

# Husbandry Guidelines For The Green Catbird



*Ailuroedus crassirostris*

Aves: Ptilonorhynchidae

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## Introduction

The Green Catbird *Ailuroedus crassirostris* achieved its name by its loud cat-like call which is often heard during breeding season. It was first described as a skrike by Paykull of Sweden in 1815 and given the scientific name *Lanus crassirostris*. After a number of incorrect family reclassifications which included a Bowerbird genus *Cabanis*, in 1851, it was bestowed the generic name of *Ailuroedus* which means cat-form (Sindel 1991).

Very little was known about the Green Catbird and there was much conjecture until some very conclusive studies were done by Richard H Donaghey, namely his Ph.D thesis The Ecology and Evolution of Bowerbird Mating Systems which was published in 1981. In the following years this foundation of information was built upon by naturalists Clifford and Dawn Frith whose further studies have given us even more insightful information about this remarkable, secretive and very intelligent bird. In 1992 Gary Innis and Jim McEvoy released a document titled Feeding Ecology of Green Catbirds (*Ailuroedus crassirostris*) in Subtropical Rainforests of South-eastern Queensland. This thorough and detailed research helped to provide an insight into the year round diet of Green Catbirds, including information on breeding and nestling diets which in turn has helped us as keepers, provide better care for this species in captivity.

There is still more for us to learn about this species, especially when it comes to successful breeding and in particular the breeding behaviour/stage making abilities of the male. The intentions of this husbandry manual is to provide information to keepers on how to best care for and successfully breed Green Catbirds in captivity. These are guidelines and I will endeavour to update the information whenever new information comes to light.

## **2 TAXONOMY**

### **2.1 Nomenclature**

Class Aves

Order Passeriformes

Family Ptilonornynchidae

Genus *Ailuroedus*

Species *crassirostris* (Paykull, 1815)

### **2.2 Subspecies**

Spotted Catbird. *Ailuroedus crassirostris maculosus* (ABBBS, 2010)

### **2.3 Recent Synonyms**

None found.

### **2.4 Other Common Names**

Cat Bird or Cat-bird. Large-billed Catbird, Australasian Catbird.

## **3 NATURAL HISTORY**

### **3.1 Morphometrics**

Green Catbirds are a medium sized stocky bird. They have long powerful legs. The bill is quite long and stout.

#### **3.1.1 Mass and Basic Body Measurements**

Length: 295-340mm

Wing: 155-171mm

Tail: 120-131mm

Bill: 26-33.5mm

Tarsus: 43-50mm

Weight: 194-224g (Donaghey, R. 1996).

### 3.1.2 Sexual Dimorphism

Distinguishing female and male Green Catbirds can be very difficult as their plumage does not vary and have identical markings but the male is slightly darker than the female. The male is the larger of the species but is an unreliable indicator. The behaviour between the two does however vary during breeding season which may help indicate a male or female, most noticeably during incubation of eggs and the caring of young. The female will rarely leave the nest during this time with the male providing food for the young and the female. However for the intentions of breeding Green Catbirds should be sexed as soon as they are acquired if they haven't already. For thorough results, feather samples can be sent to the Australian Museum for the purposes of sexing individual birds.

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### 3.1.3 Distinguishing Characteristics

**Male:** Crown and sides of head yellowish green to olive, feathers tipped black; nape to upper back olive green, feathers with greenish white center streaks or spots; rest of upperparts bright green; secondaries and secondary coverts with white tips; central tail feathers green; rest of tail feathers bright green with white tips; feathers at sides of neck and upper breast often tipped buff-white to give an irregular spotting effect; malar region olive to yellowish green with indistinct black barring; throat and posterior of ear coverts grayish washed with green, shafts of feathers with greenish white streaks; breast and sides of abdomen dull green, feathers with broad greenish white spots and streaks; abdomen and flanks greenish yellow, feathers with yellowish-white central streaks; undertail coverts pale greenish yellow. Bill horn-coloured. Iris brownish red. Legs greyish brown. Adult **female** similar to males, male slightly darker.

**Immature:** Similar to adult, but plumage duller. Bill more grayish. Iris reddish brown.

**Juvenal:** Similar to immature, but with fluffy grey down on head. (Donaghey. R. 1996)





Figure 1.1 Juvenile Green Catbird.

### 3.2 Distribution and Habitat

From Mount Dromedary. South of Narooma, south eastern NSW, north to the Cooloola and Kingaroy districts in south-eastern Queensland from near sea level to above 1000m. Extending as far west as the Great Dividing Range, Barrington Tops (Donaghey, R. 1996). However, according to the ABBBS (Australian Bird and Bat Banding Society) Green Catbirds have been banded and recaptured in far north Queensland. My own observations from living on the central coast of NSW have seen many Green Catbirds in the surrounding suburbs of Gosford City such as Erina Heights, Kincumber Mountain, Kincumber South, Terrigal and Springfield.

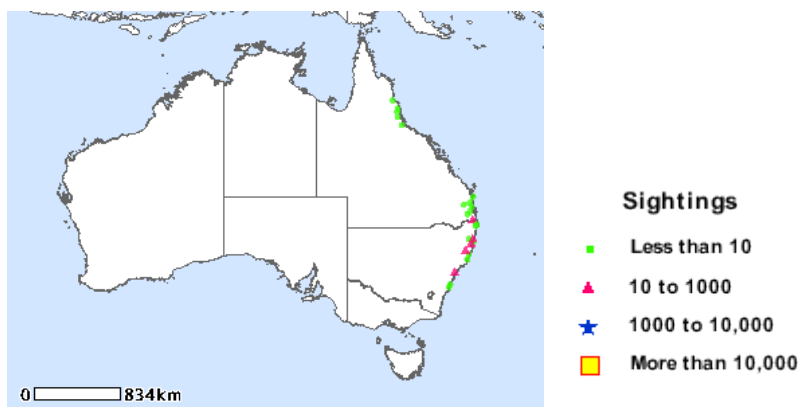


Figure 1.2 Map of All Sightings around Australia (Banding plus Recovery). ABBBS.

The 7<sup>th</sup> edition of Field Guide to the Birds of Australia (Simpson & Day) has the distribution of Green Catbirds extending from south east NSW up to Cooktown in far north QLD but the more abundant populations occur between south east NSW and south east QLD.



Figure 1.3 Distribution.

The average home range of the Green Catbirds is about five acres or around 20,000 m<sup>2</sup>. This range is much reduced during the breeding season. (Innis and McEvoy, 1992; Mayr and Jennings, 1952)

**Movement:**9km

Band 08244657, banded in October 1987 at PINE CREEK 2KM SSE OF BONVILLE STATION, NSW (-30 deg 24 min, 153 deg 4 min). Recovered after 7 years 10.3 months at BOAMBEE, NSW (-30 deg 20 min, 153 deg 7 min) in September 1995 after moving 9 km. Recovery method: FOUND INSIDE A MAN MADE STRUCTURE Recovery status: WAS RELEASED ALIVE WITH THE BAND. (ABBBS, 2010)

### 3.3 Conservation Status

IUCN 3.1 Red List Category: Least Concern.

Below are federal and state listings.

Federal - Secure  
NSW - Vulnerable  
NT - Secure  
Qld - Secure  
SA - Secure  
Tas - Secure  
Vic - Secure  
WA – Secure

### **3.4 Longevity**

No detailed studies have been undertaken on the longevity of Green Catbirds in captivity or the wild.

#### **3.4.1 In the Wild**

**Average:** 7 years 9.5 months **Maximum:** 14 years 10.6 months

Band 08185102, banded in October 1984 at MOONEE VIA COFFS HARBOUR, NSW (-30 deg 13 min, 153 deg 8 min). Recovered after 14 years 10.6 months at MOONEE VIA COFFS HARBOUR, NSW (-30 deg 13 min, 153 deg 8 min) in September 1999. Recovery method: TRAPPED IN CAGE TRAP Recovery status: WAS RELEASED ALIVE WITH THE BAND. (ABBBS 2010)

#### **3.4.2 In Captivity**

Atleast 15 years. (Pers. Comm. Carr, H 2010)

#### **3.4.2 Techniques to Determine Age in Adults**

Nil.



## 4 Housing Requirements

### 4.1 Exhibit/Enclosure Design

When first designing an exhibit consider if it will be a mixed species aviary or if will be for Green Catbirds only. For the purposes of breeding Green Catbirds I would design it around their requirements and introduce other species that can co-habitate with Green Catbirds such as pigeons and bowerbirds. This also makes sense as these are common species that are seen naturally occurring with Green Catbirds in the wild. Come breeding season, the other species can be removed to other aviaries leaving the Green Catbirds by themselves and feeling at home in the aviary and feeling like it is their territory. Choose species that will readily breed regardless if they have been moved to a new exhibit or aviary. Removing the Green Catbirds to another aviary will not be successful for the purposes of breeding, it can take up to 2 years before they settle in an aviary and successfully breed.



Figure 1.4 Aviary at the Australian Reptile Park, NSW.

Above is an aviary at the Australian Reptile Park that has previously and suitably housed Green Catbirds and Satin Bowerbirds. It measures 15m in length, 3m in width and a height of 4.5m.

In saying that, the design for the aviary should be a subtropical rainforest setting with a prominent water feature. The Green Catbirds at the Australian Reptile Park have proven to be most successful so far in this setting. Currently housed in the Platypus breeding ponds

exhibit, this exhibit also acts as an aviary. Ideally, more vegetation should be provided but the Green Catbirds began nest building before a horticultural upgrade could take place and any maintenance during this period could disturb the Green Catbirds too much and lead to breeding failure.



Figure 1.5 Looking through the viewing window of a combined Green Catbird aviary and Platypus breeding ponds.

When considering the horticultural aspect of a Green Catbird aviary, consider plant species that bare fruit and are eaten by Green Catbirds. Below is a list of 10 plant species that would ideally suit this type of exhibit. Except for the fern species, all bare fruit and are a part of a normal wild diet (Innis & McEvoy 1991).

