

Chapter 7

BREEDING BIOLOGY

Introduction

Knowledge regarding the breeding biology of Trogonidae is scarce. Skutch carried out studies on (1942, 1944, 1948, 1956, 1959,1962) several species in Mexico and Central America did not include the Malabar Trogon. The studies of Skutch covered the nesting and other habits of seven species of Trogons. The studies include life history of Mexican Trogon, life history of Quetzal, of the Citroline Trogon, Massena Trogon, the nesting of Collared Trogon, life history of Black-throated Trogon, and the life history of White-tailed Trogon. The life history of Coppery-tailed Trogon was studied by Rigway (1987a and 1987b). The breeding biology and behavior of Elegant Trogons were conducted by Taylor (1994) and Hall and Karubean (1996).

There are two different reports regarding the nest of Malabar Trogon. In the first case, the nest was in a rotten wood in a hollow at the top of a dead stump, and about eight feet from the ground according to (Bourdillon, 1878). Humayun Abdul Ali (Ali 1969) described the nest as an untidy, flimsy platform

of rotten twigs etc. slightly cupped in the centre, wedged at a height of about 8 feet, between a growing sapling and a sweeping cane-stem. It was a disreputable and deserted looking structure, reminiscent of a dove's nest. However, according to Collias and Else (1984) birds of Trogonidae, family nest in holes and both parents participate in nest building. Apart from these accounts, no detailed studies were carried out on the breeding biology of Malabar Trogon. The advertising and excavation, nest building, microhabitat and site characteristics, nest, eggs, incubation, nestling, sanitation, and breeding are described in this chapter

Methodology

Two approaches were adopted to locating the nest of Trogon during 1997 to 1999. The first approach was an intensive all out search to locate nests that resulted in recording evidences of breeding seasons. The second approach was to locate the paired birds and follow their breeding activities and that resulted in three nests.

The nesting behaviors of the bird were observed from blinds. The duration of nesting activities at and around nest were recorded in each observation. Whenever possible efforts were made to identify prey item fed to nestling by adults.

Results and discussion

Advertising and Excavation

Five nest excavations were observed during the study period. The pairs at Bhoothathankettu begin to examine the nest site on 14th of October 1998. They started to nibble on dead branches of trees. The active excavation observed after 15 days. To excavate a nest chamber, Trogons bite rather than chisel away the wood. It was observed that Trogons face great trouble in finding a dead tree, that is neither too hard for them to carve, nor so far advanced in decay that it crumbles and will not hold the shape they give the chamber. The pairs attempted excavations on 13 trees and at last, they found a wood of just the proper firmness. White-tailed Trogons and Quetzal selected the wood that a man can dig into with his fingernails, yet which does not fall into powder when pressed between the fingers, is of about the right consistency for nesting (Skutch, 1962). This quality of the wood was also met within the nests of Malabar Trogon.

The male bird appeared to choose the nest site. After that, the bird advertised the presence of a suitable trunk for nesting by remaining near the branch and incessantly repeating his far carrying call 'que' to attract the female. This behaviour reported in Citroline Trogon and White-tailed Trogon by Skutch (1948, 1962), and Elegant Trogon by Hall and Karubian (1996).

If the female comes close to the trunk, the male flew to that branch, perch upright and starts biting and letting a few fragments fall to the ground. Then he returned to his former perch and continued to call. This lasted for 5 minutes and then the female repeated the same. After 20 minutes, both birds left the place. Like this, the pairs apparently spent time in each season trying different branches until finding the proper one.

