

# Bowerbirds: overlooked avian jewels

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## Introduction

Bowerbirds are large softbills of the order *Passeriformes*, that inhabit New Guinea and Australia<sup>1</sup>. There are 18 species of bowerbirds, distributed among eight genera<sup>1,2</sup>. These birds are peculiar in that they have developed their building skills to an extreme degree, which they demonstrate in their courtship display object: the bower.

Bowerbirds were discovered early after the first European settlers reached Australia, although they were not initially recognized as an independent group and were classified with the orioles and the honey-suckers<sup>3</sup>. Traditionally, these birds have been considered relatives of the birds of paradise. However, recent DNA studies suggest that they are more closely related to the wattled-birds of New Zealand (family *Callaeidae*), the starlings and the Corvine assemblage<sup>4</sup>.

Bowerbirds are not common avicultural subjects, but they are frequently present in well stocked zoos. They are rare in aviculture primarily because their two main sources — Australia and Papua New Guinea — do not allow export of their avifauna under any circumstance except for occasional exchange of surplus domestically bred stock with zoos. However, because Irian Jaya, the western region of the New Guinea island, is part of Indonesia, a country

that does not restrict the export of non-endangered avian species, it should still be possible to obtain some of the species from there. In addition to the legal issues, the lack of knowledge of the breeding habits of the bowerbirds has caused them not to be commonly bred even in

several species of bowerbirds well established in public and private Australian collections. I also met a number of aviculturists who have successfully bred these birds, including Stan Sindel of New South Wales, who was kind enough to give me detailed verbal accounts of his methods of husbandry. These data, in addition to the published accounts of breeding that have appeared elsewhere<sup>5,6</sup> are precious for aviculture. I believe that public and private collections owning bowerbirds may greatly benefit from the application of the husbandry protocols described in these articles. I also hope that this paper will prompt aviculturists to give more attention to these magnificent birds before their importation is completely eliminated. I am convinced that efforts to preserve species diversity will be futile if as many genera as possible are not established in captivity within a short time. Except, perhaps, for the cockatoos, birds from southeastern Asia and New Guinea are more exposed than any other group to danger of extinction from habitat destruction and human disturbance than from trapping for the pet trade. Placing a species on the C.I.T.E.S. appendix I (endangered species list) hardly protects it from the damage deriving from destruction of its natural habitat.

Among the species of bowerbirds most frequently seen in zoos and private Australian collections are the beautiful Regent Bowerbird (*Sericulus chrysocephalus*), the Satin Bowerbird (*Ptilonorhynchus violaceus*), and the Green Catbird (*Ailuroedus crassirostris*). In the U.S., very few zoos have bowerbirds at this time, although the San Diego Zoo had Yellow- and Fawn-breasted Bowerbirds on display. In the past, bowerbirds were shown in several zoos in this country much more frequently. The Satin Bowerbird was bred at the National Zoo in Washington many years ago. Recently, one importer listed Spotted Catbirds

Table 1  
Classification of Bowerbirds

Genus	Species	Common Name
<i>Ailuroedus</i> * (Catbirds)	<i>buccoides</i>	White-breasted Catbird
	<i>melanotis</i>	Spotted Catbird
	<i>crassirostris</i> *	Green Catbird
<i>Amblyornis</i> (Gardenerbirds)	<i>inornatus</i> *	Vogelkop Bowerbird
	<i>mcgregoriae</i>	McGregor Bowerbird
	<i>subalaris</i>	Streaked Bowerbird
	<i>flavifrons</i>	Golden-fronted Bowerbird
<i>Archboldia</i>	<i>papuensis</i>	Archbold's Bowerbird
<i>Chlamiddera</i> *	<i>lauterbachi</i>	Yellow-breasted Bowerbird
	<i>Cerviniventris</i>	Fawn-breasted Bowerbird
	<i>maculata</i>	Spotted Bowerbird
	<i>nuchalis</i>	Great Bowerbird
<i>Prionodura</i>	<i>newtoniana</i> *	Golden Bowerbird
<i>Ptilonorhynchus</i>	<i>violaceus</i> *	Satin Bowerbird
<i>Scenopoetes</i>	<i>dentirostris</i> *	Tooth-billed Bowerbird
<i>Sericulus</i> (Regent Bowerbirds)	<i>aureus</i>	Flame Bowerbird
	<i>bakeri</i>	Fire-maned Bowerbird
	<i>chrysocephalus</i> *	Regent Bowerbird

