

**ETHOLOGICAL PATTERNS OF COPPERSMITH BARBET:  
A SHORT-TERM STUDY**



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## Introduction

There has been increasing interest of observing various kinds of behavioral patterns in past three decades that in fact helps the field scientist to understand the animal in a more detailed manner. The ethologists attempt to learn behaviors functionally, casually and evolutionarily. Basic procedures are essential in an ethological study starting from description and classification of an animal, and possible division of behavior into logical units that can be dealt implicating the knowledge of other disciplines particularly physiology and ecology.

Ethologists create ethogram comprising of its repertoire of maximum possible behaviors with a description or definition of each one. Ethologists form hypotheses about the causes and rates any particular behavior. Behavior is one of the prominent features in bird identification. Bird behavior refers to the actions of a bird in response to any type of stimulus presented to them and the resulting responses are either instinctive or learned.

## Taxonomy and Identification

### Coppersmith barbet

Kingdom: Animalia

Phylum: Chordata

Class: Aves

Order: Piciformes

Family: Megalaimidae

Genus: Psilopogon

Species: P.haemacephalus

### Description

Coppersmith barbet is a small bird with a crimson forehead, patch on its breast and has a vibrant yellow throat. This approximately 17 cm bird is small chunky and green, with streaked

underparts and reddish legs, seat and orbital skin around the eye. It utters a loud metallic, repetitive tuk..tuk..tuk.. reminiscent of a sound of a coppersmith makes while beating a sheet with a hammer. The bird is particularly vocal in the heat of the day. There is creamy yellow supercilium, cheek and skin. The bill is large and grey in color.

### **Types of barbets in India**

Asian barbet birds are native to the forest of Southeast Asia and the Indian subcontinent. There are 30 species of Asian Barbets usually reside in inner forest but the most famous coppersmith barbet is known to live on the edge of urban jungle.

#### **Great barbet (*Megalaima virens*)**

The great barbet bird is native to the Indian sub-continent as well as found in Southeast Asia, Great Barbet is the largest barbet species and feeds mainly of fruits and insects.

#### **Brown headed Barbet (*Megalaima zeylanica*)**

Brown headed Barbet is also a species native to the Indian sub-continent. This species is also a resident tree birds of Terai in north east India and also found living around urban and country gardens.

#### **Yellow fronted Barbet (*Megalaima flavifrons*)**

The Yellow fronted Barbet is an Asian barbet- endemic resident breeder in Sri Lanka.

### **White cheeked Barbet (*Megalaima viridis*)**

White cheeked barbet is a small species of green barbet found in southern India, endemic to the green forest areas of the Western Ghats. The white cheeked barbets are mostly frugivorous and feeds on various species of trees.

### **Lineated Barbet (*Megalaima lineata*)**

The Lineated Barbet is also a green bird like other species of barbet, nests in holes of tree trunks and feeds on wild figs. Lineated Barbet mostly found in the north east parts of the India from Terai to the Brahmaputra basin.

### **Golden throated Barbet (*Megalaima franklinii*)**

Golden throated Barbet inhabits green forest area of Southeast Asia, Nepal, India etc. There are only two known golden throated barbet subspecies are found generally.

### **Blue throated Barbet (*Megalaima asiatica*)**

Blue throated Barbet is the most beautiful and colorful barbet with green, blue and red plumage. The blue throat short-tail bird call is also sounding like kutorok kutorok native to Indian sub-continent and Southeast Asia.

### **Blue-eared Barbet (*Megalaima australis*)**

Blue-eared Barbet with green plumage is a resident breeder of Indian sub-continent and found from Nepal to Northeast India.

### **Crimson fronted Barbet (*Megalaima rubricapillus*)**

Crimson fronted Barbet is a smaller species that nests in tree holes like other species and stay in pair with strong bonds.

### **Malabar Barbet (*Megalaima malabarica*)**

The Malabar Barbet is an Asian barbet native to the Western Ghats in India. It was formerly treated as a race of the crimson-fronted barbet.

### **Coppersmith Barbet (*Megalaima haemacephala*).**

Coppersmith barbet is a small species of barbet bird found in India, A resident bird of the Indian sub-continent and known for its metronomic call. The barbet feeds on flower petals, banyan, peepal and other wild figs, berries and insect.

### **Barbets in Gujarat**

From the aforementioned different species, following three species have been reported in Gujarat so far:

- a. **Brown Headed Barbet (*Megalaima zeylanica*)**
- b. **White cheeked barbet (*Megalaima viridis*)**
- c. **Coppersmith Barbet (*Megalaima haemacephala*)**

Amongst these 3 species, we had observed the ethological patterns of Coppersmith barbet in our short-term study.

### **Habitat and Distribution**

Coppersmith barbets are distributed in Indian, Nepal, Bhutan, Pakistan, Bangladesh, Sri Lanka, Myanmar, China, Malaysia, Singapore etc. These species are distributed all over India except for the Andaman and Nicobar Islands and Lakshadweep Island. These coppersmith barbet species have moderate forest dependence. They normally occur in altitudes from 0 to 1800 meters. The artificial ecosystems and habitats of these species include plantation, rural gardens, orchards and urban area.

