Nesting Habitat Preference by Great Hornbill (*Buceros bicornis)* and Malabar Pied Hornbill (*Anthracoceros coronatus*) in Tropical Wet Evergreen Forests of Vazhachal Forest Division, Anamalai part of southern Western Ghats, Kerala, India.

Amitha Bachan K.H[1] and Anitha K.T[2]

[1]Assi. Prof., Research Department of Botany, MES Asmabi College, Kodungallur, Thrissur Dt., Pin - 680671 Kerala, India and Western Ghats Hornbill Foundation. amithabmes@gmail.com
[2]Research Fellow, Western Ghats Hornbill Foundation, Mathilakam P.O, Thrissur Dt., Pin - 680685 Kerala, India.

Malabar Pied Hornbill at Nest- Vazhachal

Introduction

Tropical humid forest probably contains the greatest diversity of plants and animals in comparison with all other terrestrial ecosystems. Hornbills are particularly sensitive indicators of forest conditions and human disturbance of the tropical forests because they require large tracts of unfragmented forest with large trees for nesting and are fairly well studied or documented. (Poonswad and Kemp, 1993; Kannan and James, 1998). There are 54 species of hornbills in the world (Kemp 1995), of which nine occur in India, and four in the Western Ghats. Habitat loss due to shifting cultivation and logging, and traditional hunting by tribes was reported as important threats to hornbills in India – north-east and the Western Ghats (Kannan and James, 1998; Datta, 1998). One-fourth (25.6%) of the Western Ghats's forest cover had been lost over a period of 22 years from 1973 to 1995 (Jha *et al.,* 2000). In the Anamalai hills alone, 26% of the natural forests have been converted into non-forest areas. (Ramesh *et al*., 2007). The Anamalai Hills along the southern edge of the Palghat

Gap culminating at Anaimudi (2695 m), the highest point in the Western Ghats is considered one of three endemic centers of the Ghats (Ramesh *et al*., 1997). Four species of hornbills occur sympatrically in the Anamalais which is one of the strongholds for hornbills in south India (Bachan, 2006; Mudappa and Raman, 2009). The forests of Vazhachal Forest Division occupy a central and pivotal position in the Anamalai landscape with 30% of its natural forests and link all the important forest areas in the vicinity. The temperature 16-23^{0}C, the rainfall (Average annual 4019 mm), duration of dry months (with 2-4 months) and elevation (100-1400m MSL) support the primary wet-evergreen forests and various degraded stages. The study contributes to the nest habitat preference for the two larger hornbills of south India.

Materials and Methods

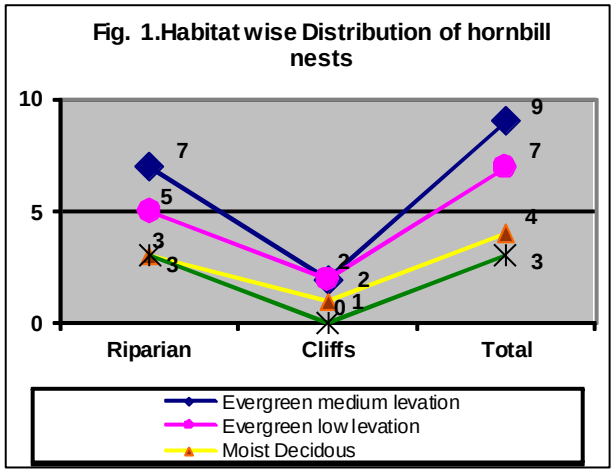
Intensive field surveys were conducted during 2004-05 to 2007-08, four consecutive nesting seasons (December – May) in the forests of Vazhachal Forest Division. Nesting trees were located with the previous experience of the tribal people, the following of lone males, presence of regurgitated seeds in fecal matter or seedlings of hornbill-preferred trees and presence of old feathers at the middens under nesting trees. Details regarding nesting trees like name, girth at breast height (GBH), height of tree, height at the nest cavity location of nest-tree, nature of vegetation, nature of terrain and nearest plants were recorded. Vegetation and terrain features were identified within the field. The major vegetation includes Evergreen-Dense, Evergreen-degraded, Riparian Forests, Moist Deciduous Forests and Plantations. Terrain categorized into Riverside, Streamside, Cliffs, Slops and Plains. The locations of nests were plotted in a vegetation map using GPS readings and the vegetation types were fine-tuned. Basic statistics of the nest locations, terrain features, characters of nest trees were calculated. Principal component analysis was done for distributions of nests correspond to the vegetation and terrain features.