The majority of the 18 species of bowerbirds are distributed in New Guinea. (From <sup>1,2</sup>)

a = Monomorphic species  
b = Species also present in Australia  
c = Species only present in Australia

zoos, and there are, unfortunately, too few aviculturists specializing in softbills who have given attention to this group of birds.

I have neither owned (yet) nor bred any of the bowerbirds, however, during my last visit to Australia in July 1991 I was impressed to find

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(*Ailuroedus melanotis*) and Fawn-breasted Bowerbirds (*Chlamydera cerviniventris*). Clearly then, keeping bowerbirds is a dream that aviculturists in the U.S. can still achieve. I will describe briefly here some of the few species most commonly kept in Australian and American collections.

The Regent Bowerbird (*Sericulus chrisocephalus*) is the most beautiful of the Australian bowerbirds. The size of a large blue-jay, its plumage has a silky, velvety texture and is colored jet black, except for the lores, crown, nape, sides of the neck and wing primaries where the color is a rich golden-yellow. The eyes are bright golden-yellow in the adult male, and brown in the juveniles and in the females. The female is drab brown, mottled in very light beige, with black patches on the crown, throat and back. Juveniles look like females. They start their attempts to build a bower at about three years of age, when their plumage is still irregularly yellow, and the eyes a pale lemon color. They become sexually mature at six years of age.

The male Satin Bowerbird (*Ptilonorhynchus violaceus*) is a crow-sized black bird. Its plumage is silky shiny blue-black. The eye is electric blue. The female Satin is brown with a regular pattern of lighter markings on the body, darker on the back parts. Her eye is also electric blue.

The Fawn-Breasted Bowerbird (*Chlamydera cerviniventris*) is a monomorphic, grey-brown bird, with feathers tipped in white. The underparts are fawn-colored. It has some white around the eye. The bill is black and slightly curved. This bird is very similar to the Yellow-breasted Bowerbird (*Chlamydera lauterbachii*), except that the latter has a pronounced yellow wash on the belly and black, instead of white, on the face?

The catbirds are crow-sized, solidly built birds, predominantly green-colored. The Green Catbird (*Ailuroedus crassirostris*) has nearly no markings, is paler in the underparts, and has a red eye. It is very similar to the Spotted Catbird (*Ailuroedus melanotis*), except for the missing black markings on the feathers. The two species also inhabit separate territories: the Spotted Bowerbird, Queensland and Southern New Guinea, and the Green Bowerbird, New South Wales. These birds have a cat-like call and can become very tame and human-imprinted. I saw a

few juvenile Green Catbirds in the aviaries of Stan Sindel, kept in a mixed collection with Figbirds (*Sphenocercus viridis*) and parrots. They were quite friendly with people and seemed rather intelligent.

These species, along with other birds present both in northern Australia and southern New Guinea, such as the Blue-Faced Honeyeater (*Entomyzon cyanotis*), are still available to American aviculturists and need all the attention we can give them. This is especially true for the Fawn-breasted Bowerbird, which has been studied very little in Australia because it lacks a gaudy plumage,

and is very rare.

