Breeding Green Catbirds at Featherdale Wildlife Park

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The Green Catbird *Ailuroedus crassirostris* is a powerfully built passerine of the family Ptilonorhynchidae which makes up the bowerbirds, of Australia and New Guinea. There is a total of twenty species in the family; seventeen species of bowerbird and three species of catbird. There has been some opposition to including the catbirds in this family as they are monogamous while bowerbirds are polygynous, and both sexes of catbird care for the young whereas the female bowerbirds have sole parental responsibilities (Rowland 2008). Unlike the bowerbirds, the male catbirds are not known to construct a bower for display, however Phipps (1969) describes a captive male Green Catbird that maintained a cleared area with leaves stripped from a lemon tree and positioned face-down in a rough circle. Performance of this behaviour has not been noted in the Green Catbirds at Featherdale Wildlife Park. DNA research suggests that the link between the catbirds and bowerbirds predates the evolution of polygynous and bower building characteristics (Rowland 2008).

Green Catbirds are predominantly green in colour as their name suggests; emerald on their upperparts with plainer greenish ear-coverts and underparts, the latter with distinct fine white streaking (Menkhorst *et al.* 2017). The bill is pale and heavy and the iris is red. Sexes are almost identical.

Green Catbirds' Australian distribution is from south-eastern New South Wales to south-eastern Queensland where they inhabit humid rainforests and the adjacent eucalyptus forests, orchards and gardens (Rowland 2008). During the breeding season they are usually seen singularly or in pairs but may form flocks of up to twenty at other times, their characteristic wailing cat-like cry often the first indication of their presence (Cooper & Forshaw 1977). Their call rises in pitch and volume and lasts for about 3 seconds, often repeated two or three times in succession and while both sexes call, the male sings louder and longer than the female (Rowland 2008). Although the call may be given at any time of the day, the birds at Featherdale Wildlife Park call mostly in the early morning and late afternoon, and more frequently in the spring and summer months. Throughout the rest of the day they can often be heard giving their loud, short *tic* contact call.

In the wild Green Catbirds are primarily frugivorous with various species of fig making up the bulk of their diet, along with other flowers, buds and shoots. Cultivated fruit from orchards and gardens will also be taken. This diet is supplemented with insects and small vertebrates such as frogs and nestling birds, increasingly so towards the start of breeding (Rowland 2008). At Featherdale Wildlife Park our Green Catbirds are fed daily a diet of our frugivorous bird mix along with a smaller portion of our coarse mince mix, supplemented by insects such as mealworms and crickets. They also take pinkies and will actively hunt any wild mice that make it into their aviary. They also relish any native fruits offered such as wild figs and lilly-pilly. Diet during the chick rearing period will be discussed later.

In 2015 Featherdale Wildlife Park in Western Sydney held four Green Catbirds: a pair in a large mixed species aviary and two housed individually. DNA sexing revealed that the two birds housed together were a true pair, but the birds held individually were two males. One of these was swapped for a female and the birds were paired in a new aviary measuring 10×4.5×3.2m that they shared with White-headed Pigeon *Columba leucomela*, Blue-faced Honeyeater *Entomyzon cyanotis*, Australasian Figbird *Specotheres vieilloti*, Bush Stone-curlew *Burhinus grallarius* and Glossy Black Cockatoo *Calyptorhynchus lathami*. The original pair were moved from the competitive mixed species aviary to a large aviary measuring 14.5×3.5×3.5m that they shared with a pair of Green-winged Macaws *Ara chloropterus* and a pair of Masked Lapwings *Vanellus miles*.

The birds were initially banded with aluminium leg bands, however some of them were able to crush these out of shape with their powerful bills. Not wanting to risk leg injuries, the bands were replaced with stainless steel ones that could withstand the pressure exerted by them.

Breeding

In the spring of 2016 the male of the original pair started to aggressively pursue the female around the aviary – behaviour that is characteristic of some male catbirds in captivity (Pearson, J. Personal communication). At its worst the female was found hiding from the male on the aviary floor under some grass tussocks and it looked probable that he would eventually injure or even kill her. To give the female an advantage we trimmed the flight feathers of the male, taking off about half the length of all primaries and secondaries on both wings. This still enabled the male a very laboured flight but the female was able to easily escape when he became aggressive. Male catbirds often feed the female during courtship and with the male's wings trimmed the female could safely approach him to receive food and eventually be mated. The second pair's male's wing feathers were trimmed as a precaution before he was introduced to the female's aviary. This trimming of the males' flights is repeated each breeding season when increased chasing of the females is observed.