Nest building

After identified the suitable stump for nesting birds started excavation. In one observation, the male came to the selected wood by 9.00 hrs and made call for a while. Female followed the male and perched near to that branch. By this time male started excavation by clinging upright to the vertical stump and dug into the wood with his bill. During this exercise, the male looked around and bite 3 to 5 times, then repeated the same for 3 minutes. After that male dropped down to a perch and then the female darted up and took a few nibbles on the site. They stopped the excavation after 45 minutes. The males and females took turns at the work, and while one carving the other usually perched nearby, uttering the beautiful, soft notes. Nearly always, as soon as one partner dropped out of the obliquely ascending shaft, the other went to work with scarcely any delay. The excavation of the chamber proceeded rapidly. Towards the end of excavation birds carved with their head and back inside, but the rump, the ends of the wings, and the tail exposed. However,

birds withdraw their head from the chamber interrupting excavation for finding out any danger. At last, only the tail remained outside. Usually the male seemed to advance the carving of the chamber. The male and female takes over the effort one after the other. Sometimes, observed the inertness of the female from carving, and the birds abandoned the work as reported to White tailed Trogon (Skutch, 1962). Female birds approval was indispensable for a successful nesting of Malabar Trogon. The excavation was completed within 8 days. The total time time for the completion of the nest was 23 days. The pair at Bhoothathankettu completed the excavation on 6th November 1998.

1. Microhabitat and site characteristics

For each nest site are recorded the following: tree species, height from the ground to the nest, and GBH of the tree species were described in the Table 12.

Nest

Some Trogons lay their eggs in cavities they carve in termite's or wasps nests and others in decaying wood. In form, the nest of Malabar Trogon was different from that of the other Trogons nests reported (Skutch, 1946). The completed chamber is roughly cylindrical in shape, with neatly finished walls. The entering tunnel has 72.5 mm X 61 mm (n = 4) size. The bottom of



Nest of Malabar Trogon



Male Malabar Trogon feeding the young one

Plate No. 4

the chamber has the diameter of 58 mm, with center has 85 mm, and the roof has 100 mm. The floor of the chamber was covered coarse particles of wood loosened while the birds carved, as no soft lining of any kind is carried in. Nest cavity contains no foreign materials. This condition also reported to Mexican Trogon (Skutch, 1942), Coppery tailed Trogon (Allen, 1944), and Elegant Trogon (Kunzmann *et al.* 1998).

Table 12

Tree species preferred by Malabar Trogon for nesting during the study

SI NO	Locality	Name of the tree species	GBH (cm)	Nest Height (m)	Remark
1	Bhoothathankettu	<i>Tetrameles nudiflora</i>	170	20.50	Near to stream
2	-do-	<i>Terminalia paniculata</i>	330	22.85	Near to stream
3	-do-	<i>Terminalia paniculata</i>	80	7.10	Near to stream
4	-do-	<i>Hopea parviflora</i>	176	13.40	Inside the forest
5	-do-	<i>Hopea parviflora</i>	270	20.20	River side
6	-do-	<i>Bombax ceiba</i>	86	10.50	Inside the forest
7	Marottichal	<i>Artocarpus hirsuta</i>	60	5.00	Near to stream
8	-do-	<i>Swietenia macrocarpa</i>	70	6.20	Mahogany plantation
9	-do-	<i>Areca catachu</i>	35	20.00	Home stead
10	-do-	<i>Xylia xylocarpa</i>	264	14.15	Forest edge
11	Thundathil	<i>Buchania axillaris</i>	108	12.00	Mixed plantation
12	Urulanthanny	<i>Hopea parviflora</i>	280	21.00	Inside the forest
13	Idamalayar	<i>Hopea parviflora</i>	195	13.10	Road side

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Table 13

Number of juvenile and their sex of Malabar Trogon recorded from different nests during the study

Area	1997	1998	1999
Bhoothathankettu	♀♀	♂♀	♀♀
Urulanthanny	♀♀	-	-
Marottichal	♀♀	-	-
Idamalayar	-	♂♀	-

♂: male, ♀:female

Eggs

Malabar Trogon laid two eggs, a clutch size characteristic of the Trogonidae (Wheelwright, 1983) Eggs were laid one week after the excavation. The eggs were laid at intervals of two days. In all the observed nests, two eggs were laid. The eggs were white, with a slight gloss, and were

blunt at their narrower end. The measurement of four eggs average 28 x 23 mm. The weight of egg measured was 6.300 gm. The egg measurements of White-tailed trogon reported was, 33.1 X 25.0 mm (7), Quetzal, 38.1 x 30.2 mm (1), and of Citrine Trogon 29.8 x 22.6 mm and 31.0 x 23.0 mm (Skutch, 1962, 1946, and 1948). It was found that in the Malabar Trogon the egg size is comparatively smaller than the eggs of other members of the family Trogonidae.

