

THE GREAT INDIAN HORNBILL (*BUCEROS BICORNIS*) AND MANAGEMENT OF OLD GROWTH FOREST PATCHES IN PERIYAR TIGER RESERVE

G. HARIKUMAR*, O.P. KALER**, SHERLY JOSEPH***, K.J. PEEYUSKUTTY****
AND V.J. ZACHARIAS*****

Introduction

The Great Indian Hornbill *Buceros bicornis* has become an endangered species throughout its range though it is fairly common in Protected Areas (Gaston and Zacharias, 1996). The decline in number of the species is due to hunting and habitat destruction. No studies have been carried out on the species in Kerala. Some studies have been conducted in Thailand (Poonswad *et al.*, 1987; Poonswad and Tsuji, 1994). Informative short notes on the species were written by Hume (1890), Bingham (1897), Baker (1927), Ali (1968). Notes on young birds kept as pets have also contributed to the knowledge on the species (Prater, 1921; Ellison, 1923). Periyar Tiger Reserve situated on the Western Ghats in the Idukki District of Kerala harbours a fairly good number of Great Indian Hornbills. A status survey of this species in the Reserve was been carried out during wildlife studies (from September 1991 to February 1993) in different parts of the Reserve along fixed transects. Attempts were also made to estimate the density of birds by counting them at roost and nest during the second phase of the study from March 1996 to 1997. The techniques though yielded good results

could be restricted only to the buffer zone of the reserve, due to time constraints.

The Great Indian Hornbill enjoys a wide distribution in Periyar in the evergreen and semi-evergreen forests at all elevations. They are found singly and in group of upto 33 birds. Distribution and movement of this species in the reserve seem to be related to the occurrence of old growth forest patches and the distribution of trees mostly belonging to Moraceae and Loraceae which have fruits almost throughout the year. Occasionally they enter the plantations bordering Periyar, coinciding with the fruiting of figs and flowering of *Bombax* which they nourish. These Hornbills roost in pairs or flocks of upto 33 birds, often near the edges of the evergreen forest patches.

Nest site and nesting

The Great Indian Hornbills in Periyar nested from the end of February to the beginning of May. A pair used the same tree every year if undisturbed. The nesting season seems to be related to the fruiting of *Ficus mysorensis* the fruit of which forms the major food given to nestlings. Six nests were located during the study and all of

*Field Director, Project Tiger, Kottayam (Kerala)

**Wildlife Preservation Officer, Thekkady (Kerala)

***Data Collector

****Data Collector

*****Department of Zoology, St. Joseph College, Devagiri, Calicut (Kerala)

them were in undisturbed old growth patches of evergreen forests. Four nest sites examined, had a good number of evergreen tree sp. around (Table 1). The diversity, density and rate of regeneration of plant species in a 25 m radius around the nesting tree are higher than in the surrounding areas. The fertile black soil is rich in organic nutrients because of the faecal matter and the remains of the food thrown around the nest.

The nestlings were found fed with snakes, lizards and fruits of *Ficus mysorensis* and *Litsea oleoides* which were collected from a distance of about 1 km and beyond. Fruits were delivered to the chick by regurgitation. A large number of the fruits of *F. mysorensis* were found on the forest floor around all the nesting trees observed. On one occasion one dead green Calotes was found fallen at the base of the nesting tree. Wood (1927) has reported capturing of Mynas by the Great Pied Hornbill from a hole.

Nests are located usually on the largest tree at the site where a number of tall trees grow around. Trees such as *Bombax ceiba* (2 nests) *Syzigium gardneri* (2 nests) and *Aglaia* sp. which had a DBH varying from 348 to 630 cm and height of about 25 m to 30 m ($m=4$) were used for nesting. The height of the nest varied from 8 to 25 m. The entrance of the nest in four nests faced North-east, (2 nests) South-West, (1 nest) and North-West (1 nest) directions. Two nests were on the major trunk of the tree with entrance vertical while 2 others were on projection of broken and decayed snags and with circular entrance. All the nests were on live trees. Four nests were located in an area approximately 12 km². The shortest distance between two nests was less than

1.0 km. This seems to be related to the availability of fruiting trees and occurrence of old growth forest patches in the area.

The canopy at the nesting site was almost completely (about 80%) covered but the ground cover was about 30% and the area around the nesting tree was partly open. The tall trees around this partly open area afforded safe perch for Hornbills in their to and fro movements from the nest. From such a perch the Hornbills could look around before alighting on the nest entrance. The partial opening of the canopy also promotes the growth of a good understorey below.