Results and discussions

A total of sixty-one nests were

located during four years search, of which fifty-seven were Great Hornbill nests and four were Malabar Pied Hornbill nests. Great Hornbills here found to nest on trees greater than 2 m GBH (average 4.3 m, n=57). Average tree height ranged 24-40 m with an average of 31 m. Height of the nest ranged 18-32 m with an average of 25 m.

Great Hornbills were found to nest on 18 species of trees. Most nests were located on *Terminalia bellirica* (8), *Palaquium ellipticum* and *Dipterocarpus indicus* (7), *Calophyllum polyanthum* (5), *Bombax ceiba, Vateria indica* and *Kingiodendron pinnatum* (3), *Cullenia exarillata, Dysoxylum malabaricum and Ficus beddomei (2*) and single nest each in *Aglaia malabarica, Buchanania lanceolata, Ficus callosa, Lagerstroemia microcarpa, Lophopetalum wightianum* and *Syzygium cumini.* . Out of the four Malabar Pied Hornbill nests three were on *Tetrameles nudiflora* and one on *Terminalia bellirica*. Nesting density is 0.14 nests/km^2 and becomes 2.25/ km^2 when comparing with actual forest area. The three hornbill species Great Hornbill, Malabar Pied Hornbill and Malabar Gray Hornbill found to nest sympatrically in the Low elevation Riparian forest at Vazhachal.



About 80% nests occur in primary moist forests. Analysis showed maximum density in the Medium Elevation Primary Wet Evergreen Forests (sd=3.421) and least in Secondary Moist Deciduous forests (sd=0.44). The principal component analysis showed Great Hornbill nest density directly correlated with quality of the forests i.e. decrees with disturbance and are more concentrated in the Riparian -streamside and Cliffs (85%) than which occur in plains and slops (15%). The Malabar Pied Hornbill restricted only to the Low Elevation Riparian Forests (100-300m MSL). The strict low elevation riparian habitat preference of Malabar Pied Hornbill, the only occurrence here (Athirapilly – Vazhachal) in southern

Western Ghats agrees with others (Datta 1998, Bachan 2006, Mudappa and Raman 2009). This point out their restricted distribution, vulnerability and need for conservation against traditional hunting and also from the threat of local extinction with the proposed Athirapilly Hydro Electric Project. Affinity of the Great Hornbills nesting sites towards the Riparian – streamside and cliffs may be due to: 1. Distribution of large trees in the riparian or streamside 2. Removal of large suitable nest trees from other areas during past forestry operations 3. Availability of more natural hollows in trees located in the riparian – streamside or cliffs due to wind effect and 4. May provide easy access for the hornbills to the canopy gaps.

Acknowledgement

Special gratitude to Kerala Forest Department, The Kadar Tribal Community, Dr. A.K. Pradeep, Department of Botany, University of Calicut.

References

Kemp, A. C. 1995. *The hornbills*. Oxford University Press, Oxford, England.

Ramesh B.R. and Rajan Gurukkal 2007. *Forest Landscapes of the Southern Western Ghats*, India. French Institute Pondichery.

Bachan, A.K.H 2006. The Hornbill Haven. *Sanctuary Asia*. 25(6): 46-49.

Mudappa, D., and Raman, T. R. S. 2009. A conservation status survey of hornbills (Bucerotidae) in the Western Ghats, India. *Indian Birds* 5 (4): 90–102.

Datta, A. 1998. Hornbill abundance in unlogged forest, selectively logged forest and a forest plantation in Arunachal Pradesh, India. *Oryx* 32 : 285-294.

Kannan, R. and James, D. A. 1998. Forest Management and the Conservation of the Great Hornbill (*Buceros bicornis*) in Southern India. Poonswad, P. (Ed.) *The Asian Hornbills: Ecology and Conservation.* Thai Studies in Biodiversity No. 2: 1-336.

Poonswad, P., and Kemp, A. C., (Eds). 1993. *Manual to the conservation of Asian hornbills*. Mahidol University, Bangkok: Hornbill Project, Thailand.

Jha, C. S., Dutt, C. B. S., and Bawa, K. S., 2000. Deforestation and land use changes in Western Ghats, India. *Current Science* 79: 231–238.