The natural ecosystem and habitats of these coppersmith barbet species include, tropical and subtropical moist lowland forests, tropical dry forests, mangrove forest and tropical moist shrublands. Mainly they prefer various habitats like gardens where they could find variety of fruits, sparse woodland and groves. They use cavities to build nest and to roost. In India they are widely spread in all the states. In South India they are always seen at a maximum of 4000 feet in Palani hill. They are rarely found in the very wet forests and dry desert.

### **IUCN and cites status**

The coppersmith barbet does not approach the thresholds for being vulnerable either under the range size criterion or under the population size criterion. The IUCN (International Union for Conservation of Nature) has categorized and evaluated the species and has listed it as of “Least Concern”. The CITES (Convention on International Trade in Endangered species of Wild fauna and flora) status is “Not Evaluated” for the Coppersmith barbet.

### **Behavior**

For the behavioral observations, two main roosting sites were selected: (i) *Ailanthus excels*/ Tree of Heaven/ Arduso, near Basketball court adjacent to P. G. Department of Biosciences, Sardar Patel University and (ii) Navsari: *Leucaena leucocephala*/River Tamarind/Subavad, Amalsad village, Gandevi Tehsil, Navsari District.

Coppersmith barbet lives happily either alone, in pairs or in small groups of four to five birds. Larger groups can occasionally be seen in fruit bearing tree mostly for the sole purpose of feeding. They prefer shelter in holes in the tree trunks over building their own nests and investing their energy into it. Biparental care is generally observed and both males and females are responsible for guarding the eggs before they hatch and for feeding the chicks until they fledge.

Nestlings are reportedly disturbed due to human interferences, predation by animal, diseases and unknown causes. They are very much careful about their nest sanitation as they always remove foreign objects and any other dirt from their nests.

### **Nesting behavior**

During regular field visits, Neem tree with full of holes near the basket-ball court adjacent to P. G. Department of Biosciences and at the same time accidentally spotted a bird flying towards that tree. It was a coppersmith barbet and it was about to enter a cavity (hole) kind of nest. The bird excavated a cavity in a semi-rotten tree trunk or branch. Out of number of cavities, one generally was found to be operative for egg laying purpose and others cavities for roosting during nights. Coppersmith stays in isolation in the cavities. Average height of nests from the ground was 9.9 m an average depth and diameter of the hole was 29.20 cm and 4.46 cm.

Both of the male and female explores the site for nesting and they play a trick of preparing several excavation sites in order to save the eggs and chicks from possible predators. All the nests were found to be more or less of similar size and shape. They made cup shaped nest with the lining of soft grasses and feathers inside the hole.



## Courtship behavior

Courtship involves singing, puffing of the throat, bobbing of the head, flicking of the tail, ritual feeding and allopreening. On 12<sup>th</sup> February 2021 during our morning field visit to the Department of Bioscience, Bakrol, a pair of coppersmith barbet on neem tree was seen engrossed in the act of courtship. The tree was located near the roadside and approachable to agricultural land and open playground with moderate traffic during the day time.



While observing the pair was found to be perching on twigs. The male started to spread the tail feathers as a fan. It then bent its limb so the abdomen became flat and was in direct contact with the branch. Initially, female was unaware about the different ethological





patterns exhibited by male then subsequently she noticed the consistent pre-copulatory behavior patterns. After two minutes the male approached the female and sat near and started fluttering its wings with no response from female. Male then came closer to the female and female seemed to have opened its bill. It was not very clear whether it was just a part of copulation act or exchange of some food particles. Further, while having the close connection through their bills, they also shook their heads and then male fluttered its wings and flew away to another branch. After one minute, the male again approached the female and sat onto a twig behind the female so that he can gather the attention of a female.

### **Breeding behavior**

The breeding season is mainly February to April in India and December to September in Sri Lanka and they breed throughout the year with geographical and climatic variations. The study was carried out during February 22 to March 14, 2021. Total 5 nests were identified and studied in order to collect the data with specific reference to breeding behavior. Sites were visited regularly every morning and evening. Height of the nest from the ground and territories were measured. The behavioral activities were observed with the help of a pair of binocular and camera. The holes onto the tree trunk are measured by the help of scale. The barbet may have laid their eggs at early morning and immediately incubation started and continued up to the hatching of last egg. The maximum incubation period is 16 days. Incubation period was observed in 4 different nests. Total 32 hours were spent spread through the duration of sixteen days with daily two hours observations. Both male and female incubate the eggs for an average of 26-30 minutes. Eggs were hatched on different days and all the eggs did not get hatched appropriately and chicks formed possibly due to lower nutritional status, less food resources or any other unknown reasons.