## Ornithology of the Bowerbirds

Bowerbirds can be grouped according to their breeding habits into two groups. A first group of monomorphic birds with males indistinguishable from the females includes the catbirds and the grassland bowerbirds. These birds form stable pairs and are monogamous. A second group of highly dimorphic birds practice polygamy, build a bower and do not form pairs. However, some of the monomorphic species, such as the Fawn-breasted Bowerbird

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*Chlamiddera cerviniiventris*), also do not form stable pairs and build bowers?

Based on their habitat, five groups of bowerbirds are recognized? The Catbirds that live in the forest, the Archbold's Bowerbird of the high mountain forest, the Gardenerbirds that build a maypole-type bower in patches of forest floor, the Regent Bowerbirds of the lowland and hill forest, and the Grassland Bowerbirds, non forest dwelling and monomorphic.

Bowerbirds have gained themselves fame as the architects of the avian world, because the males of the dimorphic species build a very elaborate display (bower), where they attract the females and mate with them. The bowers are classified into four principal types? The "court", typical of the Toothbilled Bowerbird (*Scenopoeetes dentirostris*), a cleared area of the forest decorated with green leaves; the "mat", of Archbold's Bowerbird (*Archboldia papuensis*), a carpet of mosses and ferns; the "avenue", of the Regents and the Satin Bowerbirds, which have two parallel upright walls forming a central avenue; and the "maypole", of the Yellow-fronted Gardener (*Amblyornis flavifrons*) and the Golden Bowerbird (*Prionodura newtoniana*). According to recent theories, bowerbirds have progressively transferred their gaudy display plumage to the bower! This has produced birds that build progressively more elaborate and decorated bowers, but with drabber and drabber plumage!

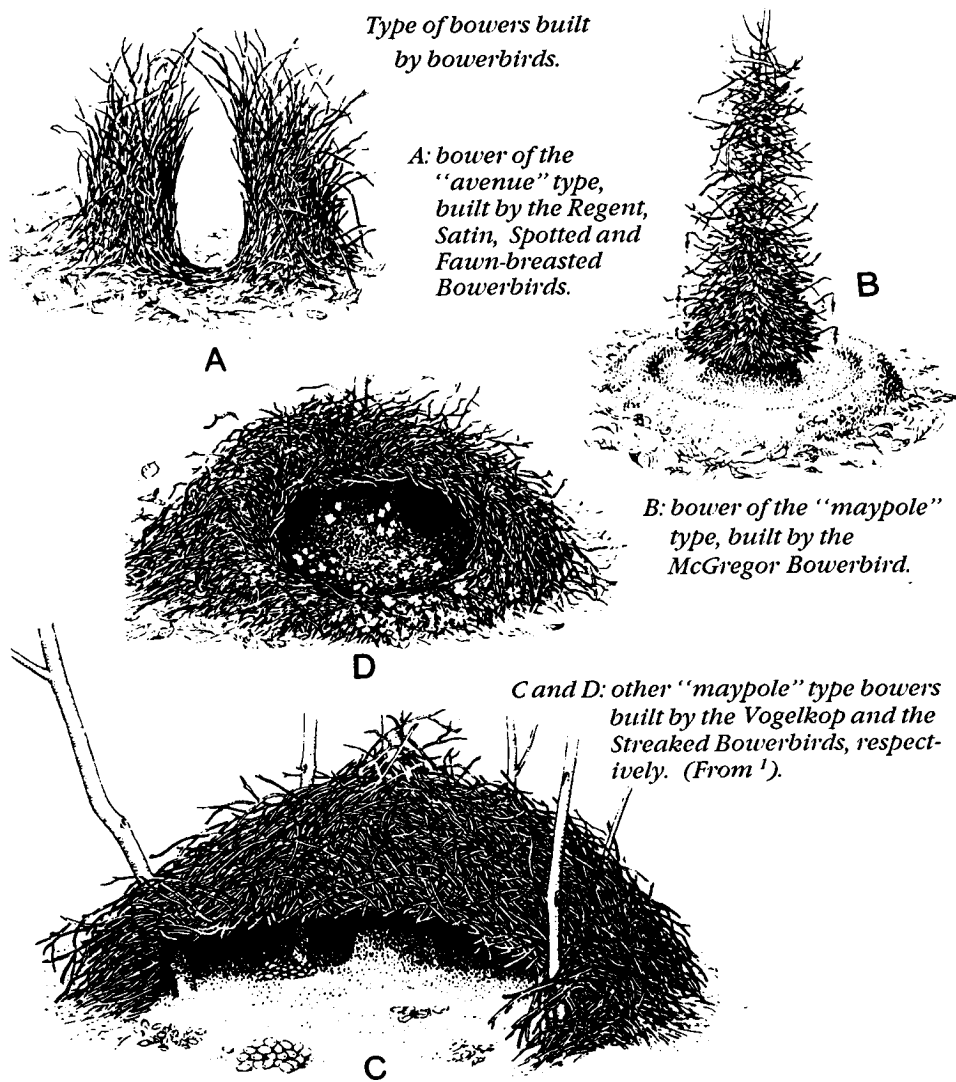
Bower construction follows specific rules regarding orientation with respect to north-south direction, and is completed by elaborate decorations? For example, the bower of the Satin Bowerbird is made of two walls of twigs with a central avenue decorated carefully with moss where the female walks before intercourse, is decorated with a number of different objects of blue color, and is "painted" in blue-black by the male? In a published report, the following objects were found decorating a Satin Bowerbird bower found near Audley, in the royal National Park in Australia, "... eight laundry blue bags, ten pieces of blue matchbox, one blue cigarette packet, a piece of blue string, thirty-four pieces of blue glass, seventeen blue feathers, one blue marble, a blue invitation card to a dance, a white ticket with blue print-