- **Sandpaper Fig** *Ficus fraseri*

**Height:** 6m – 15m

**Spread:** 4m – 10m

- **Moreton Bay Fig** *Ficus macrophylla*

**Height:** 15m – 35m

**Spread:** 15m – 35m

- **Strangler Fig** *Ficus watkinsiana*

**Height:** 30m+

**Spread:** 30m+

- **Kangaroo Vine** *Cissus Antarctica*

**Height:** 5m

**Spread:** 5m

- **Native Grape** *Cissus sterculiifolia*

**Height:** 5m

**Spread:** 5m

- **Shining Grape** *Tetrastigma nitens*

**Height:** 10m

**Spread:** 10m

- **Lilly Pilly** *Acmena smithii*

**Height:** 15m

**Spread:** 8m

- **Red Apple** *Acmena ingens*

**Height:** 40m

**Spread:** 15m

- **Myrtle Ebony** *Diospyros pentamera*

**Height:** 40m

**Spread:** 20m

- **Red-fruited Laurel** *Cryptocarya macdonaldii*

**Height:** 15m

**Spread:** 8m

- **Prickly Rasp Fern** *Doodia aspera*

**Height:** 35cm

**Spread:** 30cm

- **Tall Maiden Hair Fern** *Adiantum formosom*

**Height:** 1.2m



**Spread:** 1.6m

- **Birds Nest Fern** *Asplenium australasicum*

**Height:** 1.5M

**Spread:** 3m

- **Nardoo** *Marsilea drummondii*

**Height:** 10cm

**Spread:** 3m

Many of the plant species above exceed the size of all exhibited bird aviaries but these species can be easily pruned to the desired size and still be healthy and bare fruit. With a variety of these plant species you can achieve a subtropical setting and provide a layered canopy which is ideal for Green Catbirds.

## 4.2 Holding Area Design

Holding areas can either be built into the structure of an aviary or a transportable cage such as a noegal cage. Holding areas for this species are mainly used for the purposes of major cleaning/maintenance of aviaries and for catching up the birds by encouraging them into a holding area where capture and restraint can be done in a confined space, making it easier for the handler and less stressful for the bird.

If a holding area is built into the aviary structure the door should be permanently secured open and it should be furnished just as the main aviary would be. This means that it should have the proper perches, appropriate browse, food and water. A holding area designed this way will not seem foreign to the bird/s once inside as for the majority of the time it will be a part of its normal enclosure. Once inside the holding area any maintenance or other duties can be carried out with the birds safely secure. If there are multiples of the species in the aviary ideally two holding areas would be used. Ideally, Catbirds should not be confined to this type of holding area for more than 24 hours.

Noegal cages are also useful to act as a temporary holding area as they are easily made and are easily transportable. They can be used to house birds when doing maintenance or cleaning of an aviary. They are also ideal to use when performing health checks. For example, once a bird has been caught and examined it can be released in a noegal cage to prevent the same bird being caught twice.

When using a noegal cage to house Green Catbirds it should have perches, browse, food and water provided. Green shade cloth must be attached around atleast 3 sides of the cage and including the roof. An appropriate sized noegel cage for green catbirds would be a minimum of 1 metre in height, depth and width and hold no more than 2 birds for no more than 2 hours.

### **4.3 Spatial Requirements**

In an outside aviary Green Catbirds require a minimum floor surface area of 11250cm<sup>2</sup>, a width of 75cm by a depth of 150cm will provide this. The aviary should be a minimum of 180cm in height. However this is for only one bird. It is recommended that that these dimensions are multiplied by the amount of Catbirds to be housed in the aviary. As previously mentioned these are minimums. Catbirds are a very active bird and should be housed in a large aviary. There should be two perches for every one Catbird and one feeding station for every two Catbirds and one source of water for every two Catbirds. Phipps successfully bred Catbirds in an aviary that was 21 feet in length, 7 feet in width and 9 feet high. Sindell successfully bred in an aviary that was 7.3m in length, 1.8m in width and 2.7m high. Carr successfully bred in an aviary that was 3.5m in length, 1.5m in width and 2.5m in height.

### **4.4 Position of Enclosures**

An enclosure for Green Catbirds should be northerly facing and be protected on the southern side by corrugated iron to protect the birds from cold strong southerly winds. In colder climates where the Catbird isn't native, the enclosure should face north-east so it can trap the warmth of the sun and it will also protect from cold south-westerly winds.

### **4.5 Weather Protection**

Atleast one quarter of the roof and sides of the aviary should be enclosed and the southern face totally enclosed. The aspect of the enclosure will give sufficient protection from southerly winds. An aviary should be well vegetated and ideally have some sort of vegetation including trees to also help protect the aviary from severe weather.

### **4.6 Heating Requirements**

There are no specific heating requirements for Green Catbirds unless you have a sick or injured bird where you would remove it to a facility where it can be provided with a low heat lamp, or at the very least a heat lamp should be provided within the aviary. Also take into consideration the positioning of nesting baskets/nest trays if the birds are kept in a colder climate than normal. Eggs incubate between 23-24 degrees Celsius, which the hen can naturally provide, but to help ensure this always secure the baskets/trays to the upper and more protected parts of the aviary.

### **4.7 Substrate**

In smaller aviaries simple substrates such as sand, newspaper or kitty litter can be used. In large outdoor aviaries that would be seen in zoos and wildlife parks it is recommended that a substrate closely matching the Catbirds natural habitat be recreated. So in this instance a substrate of mulch up to 2 inches thick should be applied. This should be scarified on a daily basis and removed and replaced with fresh mulch on a monthly basis. Amongst the mulch ferns and grasses should be planted. Avoid the mulch from becoming dry and dusty by



watering when necessary such as in the summer month, and alternatively make sure the aviary has good drainage.

#### 4.8 Nest Boxes or Bedding material

Nesting trays should be provided in smaller aviaries as the Green Catbird nest above ground. Nesting trays are only necessary in smaller aviaries if there is a lack of furnishings for the catbird to create its own nest. In larger aviaries it is recommended to either have brush, *Melaleuca decora*, attached to the enclosed sides of the aviary or more ideally to have small trees/shrubs so nests can be built in the forks. Medium sized tree ferns also provide nesting sites in the crown of the tree. Epiphytic ferns that grow on tree trunks can be grown on wooden boards which can then be hung on aviary walls. Both Stan Sindell, Harry Carr and Graeme Phipps had breeding success using nest trays which made of welded mesh. Nests can take up to two weeks to build and are only built by the female. A nest typically measures between 220mm-250mm in diameter and 150mm deep. It also has a small egg cup shaped depression for the eggs which can go about 70mm deeper than the main nest (consider this when making a nesting box). It is a bulky open cup shape made of small sticks and twigs which the catbird usually binds together with the tendrils of a climber. The base of the nest and the inside lining of the nest is layered with overlapping dry leaves and grass. Also found directly under and around the 'egg cup' is substantial amounts of mud and decaying wood which helps incubate the eggs. In larger aviaries where a mulch substrate is provided all these nesting and bedding materials can be found. However in smaller aviaries where the substrate may differ, these materials would have to be provided by the keeper.

At the Australian Reptile Park I placed densely packed tea-tree foliage in the back corner of the aviary and amongst the foliage placed a plant basket which was fastened to the aviary mesh with wire. The plant basket is padded with coconut fibre and can be bought at any plant nursery. Within two days the Catbirds were observed making a nest in the plant basket.



Figure 1.6



The nesting material I provided were species of fern leaves, grasses cut to approximately 20cm, the leaves from lamandras, *Lamandra longifolia*, vine tendrils from Pandorana, *Pandorea pandorana* and also the brush around nesting sites such as the *Melaleuca decora* (see figure 1.6). Other materials that could be used are kikuyu grass runners, *Casuarina* spp. needles and stems and a variety of leaves. (Sindell, S. 1991)



Figure 1.7 A Green Catbird nest after approximately 2 days of building .Figure 1.8 Further nestbuilding







Figure 1.9 Further nest building, approximately 8 day in the making.

#### **4.9 Enclosure Furnishings**

Furnishings required for Green Catbirds are as follows, however some may differ depending on the size of the aviary.

- Perches ( minimum of 2 per bird ). Scribbly gum *Eucalyptus haemastoma* branches cut to size make ideal perches.
- Feeding stations ( minimum of 1 per 2 birds ).
- Water sources ( minimum of 1 per 2 birds ).
- Hides ( brush ).
- Trees, shrubs, ferns, grasses.
- Nesting trays/baskets and nesting material
- Pond and rockery

## 5. General Husbandry

### 5.1 Hygiene and Cleaning

Due to the sometimes messy eating habits of Green Catbirds, they tend to foul their feeding areas quite quickly. It is recommended that the feeding areas and feeding bowls be cleaned on a daily basis and disinfected with an avian disinfectant such as Avisafe or Aviclean. The mulch substrate should be scarified or raked over on a daily basis as well and removed and replaced at least every month. Any concrete and wire caging should be cleaned daily of faeces.

Nesting trays should be disinfected prior to breeding seasons and fresh nesting material supplied. Other nest boxes that are provided for other species should also be cleaned. Nesting material replaced after each clutch has fledged. You can also remove the nest, they will more than likely use the same nesting site.

**Section 8: Protocols for the Prevention and Control of Disease (Particularly Beak and Feather Disease) in Australian Birds.** Department of the Environment and Heritage 2006.

“Virkon S has been recommended as the disinfectant of choice in Section 2 (Action 2.5).

Soaps and detergents are necessary to reduce organic matter on, and effectively clean, equipment and buildings. They are also effective (once all visible organic matter is removed) against lipid enveloped viruses.

Once premises have been thoroughly cleaned of organic matter, they are treated with 2% Virkon S solution and left for 24 hours. Ensure that surfaces are covered by disinfectant solution for at least 10 minutes.

Equipment that has been thoroughly cleaned of visible organic matter can be immersed in 2% Virkon S for at least 10 minutes, taking care that parts of the equipment are not uncovered by the solution during that period.

Surfaces that have been thoroughly cleaned of visible organic matter may be covered with 2% Virkon S for at least 10 minutes' contact time, taking care that the solution does not dry out in spots during that time. Clean all equipment and surfaces of any residual disinfectant to avoid the possibility of corrosion of metals or transfer of disinfectant to birds.

Any wooden equipment, such as perches and nest boxes, should be disposed of and replaced with new perches and nest boxes. Use solid timber and avoid using new particle board (possible toxic ingredients) for nest boxes.

Disposal of carcasses and their products is covered in Section 11. Waste from captive or wild birds (faeces, urine, uneaten food and discarded litter such as sand, gravel etc) should be placed in a wet-strength plastic bag which is then placed in a clearly labeled heavy duty opaque plastic bag which displays the universal biohazard label, for disposal as medical waste by a municipal contractor. Any sharps container must be disposed of similarly. Waste

must never be placed outside a module where wild mammals and birds can access it, or where wind might distribute it to a remote site.

In situations where there is considerable waste to dispose of, it is possible to compost it, but the material must not be accessible to mammals and birds, and must be contained so that it cannot spread to other sites. In addition, a composting site must take into account the water table and leachate from the compost.”



Figure 2.0 Virkon products



Figure 2.1 Avisafe products

Material Safety Data Sheets can be located in the appendices.