### **Defensive behavior**

Defensive behavior is the immediate and direct behavioral response to threats to life and bodily safety. Both sexes of coppersmith barbet were always alert to defend the nest and territory against any other birds that even approached or tried to cross the territorial boundary or flew away over the nesting trees. They



frequently moved but called not so loudly because they exhibit peaceful behavior. They were slightly aggressive during breeding season. Mynas, Parakeet, Brahminy starling, Red vented bulbul were curious and examined the hole as Myna is found to prepare nests in every conceivable location including open electrical boxes. Parakeet and Brahminy starling continuously irritate the barbet while checking the holes. Parakeet also were observed residing in barbet cavity and that may act as brood parasite for barbet eggs or hatchlings.

### **Feeding behavior**

Feeding behavior is an action of an animal that is directed towards the procurement of nutrients. Coppersmith barbet prefers banyan, peepul and other wild figs and various types of berries besides flower petals. Both parents fed the chicks mainly with fruits probably figs. The parent bird flew in with up to three figs in its beak and before entering into the nest it closely observed the nearby surroundings so as to avoid any predator or an attempt of steal feeding. Meanwhile, chick could not tolerate the hunger anymore and attempted to extend the head out of the nest in order to receive the food.



After a few visits the female also scanned the premises and entered the nest immediately with her beak full of water. Poking her head out, she paused for a while before flying out to dump the waste away from the nest. Both parents were observed picking ants, other insects and debris from the nest.

Parents were not leaving the nest unattended and either of them remained present throughout the time to care the chicks. Over a period of one hour from 10:45 am to 11:45 am their feeding activities were recorded and one surprising act was noted that chick would

sometimes interact with the adult by extending its head protruding out from the cavity and opening its beak anticipating food from either of the parents and chick even used to bite the parent in case of a delay in offering the food or not attending the chick for a while. Bites were aimed mostly at the breast and sometimes nearer the belly, once even throat was also bitten. In fact, it did not happen every time but were observed for approximately half of the feeding sessions. The adult barbet did not seem perturbed by the bites and continued feeding the chicks.

### **Grooming behavior**

Preening is the process whereby birds keep their feather smooth by moving their feathers through their beaks. The barbets maintain good feather condition by preening and also bathing in water. Preening is a behavior also help to attract opposite sex. Feathers are critical to a bird's survival contributing to



insulation, waterproofing etc. Preening help to send sexual signals to potential mates due to its plumage coloration.

### **Roosting behavior**

On 17 February 2021 observed a coppersmith barbet roosting in a cavity. Barbets generally nest and roost in holes excavated by the birds themselves or holes in trees or any other wooden area. A mature male coppersmith barbet was initially observed and



it was flying from a tree to electric wire. It flew several times between other large trees and the smaller ones. It remained in the hole and after nearly 45 minutes appeared to be in the resting condition with its head outside the hole.

### **Parental care**

The both male and female have equal investment provided to ensure growth, development and survival of their offsprings.



The young bird left the nests when parents perch on the branch of trees near the nest. After getting food either they returned to the nest or move from one branch to another.

When parents brought the food, it looked like as if they call the young in a very gentle manner. Chicks were found to be providing jerky movements to their wings and approached near to the opening of the hole to receive food from parents. When chicks were able to have a free flight, they never returned to their parental nests.

### **Vocalization**

The bird is called coppersmith barbet because its call is similar to clinking metal. This clinking sound is like to a coppersmith tapping metal with a small hammer. Barbet produces call throughout the year except winters and approximately 90 calls they can produce per minute.

During their breeding season and addressing the juveniles or even for offering foods to juvenile- they were observed to have different frequency calls.

### **Migration and movement pattern**

These coppersmith barbet species are non-migrant birds. They disperse locally after breeding. In winter season, the population at lower levels. Post breeding, the juvenile disperses and establish in new location followed by some local movements for feeding and breeding.

### **Mortality factors**

Adult birds are occasionally being preyed by certain predatory species. In urban areas, there are records of collisions with structures including white walls. Pesticide poisoning was also found to be one of the root cause of barbet mortality.

## Observation tables

**Table 1: @ P. G. Department of Biosciences: *Ailanthus excels*/ Tree of Heaven/ Arduso**

Day	Behaviour	Observations
12/02/2021	Nesting behaviour	Try to make hole in dry tree
15/02/2021	Courtship behaviour	Male start to spread feathers, after 2-3 min female open bill
15/02/2021	Defensive behaviour	Parakeet continuously irritate and interfere in hole making
23/02/2021	Feeding behaviour	Male fed female
08/04/2021	Feeding behaviour	Adult feed juvenile

**Table 2: @ Navsari: *Leucaena leucocephala*/River Tamarind/Subavad**

Day	Behaviour	Observation
18/04/2021	Defensive behavior	Brahminy starling irritate and try to go inside the nest and they defense
25/04/2021	Feeding behavior	Male and female fed juvenile
30/04/2021	Grooming behavior	Moving feathers through beak
01/05/2021	Courtship behavior	Female and male open their bill together
01/05/2021	Feeding behavior	Male fed female

**Birds observed nearby Coopersmith Barbet territory**

**House Sparrow**



Female



Male

**Oriental magpie robin**



Female



Male



**Fan tail**



**Common Tailor Bird**



**Red whiskered bulbul (female and male)**



## References

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