Management Problems

The biggest challenge for the management of the Great Indian Hornbills in Periyar is to keep the old growth evergreen forest, stands especially in the buffer zone, intact. The study of the nest site characteristics was carried out confidentially, but some "tourism promoters" harassed the tribal watchers who assisted the study for showing them the nests of Hornbills. As a result, at the site of one nest, people started reaching in for photography and a portion of the branches of the nesting tree as well as the ground vegetation was destroyed. In another case, the birds did not return of the nest site in the succeeding year.

Conclusions

The study though for a short period could lead to the following findings:

- (1) Old growth evergreen forest patches are very important for the survival of the Great Indian Hornbills in Periyar.
- (2) The fruits of *F. mysorensis* constitute

Table 1

List of plants at the sites of four nests of the Great Indian Hornbill in
Periyar Tiger Reserve observed

Site I		Smilax spp. <i>Chloranthus brachystachys</i> <i>Gardnaria ovata</i>
Locality	- Sakunthalathuruthu	
Nesting tree	- <i>Bombax ceiba</i>	Under Storey vegetation :
Height	- 23 m	<i>Peristrophe montana</i>
Direction	- North-East	<i>Amomus muricatum</i>
Tree DBH	- 638 cm	<i>Calamus</i> spp.
Canopy cover	- 80%	<i>Lepianthes umbellata</i>
Mean canopy ht	- 26 m	
Ground cover	- 35%	
		Site - II
Trees - Large :		Locality - Koonanmavu
<i>Diospyros montana</i>		Nesting tree - <i>Syzygium gardneri</i>
<i>Artocarpus hirsuta</i>		Height - 24 m
<i>Mallotus philippensis</i>		Direction - North-East
<i>Litsea deccanensis</i>		Tree DBH - 478 cm
<i>Vitex altissima</i>		Canopy cover - 85%
Trees - Small :		Mean canopy ht - 27 m
<i>Diospyros ovalifolia</i>		Ground cover - 25%
<i>Memecylon</i> spp.		
<i>Croton malabicus</i>		Large Trees :
<i>Hydnocarpus wightiana</i>		<i>Syzygium gardneri</i>
<i>Rejoua dichotoma</i>		<i>Dysoxylum malabaricum</i>
<i>Casearia esculenta</i>		<i>Aglaia</i> spp.
<i>Dysoxylum malabaricus</i>		<i>Myristica dactyloides</i>
<i>Aphanamixis polystachya</i>		<i>Artocarpus hirsuta</i>
<i>Viburnum acuminatum</i>		<i>A. integrifolia</i>
<i>Ehretia canarensis</i>		<i>Canarium strictum</i>
<i>Cinnamomum sulphuratum</i>		<i>Elaeocarpus oblongus</i>
<i>Clausena indica</i>		
<i>Litsea coriacea</i>		Small Trees :
<i>Actinodaphne hirsuta</i>		<i>Aporosa</i> spp.
<i>Antidesma menasu</i>		<i>Croton malabicus</i>
Shrubs and Climbers :		<i>Diospyros ovalifolia</i>
<i>Ancistrocladus heyneanus</i>		<i>Hydnocarpus wightiana</i>
<i>Uvaria narum</i>		<i>Actinodaphne hirsuta</i>
<i>Colebrookea oppositifolia</i>		<i>Phoebe lanceolata</i>
<i>Elaeagnus conferta</i>		<i>Turpinia malabarica</i>
<i>Toddalia asiatica</i>		<i>Diospyros montana</i>

Contd...

Shrubs and Climbers :

*Psychotria thwaites**Ervatamia* spp.*Strychnos* spp.*Randia rugulosa**Gnetum ula**Artabotrys zeylanicus**Meiogyne pannosa**Macranga peltata**Hydnocarpus wightiana**Canarium strictum**Casearia esculenta**Cinnamom sulpharatum*

Sapling of :

*Artocarpus hirsuta**Dysoxylum malabaricum**Diospyros ovalifolia**Cinnamomum sulphuratum**Democarpus longan**Citsea* spp.*Ficus nervosa**Bischofia javanica**Evodia lunu-ankenda*

Site - III

Locality	-	Karadikkavala
Nesting trees	-	<i>Syzigium gardneri</i>
Height	-	20 m
Direction	-	South-West
DBH	-	460 cm
Canopy cover	-	85%
Mean canopy ht	-	25%
Ground cover	-	35%

Large trees :

*Myristica bacyloides**Syzigium gardneri**Aglaia* spp.*Democarpus longan**Artocarpus hirsuta**Bombax ceiba**Bischofia javanica**Elaeocarpus oblongus**Diospyros montana*

Shrubs and Climbers :

Atalantia spp.*Villebrunea integrifolia**Solanum verbascifolium**Toddalia asiatica**Mappia foetida**Uvaria narum**Piper* spp.

