

# Breeding the Gold-whiskered Barbet

(*Megalaima chrysopogon*)

by Eric Kowalczyk  
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Seattle, Washington

The barbets, family Capitonidae, consist of 81 species in 13 genera (ISIS: International Species Information System) distributed through the tropics of South America, Africa, and Asia. They are related to woodpeckers, toucans, puffbirds, jacamars, and honeyguides in the order Piciformes.

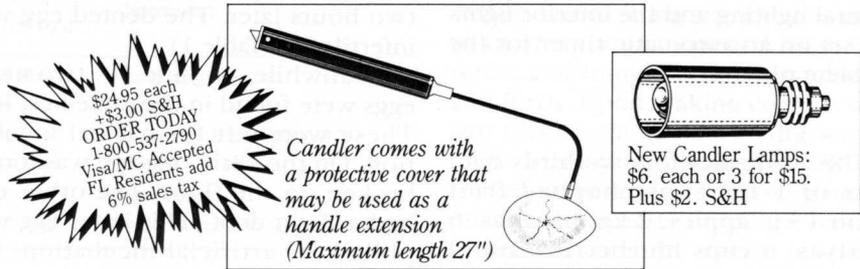
The Gold-whiskered Barbet (two subspecies: *Megalaima chrysopogon chrysopogon*, peninsular Malaysia and Sumatra; *M. c. chrysopsis*, Borneo; Delacour 1947) is not well represented in zoo collections. According to ISIS (June 1989), only two zoos are listed as having this species. Both of these institutions acquired their birds in the summer of 1986 from Bellbird, Inc. which caught them in Sumatra (Don Wells, pers. comm.). On June 15, 1989, Woodland Park Zoological Gardens hatched one barbet in what is thought to be the first successful captive breeding of this species. Another institution, Sea World of Florida, has subsequently bred this species.

## History

On July 25, 1986, Woodland Park Zoo obtained the female barbet. On May 17, 1988, she was paired with a male acquired from Brookfield Zoo. This male was thought to have killed his previous mate in November 1987. Harrison (1978) states that "in captivity, some barbets are extremely pugnacious towards other members of either sex of their own species except when nesting." No aggression has been observed in our pair. This might be due to the large size of the enclosure.

After two escapes from exhibits, through the harp wire fronts, the barbets were placed in an off-display

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enclosure. The exterior section (4.8 m. x 2.4 m. x 2.4 m.) consists of 2.5 cm. Toprite netting and wire mesh sides. The interior (3 m. x 2.1 m. x 3 m.) provides heat and shelter. A large window provides natural lighting and the interior lights are set on an automatic timer for the ambient photoperiod.

### Diet

The adult diet for two birds consists of 1-1/2 cups chopped fruit (ratio 4 kg. apples, 2 kg. bananas, 6 papayas, 6 cups blueberries, and 2 cups raisins), 1/2 cup soaked Wayne dog food, and about 1/3 cup shredded Nebraska Brand Feline Diet. Two grapes cut in half are placed on top of this mixture. Vionate, fine oystershell, Osteoform, and finch mix (for grit) are mixed in with the diet. Mealworms, crickets, and mice pinkies are offered, but rarely (if ever) eaten.

### Nest

These two barbets began nest (or roost) cavity construction almost immediately after pairing. One early preferred site was the side of a 20.3 cm. x 10.2 cm. cedar beam. As they progressed with this hole, a nest box was attached to the opposite side of the beam in hopes that they would drill into the nest box. Eventually they lost interest in this site and began drilling elsewhere. Soon there were small holes in all parts of the ceiling, walls, and sides of nest boxes. Five different cavity boxes and logs were added to provide a variety of choices for the birds. These included tree stumps, man-made nest boxes, and a palm log.

### Eggs

We attempted to get the birds to utilize the palm log in the exterior enclosure. In spring 1989, access to the heated interior was permitted only at night. On May 25, an attempted copulation was observed. On May 28, a broken egg was found on the floor in the interior enclosure. On the 30th, two eggs were found in a hollowed-out log (53 cm. x 27 cm. diameter; entrance hole: 11 cm. x 8 cm.) in the interior enclosure. The routine of confining the birds to the exterior enclosure during the daytime was discontinued. On May 31, the two eggs were checked. Since one egg had a slight dent in it, these eggs were pulled for artificial incubation. The eggs were weighed, measured, and set in a Marsh Farms Roll-X incu-

bator at 37.5 °C dry bulb and 30-31 °C wet bulb. The dented egg was repaired with a non-toxic adhesive (Elmer's Glue) to prevent excessive moisture loss. After 15 days, on June 15, egg #89041 pipped and hatched two hours later. The dented egg was infertile (see Table 1).

