INFECTIOUS DISEASE RISKS TO PARROT AVICULTURE AND REINTRODUCTION

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Introduction

Parrots, as a family among birds, seem to be susceptible to a large number of highly contagious mainly viral diseases which may have severe effects on captive populations, particularly those maintained under intensive conditions. Most of these diseases are potentially fatal, some uniformly so, whilst others may decrease production or the viability of offspring. Some have long incubation periods of up to several years which, coupled with a lack of tests for the carrier state, enable them to infect whole groups of parrots undetected. Vaccines are generally unavailable or marginally effective. An understanding of these disease risks is very important for the maintenance of parrots in collections and, particularly, for their safe transfer between collections and eventual reintroduction into the wild.

Diseases which will be considered in this paper are:

Herpesvirus (Pacheco's disease)

Polyomavirus (avian papovavirus)

Psittacine beak and feather disease

Proventricular dilatation disease (Macaw wasting disease)

Internal papillomatous disease

Chlamydiosis (psittacosis)

There are other virus and infectious diseases of parrots, but they are of lesser importance in this general context.

1. Psittacine herpesvirus infection

This virus, one of a group of avian herpesviruses which includes falcon herpesvirus, pigeon herpesvirus, Marek's disease and others, is very common in shipments of New World parrots, particularly Amazons. Most infected birds die during quarantine with acute severe liver disease, but others may be unrecognised carriers. Cases have occurred in UK collections after several years without the introduction of new birds. Herpesvirus carriers typically begin shedding virus, or become ill, because of some intercurrent stress such as breeding, dietary change or transport. A vaccine is available in the US and has been used in South America before shipment but with very poor results, possibly because of strain variation within the virus. The human antiviral drug acyclovir (Zovirax) is effective at stopping outbreaks, but there is usually too little warning to save the individual bird. It is not known, however, whether the recovered birds may remain carriers.

Serological and virus isolation (from faeces) tests are available, but the former cannot distinguish carriers from non-carrier contacts and the latter depends on the bird shedding virus.

Appropriate precautions are quarantine and testing of incoming birds. Probably faecal culture is worth doing as a newly arrived bird may shed virus under stress. Treatment of detected carriers would be controversial. The virus occurs naturally probably only in New World parrots and there is circumstantial evidence that some conures may be regular symptomless carriers. It is therefore wise to keep Old World and New World species separate and avoid mixing conures with Amazons and macaws.

2. Polyomavirus

This highly contagious virus is the only member of its family which causes systemic disease in any species. The rest cause typical infectious papillomas or warts. In parrots, only chicks are clinically affected (with a few recorded exceptions) but the disease is widespread in captive populations where the adults are carriers. Some 50% of German and US aviaries tested positive in serological surveys. The prevalence in Britain is unknown. The virus is spread horizontally between chicks in nurseries, and probably between symptomless adults. It is almost certainly vertically transmitted through the egg. Most species of larger parrot are susceptible and chicks die at 3 to 16 weeks, or may simply be very difficult to rear with repeated bacterial infections and poor growth rate. Diagnosis in nurseries may sometimes be presumptive, based on constant rearing problems correlated with serologically positive adults. Testing is difficult to interpret as sero-negative adults can be shown to shed the virus. The development of highly sensitive tests for viral DNA in droppings and tissues is likely to improve the situation in the near future. The host-virus relationship is highly complex and makes prediction of carrier or immune status very difficult.

Appropriate precautions are difficult to take. At present we can test adults in quarantine by serology (in Germany), with the caveats outlined above. There are no effective treatments or vaccines. Prevention of spread between chicks is crucial, always remembering that the symptomless chick may be the culprit and that the virus is easily transmitted and very resistant to disinfectants. Hypochlorite should be effective.

