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Research article

STATUS AND DISTRIBUTION OF MALABAR PIED HORNBILL *ANTHRACOCEROS CORONATUS* IN MELGHAT TIGER RESERVE, MAHARASHTRA

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ABSTRACT: The Malabar Pied Hornbill *Anthracoceros coronatus* is endemic to the Indian subcontinent and listed as a Near Threatened bird species. It was first time reported in 2003 in Melghat Tiger Reserve (MTR) from Central India. MTR is an important forest area in the central part of the Satpudas. As per the sighting records of *A. coronatus* in MTR from 2003 to 2013, it seems that the bird species was established well in this area. But actual status and distribution of the species in the study area was not known. Also, the research work and published materials on the status and distribution of Malabar Pied Hornbill from MTR was lacking. So with these 'key thoughts', we had started work on Malabar Pied Hornbill in MTR and here in this paper, the current status and distribution of the Malabar Pied Hornbill from MTR was evaluated. To understand the status and distribution of Malabar Pied Hornbill in MTR more than 30 visits were undertaken from January 2010 to January 2013 to various parts of the MTR. Point transects were primarily conducted to monitor population of Malabar Pied Hornbill in MTR. The number of Malabar Pied Hornbills recorded in Melghat Tiger Reserve in the year 2010, 2011 and 2012 as were 27, 21 and 24 respectively. Most of the sightings of hornbills were recorded from core area and only few birds were sighted outside the core area. In MTR, total ten fruit plant species were recorded as a preferred food by Malabar Pied Hornbill. No poaching or illegal killing, no natural predators were observed. But continuous tree felling by locals in buffer zones for agricultural expansion, intentional forest fires, old trees falling by heavy rains and storms were recorded to be the major threats to the habitat of *A. coronatus*.
Key Words: Malabar Pied Hornbill, Status and Distribution, Melghat Tiger Reserve, Central India.

INTRODUCTION

The Malabar Pied Hornbill *Anthracoceros coronatus* is one among the ten species of the hornbills found in the Indian subcontinent. It is a bird of deciduous forest and thick groves, with three distinct distributional ranges in the India i.e. the Western Ghats, the Eastern Ghats and central India. All hornbills are large birds, with the Great Pied Hornbill reaching up to 130 cm. The Malabar Pied hornbill, is comparatively smaller, and does not grow beyond 92 cm. It is basically a black bird with white under parts. The wax-yellow and black bill is surrounded by a high ridge like casque ending in front in a single, point. It differs from the Indian Pied Hornbill in having white colored outer tail feathers. While the later has black colored outer tail feathers with white tips. The Malabar Pied Hornbill is an arboreal fruit-eating bird, and keeps in noisy parties or small flocks of 8 to 10 birds. As such, they can be considered as indicators of high moist forests, ensuring the continuance of forest health and species richness.

It is endemic to the Indian subcontinent and listed as a Near Threatened bird species (Criterion NT C1) [1] and its population is declining as a result of habitat loss.

Malabar Pied Hornbill is a bird from the eastern Himalayas but now it is a resident species of the wet zone of the Western Ghats [2] of Southern India. The preferential route of dispersal of birds (especially the Malayan fauna) from the Himalayas to the Western Ghats in India could be through the Eastern Ghats and through the Central Indian hills including the Satpuda ranges [3, 4]. Later on Wagh *et al.* [5] proposed that the preferential route of dispersal for Malabar Pied Hornbill from the Himalayas to the Western Ghats is through the Satpuda Hills in Central India.

It is a resident species in the peninsular hills, from South-West Bengal and Bihar to North Andhra, the Western Ghats (mainly along the eastern edge), South of southern Maharashtra (Ratanagiri) up to 300m [6] and also in central India [7]. According to Pande *et al.* [8], it is a resident of the Konkan, Malabar and the Western Ghats up to 1000 m altitude.

A. coronatus has already been reported from different places of the Satpuda range including the Satpuda National Park, Pench Tiger Reserve, MP [9], Satpuda Tiger Reserve in Madhya Pradesh and also in Eastern Madhya Pradesh [7], and it was reported in Tadoba-Andhari Tiger Reserve in 2001[19] and in Melghat Tiger Reserve (MTR) it was first reported in 2003 [10]. It was not reported in Vidarbha before 2001 [11]. MTR is an important forest area in the central part of the Satpudas. As per the sighting records of *A. coronatus* in MTR from 2003 to 2010, it seems that the bird has become well established in this area [5]. Later on, it was reported from other protected areas on Vidarbha, like, Navegaon National Park [12], Nagzira Tiger Reserve, Tadoba Andhari Tiger Reserve, and Umred Karandla Tiger Reserve [13].

