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A Study on Hornbills in the Central Western Ghats

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Abstract

Hornbills, often referred to as the "formers of the forest," are important ecological indicators and seed dispersers in the Western Ghats of India. This study documents the occurrence, nesting behaviour, ecological significance, and population status of hornbills in the Iruvakki region of Shivamogga, Karnataka. Emphasis is placed on their unique biological traits, nesting habits, and their role as bioindicators. In field surveys we found that Malabar Grey Hornbill being the most commonly observed. Results highlight the urgent need for localised conservation efforts, especially in community forest zones.

1. Introduction

Hornbills (Family: *Bucerotidae*) are charismatic frugivorous birds that play a crucial role in forest regeneration through seed dispersal. Their reliance on large, mature trees for nesting and their sensitivity to forest disturbance make them important indicators of ecosystem health. Karnataka is home to four species of hornbills:

- *Ocyceros griseus* (Malabar Grey Hornbill) – ***Vulnerable***
- *Ocyceros birostris* (Indian Grey Hornbill) – ***Vulnerable***
- *Buceros bicornis* (Great Indian Hornbill) – ***Vulnerable***
- *Anthracoceros coronatus* (Malabar Pied Hornbill) – ***Near Threatened***

Iruvakki located in the Sagara taluk, Shivamogga district, located in the central Western Ghats, is a **lesser-documented region where hornbill populations remain under explored**. This study was conducted to evaluate species presence, estimate population size, and understand behavioural ecology in this area.

2. Materials and Methods

2.1 Study Area

- **Location**: Iruvakki, Sagara taluk, Shivamogga district, Karnataka, India
- **Coordinates**: 14.25° N, 75.27° E
- **Habitat**: Tropical moist deciduous and Evergreen forests with dominant canopy species like *Ficus*, *Artocarpus*, and *Terminalia*.

2.2 Survey Period and Timing

- **Duration**: February to July 2025
- **Time**: 6:00–9:00 AM and 4:00–6:30 PM

2.3 Methodology

- **Line Transects**: Five transects (1 km each) walked twice a month
- **Point Count Stations**: 10 points, 200 meters apart, observed for 10 minutes each

- **Nest Observation**: Identified some active nests and monitored for sealing behaviour, provisioning rate and nest success.

2.4 Data Recorded

- Species observed
- Number of individuals
- Nesting sites and tree species
- Calls and behaviour
- GPS location of sightings

3. Results

3.1 Hornbill Species Observed in Iruvakki

Species Name	Scientific Name	IUCN Status	Individuals Observed	Nesting Sites
Malabar Grey Hornbill	*Ocyceros griseus*	Vulnerable	48	4
Indian Grey Hornbill	*Ocyceros birostris*	Vulnerable	8	2
Great Indian Hornbill	*Buceros bicornis*	Vulnerable	0	0
Malabar Pied Hornbill	*Anthracoceros coronatus*	Near Threatened	0	0

The malabar grey hornbill was the most frequently encountered species during the observation period, often seen in pairs or family group. Their nesting activities was primarily associated with large, old trees, particularly *Ficus racemosa, Artocarpus hirsutus, Terminalia spp,* which served as preferred nesting site. Out of the four active nest monitored, nest-sealing behaviour was observed in two. During the peak breeding season, from March to April, male hornbill were noted to provide food for the nesting female and chicks every 1.5 to 2 hours, highlighting the species offspring care and parental care.

3.2 Feeding Behaviour.

During field monitoring, male Malabar Grey Hornbill was observed delivering food to a female hornbill. The female was inside a tree cavity, likely nesting. The male brought fruits, berries, insects and small birds and regurgitated them at the nest entrance. This provisioning behaviour occurred multiple times throughout the day.

Month of Observation: April – July

Location: approximate coordinates

Species: Malabar Grey Hornbill

Malabar Grey Hornbill	*Ocyceros griseus*			
Fruits	*Strychnos nux-vomica*	*Ficus racemosa*(4-5)	*Terminalia bellica*(12)	*Ficus auricular*

Insects	Lizard(2) Time: 3:42pm	Small snake(1) Time: 4:52pm	Grasshopper	Grub
Birds	Chicke of white cheeked barbet (1) Time: 9.37am			

fig: Malabar Grey Hornbill

4. Discussion

4.1 Ecological Role

The hornbill plays a important ecological role in maintaining the health of the Iruvakki forest, located in the Central Western Ghats of Karnataka. As a primary seed disperser, the hornbill helps regenerate the forest by feeding on various fruits especially those with large seeds and dispersing them across wide areas through its droppings. This natural process supports the growth of new trees and maintains the diversity of plant species in the forest. Hornbills are often referred to as "farmers of the forest" because they contribute directly to forest regeneration and structure. Their role is especially important for tree species that rely on animals for seed dispersal, as these trees cannot reproduce effectively without such interactions.