3. Psittacine beak and feather disease

This disease is now known to be caused by a circovirus and causes failure of feather and beak growth in all species of parrots, but is chiefly seen in cockatoos, African greys and lovebirds. Infection seems only to occur in young birds, which may die of acute liver disease, become symptomless carriers or demonstrate the classic signs at subsequent moults one or more years in the future. The virus affects the rapidly multiplying epithelium of the feather and beak causing new pin feathers to become pinched off or twisted and the beak to become first shiny and then to crumble away. There is no effective treatment for carriers or clinical cases. Generalised immunosuppression is common and the bird may die of some other unrelated infection. Extensive studies have taken place in the USA to produce a test for carriers and a vaccine but neither is currently available in the UK. Affected birds can be tested by the histological examination of a damaged feather and its follicle, and specific inclusions can be identified. The disease has occurred as devastating outbreaks in parrot nurseries and frequently leads to the euthanasia of affected adult birds. Some carriers can probably remain normal for life. It is now known that the virus can be egg-transmitted.

Precautions include quarantining any incoming birds, especially cockatoos, for long periods, elimination of breeding birds demonstrated to be infected by the presence of disease in their chicks, and introducing chicks into nurseries only if they have been incubator hatched. The disease is spread by parents to chicks in the nest by feeding, and between chicks by feather dust and dried faeces. It is even possible for the disease to be introduced by feather dust on keepers' clothes!

4. Proventricular dilatation disease (Macaw wasting disease)

This disease affects many species of parrots, particularly macaws, African greys and cockatoos. Adult birds waste and die after periods of regurgitating seed and passing undigested food in the faeces, whilst still eating well. There may be nervous signs, although these are much more common in chicks, which may show changes in voice, unusual begging behaviour and paralysis as well as regurgitation. Outbreaks occur in intensive parrot units but more often cases are sporadic. The disease is clearly transmissible but no virus has yet been definitively associated with it. The clinical and pathological picture are classical, but there are other differential diagnoses, such as candidiasis or gastric foreign bodies. No bird should be labelled as having MWD unless a definitive diagnosis has been made in an experienced laboratory, because of the potential implications for the collection.

There is a very long latent period and the disease seems to be spread by carrier birds which do not necessarily succumb to stress, but infect other birds when moved into a collection. Other birds may then die up to a year later. Consequently it may never be possible to decide which bird was responsible for introducing the disease. Once in a collection it cannot be eliminated by removal of carrier birds, although parents of affected chicks must be suspect, provided there has been no spread within the nursery. Infection is probably also spread indirectly by keepers as cases seem to crop up haphazard in a house rather than passing from one cage to the next. As no virus has yet been isolated there are no tests for carriers and no real treatment is possible.

Precautions against introduction of the disease include long quarantine periods, thorough knowledge of the origin of birds, X-ray examination of birds which become or remain thin during the quarantine period, and hygienic precautions to prevent spread between aviaries.

5. Internal papillomatous disease

Cloacal papillomas occur frequently in New World parrots, including Amazons, Greenwinged macaws and Hawkheads, and are usually recognised by the presence of fresh blood in the faeces or frank cloacal

prolapse. It is less commonly recognised that similar polyp-like lesions occur on the palate and glottis and even in the upper oesophagous. The disease appears to be transmissible, although no cause has been isolated, and is often spontaneously self-curing. Treatment by surgical removal of the papillomas can be difficult and damaging although the use of lasers looks promising. About 10 percent of affected birds have an associated pancreatic atrophy and bile-duct tumour, which is usually fatal. It is not clear how many affected birds may develop this sequel later in life, but the disease should obviously not be considered to be merely benign. Some liver function tests show promise in identifying such birds at an early stage. Transmission is believed to be by oral or venereal contact between birds and there is concern that breeding may be affected.

Incoming birds of susceptible species should undergo a thorough cloacal and oral examination as part of their general clinical check before entering the collection.