A total of 275 species of birds has been recorded from MTR [14, 15]. MTR is an Important Bird Area as notified by Bombay Natural History Society and BirdLife International [16]. Malabar Pied Hornbill was not listed in the checklist of birds of MTR, till 2003. On July 20, 2003 three Malabar Pied Hornbills including one immature bird were sighted in Melghat by Mr. Kamalakar Dhamge, a Forest Officer near Kolkhas in the canopy of a *Ficus benghalensis* tree. Later on, these birds were regularly spotted by bird researchers. Although, this species is regularly spotted by bird researchers, forest officers and the locals in the MTR forest, the detailed information about the status and distribution of the species in the study area was not available. Also, the work on the status and distribution of Malabar Pied Hornbill in MTR was lacking, even-though such basic data is essential for the conservation of Malabar Pied Hornbill species and for management of their habitat. So with these 'key thoughts' that we had started work on Malabar Pied Hornbill in MTR. In this study, the current status and distribution of the Malabar Pied Hornbill in MTR was evaluated.

Study Area

The present study was conducted in Melghat forest. It is located at $20^0$51' to $21^0$46 N and to 76^0 38 to $77^0$33 E in the Maharashtra state of India. Melghat forest is a part of the Satpuda Range of Hills in Central India. It is spread over 3970 sq. km area in the Amravati and Akola districts of Maharashtra. Out of this 2100 sq. km. area is protected under Melghat Tiger Reserve (MTR) which includes five protected areas under unified control (Fig. 1). These are Gugamal National Park, Melghat Sanctuary (the buffer zone), Narnala Wildlife Sanctuary, Wan Wildlife Sanctuary and Ambabarwa Wildlife Sanctuary. Melghat has southern tropical dry deciduous type of forest [17]. In the MTR some part of forest is semi evergreen type which starts from west side of Chikhaldara and spreads upto Kolkhas, Kund, Koha and Koktoo area (Fig.2). Sipna, Gadaga and Dolar are the major rivers and number of small streams flowing through the Melghat forest provides riverine habitat to *A. coronatus* (Fig.3). Melghat experiences tropical climate with temperatures ranging between 13^0C and 22^0C during winter and between 23^0C and 45^0C during summer. The annual rainfall ranges between 1000mm and 2250mm.

METHODS

To understand the status and distribution of Malabar Pied Hornbill in Melghat forest more than 30 visits were undertaken from January 2010 to January 2014 to various parts of the Melghat area, covering major habitat types in all seasons of the year (breeding and non-breeding seasons). Point transects were primarily conducted to monitor population of Malabar Pied Hornbill in evergreen and riverine forests of the Melghat. During field visits the observers walked the points and encountered the hornbills during the non-breeding seasons. Visual scanning involved the scanning of fruiting *Ficus* trees for spotting the hornbills in riverine patches. For observations binocular and monocular were used. Data about food preferences of Malabar Pied hornbill in Melghat forest was collected. Observations were taken with monocular (15 x 60), binocular (10 x 50 Nikon) and photographs were taken using a DSLR Nikon Camera with zoom lenses.

The latitude and longitude of all sightings of the hornbill species were recorded using a Garmin GPS-60 unit. The observations were taken during day time. The most active periods are early mornings to mid mornings and late afternoons to evenings. Available literature related to the species was referred, compiled and analyzed. The first author conducted several interviews with villagers, tribes, forest staff and bird watchers from time to time to obtain information about the present and past status of the Malabar Pied Hornbill by showing them the pictures, making them listen to the recorded Malabar Pied Hornbill calls and sometimes by showing actual birds in the wild. On two different sites the roosting behavior of the hornbill was observed at evening.

Fig 1. A map of the Melghat Tiger Reserve

Fig 2. A view of the Melghat Tiger Reserve with dense deciduous and semi-evergreen forest (Photo by- Gajanan Wagh)

Fig 3. Riverine ecosystem in the Melghat Tiger Reserve (Photo by- Gajanan Wagh)

RESULTS

The status and distribution survey of the Malabar Pied Hornbill was carried out for three years in Melghat forest and most of the ranges of MTR were surveyed. A total 23 stations were surveyed to find out the abundance of Malabar Pied Hornbill in Melghat forest (Table 1).

The Present study shows that the population estimation of Malabar Pied Hornbills in the Melghat forest. It was observed that the Malabar Pied Hornbill is uses dry deciduous forest only for foraging while the riverine forest for both foraging as well as nesting.

