Chlamydiosis in wild Australian parrots: Implications for trade in wild caught birds.

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Introduction

Chlamydiosis has been recorded from at least 159 host species, 114 of which are documented in the free-living state. Almost one quarter of the reported host species are psittacine birds[1]. The disease was thought to have evolved in parrots and cockatoos, hence the common name 'psittacosis'. However, it has since been recorded from a large number of species of *passeriformes* (pigeons and doves) and *charadriiformes* (shorebirds, gulls and terns), which together account for 45 percent of the recorded host species.

Aviculture enthusiasts and veterinary practitioners have a common interest in diseases which affect captive birds. Currently there is a great deal of research effort being directed at developing a vaccine for psittacine circoviral disease (Parrot Beak and Feather Disease), and lesser amounts of research into other viral diseases such as such as parvovirus-like agents[2] and enterovirus-like agents[3] which have been found in association with PBFD.

Prior to the identification of the causative agent of PBFD the most serious disease known to affect aviary birds was *Chlamydia psittaci*. This disease was recorded in captive and wild birds in Australia as far back as the early 1930s[4,5,6] In more recent times there have been fewer published records of this disease in wild birds in Australia, reflecting changes in research direction rather than anything else, and yet the disease remains a serious problem for aviculturists.

The aviculture industry in Australia continues to grow with the bulk of the birds traded being captive-bred, however a small proportion of the birds traded at retail outlets are derived from wild-caught stocks taken under licence. This paper describes two cases where *C. psittaci* was recorded in wild parrot populations in south-west Western Australia, and discusses the implications that these findings have for those parties involved in the capture, trade and care of such birds.

Case One: Red-capped Parrot (*Purpureicephalus spurius*)

In early 1990 while studying the ecology of this species I collected six recently fledged red-capped parrots from the wild near Manjimup (290 km SE of Perth). The birds were maintained in flight aviaries in isolation from any other birds and appeared to settle into captivity without any difficulty, but within a month three birds had died. None of the birds had shown any

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obvious symptoms of disease, but all three showed a very rapid decline in health. Post mortem examinations indicated that two, and probably all three birds died from *C. psittaci* infections. A review of available literature suggested that *C. psittaci* had only been reported once before in this species, and that was from a single captive bird housed with several other species which had contracted the disease. This experience raised the question of whether the birds collected from wild were already infected at the time of capture and if so, how common was the disease in the wild population?

To detect a 10 percent level of infection of *C. psittaci* in a population of wild parrots numbering 200-1000 at 95% confidence requires samples to be taken from at least 27-29 birds. As part of other studies on this species the opportunity existed to collect a larger sample, increasing level of confidence in the results. Over the next 12 months, 88 red-capped parrots were collected from around a single commercial fruit orchard (8 birds in each of 11 monthly samples, beginning in May 1991). Two cloacal swabs were taken from each bird collected using Chlamydia Swabs (Chlamydia Collection Kit, Pharmacia Australia Pty. Ltd.). The swabs and parrot carcases were refrigerated at 4°C. and transported back to Perth.

On arrival in Perth, the birds were examined for clinical signs of *C. psittaci* infection, sexed by examination of the gonads, and tissue samples taken from the kidney, pancreas, adrenal gland, ovary/testes, gut, heart, lung, proventriculus, liver and spleen. The pathology examinations were performed within 48, and usually 24 hours of the birds being collected. The cloacal swabs were washed in buffered solution and then discarded. The buffered solutions containing the secretions recovered from the cloacae were then frozen at -20 degrees C. and stored until the samples could be analysed in bulk. The analysis was carried out using a commercial enzyme immuno assay kit (Chlamydia EIA, Pharmacia Australia Pty. Ltd.). This type of detection kit tests for the presence of the *Chlamydia* antigen rather than the antibody. EIAs have been shown to be very accurate in detecting the presence of *Chlamydia* antigens[7] and provide a quick and cheap means of surveying a population.

None of the 88 birds examined demonstrated any gross pathological symptoms corresponding with those normally associated with *C. psittaci.* To all intents and purposes all 88 birds appeared normal and healthy. None of the slide preparations made indicated any abnormal features at the microscopic level. Swabs from seven birds were shown to be positive (ie the birds were actively excreting *Chlamydia*), and a further two birds returned 'suspect positive' results (total 9.8% infected). Suspect positive results can be interpreted as likely to be positive, but the level of *Chlamydia* present in the sample was too low to be certain. The remaining 79 birds returned negative results.

There was no bias in the sex ratio of the birds which returned positive, or suspect positive results (4 male, 4 female, 1 sex unknown). Neither was there any bias in the proportion of adult and immature birds which returned positive or suspect positive results (X^2=1.21, d.f.=2, p>0.05). However, there was a significant difference in the proportion of birds which returned positive or suspect positive results in the seven, monthly samples collected in 1991 (no sample in November) in comparison to the four, monthly samples collected in 1992 (X^2=6.19, d.f.=2, p<0.05).

These results clearly indicate that *C.psittaci* can be established in a significant proportion of a local red-capped parrot population, and that it can persist in a population virtually undetected for a prolonged period. While *C. psittaci* has been recorded from a range of other species of

wild parrot in Australia, none have been shown to have such a high level of infection in an apparently healthy population. The absence of *C. psittaci* from any of the birds collected in 1992 can be explained by the fact that the EIA only detects antigens and that this indicates that none of the birds tested in 1992 were actively excreting the virus. It is reasonable to expect that an equal or greater proportion of birds in the population would have had antibodies to *C. psittaci*, indicating that almost 20 percent of the population had been exposed to the disease.