Understorey vegetation :

*Lepianthes umbellata**Psychotria* spp.*Chloranthus brachystachys**Clausena heptaphylla**Ophiorhiza mungos*

Site - IV

Small Trees :

*Dysoxylum malabaricus**Croton malabaricus**Drypetes venusta**Scolopia crenata**Diospyros ovalifolia**Mallotus philippensis**Actinodaphne hirsuta*

Locality	-	Thondiyar
Nesting tree	-	<i>Aglaia</i> spp.
Height	-	7.5 m
Direction	-	North-West
DBH	-	348 cm
Canopy cover	-	85%
Mean canopy ht	-	22 m
Ground cover	-	35%

Contd...

Large Trees

Aglaia spp.
Dysoxylum malabaricum
Syzigium cumini
Michelia champaca
Bischofia javanica
Myristica dactyloides

Small Trees

Phoebe lanceolata
Hydnocarpus spp.
Antidesma menasu
Croton malabaricus
Diospyros ovalifolia
Casearia eaculenta

Calophyllum polyanthum

Vernonia monosis
Villebrunia integrifolia
Democarpus longan
Scolopia crenata

Shrubs

Ervatamia spp.
Pavetta spp.
Psychotria thwaitesii
Memecylon spp.

Understorey Vegetation

Peristrophe montana
Elatostemma spp.

the major food of nestling Hornbills and the nesting of Hornbills coincides with the fruiting season of *F. mysorensis*.

- (3) Hornbills fly long distance, more than a kilometre for collecting food for the young and figs could act as 'Corridors' in the distribution of the Hornbills.
- (4) Under safe condition Hornbills may nest as low as 8 m though Ali (1968) has recorded them nesting at heights of about 20 to 25 m.
- (5) Size of the nest cavity is important in determining the nest site selection. Hornbill nests have an important role in the regeneration of plants.
- (6) Hornbills are observed carrying snakes

and lizards besides fruits for feeding the young ones.

Recommendations

- (i) Strict protection should be afforded to all of the old growth forest patches in the buffer zone areas - especially in the border areas of the Reserve. Such areas may be treated as satellite core areas.
- (ii) Disturbing nesting birds through photography and other means should be strictly banned. On the merest suspicion, the adult birds bringing food keep away from the nest for a long time causing stress to them as well as to the chicks.

SUMMARY

The Great Indian Hornbill is now an endangered species although in Protected Areas it is fairly common. Systematic studies have not been conducted through stray notes are available. A status survey was conducted in Periyar Tiger Reserve. It has shown its wide distribution in evergreen and semi-evergreen forests where it is found singly or in groups. It prefers old growth forest patches. Nesting take place from February to May which is related to fruiting season are figs. Nesting is done on tall old trees. Young ones are fed on figs and occasionally Lizards and even Snakes. Entrances are vertical to circular, the height of nests being 8 to 25 m from the ground. Photography is posing a management problem and in some cases the birds did not return to the nest which they generally did when they were not disturbed.

**भारतीय धनेश (बुसरोस बाइकोर्निस) और पेरियार बाघ संरक्षित क्षेत्र में
पुराने वृक्षों वाले वन टुकड़ों का प्रबन्ध**

जी० हरिकुमार, ओ०पी० कलेर, शर्ले जोजफ, के०जे० पीयूषकुट्टि व वी०जे० जकारियास
सारांश

महाभारतीय धनेश अब संकटापन्न जाति है हालांकि आरक्षित क्षेत्रों में यह काफी संख्या में मिल जाती है। इसका विधिवत् अध्ययन नहीं हुआ है यद्यपि इसके विषय में छोटी-मोटी टिप्पणियां उपलब्ध हैं। पेरियार बाघ संरक्षित क्षेत्र में इसकी स्थिति का अध्ययन किया गया है जिससे पता चलता है कि यह सदाहरित और अर्द्ध सदाहरित पुराने वृक्षों वाले वनों के टुकड़ों में ज्यादा मिलता है। उनमें यह एकाकी तथा समूह बनकर रहता है। नीडन कार्य फरवरी से मार्च तक चलता है जिसका सम्बन्ध अंजीरों पर फल लगने से भी है। नीड लम्बे और मोटे वृक्षों पर बनाए जाते हैं। छोटे बच्चों को अंजीर के फल खिलाए जाते हैं, कभी-कभी छिपकलियां और सांप तक भी। नीडों में अन्दर जाने का रास्ता खड़ा या गोलाकार होता है। नीडों की ऊँचाई जमीन से 8 से 25 मी० तक रहती है। छायाचित्रण से प्रबन्ध करने में समस्याएं आ रही हैं और कहीं-कहीं तो पक्षी अपनी पुरानी नीडस्थली पर वापस दुबारा आए ही नहीं, यद्यपि पहले वे ऐसा ही किया करते थे, जब उनके साथ छेड़-छाड़ नहीं होती थी।

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