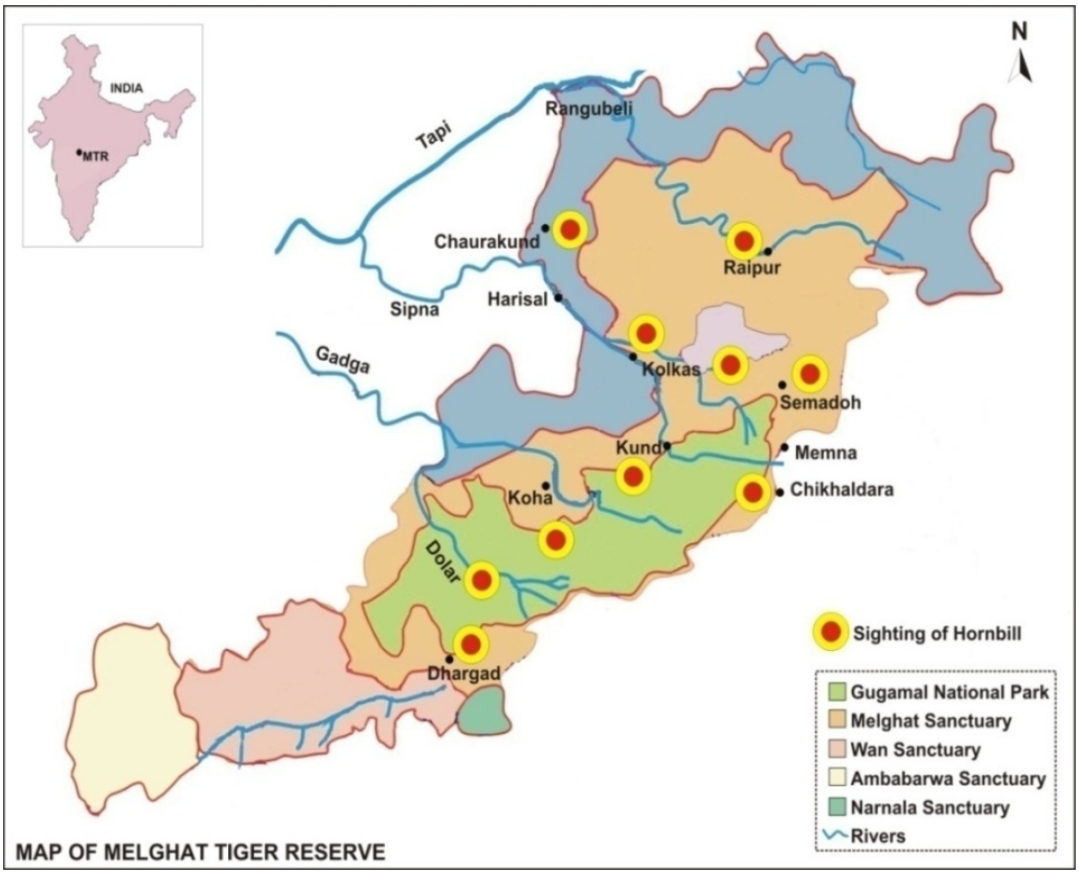

Fig.4. Map showing the locations of Malabar Pied Hornbill sightings in Melghat Tiger Reserve

Status and Distribution

Table 1. Distribution of Malabar Pied Hornbill *A. coronatus* in Melghat Tiger Reserve