ing, eight yellowish wood shavings, two pieces of yellow-green onion peelings, eight snail shells, one cocoon, six cicada numphal cases, numerous small yellowish green flowers and a very large number of yellowish-green leaves, mostly the stiff, serrated leaves of *Banksia serrata*. . . ."<sup>3</sup> It is clear that the Satin Bowerbird prefers blue and, to a lesser extent, yellow or yellow-green objects for the decoration of its bower. Other bowerbirds are also this choosy, with the Golden Bowerbird (*Prionodura newtoniana*) using primarily white bones, the Spotted Bowerbird preferring pinkish objects, and the Fawn-breasted Bowerbird employing green berries to decorate the bower?

Concerning the color preferences of the objects used for decoration, it is interesting to note that the Satin Bowerbird has an electric blue eye, present also in the female, but absent in the juveniles, and the Spotted Bowerbird has a bright pink display speculum in the nape. Therefore, it

seems that a symbolic correspondence exists between the color of body parts of the bird related to the courtship — the eye color for the Satin and the pink speculum for the Spotted Bowerbird — and the color of the objects chosen to decorate the courtship bower!

Some bowerbirds, particularly the Satin Bowerbird<sup>3</sup> complete their bower by painting it. These birds deposit layer after layer of a blue-black paint on the internal walls of the bower, and maintain this painted coat very carefully during the breeding season. The color coat, which can reach a thickness of several millimeters, is produced by charcoal powder mixed with saliva. The birds paint their bower by holding a piece of charcoal (fires are very common in the Australian countryside) in their semi-open bill. While their beak finely grinds the charcoal, the saliva flows and the bird deposits this "paint" on the twigs that compose the bower<sup>3</sup>. This ritual is considered part of the symbolic transfer effects





mentioned above. None of these activities take place for the monomorphic species that form stable pairs.

During the breeding season, females regularly visit bowers of males (which are built in the same spot year after year), mate and get fertilized. Then they return to their less conspicuous territories to finish building their nest, lay their eggs and raise their young entirely on their own.