## **5.2 Record Keeping**

All notable events are a part of record keeping. When servicing the aviary where Green Catbirds are held, always perform a distance examination. Check the appearance of birds such as the plumage, the beak and legs are normal. Check droppings to see if they are normal. Observe the food and water consumption. Watch the birds behavior and listen to the vocalizations or lack there of. Knowing your species will help you determine what is normal.

Record all notable events such as reproductive behavior, nesting activity/nest building, egg lay date, births, fledging dates, changes in diet, medications and supplements.

Carry a notepad in your top pocket to record these notable events (in case of human error or later forgetting to make diary entries) and then they should be transferred into a daily diary with the date and keepers name.

Sometimes some things may not seem worth noting, but record everything regardless of the triviality, it may add up to nothing but it also may help you identify any patterns and give you the advantage of hindsight.

## **5.3 Methods of Identification**

Green Catbirds should be banded prior to release. Typically a male is banded on the right leg and the female on the left. Use a size 08/09 stainless steel band. Colour banding can also be added to help identify each individual bird

## **5.4 Routine Data Collection**

- Routine health checks
- Worming treatment
- Medications
- Blood collection
- Faecal samples
- Weights
- Reproductive behavior
- Nesting activity
- Copulation

## **6. Feeding Requirements**

### **6.1 Wild Diet**

Green Catbirds are classified as omnivorous but are mainly frugivorous (native, introduced or cultivated), feeding on figs and a variety of vegetable matter such as buds, shoots, flowers and seeds. Catbirds will also be seen in cultivated fruit orchards when their naturally occurring food sources become scarce. Their diet is also supplemented with insects such as grasshoppers, cicadas, beetles, millipedes and mites and small vertebrates such as tree frogs and hatchlings of smaller birds that inhabit their area.

Catbirds also foraged for flowers, various plant materials, insects and millipedes, and these were also significant components of the diet during spring and summer. Different species of asynchronous fruiting figs (*Ficus* spp.) occurred in lowland and upland forest, and these were the most important foods in each forest type. Catbirds bred from December to March when figs were the only reliable fruit that figured prominently in the diet. Insects also appeared to be an important (perhaps essential) component of the nestling diet during this period (Innis & McEvoy 1991).

Breeding territories usually contain several fig trees which regularly produce large amounts of ripe fruit for several months which coincides with the Catbird breeding season.

Green Catbirds drink and bath in pools of water that are found in the crevices of surrounding trees or water courses.

### **6.2 Captive Diet**

In captivity a Green Catbirds diet should be made up of about 80% of tropical fruits and 20% invertebrates such as grubs, worms, maggots, fly pupae, crickets and grasshoppers. Daily scarifying of the mulch substrate can provide many insects. Use mealworms sparingly as they have little nutritional value. Always supply some form of protein year round.

Figs are a favourite and a staple of their wild diet but not always easily sourced. Fruits that can be used are mango, apple, banana, grapes, types of melons, tomato, berries, passionfruit and kiwi fruit which are a favourite. Stone fruit can also be used when in season. I supply a mixture of these fruits which are diced up and placed in a single Chinese container and fed out daily, this is for a pair of Green Catbirds but a pair of White-headed Pigeons also occupy the aviary. Dice them in portions no bigger than a pea. I also feed out 'nail fruit'. Place several bullet-head nails in various perches where you can stick large fruit items on the nail such as bananas, kiwi fruit and apple. Cut the fruit in half before hand so they don't have to try penetrate the skin. In my case I find that they eat more of the 'nail fruit' than the diced fruit. I also supply a meat mix which is made up of kangaroo mince which is mixed with insectivore, crushed kibble, calcium and raw egg.

Even though having more than enough food items provided, you will find that they go back and forth and favour certain food items at different times so by providing a variety of foods you will better provide for a nutritional diet.

## 6.3 Supplements

The supplements I provide are incorporated into their meat mix. That being insectivore, crushed kibble, calcium, glucose and raw egg. Also a cake mix is provided which is comprised of sponge cake, boiled egg, cheese and egg and biscuit mix.

Directions for 'Meat Mix'

- 1kg of kangaroo mince
- 2 cups of crushed kibble
- 2 cups of insectivore powder
- A pinch of calcium powder
- Half a cup of shell grit
- A pinch of glucose powder
- 1 raw egg

The contents is mixed together thoroughly by hand making sure all supplements are as evenly spread as possible. Put the larger chunks into a blender to help break up into smaller pieces. Mix again as a whole.

Directions for 'Cake Mix'

- 200g of sponge cake. Break the cake up with fingers
- 3 hard boiled eggs
- A handful of shredded cheese
- 1 cup of egg and biscuit mix

Mix all contents by hand so you end up with an even consistency and no large chunks.

## 6.4 Presentation of Food

Feeding trays should be placed in holders that attach to the sides of the aviary and be at least 5ft off the ground where possible as green catbirds seldom eat off the ground. There should be one feeding tray for every two birds and one water source for every two birds unless there is a communal pond available.

Figs can be stashed away in branches, brush or foliage as these are a sought after fruit and can provide good enrichment for Catbirds. You can also scatter sultanas, currents and leafy greens (pers. Comm.. Phipps 2010). Also grasshoppers can be used in this way to encourage their natural hunting behavior. Also as mentioned, use pieces of fruit which are cut in half and stuck on nails which have been hammered in to perches.





Figure 2.2 Feeding on kiwi fruit. Figure 2.3 (below) Feeding on nail fruit such as apple, banana and kiwi fruit



## 7. Handling and Transport

## 7.1 Time of Capture and Handling

Ideally any forms of capture and handling should be done in the cooler parts of the day such as the morning and late afternoon, especially in the warmer months of the year. Green Catbirds are very agile and nimble birds and if you fail in your first attempt it will only become harder so have a strategy and set yourself in a position where you are more likely to capture the bird. Ideally you should have two people involved in the catch up. Don't chase the bird, your presence in the aviary will usually be enough for them to become more active and more than likely they would have been caught up before so they will immediately become suspicious when a keeper enters the aviary with a net. If you fail after the first three or four attempts come back later unless it's absolutely necessary. Always avoid having to catch up Green Catbirds prior to and during breeding season.

## 7.2 Catching Bags

Nets or hoop bags are ideal for catching Green Catbirds. The hoop should be around 50cm in diameter with padding around the hoop to protect the bird. The bag should be made of a light fabric such as cotton for easy maneuvering and have at least a few of these tools that have handles at different lengths. For example a 50cm handle, a 1m handle and a 1.5m handle, either one would suit the sizes of most aviaries.



Figure 2.4 Hoop bags

## 7.3 Capture and Restraint techniques



Once you have caught the bird seal off the bag. Once you know where the beak and legs are you want to slide your hand inside the bag and get your restraint on the bird while it is still in the bag. If you are by yourself you can use one hand or if you are with two people you can use two hands (see below). Have a firm hold but do not hold too tightly as this will prevent the bird from breathing.

Gloves can be worn but there may be a loss of dexterity in a handlers hands and fingers. Catbirds can not cause any serious injuries (scratches only) so it is best to use bare hands or if is suspected of carrying a disease latex gloves should be used. Always wash hands thoroughly after handling birds and treat any scratches as soon as possible.



Figure 2.5 Two handed restraint



Figure 2.6 Single handed restraint

## 7.4 Weighing and Examination

Weighing and examinations should always be carried out by at least two people so it can be done efficiently, safely and as quick as possible. When weighing a bird it should either be placed in a snug secure box and then weighed or placed in a cotton bag and weighed by a hand held scale.

When performing examinations have one person restraining the bird while the other person performs the examination. When examining the wings make sure your thumb and index finger have hold of the elbow of the wing before stretching the wing out to it's full length.

## 7.5 Release

Ideally capturing, handling, examinations should be done in the cool of a morning, this also applies to the release of the bird. A bird will be suffering some stress after examination so where possible release in the morning aswell so heat will not affect its recovery.

It is best to release the bird either from a hand restraint so it immediately can see its surroundings or otherwise if in a permanent holding cage such as a naegal cage, the door can be left open and it can leave the cage on its own accord.

## 7.6 Transport Requirements

Transport inevitably causes stress and therefore should be done as efficiently as possible. Transport cages should not be too large but should be spacious enough for the birds to move around. Birds do not tolerate extremes of temperature and should not be left in parked vehicles in the sun or hot weather. The words "Live Birds" should be displayed on similar sized labels on at least two sides of the container.

### 7.6.1 Box Design

The transport box should either be made of wood, plywood, plastic, fiberglass, welded mesh or wire mesh and have a solid wooden frame. Certain designs are for certain types of transport. If you are transporting locally then a cardboard with some wood shavings and 2 perches pierced through the sides would be adequate. Make sure the cardboard box is secured with adhesive tape. For longer or over night transport properly made wooden boxes such as the ones pictured below are ideal. They have perching already built in, they are well ventilated and all that needs to be added is some wood shavings for substrate.



Figure 2.7 Transport boxes



## **7.6.2 Furnishings**

An appropriate sized perch which allows the bird to grip while in transport must be installed. It must be placed so that the head and tail of the bird does not touch the top and bottom of the box. It should be out of the way of food and water sources.

## **7.6.3 Water and Food**

For short local transportation there is no need to provide food or water. For trips in excess of 1 hour a water dispenser should be placed inside the transport box. There are variables though with weather so if you are travelling on a hot day a water dispenser should be provided regardless. For long or overnight transportation water and food must be provided in the form of a water dispenser and some food, something as simple as a halved banana or apple will suffice. If you know what your Green Catbirds favourite food is then choose that food item.

## **7.6.4 Birds Per Box**

Always transport Green Catbirds singularly regardless if they are a pair. If you are transporting young or Catbirds that haven't fledged then they should be transported together.

## **7.6.5 Timing of Transportation**

Ideally transportation should be done as early in the morning as possible or in the afternoon or night. If it is unavoidable then assess whether or not food or water needs to be provided. Avoid at all costs transporting during the day in summer, if it has to be done make sure the vehicle has air-conditioning but proper management and planning should avoid this.

## **7.6.6 Release from the Box**

When releasing or introducing a new Green Catbird in an aviary consider using a noegal cage as a way of introducing it to the existing birds already occupying the aviary, especially if you are going to release into an aviary which already has Green Catbirds, Bowerbirds or Honeyeaters. The ideal time to release is in the morning as to give the bird the day to adjust in the aviary. Perform the release at ground level and away from obstructions and allow the bird to come out of its own accord if it doesn't immediately come out.