6. Chlamydiosis (psittacosis)

This disease of all birds is well-known in parrots, but much misunderstood. Emphasis tends to dwell on the potential infectivity for humans and frequently leads to overreaction in this regard, when the main threat is to the birds. The infectious agent is a primitive bacterium but, being cell-associated, has many similar features to viruses, including being very indestructible in its resting stage. It is susceptible to antibiotics, including tetracyclines and erythromycin, when actively multiplying, and there are tests for carriers, so the outlook is more promising than for most viruses. However, a life-time carrier state appears to exist, so this has to be included in the group of 'time-bomb' diseases. Infection is most often seen in newly imported New World parrots and losses can be massive in heavily stressed birds. The widespread illegal use of tetracycline antibiotics in quarantine frequently leads to suppression of the disease, so that the parrot falls ill on the next owner, when antibiotics are withdrawn and the stress of movement is added. Chlamydiosis is typically manifest at times of stress such as change of ownership, breeding, bad weather etc. The clinical syndrome varies with species – some, such as cockatoos, seem to be resistant, others like cockatiels and budgerigars may have persistent subclinical infection, whereas Amazons may develop severe hepatitis and die quickly. Australian parakeets tend to get mild eye disease and coryza. Some flocks may only suffer poor egg production and lowered hatchability.

Young Lesser Sulphur-crested Cockatoo suffering from a feather condition

Diagnosis is possible from clinical signs, but there are now very sensitive faecal tests for chlamydial DNA (Central Vet Lab, Weybridge) which can detect many carriers as well as clinical cases. Frequently the presence of the disease is only suspected when a human case occurs. Chlamydiosis is **not** notifiable (except in Cambridgeshire) and officials have no rights to dictate the management of infected birds, although there are Health and Safety implications in zoos. In any case, the response of officials is usually wrong. Positive cases should be isolated and **correctly** treated, tested after treatment is complete and then returned to the collection, or allowed to enter it, while carrying a "flag" against their name as a possible carrier (with low probability).

Incoming birds can be tested in quarantine, preferably twice, with a good likelihood of success as the stress should cause them to become shedders. There is **no** justification for random treatment or treatment of quarantine birds. Spread between cages seems to be low, but is high within cages. Frequently the only sign that a bird is a carrier is when the new mate to which it is introduced goes down with the disease. Because of widespread carrier states in parakeets, cockatiels, budgerigars and finches, large parrots should be kept well away from these species.

Conclusion

The foregoing should make clear that the maintenance of closed aviaries of parrots is the ideal. Of course, this philosophy is incompatible with joint management of species and the pairing of unrelated birds. Nevertheless, it appears that diseases like MWD are increasing exponentially in captive parrot populations and any established breeding collection would do well not to add to its numbers from unknown sources unless absolutely necessary and, in these cases, to quarantine and test incoming birds exhaustively. The expense of such procedures should be well repaid in time.

One alternative would be to set up a system of certifying collections as free of certain diseases. In the absence of definitive tests this can be difficult, but it should be possible to a limited degree if certain criteria are met:–

a. All parrots, chicks and eggs dying in the collection should be examined post mortem, by a competent laboratory with a knowledge of parrot diseases.

b. All sick birds and chicks should be examined clinically and an accurate diagnosis made (as far as possible).

c. All birds should be tested regularly for those diseases for which tests are available, and clinically examined for signs of others (e.g. beak and feather disease, papillomas) on an annual basis.

d. Records should be kept of offspring from the collection, their destination and eventual causes of death.

e. There should have been **no** incoming birds during the period covered by the certification.

It should then be possible to make up further breeding groups using offspring from certified collections which should, by definition, be free of the major infectious diseases. Such offspring would be prime candidates for reintroduction projects as, with the exception of beak and feather disease, we have no knowledge of these conditions among wild populations and cannot know the possible consequences of introducing them either to naive populations or virgin habitat. The ability of other carriers than the birds themselves, particularly visiting aviculturists and even veterinarians, to introduce disease accidentally should not be overlooked.

Infectious disease represents a major threat to the viability of captive parrot populations in a way that is probably unique in the zoo world. Tremendous efforts are being made to come to grips with these problems prompted, it has to be said, by the economic pressures of American aviculture rather than by the efforts of zoos. Nevertheless, complete success and security are clearly some way in the future and it is vigilance now which will ensure that we have breeding birds and offspring for reintroduction in the future.