In the wild, the diet of bowerbirds consists largely of fruit, with a variable amount of insects and arthropods, depending on the species.<sup>3</sup> During the breeding season and the rearing of the young, bowerbirds become nearly totally insectivorous and some species, notably the catbirds, will feed the young and eggs of other species to their chicks, reminiscent of the similar habit of crows, magpies and jays. Bowerbirds are very choosy about their insect preferences. They will select only certain types of moths and other local insects (Stan Sindel, personal communication). Fortunately, Stan Sindel has figured out a substitute diet for us in captive breeding.<sup>5,6</sup>

### Husbandry And Breeding

#### *Housing and Breeding Setup.*

The breeding setup for the bowerbirds that Stan Sindel has devised has been rewarded by successful breedings of the Satin and the Regent Bowerbirds.<sup>5</sup> Because it takes into consideration the non pair-forming character of these birds, it should be regarded as the prototype setup for species weary of other individuals, and even of their own mate; the most notable example of this type of birds being the hummingbirds.

Birds are extraordinary among the vertebrates, in that their variety is extreme. Extreme differences in body size and diet parallel enormous differences in breeding habits. For example, in the Black-breasted Button Quails (*Turnix melanogaster*) and the cassowaries (family *Casuariidae*), the males sit on the eggs and rear the young. The Amazona parrots and the cockatoos practice a totally conventional monogamous marriage, and the Alexandrine Parrots only pair during the breeding season. The hummingbirds and the bowerbirds are polygamous and the males never meet their offspring, with the females by themselves entirely taking care of incubation and

rearing duties.

Birds with such extremely varied habits represent a formidable challenge for the aviculturist who tends to think of bonded pairs as the natural reproductive unit. This Victorian idea has led many to make errors in the setup of some species, and has led them to be labeled as "difficult to maintain in captivity" or even "unbreedable."

Bowerbirds, like hummingbirds, barely tolerate the presence of another individual of the same species, much less one of a related species, in the same territory. Therefore, these birds have to be kept individually. One of the most important observations reported by Stan Sindel about the Regent Bowerbird is that when the pairs were kept together in a 15 foot long, 10 foot high and deep aviary, the male was found several times listless and looking as if it were on the verge of dying. Apparently, the female kept it from feeding. This happened even after a second feeding station was added to the aviary. Consequently, the birds were moved to separate, adjacent aviaries. Under these conditions also, the male was found listless and nearly dying on several occasions. Therefore, pairs of Regent (and Satin) Bowerbirds are now kept by Stan Sindel in adjacent aviaries divided by a solid partition for half of its length. A wire door allows communication between the two aviaries for the mating to occur, when the time is appropriate.<sup>5</sup>

Under these conditions, the male builds a bower, and will decorate it, if given the appropriate objects. When the female is ready to breed, she starts building a six inches wide and two inches deep, unlined twig nest.<sup>5</sup> She then spends time in front of the wire partition, showing interest in the male courtship. At that time, the door is open three or four times a day for periods of about one hour. During these brief encounters, the female accepts the courtship of the male and intercourse occurs. Afterwards, the female returns to her secluded quarters and starts laying eggs and touching up the unfinished nest. The female will usually nest in the most secluded area of her aviary, out of sight of the male.<sup>5</sup> In natural conditions, males are highly polygamous and will service numerous hens every season.

It is interesting to note here that this setup is extremely similar to the successful setup that Dr. Karl



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Regent Bowerbird (*Sericulus chrisocephalus*). Adult male older than seven years. From Stan Sindel's collection, New South Wales, Australia.



Green Catbird (*Ailurodeus crassirostris*). From Stan Sindel's collection, New South Wales, Australia.



Unfinished bower built by a Satin Bowerbird in the aviaries of Pauline Courtney, Kuri Kuri, New South Wales. Note the plastic blue strip gathered by the bird in an attempt to decorate the bower.

Shuchmann uses to breed hummingbirds in Germany? In this case also, the pair is kept separate, and only after the female has built the nest and has given signs of being ready to lay, is the male admitted several times a day for the fertilization to occur.