Meanwhile, on June 10, two more eggs were found in the same nest log. These were left for natural incubation. On the 13th, one egg was found broken on the floor. The other egg had a slight dent. This latter egg was pulled for artificial incubation. On

June 23, egg #89059 was found in the nest. As it had a dent, it was pulled immediately and a "dummy" egg was placed in the nest. No more eggs were laid, and the barbets showed no interest in incubating the "dummy" egg. On July 8, egg #89059 pipped and was assisted in hatching the following day.

### Hand Raising

Gold-whiskered Barbet nestling # 890412 hatched two hours after pipping on June 15th. We had expected a 17 day incubation period (based on



*Gold-whiskered Barbets (breeding male in photo) come from Malaya, Sumatra, Borneo, and the Thailand peninsula.*



*Two young Gold-whiskered Barbets (30 days and 6 days) bred at Woodland Park Zoological Gardens.*

Table 1

**Gold-whiskered Barbet Eggs — 1989  
at Woodland Park Zoological Gardens**

Egg ID #	wt (g)	L (mm)	W (mm)	Fertility	Estimated Date Laid	Comments:
None	—	—	—	—	28 May	found broken
89040	11.2	31.7	25.8	infertile	29 May	dented
89041	12.2	34.1	25.6	fertile	30 May	hatched in 15 days (#890412)
89052	13.2	35.3	27.2	infertile	09 June	dented
None	—	—	—	—	10 June	found broken
89059	11.9	31.9	26.0	fertile	23 June	dented; hatched in 16 days; (#890525)

information for other barbet species), so the egg hatched in our incubator and had not been transferred to a hatcher. The bird's weight was 9.9 grams. Three hours later it was transferred to a brooder that was kept at 36°C temperature and 27°C wet bulb humidity. The altricial nestling stood in the nest, held its head up and showed a strong begging response. The lower mandible was longer than the upper mandible for the first 14 days. This condition possibly aids in obtaining food by providing a wider target to which the parents bring food. Conspicuous heel pads on its tarso-metatarsal joint were observed, a condition also seen in toucans and woodpeckers. Skutch (1976) mentions that "nestlings that grow up in unlined chambers have special pads on the heels (which) together with their swollen abdomens, bear the weight of the young birds." This cushion of thickened skin protects each bird from abrasion as the nestling shuffles about on the hard nest floor. For further comparison of another barbet species, the Prong-billed Barbet (*Semnornis frantzii*), see Skutch (1983).

Feeding began the following morning, approximately 19 hours after hatching. The schedule was to offer food every two hours from 0700 to 1900 hours. Weights were taken each day before the first feeding and before the last feeding to evaluate the nestling's progress as well as our methods and techniques. We measured weight gains during each day, weight loss during the night, and compared daily weight gain. Daily weight gained for the first 20 days ranged from 1.4% to 33%, with an average of 13.65%. We began feeding papaya pulp, Gerber's strained beef, and freshly killed mouse pinkies, with an approximate 2:1 ratio by mass of meat to fruit. Gradually, other

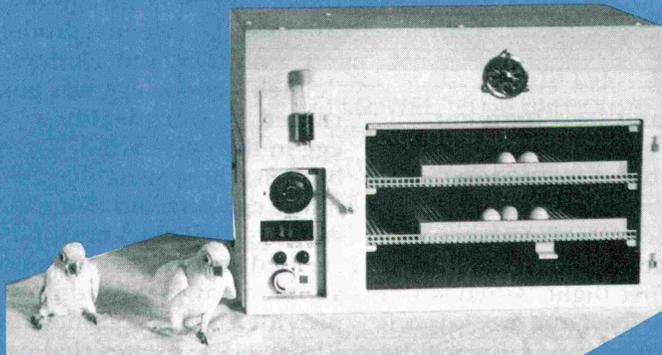
food items such as white mealworms, cricket abdomens, banana, blueberry, grapes and other fruits, were added (and/or deleted) with careful observations on the bird's response to these changes (i.e., examination of feces for undigested food, bird's food preferences as judged by begging or swallowing responses, etc.). All food items were dipped in a Nekton-bio solution. In addition to providing moisture, this solution might promote better plumage. The mouse pinkies were dusted with Osteoform and Vionate.