The females only (as is usual for all members of the family) of both pairs built large, bulky, cup nests out of sticks and lined them with grasses. The nests were built in dense dried brush (Paperbark *Melaleuca* spp.) that was placed in the sheltered sections of the aviaries. One pair built their nest in a hanging plant basket lined with fine branches and placed in the brush as a nesting receptacle. As this was our first time breeding catbirds we decided to be very hands-off, checking the nests very little. The usual clutch is two eggs and the incubation period is 23

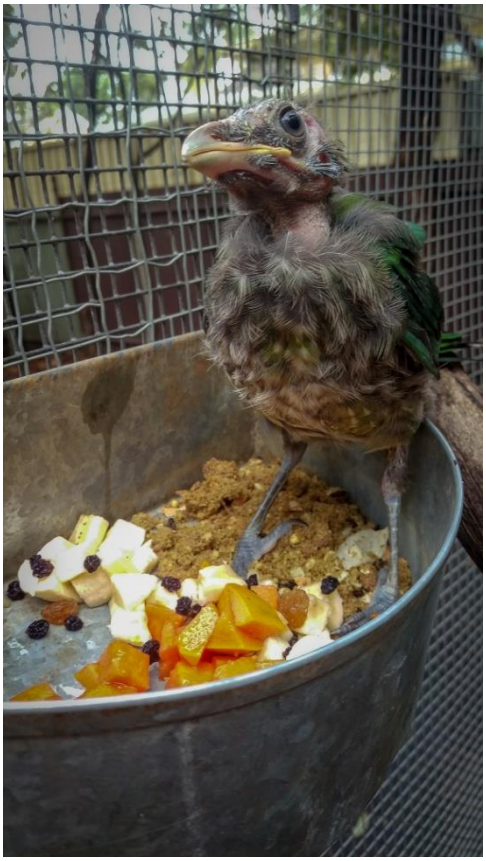
to 24 days (Rowland 2008). Egg lay dates were not noted but incubation was calculated from when the female started spending considerable time on the nest, both being very tight sitters. Stan Sindel (1991) notes that in his experience incubation commences with the laying of the second egg and that the chicks hatch on the same day. Incubation is carried out by the female only. Towards the expected hatch date, the birds were given additional feeds of live mealworms and crickets, along with chopped pinkie mouse. The presence of chicks was determined by the parents carrying food to the nest. At this point live feeds were increased to five times per day, with the first feed at 7am and last feed at 4pm. Live food was presented in deep plastic storage tubs that kept the crickets contained. Enough was fed that there would still be some remaining by the next feed. Crickets were the favoured food item for the first week or so with the parents feeding increasing amounts of fruit to the chicks until they fed mostly fruit by 17 days old. Sindel (1991) maintains that the parents are almost completely insectivorous for the first week, after which they start supplementing the chick's diet with fruit. Both parents feed the chicks but only the female broods, spending most of her time on the chicks initially but decreasing the amount of time spent brooding after the first week.

As the chicks grew their heads became visible over the rim of the nest when they begged for food upon the arrival of a parent. We were able to observe a single chick with the original pair and two chicks with the second pair. The chick from the first pair fledged at 19 days old, which appeared very premature, with almost no tail and no feathers at all on its head which only had a light covering of soft fuzzy ginger down. The body and wing feathers were a duller green version of the adult colours and there were whitish feathers on the abdomen and lower breast. Looking so young, we attempted to return the chick to the nest, but it left again almost immediately. From three successful nesting attempts, Stan Sindel (1991) recorded fledging at eighteen, nineteen and twenty-two days after hatching.

Felix on fledging day

A strange thing happened after the chick fledged. The female, who up to this point had been a model parent, started pecking the chick around the head. At first, we thought this could be to encourage the chick into cover, however the pecking increased in intensity to the point where removal of the fledgling was necessary by the end of its first day out of the nest. At this point the chick weighed 100g and took several days to calm down and readily accept food from its new human carers. Named Felix, he was fed between 6:30am and 8pm on a diet of fruit pieces (paw paw, banana, rock melon, soaked currants), chopped pinkie and crickets. According to Rowland (2008), chicks are dependent on their parents for up to 80 days after fledging, however this chick was mostly self-feeding three weeks after fledging. DNA sexing identified Felix to be male.

Felix's weaning diet



Felix self feeding

Meanwhile, the second pair were having problems of their own. Sixteen days after hatching the bobbing heads of the chicks could no longer be seen and a nest inspection revealed two dead chicks. Upon touching the nest, it was immediately apparent that the chicks were covered in

mites. Our hands-off approach had failed us in this instance and the mites had taken hold and overcome the helpless chicks without our knowledge. Spraying the nest and brush with an insecticide (Coopex) before and during nesting is now practiced. Chicks in the nest are now also sprayed with a topical insecticide (Avian Insect Liquidator) if there is any suspicion of mite infestation. Mites are sometimes carried by the wild Eastern Cattle Egret *Bubulcus coromandus*, Great Egret *Ardea alba* and Australian White Ibis *Threskiornis molucca* that nest within and inhabit the park, which has resulted in occasional random outbreaks in some of our aviaries.

