Pathology, Diagnostics Implications and Strategies in a Breeding Colony of Orange-bellied Parrots (*Neophema chrysogaster*)

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The Orange-bellied parrot is a unique psittacine species in that its breeding territory is the remote South-West part of Tasmania and it winters over along the Southern coast of Victoria and South Australia. This requires a migration across the Bass Strait. There are an estimated 300 individuals in existence. About 50 percent of these are housed in four locations and the remainder are free ranging .Three pairs are held by a private aviculturist in cooperation with the recovery program, some are at the Adelaide Zoo, and the primary breeding groups are divided between Healesville Sanctuary in Victoria and a facility at Taroona, Tasmania. Periodically, young birds from each breeding facility have been exchanged to maintain genetic diversity. In the past there have been no quarantine and testing protocol procedures in place when birds have been moved.

The facility in Taroona is composed of two buildings with 21 flights, housing 56 adult birds. Some birds are housed as single pairs and some as multiple pairs. The flights have sand-covered floors. Nest boxes are constructed of plywood with natural hollow branch entrances. There has been no bio-security protocol in place. In the past deceased birds were necropsied, tissues fixed in formaldehyde and sent to Healesville. From there the samples were forwarded to a private veterinary pathology laboratory for processing and pathologist examination. The two most common causes of death at the Taroona colony were head trauma (startled birds flying into solid objects) and nematode infestations obstructing the intestines.

The breeding season starts in early spring and previous years were devoid of high numbers of chick deaths. Biologists monitoring the wild population reported that more chicks hatch in the wild but more chicks fledge at the breeding facilities. As of 25 January, 2006, at Taroona, 52 chicks hatched,36 chicks died and 14 fledged. One chick was being hand-raised and one chick was still in the nest. In addition there were on this date 25 eggs under hens. Of eight clutches, two had all chicks survive. The totals for the years 2002-2006 were as follows:

Season	Hatched	Fledged	Died before fledging	Died after fledging
2002-2003	34	18	8	1
2003-2004	30	23	8	1
2004-2005	41	26	15	3
2005-2006	62	19	43	2

The statistics on numbers hatched and fledged in previous years was about the same as the 2002-2005 period.

The current medical history started on 28 November, 2005. A dead chick from one of the breeding pairs was presented dead on arrival. In the past deceased birds were adults and a chick raised my level of suspicion that something was amiss. The remains were sent to the Tasmanian Animal Health Laboratory for necropsy and histo-pathological evaluation

During early December, 2005 a number of chicks died as well as an adult bird. After consultation they were shipped to Shane Raidal at Murdoch University under refrigeration for PCR testing for circovirus, polyoma virus and *Chlamydophila*. The samples were sent by Express Post on 15 December, 2005 and took four days to arrive.. They were not suitable for histopathology but were suitable for PCR testing. The University was closed for the Christmas holidays and staff was away so results were to be available after the start of 2006. More chicks died and they were preserved in alcohol pending results from both the Animal Health Laboratory and Murdoch University. On 10 January, the preserved chicks were sent by the Nature Conservation Branch of DPIW to Healesville Sanctuary to hold until the pending results were available. Unfortunately these were sent to the private veterinary pathology laboratory and processed and were not available for PCR testing. Three more chicks died and were saved in alcohol.

On 13 January the Animal Health Laboratory reported: "intra nuclear inclusion bodies seen". One of Shane Raidal's graduate students reported that the PCR for circovirus was negative. On 20 January it was reported that the polyoma PCR would not be run until the week of 22 January. It was 55 days since the first chick death and still no confirmed diagnosis. After discussion with Peter Holz at Healesville, Karrie Rose, the pathologist at Taronga Zoo, was contacted, and dead chicks were sent to her for evaluation on 25 January, 2006. The chicks had died in nest and were too autolysed for diagnostic value. Slide review of material from the Animal Health Laboratory and the private pathology laboratory did not confirm inclusion bodies.

On 3 February Shane Raidal reported that the polyoma PCR was negative on the samples sent to his laboratory. On 6 February two more dead chicks were presented and swabs of the coelomic cavity submitted for bacterial culture. In addition to a coagulase negative staph, both chicks grew *Candida famata*. Samples of nesting material and saw dust, were cultured from nest boxes as well as unused nesting material and no *Candida* sp were grown.

Karrie Rose arranged to send samples to the University of Georgia for further testing and additional chicks in alcohol were sent to her. Since *Neophema chrysogaster* is a CITES I-listed species, special permits were needed to send samples. The laboratory at the University of Georgia reported a herpesvirus, not Pacheco's virus, was found by PCR testing of the samples. Since the Adelaide Zoo had a group of confiscated conures and chicks had been moved from there I would not have been surprised if the herpesvirus in question had been Pacheco's virus even though the conures were supposed to be kept in a quarantine facility. The questions now are: What herpesvirus are we dealing with? Is it an exotic virus or one endemic to Australia? Does is exist only in the Taroona breeding colony or is it in all the captive locations? Finally is it in the wild, free ranging population?

To this end, David Phalen is now in Australia and is setting up his laboratory in Sydney associated with the University of Sydney at Camden. He will be assisting on this matter. During the coming breeding season, birds in the wild will be sampled by pharyngeal and cloacal swabbing and submitted for PCR testing. This can be done when birds are in the nest boxes. Birds in the captive

breeding facilities will also be sampled. Hopefully the specific herpes virus can be identified and its distribution within this species defined. If it is not present in the free ranging population, chicks from the breeding colonies cannot be released into the wild. If it is present in the wild population it may be one of the factors along with destruction of the wintering habitat that has contributed to the decline in numbers of the species.

In either case, bio-security of all captive populations must be instituted and complied with as well as with field operation involving the wild birds. Currently the facility at Taroona is under quarantine. I suspect the "horse is already out of the barn". It may be too late to save this species. It is not too late to learn from this exercise. If governments are truly interested is committing themselves to habitat and species preservation they must commit adequate funds and personnel for the task as well as professionally staffed properly equipped diagnostic facilities that are conveniently located for the rapid diagnosis of disease.

Do humans need orange-bellied parrots? No, but in learning to save them, humans may learn to save themselves.