## **8. Health Requirements**

### **8.1 DAILY HEALTH CHECKS**

A keepers' personal observation on behavioural and physical changes of the Green Catbird are noted in a daily diary whenever they are within sight. Keepers who deal with Catbirds should know the history and signs to look for, both normal behaviour and abnormal behaviour. Listlessness, going off food, dull appearance and lack of their usual personal habits are some of the signs of ill health. Observations of aggressive or submissive behaviour help to manage the birds, indicating the need for separation.

### **8.2 DETAILED PHYSICAL EXAMINATION**

Physical examinations when restrained should be as brief as possible but thorough.

#### **Head & Eyes:**

Eyes checked – swollen lids, discharge, squinting, or a change in colour of the globe. Possible cause – infection, injury, foreign bodies, or swollen tissues. Dilated pupils may indicate shock, blindness, or concussion. Bleeding in the anterior of the eye could possibly be head trauma. A small light or torch should be used to check papillary response. Pupils respond individually in birds. An Ophthalmoscope can be used for deeper examination of eyes if abnormalities are suspected. Atropine will not cause pupil dilation (as in mammals), because of their striated rather than smooth muscle in the iris and ciliary body. Also if head trauma is suspected wet the crown down and you will be able to see if there is any meningeal haemorrhaging

#### **Beak & Mouth:**

Check the evenness of the beak. If it's over grown, the beak may need constant trimming every 2 – 4 months. If trauma is suspected, the beak should be palpated for fracture or other damages. Nares should be checked for any plugs or discharges. The beak often opens in vocalisation which can allow viewing inside the mouth, but if not, then gently pry with the index finger on one side and the thumb on the other side. Mucous membranes are usually pink in a Catbird. Based on the moistness of the mucous membranes, the level of hydration can be estimated.

#### **Auditory Canal & Neck:**

Check auditory canals (ear), for exudates, blood, and infection. Trauma of the canal from aggression can be observed as partially closed, swollen, and filled with blood. Neck, oesophagus and trachea should be palpated for the presence of liquids, solids, or air. The lower section of the cervical oesophagus called the crop should be checked, gross distension indicates blockage or impaction.

**Body Condition Index (BCI):**

BCI can be determined by palpating the pectoral muscles and the keel to help estimate the degree of development or atrophy of the bird. BCI is best determined with the comparing the individual and not between birds. Taking an evaluation every time the bird is handled could help accomplish this.

The BCI works on a scale of 1-5.

- 4 or 5 – indicates a well-muscled or plump bird and the pectoral muscles will be rounded convexly from the keel.
- 3 – have a flat profile to the pectoral muscles.
- 2 – have a concave shape to the pectoral musculature.
- 1 – indicates severe muscle atrophy and emaciation.

**Abdomen:**

Gently palpate for internal masses, ovulated eggs, and fluids. The vent area can be checked for growths, lesions, protrusions and for urates or faeces accumulating on the feathers.

**Skin & Plumage:**

Elasticity of skin indicates general level of hydration. Check for parasites, skin swellings, and missing or damaged feathers. Feathers which are dull, frayed or split may indicate nutritional deficiencies, stress, or hormonal imbalances. Skin irritation and broken feathers or an area of missing feathers are an indication of possible self-mutilation which is usually associated with stress or boredom.

**Wings:**

Check all bones and joints while assessing muscle tone and extension. Swellings, abrasions or bruising are common on the carpus. In subcutaneous haemorrhages, green pigment discolouration will develop as the red blood cells are destroyed.

**Legs:**

Check as you would for wings, also broken/missing nails or for swollen areas on toes or foot. Toe swellings occur with dislocations, fractures and Bumblefoot.

**Auscultation:**

The use of a stethoscope is included in every examination. Determine heart rate, rhythm, and location to detect sounds including heart murmur, and assessing the respiratory system. Note that the Green Catbirds respiration is hard to hear on both inspiration and expiration due to the relative small size of the bird.

**Temperature:**

Green Catbirds should have a constant temperature around 42°C, cloacal temperature monitoring is not normally part of the physical examinations.



## 8.2.1 CHEMICAL RESTRAINT EXAMINATION

For more in-depth examinations such as radiographs; repair or surgery on wings, serious fractures of beaks, lacerations; endoscopic examinations for sexing or diagnosing respiratory and abdominal disorders, and ventriculotomy (foreign body removal), sedation is required. The best technique for sedation or surgical anaesthesia is gas, using isoflurane. Induction and recovery are rapid and smooth, a critical factor for both the bird and handler. Halothane has been used, but has been associated with a greater incidence of respiratory and cardiac problems. Catbirds are generally induced by a mask and then intubated but pre-anaesthetics such as midazolam or tiletamine-zolezepam can be used. Injectable anaesthetics such as tiletamine-zolezepam or ketamine combined with midazolam, diazepam, xylazine can be used, but cardiac and respiratory complication rates are greater and the bird must be carefully monitored and contained in a soft cardboard box with shredded newspaper or wood shavings. When using xylazine, yohimbine has been used on several occasions to speed recovery. Local anaesthesia is workable using small amounts of iodocaine or another local anaesthetic. Note that the above procedures should only be done by veterinary staff.

## 8.3 ROUTINE TREATMENTS

Catbirds should be wormed routinely every 3-4 months along with all other birds that are in the aviary. This can be best achieved by using WORMOUT GEL (see appendices for MSDS) which is mixed into a single water source. It is important to have a single water source such as a single pond or water bottle to ensure that the Catbird and fellow aviary birds intake the WORMOUT GEL treatment. Also perform worming when you know that there will be no rain for atleast a few days. Leave in aviary for atleast 3 days. However, this way of worming is for large aviaries with many birds. If it is just a pair of catbirds worming may not be necessary as they are not fed on the ground and in this case you could simply catch up the birds and worm them via a crop needle. (Pers. Comm. Graeme Phipps) In saying this, at The Australian Reptile Park we prefer the above procedure as we scarify the aviary substrate to expose invertebrates in the mulch and soil. There are no known vaccinations.

## 8.4 KNOWN HEALTH PROBLEMS

### **Problem:** Vitamin A Deficiency

**Cause:** A lack of Vitamin A, occurs more in birds kept in artificial conditions and on artificial diet, disallowing the birds to pick up natural foods from the soil

**Signs:** Symptoms can appear as proliferative, plague-like lesions of the epithelium of the alimentary mucosa, ear canal, skin, eyelids, or conjunctiva.

**Treatment:** Vitamin A injection

**Prevention:** Green feed, vitamin supplement, or a well balanced diet.

**Problem: Fungal Pneumonia**

**Cause:** *Aspergillus fumigatus*

**Signs:** Respiratory problems. Using a stethoscope, sounds are unilateral and dull. Fails to respond to standard antibacterial therapy.

**Treatment:** Itraconazole, though treatment not generally successful. Maintain in a non-stressful, warm environment (21 – 29° C or 70 – 85° F). Tracheal flushes and nebulising also recommended. In chicks, nebulising is best with Clotrimazole medication.

**Prevention:** Sound hygiene and good husbandry.

**Problem: Ectoparasites**

**Cause:** Outside contamination.

**Signs:** Skin irritation, excessive preening, behavioural signs of stress and discomfort.

**Treatment:** Fipronil, Derris Dust or Carbaryl (use with caution, ensure dust not breathed in by bird), Ivermectin.

**Prevention:** Constant monitoring . If a problem is suspected, place a Shelltox Pest Strip near where the birds roost. (Pers. Comm. Graeme Phipps).

**Problem: Helminth Parasites, including Trematodes, Cestodes and Nematodes**

**Cause:** Ingestion from eating contaminated foods.

**Signs:** Faecal tests (direct smear, floatation, and sedimentation). Large infestation, progressive anorexia, weight loss.

**Treatment:** Fenbenanzole, Ivermectin, Moxidectin or Praziquantel  
**Prevention:** Correct hygiene.

**Problem: Avian Tuberculosis.**

**Cause:** *Mycobacterium avium*

**Signs:** Bone problems. Anorexia, weight loss, abdominal organ enlargement, presence of masses on radiograph, and an elevated WBC count.

**Diagnosis:** Laparoscopy, faecal culture, and liver biopsy.

**Treatment:** Difficult to treat and usually unsuccessful

**Prevention:** Quarantine, identification and removal of carriers, and good hygiene. However, after consulting with Graeme Phipps, he recommended euthanasing and burning the infected birds, having any cohabitating birds checked by a vet, stripping and burning any aviary furnishings and substrate, if the aviary floor is concrete scold with boiling water and leave it bare and exposed to the sun for at least 3 months.

**Problem: Coccidia.**

**Cause:** Protozoan.

**Signs:** Oocytes found in faecal test. Large infestation — dysentery, anorexia, depression and dehydration.

**Treatment:** Baycox and Trimethoprim/sulfa

**Prevention:** Hygiene and ongoing monitoring.

**Problem: Avian Pox infection.**

**Cause:** Avian Pox virus — through biting insects, mainly mosquitoes

**Signs:** Proliferative lesions (lumps) around bare-skin areas and feet

**Treatment:** Self-limiting

**Prevention:** Mosquito prevention

**Problem: Orthopedics Bumblefoot.**

**Cause:** Foot wounds infected by *Staphylococcus aureus* bacteria

**Signs:** Swelling at base of foot.

**Treatment:** Surgical debridement, antibiotic therapy — Enrofloxacin, Clavulanic acid, Trimethoprim/sulfa, Lincmycin and anti-inflammatory eg, Meloxicam.

**Prevention:** Good hygiene and early treatment to wounds. Also having a range of perches in different sizes and rope can help with prevention.

**Problem: Shock**

**Cause:** Trauma, injury and or disease

**Signs:** Dilated pupils, shock and/or abnormal, slow behaviour

**Treatment:** Lactated Ringer's solution. You can also place the bird in a warm lowlight cage or add a heatlamp to the aviary.

**Problem: Salmonella spp**

**Cause:** Carriers of *Salmonella*, contaminated food.

**Signs:** Found in faeces. However the first time you knew your green catbird had salmonellosis would most likely be after an autopsy.

**Treatment:** Either of the following antibiotics – Trimethoprim-sulfa, Tetracycline or Ampicillin.

**Prevention:** Find and eradicate carriers. Correct food storage if feeding out meat products during breeding season.

**Problem: Thrush**

**Cause:** Candida albicans

**Signs:** Thick white raised plaque-like lesion covering the mucosa within the oral cavity and may extend into the esophagus, proventriculus and such. Lesions also noted for beak erosion.

**Treatment:** Nilstat (Nystatin), Amphotericin B (Cutter pers. comm.).

**Prevention:** Sound hygiene, plus it could also be related to a permanent damp/wet aviary so make sure your aviary has good drainage.