From the beginning, the best feeding response was observed in response to darkening the room. Possibly this simulates the darkening of the nest cavity when the adult bird enters with food (Welty and Baptista, 1988). The nestling stretched its neck to the maximum, opened its mouth wide, and immediately swayed back and forth. Upon making contact with the food item, the nestling would make a grasping movement. Skutch (1976) mentions this grasping movement and contrasts the active feeding responses of some cavity nestlings with those altricials who simply gape passively until the parent pushes in the food. We can speculate on the adaptive significance of this behavior. The most active nestling will presumably obtain the most food. But in our hand-rearing procedure, it made feeding with forceps rather difficult as we had to get the food in the gaping mouth without piercing the constantly moving bird. Parental feeding for this species is undocumented, but might be assumed to be by food carried in the bill by both parents. Harrison (1978) suggests that only a few of the smaller barbet species feed

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Table 2

## Hatching differences between the two fertile barbet eggs

Egg ID #	Incubation Temp. (°C)	Incubation wet bulb (°C)	Hatch Temp.	Hatch wet bulb	Incubation Period	Wt (g)
89041	37.5	30 - 31	37.5	30 - 31	15 days	9.9
89059	37.5	28 - 29	37	30	16 days	7.5

by regurgitation.

The amount of food offered at each feeding was gradually increased. This was determined by the weight gained each day, and by the begging response. As we did not want to over-feed the bird, we stopped each feeding before the bird was satiated. Thus, there was always some begging response as we returned the bird to the brooder.

We had questions about the type of substrate to use in the artificial nest. In most descriptions of barbet cavities, the eggs and nestlings lie at the bottom of a cavity with little or no nesting material. Improper nests might result in splayed legs. In a natural nest shared with perhaps three siblings, the birds would rest against each other. For the first 14 days, we kept the nestling in a plastic strawberry basket lined with tissue paper. A few small twigs were placed on the bottom to give the bird something to grasp. This was eventually switched to a more natural, sawdust substrate. The nestling mostly lay flat in the nest, with legs spread out. As the bird grew and developed, it became increasingly difficult to determine if this posture was normal or if the legs were splayed. Apparently this is a normal posture, as the bird eventually grew and developed normally.

### Growth and Development

The bird's eyes began to open on the 16th day but it was not until the 29th day that both eyes were continuously wide open. On day 35, the bird perched on the rim of its nest basket and took its first flight. At day 43, it began to eat by itself and at 57 days it weighed 122.0 grams and was fully independent of hand feeding. Its heaviest weight was 154.4 grams on day 31. At approximately five months, weighing 148.2 grams, the

bird was laparoscoped and found to be a male.

During the last days of hand feeding, the bird became increasingly unwilling to swallow mice pinkies. When the bird was feeding free choice, it showed a definite preference for fruit. In comparison, Wilkinson and McLeod (1984) mention that parent reared Fire-tufted Barbets (*Psilopogon pyrolophus*) rejected the pink mice that they were raised on in favor of fresh fruit when they were feeding themselves at 44 days.

Presently, our hand-raised bird is completely weaned and shows no signs of being hand-raised and imprinted. With good management and luck, this bird should be able to successfully breed.

On July 8, egg #89059 piped and was assisted in hatching the following day after a 16 day incubation period. From the start, this bird was unable to hold up its head and beg as the first nestling had. It survived for only 17 days.

### Discussion

This year we obtained a total of six eggs from our pair of barbets. These eggs were laid in three clutches of three, two and one egg respectively. Intervals between clutches varied between nine and 13 days. The last "clutch" of one egg was possibly disrupted by our placing a "dummy" egg in the nest cavity. Two eggs were broken, three were dented, and one intact egg was laid. We did not measure eggshell thickness, but the eggs seemed thin. Perhaps some calcium supplement in the adult diet might provide thicker eggshells, however, Ripley (1945) states that barbet eggs are normally thin shelled. Perhaps a softer substrate of sawdust might provide better protection for the eggs. We believe the dents resulted from the birds sitting on the eggs and pressing them against the cavity floor.