Catbirds and other monomorphic, pair-forming species are kept in pairs in large aviaries, sometimes in mixed collections.<sup>6</sup> However, if one plans to breed other birds together with the catbirds, care must be taken to choose an appropriate combination of species. The catbirds have been reported to consume eggs and chicks of other species and feed them to their offspring, including eggs from birds much larger than themselves, such as the Red-tailed Black Cockatoo (*Calyptorhynchus banksii*).<sup>6</sup> Moreover, they can be very aggressive with smaller species.

### Breeding

All bowerbirds lay a clutch of two eggs, with rare occasions of clutches of one (Great Bowerbird<sup>3</sup>) or three eggs (Spotted Bowerbird<sup>3</sup>). The eggs are laid at intervals of two days and are oval. The color is variable, with some of the species having no marking (catbirds and Golden Bowerbird), and others carrying whirled streaks or, rarely, spots (Satin Bowerbird) on a uniformly colored background. The background color ranges from off-white (Golden Bowerbird), to cream (catbird) and yellow-green with variable shades of earth brown or ochre (Satin and Spotted Bowerbirds).<sup>3</sup> Incubation time is not known, except for the species bred domestically.<sup>5,6</sup> It ranges from 18 to 21 days, and seems to depend on the weather.<sup>5,6</sup> Fledging takes about 2 to 2-1/2 weeks. Some of the species will double-clutch in case of loss of the first clutch (Green Catbird<sup>6</sup>). Nests are never very refined, in contrast to the meticulous quality of the construction of the bowers.<sup>3</sup> Materials used to build the nest are twigs, dry grass and leaves. Their size is approximately six inches wide by two inches deep, internally.<sup>3</sup>

Table 2  
Breeding Information for Bowerbirds and Catbirds

	Regent Bowerbird	Green Catbird
Eggs	Oval, cream-colored, marked with purple brown whirling streaks and lines.	Oval, cream-colored
Clutch	2 eggs, laid every other day	2 eggs, laid every 2 to 3 days
Incubation	16 days, starting with the second egg	21, 22, 24 days, starting with the second egg. Birds may double clutch.
Fledging	18 days	22 days





Satin Bowerbird (*Ptilonorhynchus violaceus*) adult male from Stan Sindel's collection, NSW, Australia.



Adult female Satin Bowerbird from Stan Sindel's collection, NSW, Australia.

### Diet:

Bowerbirds are classic softbills and will consume a mixed diet of fruit, high protein soft food and live food, consisting of insects and small mammals such as mice<sup>3</sup> Table 3 describes the diet used by Stan Sindel to keep and breed his catbirds and bowerbirds.<sup>5,6</sup> The live food is not essential outside the breeding season, because the birds are primarily frugivorous when not breeding. However, during the breeding season, specifically during the first week of raising the chicks, the birds switch entirely to insects. This continues through the second week but, at this time, the

Table 3  
Diet for Bowerbirds and Catbirds

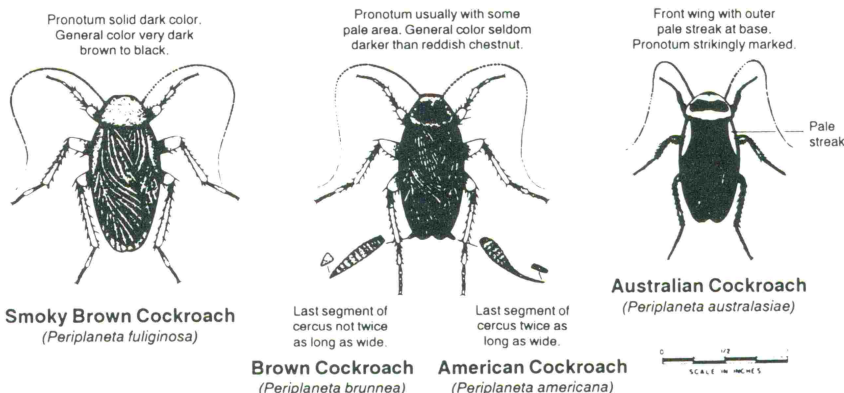
A: Softfood	1 tablespoon egg and biscuit canary rearing food 1 tablespoon lory nectar
B: Fruit	1 inch diced banana 1 inch diced, cooked carrot 1/2 apple 1 pod English peas seasonal berries and fruits according to availability
C: Insects	Mealworms Grasshoppers Cockroaches (South American) Pinkies or mice*