**Problem: Avian Botulism**

**Cause:** Bacteria - Clostridium botulinum, either by ingesting the toxin directly or eating invertebrates infected with the toxin. Bacteria are prevalent in the soil and require – warm temperatures, a protein source and an anaerobic environment so as to become alive and produce toxins.

**Signs:** Loss of wing and leg movement, or control of third eyelid, neck and other muscles.

**Treatment:** Mildly affected birds provided with shade, fresh water and cover from predators may help. Botulism antitoxin is accessible but requires specific handling and must be given early in the intoxication.

## **8.5 QUARANTINE REQUIREMENTS**

The quarantine period for Green Catbirds should be 30 days. Below are recommended procedures and protocols from Quarantine and Health Screening Protocols for Wildlife Prior to Translocation and Release Into the Wild, compiled by Michael H. Woodford, Dr. vet. Med., FRCVS.

1. Faecal examination, direct and flotation, for trichomonads, other motile protozoa and

coccidia, gizzard worms of ducks and geese and tapeworms in small passerines. Stain faecal smear (Gram) and examine for *Candida sp.* and *Clostridia sp.*, stain faecal smear (Ziehl-Neelsen) for acid fast bacteria but remember that *Mycobacterium 61 avium* may be shed only sporadically and that thus a negative smear is not significant. For the diagnosis of avian tuberculosis a liver biopsy may be more useful.

2. Check for ectoparasites, especially *Amblyomma sp.* ticks that can be vectors of cowdriosis-heartwater. If present, treat with an acaricide.

3. Carry out appropriate serological tests for chlamydiosis (psittacosis) and if positive, confirm by cloacal swab cultures. If culture is positive, the bird must be treated if of conservation value or destroyed if not. Treatment, which in some countries is mandatory for psittacine birds in quarantine, is lengthy, consisting of **45 days** continuous feed medication with chlortetracycline.

**Note: Chlamydiosis (Psittacosis /ornithosis) is a dangerous zoonosis.**

4. Faecal cultures for *Salmonella sp.* and *Campylobacter sp.*

5. Collect samples (choanal and cloacal swabs) for virus isolation from all incoming birds. Samples may be pooled from members of a flock. Samples for virus isolation should be routinely collected from all birds, which die in quarantine. All virus isolation tests should be negative in birds destined for release or entry into captive breeding flocks.

6. Carry out complete Blood Count and PCV.

7. Carry out serology/ELISA, as appropriate, for aspergillosis, *Chlamydia sp.*, paramyxovirus 1 (PMV-1), PMV-2, PMV-3, Eagle herpes virus, pigeon and raptor viruses, adenovirus, avian pox, avian influenza, mycoplasmosis and, for psittacines, “beak and feather virus” disease, Pacheco's disease and polyoma virus disease. All ELISA tests should be negative in birds for release or entry into captive breeding flocks.

8. Check raptors, *Otididae* (bustards) and *Columbidae* for oral trichomonosis.

9. Examine blood smears for avian malaria, *Babesia sp.* and *Leucocytozoon sp.*



## 9. Behaviour

### 9.1 Activity

Active from early morning until dusk but not uncommon to be heard calling as late as midnight. Green Catbirds will constantly spend their time seeking out food sources both inside and outside their territories and fiercely defend food sources within their territory from other males and females. Patrolling their territory also makes up a large portion of their daily activity. They will be heard regularly calling but this is most common during breeding season, when predators are in the vicinity of nests and when engaging other birds in territorial battles.

In captive situations such as zoos and wildlife parks it is recommended that some items of fruit be left in aviaries ( nail fruit ) overnight as Green Catbirds will be active prior to and after opening and close times of the zoo /wildlife park.

### 9.2 Social Behaviour

Although usually seen individually, Green Catbirds typically socialize in pairs but can be seen in groups of 3-5 at the end of breeding season when their young are still somewhat dependent on their parents. Green Catbirds do not flock but outside of breeding seasons it is not uncommon to see them in groups of around 20 birds all feeding in mutual territories, this is most common during winter fruiting seasons. Amongst these groups of Green Catbirds other species that can be found during these communal feeds are Satin Bowerbirds *Ptilinorhynchus violaceus*, Regent Bowerbirds *Sericulus chrysocephalus* and Fig Birds *Sphecotheres viridis* (HANZAB, Vol 7, 2006).

### 9.3 Reproductive Behaviour

Once Green Catbirds become a monogamous pair it is thought that the female does not need the male to court her to commence nest building. However he will court her with displays of fruit and flowers and feeding her, but not as intensely as a male who is trying to win over a female for the first time. I have personally observed a male displaying to a female with peach gerbra flower petals in his mouth. The male will feed the female from the beginnings of nest building through to the hatching of young.



Figure 2.8 The male courting the female with flower petals. Figure 2.9 (below) The male prior to feeding the female banana.



Courtship involves pairs intensely chasing each other in and out of tree canopies and through forested areas, this can either be by vigorous hopping between branches and perches or short bursts of flying. Note that this type of behaviour is very similar to that of a Green Catbirds defending its territory from other Green Catbirds in the wild. However, in captivity Green Catbirds can be housed with other species but only a single male and female Green Catbird should occupy a single aviary or enclosure. This will help a keeper in their observations of an impending breeding cycle as territorial battles will be non-existent.

There has been allusions to Catbirds building bowers, but the use of decorative materials by this species was first described by Phipps (1995) from observations of captive Catbirds. A pair of Green Catbirds housed in a planted aviary maintained a rudimentary display arena decorated with leaves from a lemon tree and placed face down in a circle on the ground exposed to sunlight. Phipps deliberately turned over a few leaves and noticed that the bird turned back those leaves so that all were positioned with the pale side faced up. As the leaves withered they were discarded and replaced with fresh ones. Pieces of green broken glass and plastic were gathered by the bird and placed in the water dish; each morning Phipps removed these and threw them to the rear of the aviary but they were quickly regathered by the bird and placed back in the dish. It was not determined whether one or both birds carried out these actions.

## **9.4 Bathing**

Green Catbirds build their nests near creeks and water courses and once found can be seen bathing and preening as a regular part of their daily activity. Therefore rather than just a drinking source it is recommended that a small pond be included in the aviary where they are being housed.

## **9.5 Behavioural Problems**

Green Catbirds being a very, brainy, alert and active birds, can easily slip into repetitive behaviours when they become bored such as hopping back and forth from one perch to another. Green Catbirds patrol their territory by rapidly hopping and flying between branches therefore they need to be housed in an adequately sized aviary where they have the space to perform short bursts of flying.

During breeding season Green Catbirds can become aggressive towards keepers especially when nest inspections of eggs and chicks are performed.

## **9.6 Signs of Stress**

All birds can easily become stressed if the right conditions are not provided for when in captivity. Green Catbirds are a very active species and require regular enrichment to promote their well-being in captivity. Signs that a Catbird is stressed are as follows:

\* Note that 1 or more signs may be evident and knowing your own birds will help you pick up on these signs:

- Excessive activity
- Feather picking
- Increased pecking
- Inactivity or sluggishness
- Lack of desire to socialize
- Abnormal vocalization
- Ruffled feathers
- Sitting at the bottom of the cage, listlessness
- Redirected responses such as wiping their beak when they haven't actually eaten any food.

## **9.7 Behavioural Enrichment**

Firstly, Green Catbirds need to be housed in an adequately sized aviary where they have the ability to perform short bursts of flying. In the wild they generally live in thick forested areas and have developed a great agility which allows them to rapidly hop between branches when patrolling their territory, so it is recommended that there is enough perches and plant species in their aviary which helps encourage this natural behaviour. Fruiting plants are ideal as they are primarily a frugivorous bird but not essential.

During breeding season the male will court the female with displays of fruits and brightly coloured flowers so it is essential that these are either naturally a part of the exhibit or sourced from outside the institution. Growing annual plant species in the aviary such as snow peas, calendulas and other brightly coloured flowering plants make fantastic sources of enrichment.

Note: If the institution is located in a region where Green Catbirds are endemic then the wild Catbirds will be attracted to the captive Catbirds and provide invaluable enrichment.

## **9.8 Introductions and Removals**

When introducing newly acquired Green Catbirds into an aviary of other Catbirds, place the new stock in a noenal cage to allow the existing birds to become aware of its presence. Use your discretion when you think it is suitable for release into the main aviary. They will most likely squabble and chase each other around the aviary but they should settle. If possible have an observer on hand for the first hour or until they settle.

When creating a new aviary, you would build up the collection by introducing the most timid species first with the Green Catbirds being the last to be introduced to the aviary (pers. Comm. Phipps 2010).

## 9.9 Intraspecific Compatibility

The ideal setup in an aviary is a single pair of Green Catbirds. Having two pairs may cause territorial disputes. There is no evidence to suggest that either groups of males or females cannot be housed in single sex aviaries. However for the purposes of breeding you would have a single pair per aviary.

## 9.10 Interspecific Compatibility

Outside of breeding season Green Catbirds can be housed in mixed species aviaries. There is evidence of Green Catbirds being housed and successfully breeding whilst being housed with a pair of Red-tailed Black Cockatoos *Calyptrorhynchus banksii*.

The only co-occupants likely to breed successfully in the company of Green Catbirds are those whose nests or nest sites exclude the possibility of predation, such as members of the parrot family. These dissimilar pairs soon settled in together and co-existed well, with the Catbirds respecting the Red-tails and, who in turn, chose to ignore the former unless they ventured too close. The pair of cockatoos laid, hatched and successfully fledged a youngster while another was reared to pinfeather stage before being taken for hand rearing. There was no interference from the Catbirds.

Adversely in another aviary of an identical set up, the Red-tails laid three eggs all of which were broken. In each case the remains of the egg were found on the aviary floor suggesting the Catbirds were the culprits. Although in defence of the Catbirds, in an effort to establish their guilt or innocence, a fresh hen egg was placed on their feeding tray and there it remained for three weeks without damage. As yet im still unable to provide a verdict (Sindell 1991).

Birds that can be suitably housed with Green Catbirds are native pigeons and doves such as:

- Wonga Pigeons *Leucosarcia melanolauca*
- Emerald Doves *Chalcophaps indica*
- Topknot Pigeons *Lopholaimus antarcticus*
- White-headed Pigeons *Columba leucomela*
- Bronzewing Pigeons *Phaps chalcoptera*
- Bar-shouldered Doves *Geopelia humeralia*
- Rose-crowned Fruit Doves *Ptilinopus regina*

Other Bowerbirds such as:

- Satin Bowerbirds *Ptilinorhynchus violaceus*
- Regent Bowerfirds *Sericulus chrysocephalus*

Note: Green Catbirds will prey on the young of all these species during breeding season. Green Catbirds should not be housed with any birds of prey.