In addition to regeneration, Hornbills also serve as bioindicators of forest health. They require large, mature trees with natural cavities for nesting, which means their presence suggests a relatively undisturbed and healthy forest ecosystem. A decline in their numbers could indicate habitat degradation or loss of biodiversity. Furthermore, hornbills are part of a larger food web, consuming not just fruits but also insects and small animals, helping maintain ecological balance. By supporting plant diversity and structure, hornbills contribute to a resilient and self-sustaining forest in Iruvakki.

4.3. Comparative Analysis

Based on scientific research conducted in Iruvakki, the **Malabar Grey Hornbill** was found to be the most abundant hornbill species, while the **Great Hornbill** and **Malabar pied Hornbill** were completely absent. This suggests that the forest structure and ecological conditions in Iruvakki are more suitable for smaller-bodied, endemic frugivores like the Malabar Grey Hornbill. As a primary frugivore and cavity-nester, the Malabar Grey Hornbill plays a critical role in **seed dispersal** of many mid-sized fleshy-fruited tree species such as *Ficus*, *Vitex*, and *Terminalia*. Their activity supports forest regeneration, genetic connectivity

among plant populations, and overall biodiversity, especially in moist deciduous and semi-evergreen habitats typical of the mid-elevation(640m above sea level) Western Ghats.

The absence of larger hornbill species may be indicative of ecological limitations in Iruvakki, such as **fragmentation, scarcity of large canopy trees**, or reduced availability of large fruits and suitable nesting cavities required by Great Hornbill and Malabar Pied Hornbills. This pattern highlights the **Malabar Grey Hornbill as a keystone species** in the local ecosystem, fulfilling essential ecological roles that maintain forest structure and resilience. The findings also underline the importance of conserving mid-sized frugivores in fragmented landscapes, as they are often the last remaining effective seed dispersers in disturbed habitats. These results contribute to understanding hornbill ecology in lesser-studied regions of the Western Ghats and can inform future conservation planning.

A. Habitat Adaptability : (Kannan & James, 1999) (Mudappa & Raman, 2009)

Species	Habitat Preference	Shivamogga Context
Malabar grey hornbill	Evergreen, moist deciduous, secondary forest	Present in forest fragments, agroforests
Great hornbill	Large tracts of undisturbed evergreen forest	Rare outside protected zones
Malabar pied hornbill	Deciduous and semi-evergreen, forest edge	Limited by habitat and interspecific competition

B. Nesting Requirements

Species	Nesting Behavior	Nesting Tree Size	Observed Nest Availability in Shivamogga
Malabar grey hornbill	Cavity nester	Small-medium trees	Widespread across riverine and mid-elevation zones
Great hornbill	Cavity nester	Large old trees	Scarce due to logging and fragmentation
Malabar pied hornbill	Cavity nester	Medium-large trees	Moderate availability, high competition

C. Diet and Frugivore: (Datta & Rawat (2003)

Species	Diet Type	Shivamogga Observations
Malabar grey hornbill	Generalist frugivore (mid-canopy)	Fruits from *Ficus*, *Vitex*, *Syzygium* observed commonly

Great hornbill	Large-fruit specialist (figs, etc.)	Restricted to undisturbed zones with canopy continuity
Malabar pied hornbill	Omnivore (fruit + insects, small animals)	Lesser sightings in deep forest patches, prefers dry belts

D. Fragmentation and Human Tolerance

The Malabar grey hornbill exhibits a high tolerance to habitat fragmentation and a medium-high tolerance to human activities. In contrast, the Great hornbill shows a low response to both fragmentation and human activity, this shows indicating its sensitivity to environmental changes. The Malabar pied hornbill displays a moderate response to fragmentation and a medium tolerance to human activities, positioning it between the other two species in terms of adaptability.

4.4 Decline in Hornbill Population Due to Habitat Loss in Iruvakki

The hornbill population in iruvakki is significally lower compare to other region of central western ghats, particularly in the shivamogga district, primarily due to on going forest degradation. The continuous removal of large, old-growth trees essential for hornbill nesting has severally impacted their habitat, rendering these farmer of forest effectively homeless. Satellite image from Google Earth comparing iruvakki in 2013 to 2025 clearly reveals a marked decline in forest cover and biodiversity. This loss of mature forest not only threatens hornbills population but also disrupts the broader ecological balance.

Fig 1: 2025 (iruvakki)

Fig 2: 2021(iruvakki)

Fig 3: 2014(iruvakki)

5. Conclusion

Hornbills in Iruvakki are thriving in select forest pockets but face increasing threats from habitat disturbance and fragmentation. Their role as ecological guardians, seed dispersers, and cultural icons makes their conservation essential. Local forest patches, especially community forests in Shivamogga, need protection to preserve this vital group of birds and maintain ecosystem integrity in the Western Ghats. One of the precious natural legacies not just a Karnataka, but of the world. Protecting hornbill is essential not only for biodiversity but also for long term well-being of our forest and humanity.

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