S. No.	Area	location	Altitude (Feet)	Sightings		
				2010	2011	2012
1	Ghatang	21^0 27.28'N $77^0$25'.24 E	2233	--	--	--
2	Chikhaldara	21^0 21.42'N $77^0$22'.26 E	3500	✓	✓	✓
3	Semadoh	$21^0$34'.52"N $77^0$16'.12"E	1764	✓	--	--
4	BujrukPadav Camp	$21^0$32'.52"N $77^0$14'.12"E	1518	✓	✓	✓
5	Kolkaj	$21^0$29'.49"N $77^0$12'.30"E	1386	✓	✓	✓
6	Banderkahu	21^0 27'.21N $77^0$16' 14E	1806	✓	✓	✓
7	Tarubanda	21^0 27'.21N $77^0$16' 08E	1836	--	--	--
8	Kund	21^0 27'.21N $77^0$16' 08E	1705	✓	--	✓
9	Koha	21^0 27'.21N $77^0$16' 08E	1659	✓	--	✓
10	Dhakana	21^0 15'.31N $77^0$00'.52 E	1672	--	--	--
11	Koktu	21^0 19.14'N $77^0$02.42' E	1743	✓	✓	✓
12	Gularghat	21^0 15'.31N $77^0$00'.52 E	1920	✓	✓	✓
13	Dhargad	21°15'N 76°58'E	2125	✓	✓	✓
14	Wan Sanctuary	21^0 14'.167N $76^0$50'.075 E	1469	--	--	--
15	Ambabarwa Sanctuary	21^0 13'.31N $76^0$39'.52 E	2335	--	--	--
16	Narnala Sanctuary	21^0 14'.31N $77^0$01'.52 E	2994	--	--	--
17	Raipur	$21^0$34'.52"N $77^0$16'.12"E	1764	✓	✓	✓
18	Hatru	$21^0$36'.228"N $77^0$18'.876"E	2109	✓	--	--
19	Jarida	$21^0$38'.081"N $77^0$24'.786"E	1813	--	--	--
20	Chourakund	$21^0$32'.45"N $77^0$06'.39"E	1416	✓	✓	✓
21	Jamoda Padav	21°39'N 77°06'E	1527	--	--	--
22	Rangubeli	21°42'.367"N 77°07'540"E	1041	✓	✓	✓
23	Harisal	21°35'.242"N 77°07'631"E	1574	✓	✓	✓

Table 2. Sightings of *A. coronatus* in Melghat Tiger Reserve

S. No.	Area	No. of Birds encountered		
		2010	2011	2012
01	Kolkaj	03	02	07
02	Bujrug Padav Camp	02	04	02
03	Semadoh	02	-	-
04	Raipur	02	-	-
05	Hatru	01	-	-
06	Harisal	03	02	02
07	Chourakund	01	-	-
08	Rangubeli	02	-	02
09	Banderkahu	02	03	02
10	Chikhaldara	07	03	02
11	Koha	-	-	01
12	Kund	-	-	01
13	Koktu	--	03	02
14	Dhargad	-	02	-
15	Gularghat	02	02	2
Total		27	21	23

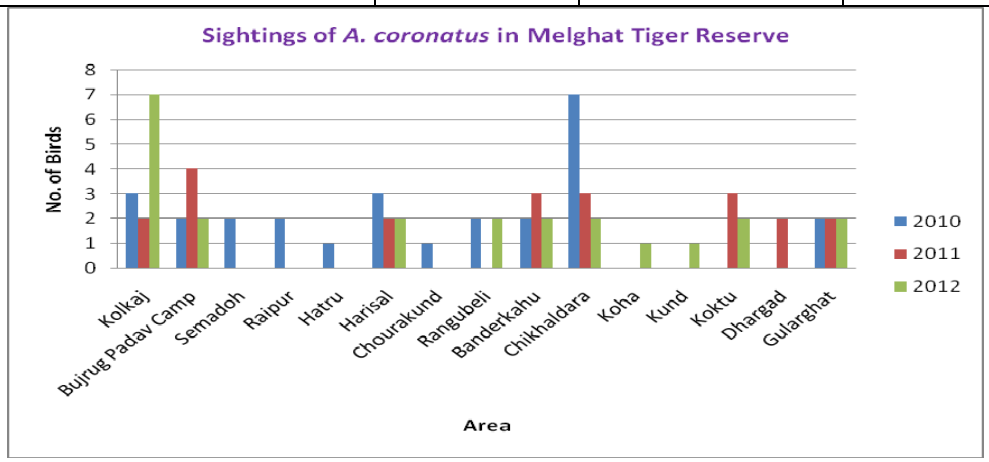

Fig.5: Sightings of A.Coronatus in Melghat Tiger Reserve of three years

Food preferences

The food preferences and feeding habits of the Malabar Pied hornbills were studied in different seasons in the Melghat forest and observation about the foraging habits were noted down (Table 3).

Table 3. Food preference of *A. coronatus* in Melghat Tiger Reserve

S.No	Plant Species	Seasons wise food preferences		
		Monsoon	Winter	Summer
1	*Ficus benghalensis*	✓	✓	✓
2	*Ficus religiosa*	✓	✓	✓
3	*Ficus racemosa*	✓	✓	✓
4	*Ficus infectoria*	✓	✓	✓
5	*Ficus virens*	✓	✓	✓
6	*Syzygium cumini*	-	-	✓
7	*Adina cordifolia*	✓	✓	✓
8	*Schleichera oleosa*	✓	✓	✓
9	*Grewia tiliifolia*	✓	✓	✓
10	*Phoenix sylvestris*	-	-	✓
11	*Ziziphus mauritiana*	-	-	✓
12	*Azardirecta indica*	-	-	✓