Case 2: Western Rosella (*Platycercus icterotis*)

In 1996 a member of the public contacted the Department of Conservation and Land Management (CALM) seeking advice on what might be killing the western rosellas which were visiting her backyard garden near Denmark (360 km SSE of Perth). The caller could offer little background information other than that the birds were literally falling out of the trees dead. Approximately 15 birds had died in this manner before help was sought.

A freshly dead western rosella was subsequently delivered to a veterinarian based in Albany (who had been involved in the research into *C. psittaci* in red-capped parrots) for examination. The post mortem showed that the bird had died from an acute *C. psittaci* infection. Since the birds were dieing in a populated area the Public Health authorities were notified, and the health implications of the disease were explained to the caller who had reported the dieing birds. She then commented that she had had a persistent chronic chest infection for some months, which had not responded to treatment. She was advised to visit her doctor as soon as possible and make him aware of the *C. psittaci* outbreak in birds frequenting her garden.

Trade in Wild Caught Birds in Western Australia

In Western Australia there are currently 11 licensed bird trappers, three of whom are authorised to trap red-capped parrots, western rosellas and Port Lincoln ringnecks (*Barnardius zonarius*). Over the past seven years (1989/90-1995/96) those three trappers combined have taken 3938 (average±s.d.; 562±187 per annum) red-capped parrots, 4134 (590±236 per annum) western rosellas and 11569 (1652±477 per annum) Port Lincoln ringnecks for sale to the aviculture trade (CALM Annual Reports).

Once trapped, the birds are transported to holding cages where they are maintained at fairly high densities and in darkened cages with reduced ventilation for a minimum of 14 days before being sold to wholesale markets. Approximately 30 percent of the trapped birds are exported direct to markets in the eastern States, the remainder going to local markets, from which a small number are subsequently exported to the east.

Western rosellas are the most sought after of the three species mentioned and they invariably command prices five to six times that of red-capped parrots and Port Lincoln ringnecks, and it is not uncommon for there to be no market for red-capped parrots or Port Lincoln ringnecks. To avoid being left with large numbers of red-capped parrots or Port Lincoln ringnecks in stock the trappers try to make the sale of western rosellas conditional upon the wholesaler taking a specified number of red-capped parrots and/or Port Lincoln ringnecks in each consignment. However, this is not always successful and the unsold birds can remain in the trappers′ aviaries for extended periods.

Discussion

The data presented above indicate that at the population level, chlamydial infections can be both benign (as in red-capped parrots) and lethal (as in western rosellas) in wild populations of parrots. It should not be assumed that parrots can tolerate latent infections of *C. psittaci* without any adverse affects, since there is no information on the impact that infections can have on the movements and behaviour of wild birds. Effects of disease, which to humans appear insignificant, may be sufficient to expose individuals to increased rates of predation. Sub-lethal effects of *C. psittaci* in wild birds may be just as important if they lead to growth retardation, weight loss and depression or termination of egg-laying[1]. Such adverse impacts are also important to aviculturists, especially those attempting to breed birds for commercial gain.

The conditions under which wild caught birds are held prior to disposal to wholesale outlets is likely to have a significant impact on the quality of the birds which are subsequently sold, and also presents a serious quarantine risk to prospective buyers. The stresses associated with trapping, transport, initial confinement and a change in diet may be sufficient to cause a reduction in immune system response in some birds. If those birds are already infected with *C. psittaci* the disease may change from a latent one to a lethal one, resulting in a loss of 'product' to the trapper. Before those birds die they are highly likely to infect other birds sharing the same aviary facilities. In cramped, darkened cages with reduced ventilation and quite possibly reduced frequency of cleaning (to reduce disturbance to the birds) conditions exist for the establishment of a mini epizootic.

Examination of trapper licence returns suggest that such mini epizootics seldom occur, but it does not mean that a greater number of birds sold to the aviculture market are not infected with *C. psittaci* at the time of sale. Only after the added stresses of one or more additional movements, a new diet and possibly a new climate will the disease manifest itself and birds die.

It is interesting to note that much of the early literature on chlamydial infections was published by medical practitioners as a result of humans contracting the disease. The significance of this disease to those humans involved in the handling, care and sale of wild birds should not be underestimated. Burnet and Macnamara[4] reported 17 people being infected in one outbreak, 12 of whom were known to have contracted the diseases through contact with a single consignment of wild caught birds sold through a Melbourne dealer. Antram[8] reported that wildlife officers contracted the disease after handling a consignment of twenty-eight parrots (*Barnardius zonarius semitorquatus*), and a researcher contracted the disease while working on corellas (*Cacatua sanguinea* and *C. tenuirostris*) in South Australia[9].

The recent outbreak of psittacosis in August 1995 in Bright, Victoria, where 10 people were infected and one person died serves as a reminder that this disease is not one which can always be cured with modern drug therapy. More recently one of the major aviculture breeders and suppliers in Australia has had to get out of bird keeping altogether due to a chronic psittacosis infection. Successful treatment depends as much on early diagnosis as it does on appropriate drug therapy. Most doctors would be lucky to see this disease once in a year, but that does not mean it is any less significant for the unfortunate person who contracts it.

In Western Australia *Chlamydia psittaci* is a notifiable disease which should be reported to the Public Health Department. Veterinary practitioners can play an important role in public health by continuing to advise aviculturists of the risks associated with this disease, and stressing the importance of birdkeepers being tested for this disease when they have been exposed to diseased birds, particularly those cases involving acute lethal infections.

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