The death of the second nestling perhaps was caused by different incubation conditions or because this egg was dented and repaired prior to incubation. This nestling weighed 2.4

grams less than the first nestling, hatched a day later, and was unable to hatch itself.

We hope that we will correct these problems and have the opportunity for the parents to rear a clutch next year. This would be most informative, for us to be able to compare the hand-reared bird with a parent reared bird, and to contrast the rearing processes.

This hatching presented us with many questions and challenges, primarily because we had no breeding biology data for this species. The best we could do was to extrapolate from information in the literature. Although this species is not well represented in collections listed in ISIS, five other species of *Megalaima* are in collections at 11 different institutions (ISIS, June 1989). We hope that information recorded here will be helpful in the successful breeding of other barbet species in the future.

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### Acknowledgements

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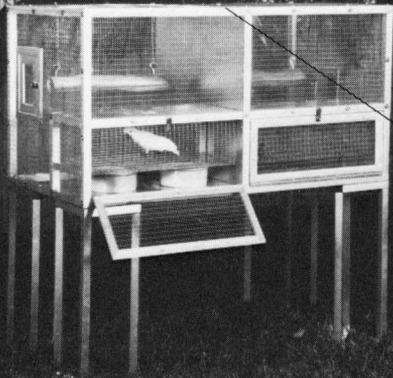
### Products Mentioned

- Elmer's glue: Borden, Inc., HPPG, Columbus, Ohio 43215.
- Gerber's strained beef: Gerber Products Company, General Office, Fremont, Michigan 49412.
- Marsh Farms Roll-X incubator: Lyon Electric Company, Inc., General Office, 3425 Hancock Street, San Diego, California 92110.
- Nebraska Brand Feline Diet: Central Nebraska Packing, P.O. Box 550, North Platte, Nebraska 69101.
- Osteoform: Vet-a-Mix, 604 W. Thomas Ave., Shenandoah, Iowa 51601.
- Toprite netting: J.A. Cissel Mfg. Co., P.O. Box 339, Farmingdale, New Jersey 07727.
- Vionate: Rich Health, Inc., Nutritional Research Laboratories, P.O. Box 18258, Irvine, California 92713.
- Wayne Dog Food: Royal Canine U.S.A., Inc., St. Charles, Missouri 63303.

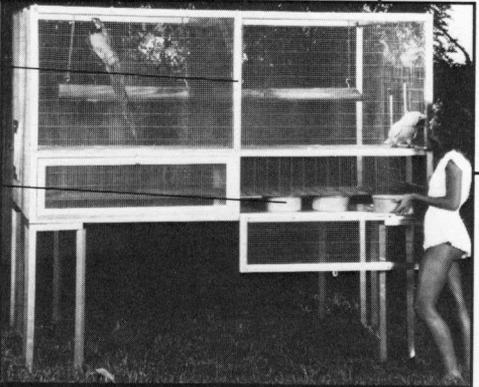
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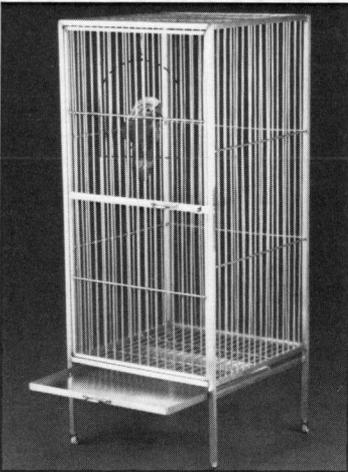
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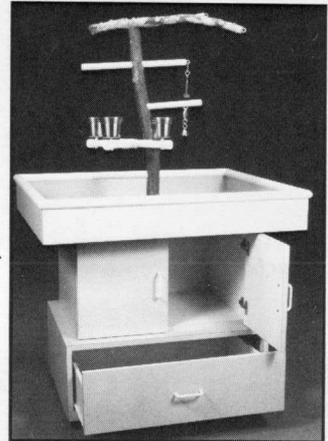
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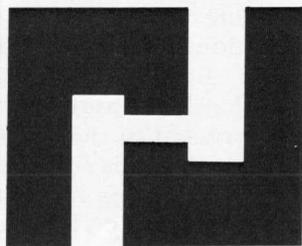
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