Figure 3.0 Green Catbird co-existing with a White-headed Pigeon.

### **9.11 Suitability for Captivity**

Green Catbirds make a very good display species when housed in a suitable environment. Things to keep in mind when considering housing Catbirds are as follows:

- An appropriate sized aviary as they are a very active bird which need space for short spurts of flying. See Housing.
- Species in which Catbirds are to be housed with. This includes reptiles as they are a food source during breeding season.
- The location of the institution. Being native to SE Qld down to SE NSW, Catbirds will not do well in the cold climates.
- 

Green Catbirds are a very intelligent bird and I believe would be very responsive to conditioning.

## **10. Breeding**

### **10.1 Mating System**

Green Catbirds are monogamous breeders. Once a female accepts a male they will mate for life. In the event of death, both the male and female will seek a new partner.

### **10.2 Ease of Breeding**

The first key to the ease of breeding depends on the female accepting the male. It is widely accepted that female Green Catbirds are not as fussy as other birds in the Ptilinorhynchidae family such as Bowerbirds, however a female who continually rejects a male will need a new male to impress if breeding is the desired result for keepers. Paired Green Catbirds will usually mate every season and have young. As long as correct diets, nesting materials are provided, these are essential. However the major key for breeding success is keeping the aviary cleaning regime to a very regular schedule, keeping as far away from the nesting site as possible and doing the bare minimum in the way of maintenance as disturbances could lead to breeding failure. Announcing your arrival as you approach the aviary can help condition them and accept your presence. Something as simple as tapping a bell, the jingle of keys or whistling can help achieve this. (Pers. Comm. Graeme Phipps 2010).

### **10.3 Reproductive Condition**

#### **10.3.1 Males**

Having an adult male that is in optimum health is of major importance. Males expend more energy courting the female with displays of flowers that they hold in their beaks and by providing her with food. The male needs to look his best, so by providing a suitable diet his plumage will be bright and healthy and attractive to the female.

#### **10.3.2 Females**

As the male does, the female needs to be in optimum health, of breeding age (2 years) and have accepted a male as a partner.

### **10.4 Techniques for Controlled Breeding**

Separating males and females is the easiest way to achieve this however if you intend on breeding in the future separating a pair will typically ruin their bond. If you need to control the breeding without separating the pair, remove possible nesting sites and nesting material.

## 10.5 Occurrence of Hybrids

There is no evidence to support hybridization between Green Catbirds and other bird species. However there is evidence of a hybrid occurrence between Satin Bowerbird and a Regent Bowerbird (Hickey 2010).



Figure 3.1 A possible Satin Bowerbird/Regent Bowerbird hybrid

## 10.6 Timing of Breeding

Breeding seasons for Green Catbirds typically begins during September and can go through until March. The peak of the breeding season is October through to December. In northern NSW and SE Qld breeding coincides with the peak fruiting of plant species which is between December and March (Frith & Frith 2004)

## 10.7 Age at First Breeding and Last Breeding

There is no studies relating to the age at when Green Catbirds can continue to breed but the can be able to breed first at the age of 2 years (Pers. Comm. Harry Carr 2010).

## 10.8 Ability to Breed Every Year

Once an established breeding pair Green Catbirds will breed annually successfully, however if moved to a new location it could be 2 seasons before they successfully breed again.

## 10.9 Ability to Breed More Than Once a Year

While pairs will re-nest following a nest loss, there is no evidence of 2 broods being successfully raised in one season (Frith & Frith 2004)

## **10.10 Nesting, Hollows or Other Requirements**

Unlike other male bower birds, the male Green Catbird does not build a bower, however the male will clear an area that he will perform and display to other females. However, like other male bower birds, he will attempt to attract other females by displaying colourful fruits, flowers and leaves in their beak. So an enclosure should at least have plants that will flower and bear fruit at the time when breeding seasons occurs. If not, then these materials must be provided by a keeper to help initiate courtship and mating. Whilst the male will have a display site or stage, it is the female that solely builds the nest. In the wild, nests have been found in a variety of locations and most of these can be replicated in captivity depending on the size and location of the enclosure. If Green Catbirds don't like a nesting site they will not breed, therefore they should be provided with at least a choice of 3 or 4 nesting sites. These can be as follows:

- A bushy sapling that has an upright fork.
- A tangle of vines hung from the roof of an enclosure
- A tree fern, the crown can make an ideal nesting site as well as a palm frond.
- An epiphytic fern like a stag horn. This can be attached, hung in an enclosure or even grown on a branch.
- Brush resting up against a tree can provide a suitable nesting site.
- In the wild the above ground root structure of fig trees has provided suitable nesting sites.
- Phipps successfully bred Green Catbirds in mesh nesting trays, they had a surface area of 6 square inches, the front of the tray was 3 inches high while the rear wall of the tray was 8 inches high.

A nest will typically be comprised of organic matter. Most materials can be provided in a well constructed enclosure of plant species however this is not always possible due to size constraints, therefore some materials may need to be introduced by a keeper. Materials needed for nest building are as follows:

- Sticks
- Twigs.
- Vine stems.
- Tendrils.
- Rootlets.
- Palm fibre.
- Moss.
- Earthy matter such as that found amongst epiphytic ferns.

See Section 4.8 for further information.

## **10.11 Breeding Diet**

Normally a frugivorous bird, the Green Catbird will become omnivorous during breeding season. The breeding diet will still consist of its normal diet of fruits, leaves, stems, buds and seeds, however, leading into and during breeding season their diet must be supplemented

with foods such as mealworms, diced kangaroo meat, pinky mice, day old chicks and quails (Pers. Comm. Harry Carr 2010). See Section 6.2 for further information.

### **10.12 Incubation**

Typically 22-24 days. 2 eggs incubated for 24 days (Sindell 1991)

### **10.13 Clutch Size**

Green Catbirds can have anywhere between 1-3 eggs but an average clutch is 2.5.

### **10.14 Age at Fledging**

Average fledging was 21 days but full fledging could be up until and between 70-80 days. Disturbance of the nest can cause premature fledging.

### **10.15 Age at Removal From Parents**

In the wild young can be dependent up to 80 days after first fledging. You can either remove the birds after approximately 30 days but they would still require human intervention and care for perhaps another 5-7 weeks where as if you took them at around the 70-80 day mark after they have had natural parental care they will do a lot better.

### **10.16 Growth and Development**

After 60 days the young were fully feathered and almost the size of their parents. At 70 days the eye colour had changed to brown with a black iris, that of an adult. (Sindell 1991). See Section 3.1.3 Distinguishing Characteristics for detail of juveniles and adults.

The breeding and nestling diet is crucial for the successful growth and development of both the eggs and the young.





Figure 3.2 A juvenile Green Catbird, it still has young duller plumage.

Figure 3.3 (below) A Green Catbird with young.



## 11. Artificial Rearing

Ideally Green Catbirds should rear their own eggs as they are naturally the best incubators. I wouldn't recommend removing eggs for incubation until you know you have a breeding pair who have successfully bred in previous years and you are confident they will breed again.

Eggs are often removed in captivity for the purposes of double clutching however this may be successful with many other species but is not guaranteed with Green Catbirds as they may see the loss of eggs as an invasion of their territory and may not go down again whilst in the same aviary and it may take a season or two before they successfully breed again.

### 11.1 Incubator Type

There is no one incubator that is best but I would recommend one of the leading brands in bird egg incubation which is Brinsea. The Mini Advance EX which can hold up to 7 eggs or the Octagon 20 Advance EX which has a holding capacity of 24 eggs. Both these models have automatic egg turning, a fan for ventilation, a temperature alarm and automatic humidity control. However there are more affordable models on the market that can still successfully be used for bird egg incubation. As long as it can perform the functions of temperature control, has automatic egg turning, airflow control and a wet bulb thermometer for the control of humidity then you should have success.



Figure 3.4 Brinsea Mini Advance EX.



Figure 3.5 Brinsea Ocagon 20 Advance EX

## 11.2 Incubation Temperatures and Humidity

Vogelpark Walsrode in Germany have records stating eggs of White-eared Catbirds *Ailuroedus buccoides* were removed from a nest 1-2 days after laying and were incubated at 37.4 degrees Celsius and at 55% humidity. It took 22 days to hatch. (Frith & Frith 2004). This is identical to Green Catbirds who's average incubation period is 22 days but as long as 24 days (Sindell 1991).

## 11.3 Desired % of Egg Mass Loss

Most Bowerbird eggs, softbills (and most likely Green Catbirds), irrespective of size lose about 15% of their fresh laid weight during incubation, due to loss of water from the contents through the porous shell. Weight loss can be controlled by controlling the humidity levels in the incubator. The egg weight loss for the closely related Black-eared Catbird *Ailuroedus melanotis* over the entire period was 15%. (Frith & Frith 2004).

## 11.4 Hatching Temperature and Humidity

Eggs nearing hatch are slightly less sensitive to temperature and the hatching temperature can be reduced by 1 degree Celsius and humidity increased much higher than the incubator. Stop turning the eggs at the first internal pip and move to the hatcher at the same temperature as the incubator. (Hickey 2010)

## 11.5 Normal Pip to Hatch Interval

Pipping eggs of the closely related Black-eared Catbird typically show 3-5 tiny shell eruption 'stars' in the middle of their wider end 2 days before hatching. The day prior to hatching they have up to 6-8 eruptions, often with pieces of shell missing to expose the membrane and/or a hole through which the, often vocal, chick is visible. Eggs of the Black-eared Catbird, mostly 90%, hatch in the order they were laid. Those of 2 egg clutches hatched at the same time. (Frith & Frith 2004).

Within 24-48 hours of pip, eggs will undergo 'drowndown', as the air cells change shape. It's a good idea to candle eggs every 6-8 hours and place them in the hatcher as rolling is no longer required. (Hickey 2010).



## 11.6 Brooder Types Designs

Brinsea and A.B Newlife both make quality brooders and there is also the Lyons Intensive Care Unit made by Lyons Electric Company.



Figure 3.6 Brinsea TLC-4 Brooder.

Brooders however can be self made as long as all necessary requirements are met such as a thermostat, a heat source, a fan for cross ventilation, a water reservoir for humidity, a wet bulb to read humidity levels, an absorbent sterile substrate such as wood shavings which also provides traction. The brooder should be segmented to restrict the chicks movement but have different sizes to cater for the chicks growth.