Incubation

Incubation started after the first egg was laid, but the incubation is inconsistent and remains unattended for a long time. On the fourth day, onwards the parents were more consistently incubate the egg. Only after one week, the incubation proceeds continuously and regularly. Same as the excavation pattern the males advance the incubation and care. However, during the night female takes over the incubation, the male roost nearby. While the birds were sitting, we could see their bill and forehead looking down the entrance. Estimated average length of incubation was 19 days.

Nestling

The newly hatched Malabar Trogons have dark pink color skin without feathers and their eyes are closed. The nestling are fed infrequently from morning to late evening. During feeding the parents perched near the nest,

repeated a low, soft note many times, then proceeded to the doorway and spent some time on the rim of the entrance hole, and delivered the food, after which they flew away. First few days after hatching female brood the nestling. Both parents brood the young after hatching. Brooding activity continued throughout the first week. In the nighttime female bird takes up the duty. When nestling becomes 12-day age night brooding only occurs, by the female. Estimate length of brooding was 17 days. Males brood more times than females. The sex ratio calculated from six successful nests that were as 10♀: 2 ♂ (Table 13).

Food of juveniles

During the first few days of the fledging period of the Malabar Trogon fed the juveniles only by smooth caterpillars. In the succeeding days the bird changes the food items delivered to the nestling as leafhoppers, bugs, flies, and praying mantis. After the nestling leave the nest cavity parents feed the juveniles upto 170 days.

Usually the males bring the food in early morning. Measurement of four days old chick was; Tarsus- 16 mm, Wing- 49 mm, Bill from skull- 12 mm, Bill base width- 22 mm (recorded on 16 -2- 2000). Ringed chick-Details of the ring: BNHS-AB 148203 (ringed on 28-11 1998).

Sanitation

The parent never removed any waste matter. This began to accumulate after the third day of brooding. The empty shells from which the nestling emerged were not removed, but seen as broken into fragments.

Breeding season

Breeding activities of an individual pair calculated from the first nest site selection to the termination of the family bond between the fledglings and the parents. That was 187 days in the case of a pair, which were marked on the first day after leaving from the nest. This period included the nest site selection, excavation, egg laying, incubation, brooding, and the subsequent rearing of the young. The breeding activities started in September in some pairs (Table 14). In the same site, the other pair started breeding in the April. Thus, the breeding season of Malabar Trogon extended from September to May.

Table 14

Breeding record of Malabar Trogon in different areas during the study period

Area	Year of observation			
	1996	1997	1998	1999
Thattakad	-	April	November	February
Bhoothathankettu	October	April	December	January
Urulanthanny	March	-	-	-

Conclusion

The observation on breeding biology clearly showed that Malabar Trogon are monogamous. There was no courtship displays noticed in Trogons during the study period. The breeding season of Malabar Trogon lasted for a little over 9 months between September to May. The Malabar Trogon is a cavity nesting species. They breed only in dead and decaying trunks of trees. Trogons carving their nest cavities at heights upto 22.85-m. The male appeared to choose the nest site. Both the birds participated in the nest building. The completed chamber is roughly cylindrical in shape, with neatly finished walls. Malabar Trogon laid two eggs, a clutch size characteristic of the Trogonidae. The interval between egg laying occurs was observed 24 hrs. Only one clutch in a season observed for a pair, a second or replacement clutch was not attempted after the first one is lost. The eggs were rounded-ovate and glossy white in colour. The size of four eggs average 28 x 23 mm. The weight of the egg measured was 6.300 gm. The incubation period was 19 days and the brooding period was estimated to 17 days. The males advance the incubation and brooding. However, during the night female takes over the incubation, the male roost nearby. The juveniles after leaving the nest were dependent on the parents observed for 187 days.

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Nestling (4 days old) and egg of Malabar Trogon



Young one of Malabar Trogon with spreaded wing



Young one of Malabar Trogon (female)

Plate No. 6



Malabar Trogon young one (female)



Ringed Malabar Trogon - young one (female)