Feather calamus abnormalities eg pinching/necrosis

As the virus attacks the feathers when they are growing, the clinical presentation of these birds will depend on the stage of moult of that bird when it became infected with PBFD. Young chicks with all feathers growing can present with 100% feather dystrophy, however in older birds the feather changes will be gradual, as it will only be the new growing feathers that are affected as the bird moults.

The classic featherless bird generally only presents for chronic cases of PBFD in cockatoos. In most cases the changes are not so obvious, there is a wide range of far more subtle feathering abnormalities that can suggest that a bird is suffering from PBFD.

Birds that develop beak abnormalities typically develop a longer beak that is brittle and often develops fractures – advanced cases will also have necrosis of the hard palate – this is a very painful condition and these birds will find eating difficult. Typically only cockatoos develop beak abnormalities with PBFD.

Immunosuppression

Circovirus will selectively attack the Thymus and Bursa of Frabriscus preventing lymphocyte production and severely impairing the birds immune system. The younger the bird is infected the more severe is the immunosuppression. Birds develop their antibody diversity in the Bursa of Frabriscus in the first 3-6 wks of life, those infected before they have developed any immune function will never establish an adequate immune system. These birds with a suppressed immune system due to Pbfd will commonly suffer from a range of secondary infections; recognising an unusual infection may be the only symptom that prompts a vet to test for Pbfd.

Disease Progression

The course of the disease can vary greatly, this will again depend of the species of bird and the age when the bird is infected. It is very rare for any bird over 2 years of age to become infected with Pbfd, most birds are infected at a young age and develop symptoms as they moult through new feathers.

As with most viral infection the course of the disease can vary from acute to chronic, birds infected at a very young age tend to have an acute course and can die within weeks of first showing symptoms.

Birds infected after they have developed a functional immune system tend to follow a more chronic disease course that will present with feather abnormalities and possibly some level of immune suppression. Some of these birds can live a long life yet be constantly shedding Pbfd virus.

Diagnosis

Classical feathering abnormalities can be pathognomic for an experienced vet or wildlife carer. There is a range of pathology tests available to confirm a diagnosis.

- **HA/HI** – Heamagglutination(HA) test can be used to determine the level of virus in a bird, and Heamagglutination-inhibition(HI) will assess the immune respone of a bird to the Pbfd virus. The combined results give an accurate picture of the likely outcome of the disease eg. A bird with a high level of virus and no immune response is likely to die however a bird with a low level of virus and a good immune response may well live a long life but be shedding the virus.
- **PCR** – This is a very sensitive technique that will detect very low levels of virus. When using PCR it is best to send a blood quill feather and blood on filter paper for PCR. It is possible to get false +ve results with this technique.
- **Histopathology** – inflammatory cells typically accumulate in the feather pulp and Bursa of Frabriscus. Pbfd virus produces basophilic intracytoplasmic or intranuclear inclusion bodies in the feather pulp, feather follicle skin or the Bursa of Frabriscus. The absence of these inclusion bodies on histopathology does not rule out Pbfd. Histopathology of a blood quill feather is often the simplest and most cost effective way of confirming a case of Pbfd, however it is possible to get false -ve results with this technique.

Differential Diagnosis

Unfortunately many other disease processes can look similar to a subtle case of PBFD. Generally a detailed history and close clinical examination will differentiate from PBFD, however if there is any doubt and pathology tests are an option it will be best to confirm your suspicions.

- Polyoma virus – can produce feathering loss in a similar pattern to PBFD particularly in budgerigars. Typically polyoma virus will cause high mortalities in nestling chicks without necessarily causing any feathering abnormalities.
- Liver Disease – liver disease can cause narrow feathers and feather colour changes, occasionally these could be mistaken for PBFD.
- Poor Nutrition – Birds on a poor diet can also have feathering abnormalities and colour changes.
- General Health – chronically sick birds will have poor feathering – it is easy to confuse a chronically ill bird for a bird with PBFD. Eg. Chronically unwell Cockatoos will start to loose their powder down and have very stunted down feathers – this can be mistaken for PBFD.
- Feather picking – Some birds with PBFD will feather pick – it can be difficult to assess feather picking birds for PBFD and pathology testing may be necessary.

Treatment

There is no effective treatment for PBFD, although some birds will survive the initial infection these birds will become chronic shedders of the virus, if these birds are released into the wild they will spread the virus their entire life.

Pet birds with the chronic form of the disease can sometimes live a reasonable life, keeping these birds on a excellent diet and maintaining good husbandry are the basis for helping these patients. Any secondary infections should be treated very aggressively. Recent work has focused on helping these chronic cases with interferon to boost the immune system.

Species presentations

- **Lorikeets** – Rainbow Lorikeets and Scaley Breasted Lorikeets are by far the most common wild birds in South East Queensland that are presented with PBFD. These birds are typically young (still have dark beaks) and present with their tail feathers and outside primary wing feathers missing and are often called 'runners' because of their inability to fly. Remaining flight feathers will often pluck out very easily and have the classical calamus abnormalities of PBFD (ie pinching/necrosis).

Some Lorikeets will present with weak flight and just have abnormal colouring on the feathers – generally this will be incorrect areas of yellow on the primary feathers – more commonly on the tail feathers. Being familiar with what is normal colouring will help greatly when assessing these more subtle feathering abnormalities.

Older Lorikeets that have been carrying the PBFV virus for some time may develop feathering colour changes of the contour feathers (body feathers), this can present as yellow contour feathers or patches of yellow within the green contour feather. These birds generally present as weak and are suffering from a secondary infection associated with their weak immune system due to the PBFV virus.

- **Cockatoos** – Are the more classical presentation of PBFV. Depending on the age they become infected these birds progressively loose their feathers and may have dystrophic feathers grow in their place. The loss of powder down and powder down feathers is the first and most reliable method of assessing Cockatoos for PBFV. As the powder down feathers are constantly moulting, this will be the first place to notice PBFV in Cockatoos. Cockatoos can also develop beak lesions in chronic cases.
- **Budgies** – PBFV is often called 'French Mould' in budgerigars. Budgies will present in a very similar presentation to Lorikeets – these birds will loose their primary tail feathers and outside wing flight feathers. When these feathers regrow they will often be twisted and disfigured. The feathering will often improve after the subsequent 2-3 moults.
- **The Rest** – Although the virus will principally cause similar lesions in all infected birds, there is variability to which feathers are affected most and what colouring abnormalities are most common.
- **Cockateils** – Interestingly Cockateils don't seem to be affected by PBFV virus despite being a member of the Cockatoo family.

Disease spread/transmission

PBFV virus can be shed in faeces, feather dust, blood and crop contents. Shedding of the virus into the environment is a significant risk and contamination of clothing, feet and hands can easily transfer the virus. There is evidence that the virus can be spread vertically, ie. through the egg such that a chicks is infected with the virus before it hatches.

Control/prevention

The PBFV virus is very stable under a range of environmental conditions and is likely to persist for some time. All efforts should be made to prevent the virus entering an aviary/collection of birds as it can be very difficult to eliminate. No testing has been possible to accurately assess the effectiveness of any disinfectant however F10 is likely to be best. Due to the highly infective nature of the virus, any bird with PBFV should not be housed on the same property as other susceptible birds. After handling a bird suspected of having PBFV it will be best to change clothing and shower before getting in close proximity to other susceptible birds.