## 11.7 Brooder Temperatures

As a general rule most newly hatched chicks can be maintained at a temperature that is 1 degree Celsius lower than the temperature they were incubated at, once they have fully dried off (ie most species are incubated at 37.5 degrees Celsius, therefore newly hatched chicks can be maintained at this temperature for the first few hours then then maintained at 36.5 degrees Celsius). (Hibbard, Carney 2008).

Below is a guide for most medium sized altricial chick species.

First 4-5 hours after hatching	37.5 degrees Celsius
First 4-5 days after hatching	36.5 degrees Celsius
From day 6 to day 10	35 degrees Celsius
From day 11 until chick has good coverage of down feathers	34 degrees Celsius

The temperature can then be gradually reduced as the chick develops until it reaches room temperature (25-26 degrees Celsius). (Hickey 2010).

## 11.8 Diet and Feeding

Overall a wild nestling diet comprises on average 70% fruit and 30% animal matter such as insects, frogs and chicks of other bird species including their eggs. However, as soon as the chicks are hatched the parents become almost entirely insectivorous for atleast the first week then supplement their diet with a little bit of fruit, especially soft fruit such as banana, soft apple and paw paw. Unlimited insect food is essential if Green Catbird chicks are to fledge.

(Sindell 1991). Insects such as mealworms and cockroaches can be commercially obtained but you can also collect essential food items such as moths and beetles by setting up a moth trap. When feeding out insects cut them up if they are large, don't feed them live and with mealworms, cut their heads off as they can harm the gut of a chick before they die. Use forceps to avoid imprinting. A high protein formula should also be incorporated into the nestlings diet such as the commercially available Womboroo Insectivore Rearing Mix which contains 52% proteins, 12% fats and 5% fibre. Liquid formulas can be fed by using a syringe. Take precaution when feeding with a syringe that you stop feeding when the chicks feeding response stops as the liquid formula may go into the lungs which will be fatal. At this vital stage of chick development and when you start to feed soft fruits after the first 7-10 days, it is vital to sprinkle diced banana with a multi-vitamin and mineral supplement as well as administer 1ml of calcium sandos twice daily to each chick via a crop needle and syringe (Sindell 1991).

A generally accepted rule for feeding passerines is to feed them when you would feed yourself. So for example, at breakfast, morning tea, lunchtime, afternoon tea and at dinnertime. But the first and last feed should be around 6am and 6pm respectively. However in the first 2 weeks you should aim at 6 feeds per day.

Passerine species will generally stop begging for food once their appetite has been fulfilled but circumstances such as residual food in the crop, low or high brooding temperature, stress, illness, clumsy feeding and high feeding frequency may result in chicks becoming reluctant to feed.

## **11.9 Specific Requirements**

Eggs need to be turned several times a day, 3 being the minimum. Eggs that are not turned automatically should be marked with an arrow used to indicate the direction in which the egg needs to be turned. The date the eggs were laid and the time of removal should be recorded. Eggs should be candled immediately after removal to check if eggs are fertile. Regular candling should be performed throughout the incubation period as to be able to observe the development of the embryo and the size of the airspace, which is a good indicator of humidity levels (insufficient humidity can cause too large an air space and excessive amounts too small an air space). Eggs should be weighed daily to check the rate of weight loss from the beginning to the end of the incubation period. A standard weight loss curve and air-sac area curve for the species is useful to determine the normal rate of weight loss and that the embryo is growing normally. The fresh egg weight should be recorded to ensure correct monitoring of egg weight loss during incubation. Partially incubated eggs must not be stored and incubated immediately and you should never allow partially incubated eggs to cool..

## **11.10 Pinioning Requirements**

There is no requirement to remove the pinion joint of Green Catbirds. They are a native species and would cause no threat to flora or fauna of Australia if they escaped.

## **11.11 Data Recording**

Consistent detailed record keeping is essential to the successful hatching of eggs. Analysis of records will help in the ongoing refinement of artificially rearing Green Catbirds, especially



as there is little information currently available. The following basic data should be collected on each and/or clutch;

- Species
- Individual egg identification number
- Cock and hens identification, age and reproductive history.
- Lay date
- Set date (the date either natural or artificial incubation commenced).
- Expected term
- Expected egg weight loss
- Fresh weight( egg weight on the lay date).
- Incubator and brooder( identify individual machines)
- Temperature and humidity settings prescribed.

Each time the egg is handled for weighing, candling or moving to a different machine, the following data should be recorded:

- Day of incubation(lay date = day 0)
  - Date and time
  - Actual temperature and humidity
  - Current egg weight
  - Candling observations, changes to the incubation environment and other comments
  - Name of the person recording the data
- (Gage, Duerr 2007)

## **11.12 Identification Methods**

When artificially rearing eggs they should be marked with a chinagraph pencil to make them individually distinguishable from other eggs in the incubator.

Green Catbirds should be banded prior to release. Typically a male is banded on the right leg and the female on the left. Use a size 08/09 stainless steel band. Colour banding can also be added to help identify each individual bird.

## **11.13 Hygiene**

During this period of artificial rearing the young birds need to be kept in a clean, temperature controlled environment as free as possible from airborne contaminants such as fungal spores and dust. All utensils used in feeding should be soaked in a disinfectant such as Avisafe. Formulas and supplements should always be stored correctly to ensure the quality of the product. Any spilt food items or formulas should be gently cleaned off the bird which if let to build up can lead to infections. The person/people involved in rearing should always practice safe hygiene procedures such as washing arms and hands before and after handling or feeding.

### **11.14 Behavioural Considerations**

Always try minimise any possible imprinting. An imprinted Green Catbird while more than likely not have the ability to reproduce regardless if it is a male or female. Green Catbirds are a secretive bird, taking eggs from a nest may adversely impact its ability to breed in the same enclosure again. Even though there are wild records of Green Catbirds re-nesting after the loss of a brood, I would not encourage the taking of a clutch in hope of a pair producing a second clutch in the same season.

### **11.15 Use of Foster Species**

Other species of Catbirds or even Bowerbirds could be attempted but there is little to no evidence supporting cross fostering with in the Ptilinornhynchidae family let alone with Green Catbirds.

### **11.16 Weaning**

When chicks start to show signs of eating for themselves they are ready to be moved into a small fledging cage or aviary, an ideal size would be 2 metres wide, 2 metres deep and 2 metres high. Provide multiple perches and brush for foliage. The aviary should be placed in an area where it is well protected from any severe weather. Although they fledge in the summer months the aviary should be placed in a position where it is protected from the south/south west in case you have sudden drops in temperatures and cold winds overnight. Monitor the food intake on a daily basis and perform weight checks for a period of its fledging to ensure weight is being gained, whilst performing weight checks check the body condition and pectoral body mass. No individual Green Catbird will fully fledge at any particular time. Studies have recorded full fledging between 70-80 days (Donaghey 1981). However expect that this may take longer in captivity.

## **12. Acknowledgements**

Researching the Green Catbird was a very challenging and rewarding project and I would like to thank many people for their support.

I would like to thank my lecturers, in particular Jacki Salkeld, Graeme Phipps for his infectious enthusiasm and Brad Walker for his ongoing support and encouragement.

I must thank and acknowledge the support of my fellow staff members at the Australian Reptile Park, in particular Senior Curator Tim Faulkner and Head of Mammals and Birds Brad Gabriel for their support and allowing me to study our Green Catbirds in captivity.

I must thank Harry Carr for his support and knowledge of Green Catbirds and providing me with a pair to observe and study. Also, I must thank Colin Riddiford, Journal Editor of Avicultural Society of Australia for kindly providing me with a highly sort after 1991 edition of Australian Aviculture.

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Figure 1.7 - Photo taken by Adrian Good, Australian Reptile Park, Sommersby, NSW, 2010

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Figure 1.9 - Photo taken by Adrian Good, Australian Reptile Park, Sommersby, NSW, 2010

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Figure 2.2 - Photo taken by Adrian Good, Australian Reptile Park, Sommersby, NSW, 2010

Figure 2.3 - Photo taken by Adrian Good, Australian Reptile Park, Sommersby, NSW, 2010

Figure 2.4 - Photo taken by Adrian Good, Australian Reptile Park, Sommersby, NSW, 2010

Figure 2.5 - Photo taken by Adrian Good, Australian Reptile Park, Sommersby, NSW, 2010

Figure 2.6 - Photo taken by Adrian Good, Australian Reptile Park, Sommersby, NSW, 2010

Figure 2.7 - Photo taken by Adrian Good, Australian Reptile Park, Sommersby, NSW, 2010

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## 15. Glossary

**Altricial** - Hatched or born in an undeveloped state and requiring care and feeding by the parents

**Auscultation** - The action of listening to sounds from the heart, lungs, or other organs, typically with a stethoscope, as a part of medical diagnosis

**Asynchronous** - Not going at the same rate and exactly together with something else, in particular

**Brooder** - incubator: apparatus consisting of a box designed to maintain a constant temperature by the use of a thermostat; used for chicks or premature infants

**Ectoparasites** - A parasite, such as a flea, that lives on the outside of its host

**Frugivorous** - Feeding on fruit

**Interspecific** – Existing or occurring between different species

**Intraspecific** - Produced, occurring, or existing within a species or between individuals of a single species

**Monogamous** - having one mate

**Omnivorous** - Feeding on food of both plant and animal origin

**Pinion** - The outer part of a bird's wing including the flight feathers

**Pinioning** - Cut off the *pinion* of (a wing or bird) to prevent flight

## 14. Appendix

### Virkon

## MATERIAL SAFETY DATA SHEET

Pharmacal Research Laboratories Inc. • 562 Captain Neville Drive, Waterbury CT 06705  
(203) 755-4908 • 800-243-5350 • FAX (203) 755-4309  
www.pharmacal.com

**VIRKON-S POWDER** PAGE 1 of 5

**ISSUE DATE: 02/10/2010**

### I. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND COMPANY

**PRODUCT: VIRKON-S EPA REG # 71654-6**

MSDS HSD/US41

**Distributor:** Pharmacal Research Laboratories  
562 Captain Neville Drive Waterbury CT 06705  
Tel: 800-243-5350

**Manufacturer:** DuPont Chemical Solutions Enterprise  
1007 Market Street  
Wilmington, DE 19898

All information provided in this Material Safety Data Sheet refers specifically to the Virkon S powder, as supplied, & **not** the in-use solutions, unless otherwise stated.

### II.COMPOSITION/INFORMATION ON INGREDIENTS

**Chemical %**

**Concentration**

**n**

CAS Exposure

Potassium

peroxomonosulfate

40-60 70693-62-8 1mg/m<sup>3</sup>, total dust, 8 &

12 hr. TWA –

manufacturer's  
recommendation.