Within 6 days of losing her chicks the female was relining the nest and eight days later was incubating. Once again, we were fairly hands-off except to spray the nest area with Coopex and the chick with Avian Insect Liquidator at about a week old as a precaution. This time the pair reared a single chick; the female was very vocal and protective of the chick after fledging, and she did not show any of the aggressive behaviour towards the chick that the female of the first pair did. The chick was left with the parents for three months and DNA sexing revealed its sex to be female. At this point she was moved into a new mixed display aviary with Felix, the young male from the first pair.

The following breeding season, in late spring 2017, the second pair were noted to be incubating and a nest inspection revealed two eggs. Additional live feeds at predicted hatch time commenced, however a later nest inspection revealed only one chick. As a precaution the chick and nest area were sprayed for mites. Once again, this pair proved to be model parents and reared the chick to independence with an identical feeding regime to the one described above.

Chick in nest

Fledgling

Housing

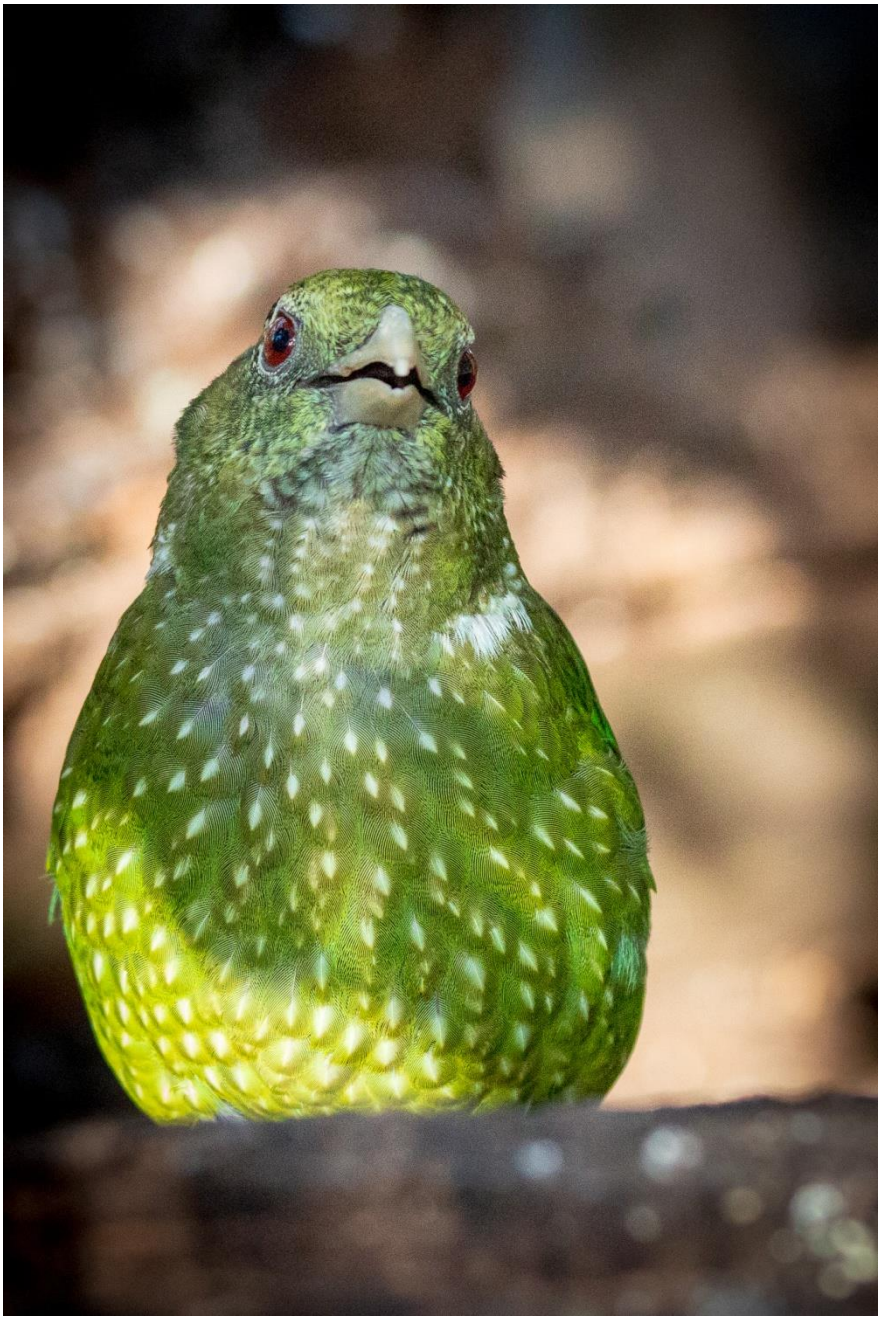
Green Catbirds are large and energetic so require a roomy aviary that is planted with, preferably, tropical plants such as *Ficus* spp., lilly-pilly (such as *Syzygium* spp.) and various species of palms. Although not particularly destructive to vegetation, they will strip and eat some leaves of lilly-pilly trees and tend to break off the emerging shoots of tree ferns *Dicksonia antarctica*. They utilise all levels of the aviary and are very curious, investigating their surroundings, which highlights the need to provide a complex environment to keep them active and engaged. They love to bathe under a sprinkler or in a shallow water bowl. At Featherdale they are provided with a shelter over part of the aviary, which enables them to get out of the elements, but in our Sydney climate do not require any artificial heat source.