The amounts given refer to a single bird. The insect component is given only occasionally when the birds are not breeding. It is consumed nearly exclusively during the first and second week of chick rearing (from <sup>5,6</sup>).

\* Pinkies are given (also mice) only to catbirds.

parents gradually introduce some fruit into the diet of the chicks.<sup>5,6</sup> It is very important during this phase to use supplements containing vitamins and minerals in order to prevent rickets, bone weakness and spontaneous fractures due to calcium deficiency.<sup>6</sup> It is important to realize that live insects, at least of the type consumed by bowerbirds, do not contain a balanced enough amount of minerals to insure proper bone development.<sup>6</sup>

A comment here on the type of live food to be offered to bowerbirds rearing young is in order. In Australia, aviculturists raise birds outdoors and can catch plenty of insects with moth traps made of a lamp surrounded by an electrically powered grid.<sup>6</sup> The insects fly into the light and get electrocuted. Then they fall into the water pan at the base of the trap and can be served to the birds in the morning. Because of the very high amount of insects necessary to raise bowerbird chicks, however, Stan Sindel tried a variety of standard insects usually raised by aviculturists. Mealworms, crickets, grasshoppers and locusts were all accepted in different measure, but the best insects seemed to be the large South American cockroaches of the genus *Periplaneta*.<sup>8</sup> These unpleasant arthropods, the size of about one inch, are wide-



Cockroaches useful in feeding bowerbirds and catbirds during the breeding season (From <sup>8</sup>). Stan Sindel probably used *Periplaneta australasiae*.<sup>5,6</sup>



spread in the warmer parts of the U.S. as well as in Australia. They can be easily caught using a container in which some soft dogfood is placed, and putting it in corners or other areas preferred by the insects. The roaches must be immobilized by lightly crushing their chest, and can be stored in this semi-dead status in the refrigerator for two or three days. If large roaches are unavailable, I would try crickets, grasshoppers and locusts, immobilized by removing their legs, but I cannot certify that this will work. The insects must be put in a smooth container with high sides to prevent escape and immersed in a pan of water to avoid invasion by ants (if your aviary is outside).<sup>6</sup>

The constant supply of cockroaches has been claimed by Stan Sindel to have been one of his most important assets in successfully breeding bowerbirds and catbirds. His Green Catbird hen consumed 25 cockroaches a day during the first days after hatching the chicks, and increased to 50 roaches a day prior to fledging.<sup>6</sup>

#### Conclusion

Bowerbirds are fascinating, beauti-

ful softbills still available to American aviculture, albeit on a limited basis. Most of the species must still be studied and bred in captivity. All New Guinea species should be established before the transmigration program that Indonesia is enforcing – moving large masses of populations from the Indonesian islands into Irian Jaya – interferes irreversibly with the local wildlife.

Unfortunately, the price of the few imported bowerbirds is high, and their space requirements difficult to meet for the average aviculturist. However, more affluent, experienced aviculturists and public zoos and aviaries should give as much attention as possible to these species if we do not want to be obliged to travel to museums or to the Southern Hemisphere in order to see them in the future.

A final note – the breeding setup of dimorphic, non pair-forming bowerbirds is the prototype setup for other non pairing avian species with similar requirements, such as hummingbirds.

#### Acknowledgements

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