Sodium

Dodecylbenzenesulphonate

10-20 25155-30-0 None assigned.

Sulfamic Acid 1-10 5329-14-6 0.5mg/m<sup>3</sup>, 8 & 12 hr.

TWA – manufacturer's  
recommendation.

### III.HAZARDS INFORMATION

Potential Health Effects

**Danger: Powder is corrosive.** Causes skin burns & irreversible eye damage.

Harmful if swallowed, absorbed through skin or inhaled. Do not get into eyes, on skin, or on clothing.

None of the components present in this material at concentrations equal to or greater than 0.1% are listed by IARC, NTP, OSHA or ACCIH as a carcinogen.

HMIS

Health-3 Fire-0 Reac- 0

## MATERIAL SAFETY DATA SHEET

#### **IV. FIRST AID**

##### **INHALATION**

**Symptom:** - Inhalation of this powder in sufficient quantities may cause irritation of the upper respiratory passages, nose & throat. Gross over exposure may cause ulceration of mucous membranes.

**Treatment:** - Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Call a physician.

##### **SKIN CONTACT**

**Symptom:** - If allowed to become moist the dry powder may cause severe irritation and in cases of prolonged contact may cause burns or ulceration. Contact with the dry powder may cause skin irritation with discomfort or rash, or allergic skin reactions in sensitive individuals.

**Treatment:** - Flush skin with plenty of water. Remove contaminated clothing & shoes after use. Call a physician. Wash contaminated clothing before reuse.

##### **EYE CONTACT**

**Symptom:** - Eye contact with the powder may cause eye corrosion or ulceration; eye irritation with discomfort, tearing or blurring of vision. Severe eye damage may result if not treated immediately.

**Treatment:** - In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Call a physician.

##### **INGESTION**

**Symptom:** - Ingestion of this product in sufficient quantities may cause gastritis, with stomach pain, nausea, vomiting, diarrhoea, headache or weakness; possibly progressing to necrosis or haemorrhage with gross overexposure.

**Treatment:** - If swallowed, do not induce vomiting. Give 2 glasses of water immediately. Never give anything by mouth to an unconscious person. Call a physician.

#### **V. FIRE FIGHTING MEASURES**

**Flammable properties:** Not applicable

**Extinguishing media:** Water, dry powder (sand or Met-L-X), CO<sub>2</sub>.

**Fire Fighting instructions:** Evacuate personnel to a safe area. Wear self-contained breathing apparatus (SCBA) & full protective equipment. When heated above 70°C, decomposes with evolution of corrosive gas (SO<sub>2</sub>). Virkon S itself is not flammable or oxidizing, but may assist combustion of other materials under exceptional circumstances.

#### **MATERIAL SAFETY DATA SHEET**

#### **VI. ACCIDENTAL RELEASE PROCEDURES**

##### **Safeguards (Personnel).**

Review FIRE FIGHTING MEASURES & HANDLING sections. Use appropriate Personal Protective Equipment during clean- up.

**Environmental precautions:** Do not allow the powder concentrate to enter drains. Infrequent disposal of small quantities (<0.5kg) may be diluted to waste with large quantities of water, subject to local waste disposal regulations. Do not

allow entry to surface waters.

**Methods for clean up:** Sweep up carefully, preferable with the aid of a suitable dry anti-dusting agent if available. Place in suitable containers for disposal. Prevent powder from becoming moist while awaiting disposal, if possible. Moist product awaiting disposal must be kept away from combustible material & stored in a manner that allows suitable ventilation of the waste.

## **VII. HANDLING AND STORING**

**Handling Personnel:** Avoid inhalation. Do not get in eyes and avoid contact with skin. Wear Personal Protective Equipment in accordance with section 8.

Handle with sufficient care to prevent dust generation.

**Storage:** Keep containers tightly sealed & avoid coming into contact with moisture during storage. Keep containers tightly sealed. Keep away from combustible material. Avoid contamination of the product.

**1% solution:** Store in a clean, loosely capped plastic container at room temperatures, and away from direct sunlight. Do not allow solution to freeze. Discard any used or contaminated solution & dispose of any stock solutions after 7 days from date of preparation.

## **VIII. EXPOSURE CONTROLS/PERSONAL PROTECTION**

### **Engineering Controls:**

Appropriate Local Exhaust Ventilation may be necessary for handling the product where dust formation is a problem, i.e. product in bulk quantities, or operations in small and/or poorly ventilated areas. Not normally necessary for preparation of solutions from small pack sizes (10lb or less).

### **Personal Protection Equipment:**

**Respiratory:** Where a Health and Safety assessment shows the dusting levels to be sufficiently high when handling the powder product, wear a NIOSH approved respiratory mask against fine particles. Respiratory protection is not normally considered necessary when handling solutions of diluted product. However, when working with spray mists of Virkon S, respiratory protection in the form of a NIOSH approved respirator unit in conjunction with an organic vapor – fine particle filter cartridge.

### **Protective clothing:**

**Eye:** Chemical splash goggles.

**Skin:** Overalls.

**Hand:** Rubber gloves.

## **MATERIAL SAFETY DATA SHEET**

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www.pharmacal.com

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### **Exposure Guidelines & Applicable Exposure Limits:**

Potassium peroxomonosulfate

PEL (OSHA): None Established

TLV (ACGIH): None Established

AEL\* (DuPont): 1 mg/m<sup>3</sup>, total dust, 8 & 12 hr. TWA

Sulfamic Acid

PEL (OSHA): None Established

TLV (ACGIH): None Established

AEL\* (DuPont): 0.5 mg/m<sup>3</sup>, 8 & 12 Hr. TWA

1.5 mg/m<sup>3</sup>, 15 minute TWA

\*AEL is DuPont's Acceptable Exposure Limit. Where governmentally imposed

occupational exposure limits which are lower than the AEL are in effect, such limits shall take precedence.

## **IX. PHYSICAL AND CHEMICAL PROPERTIES**

Boiling point: Decomposes on heating

Solubility in water: Approximately 8.3oz/gal

Form: Free flowing powder

Color: Yellow

Specific gravity: ~1.07

## **X. STABILITY AND REACTIVITY**

**Chemical stability:** Stable at normal temperatures & storage conditions.

**Incompatibility with other materials:** Incompatible with strong alkalis. In contact with halogen salts (e.g. KCl, KBr, KI, NaCl), Virkon S may react to release toxic halogen gases, such as chlorine, bromine & iodine. In exceptional cases Virkon S may support combustion; avoid contact with combustible materials.

**Decomposition:** Under certain extreme conditions sulphur dioxide & chlorine may be generated if the powder is allowed to become moist.

**Polymerisation:** Polymerisation will not occur.

## **XI. TOXICOLOGICAL INFORMATION (Animal Data- VIRKON-S POWDER)**

**Acute Dermal Toxicity:** LD<sub>50</sub> >2.0g/kg (rabbit).

Acute Oral Toxicity: LD<sub>50</sub> = 1.70g/kg (male rats) & 1.16g/kg (female rats)

**Acute Inhalation Toxicity:** 4 hour LC<sub>50</sub> > 6.147mg/l (male & female rats).

**Guinea Pig Dermal Sensitisation:** Virkon S displayed no fatiguing or sensitising effects.

**Primary Skin Irritation:** The powder is corrosive to the skin of rabbits with an irritation index of 7.00. A dilution of 5% results in an irritation index of 0.08 in rabbits.

**Primary Eye Irritation:** The powder is corrosive to rabbit's eyes. A dilution of 5% produces conjunctival irritation.

**Effects of Overexposure:** Inhalation of dust may cause choking, coughing or wheezing. A 1% solution is normally non-irritating.

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# MATERIAL SAFETY DATA SHEET AVISAFE

Date of Issue: 17 February, 1999 Issue 1

**Not classified as Hazardous according to criteria of Worksafe Australia**

## IDENTIFICATION

**Product Name:** Avisafe UN Number:

None Issued

**Hazchem Code:**

None Issued

**Other Name:** None **Dangerous Goods**

**Class and Sub-risk**

None Issued

**Manufacturers**

**Code:**

B-0002 **Poison Schedule:** None Issued

**Packaging Group:** None Issued

**Use:** Avian disinfectant cleanser, effective against a wide range of viruses, bacteria and fungi found in bird keeping.

**Physical Description/Properties:**

**Appearance:** Clear, pale green liquid

**Odour:** Lemon

**pH (10% soln)** 9 - 10

**Boiling point (°C)** ~ 100°C

**Solubility in Water:** Miscible in all proportions

**Specific Gravity:** 1.000

**Ingredients:**

**Chemical Entity:**

Halogenated Tertiary Amines

**CAS No:**

N/A

**Proportion:**

10 %

Ingredients Determined Not to be Hazardous

# Vetafarm

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## HEALTH HAZARD INFORMATION

**Health Effects:**

*Acute:*

**Swallowed:** May be irritating.

**Eye:** May cause redness or irritation.

**Skin:** May be irritating on prolonged and repeated contact.

**Inhaled:** Spray mist may be irritating.

*Chronic:* No effects reported following long term exposure

**Swallowed:** Do NOT induce vomiting. Give milk. Contact a doctor or Poisons Information Centre and show the container label.

**Eye:** Hold eyelids open and flush eyes with cold water for at least 15 minutes and see a doctor.

**Skin:** Remove contaminated clothing and wash skin thoroughly.

Seek medical advice if symptoms persist.

**Inhaled:** Remove to fresh air. Seek medical advice if symptoms persist.

**First Aid:**

**First Aid**

**Facilities:**

Clean running water.

**Advice to Doctor:** Treat symptomatically.

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### **PRECAUTIONS FOR USE**

**Exposure Standards:** This product does not contain any relevant quantities of material with critical values that have to be monitored in the workplace.

**Engineering Controls:** Avoid inhaling spray mist. Use with adequate ventilation.

**Personal Protection:** Wear safety glasses to prevent contact with eyes. Avoid contact with skin. Wear gloves for prolonged and repeated contact.

**Flammability:** Not flammable.

### **SAFE HANDLING INFORMATION**

**Storage and**

**Transport:**

No special precautions for transportation. Store away from food and keep container closed when not in use.

**Spills and Disposal:** Remove and dispose according to government regulations for large spills, contain using sand or earth. Prevent run-off into drains and waterways. Collect and seal in suitably labelled drums for disposal.

Wash away residue and small spills with large amounts of water.

**Fire/Explosion**

**Hazard:**

Not combustible.

### **OTHER INFORMATION**

**CONTACT POINT:** Vetafarm Pty Ltd

Head Office: (02) 69 256 222 (b/h)