Compatibility and health

The second pair inhabit a mixed aviary and have remained relatively peaceful towards their exhibit mates even during breeding, including tending to their fledglings. A number of the other species have successfully bred whilst living with the catbirds, including the Blue-faced Honeyeaters, White-headed Pigeons and Bush Stone-curlews. The original pair of catbirds shared their enclosure with the Masked Lapwings without incident until the lapwings hatched chicks, which were quickly predated by the catbirds. It can be expected that catbirds will predate small chicks of other species that are easily accessible and left unattended by their parents.

There has been no interaction noted between the Green-winged Macaws and the catbirds. Stan Sindel (1991) suspected that his Green Catbirds may have been responsible for breaking the eggs from a pair of Red-tailed Black Cockatoos *Calyptorhynchus banksii* that they co-habited with.

Our experience at Featherdale indicates that housing Green Catbirds with Satin Bowerbirds *Ptilonorhynchus violaceus* is not advised. Whilst they do appear to be compatible for periods of time, we have found aggression can be expressed between the two species, with both species capable of being the aggressor. We have had a female Satin Bowerbird die from injuries sustained from a male Green Catbird in a very large mixed species exhibit. Conversely, we have had the bowerbirds exhibit a low level of dominance that included displacing the catbirds from feed areas. Whilst this dominance may not have immediate effects, it can contribute to an increased stress level in the catbirds that may leave them open to secondary infections. The stress associated with dominance from a male Satin Bowerbird is suspected to have contributed to our young male catbird Felix acquiring an *Aspergillus* infection. *Aspergillus* is a genus of fungi found naturally in the environment, with the ability to grow efficiently under a variety of environmental conditions and to utilise a wide variety of substrates. While birds may be able to tolerate exposure to *Aspergillus* spores without becoming infected, stress is considered to be a major contributor to a bird becoming diseased. The respiratory system is the primary location of infection, mainly in the trachea and air sacs, and the lungs may also be involved. As the disease progresses multiple organs can become affected and it will often result in the death of the bird. *Aspergillus* infection will often (but not always) present itself as laboured, open-billed breathing due to the build-up of fungus in the airways. Felix and his mate are housed in a large mixed species display that also includes a pair of Satin Bowerbirds. After about six months of living together some low-level aggression was noted from the bowerbirds towards the catbirds and plans were made to remove the bowerbirds. However, in the meantime Felix started exhibiting signs of open-billed breathing. Suspecting aspergillus infection, both he and his mate were immediately removed to our veterinary hospital and started on a lengthy course of oral itraconazole administered directly to the bill via a syringe. The female catbird didn't show any symptoms but was treated as a precaution and also moved to provide Felix with company in an attempt to reduce his stress levels. After about four weeks of treatment twice daily and, to be honest, little hope of recovery, Felix suddenly showed marked improvement with much reduced open-billed breathing that eventually stopped all together. Treatment was reduced to once per day and continued for another two weeks after his symptoms ceased before being discontinued. It is impossible to know if the infection is eliminated or whether it will reoccur, but for now Felix is looking healthy and happy and has appeared to have recovered and the pair have been returned to their exhibit after the removal of the Satin Bowerbirds.



Felix as an adult

In conclusion

The Green Catbird is a species that is held in small numbers in private aviculture and some zoological institutions such as Featherdale. They do breed well given the right conditions, allowing for the male's sometimes aggressive behaviour towards the female. Displaying them in appropriate aviaries, mimicking their habitat, shows them to their best where their beautiful colour and confident, jaunty mannerisms make them a pleasure to watch.

Acknowledgements

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Products mentioned in the text

Coopex: Produced by Bayer CropScience Pty Ltd, Level 1, 8 Redfern Rd, Hawthorn East, Vic 3123. www.environmentalscience.bayer.com.au

Avian Insect Liquidator: Produced by Vetafarm, 3 Bye Street, Wagga Wagga, NSW 2650. www.vetafarm.com.au

Itraconazole Liquid 100mg/ml: From Bova Compounding Chemist, 304-318 Kingsway, Caringbah, NSW, Australia.

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