Fig.6. Malabar Pied Hornbill in MTR (photo by Ninad Abhang)

Fig. 7. Roosting site of Malabar Pied Hornbill in MTR.(Photo by Gajanan Wagh)

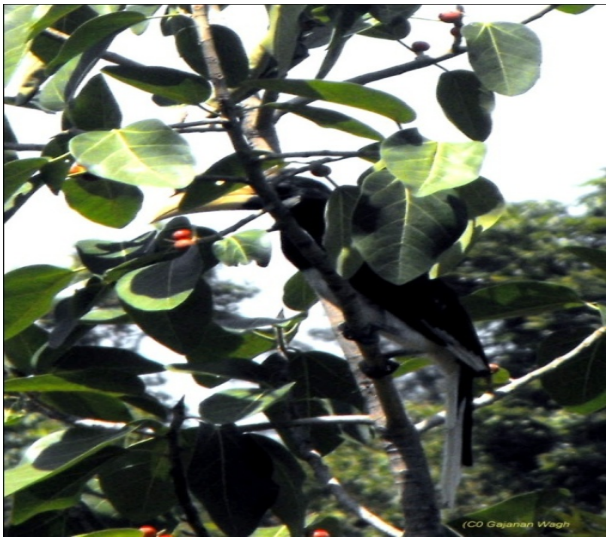

Fig.8. Malabar Pied Hornbill feeding on *Ficus bengalesis* fruits in MTR. (photo by Gajanan Wagh)

DISCUSSION

Status and distribution

The number of Malabar Pied Hornbills recorded in Melghat Tiger Reserve in the year 2010, 2011 and 2012 as were 27, 21 and 24 respectively (Table 2). Of these, maximum hornbills were recorded from core area and few birds were sighted outside the core area. More abundance of the Hornbills in the protected area of Melghat forest was due to high fruit richness, large size landscape with dense canopies and favorable reverine patches. (Fig 5). As per our observations, population of the Malabar Pied Hornbill in Melghat is not very high and their sightings are also uncommon as compared to the habitats in Western Ghats and some other tiger reserves of the central India like the Pench Tiger Reserve in Madhya Pradesh [9].

Malabar Pied Hornbills were found almost throughout the year in the Melghat indicating that it is not a passage migrant or vagrant to the study area but it is a resident species. Most of the sightings were reported from the central part of the Tiger Reserve i.e. Gularghat, Dharghad, Koktu, Dhakana, Koha, Kund, Bandarkahu, Semadoh, Kolkhas, Chourakund, Rangubeli and Raipur (Fig.4). These areas have abundant crowns of large old trees of *Ficus* which are the main food source for the Hornbills. Spotting of adult birds with juvenile further confirms their breeding in Melghat forest.

The first author spotted Malabar Pied Hornbills around Chikhaldara in the months of April to June. There are several ancient *Ficus benghalensis* and *Phoenix sylvestris* trees. Chikhaldara is a popular hill station in Vidarbha. April to June is the fruiting season of *Ficus benghalensis* and *Phoenix sylvestris* in this region. During summer (April to June) the hornbills were found to forage on the ripe fruits of these trees (Fig.7).

In Melghat, total ten fruit plant species were recorded as a preferred food namely, *Ficus benghalensis, Ficus religosa, Ficus racemosa, Ficus infectoria, Ficus variegata, Syzygium cumini, Adina cardifolia, Schleichera oleosa, Phoenix sylvestris and Grewia tilifolia* (Table 3).

Malabar Pied Hornbills are both fruit and flesh eaters. They are far-ranging in their search for food and drop the seeds of the fruits they eat as they go, dispersing them over a wide area. They are thus important seed dispersers for the forest, acting as an agent of forest regeneration, at the same time as controlling large sized insects and other small animals. As such, they can be regarded as indicators of high moist forest, ensuring the continuance of forest health and species richness [18].

The relatively open riverine habitats on the banks of the River Sipna, Gadaga, Dolar and number of small streams provides important habitat for the Malabar Pied Hornbill in Melghat. They mainly roost in the foliage of ancient trees like *Terminalia arjuna, Tectona grandis* and *Adina cordifolia* (Fig.5 & Fig.6)

CONCLUSION

As per observations, abundance of the Malabar Pied Hornbills was much less and their sightings were also uncommon in the MTR forest. Population of Hornbill in forest area generally affected by some factors such as type of vegetation, habitat, temperature, availability of food, size of the forest area, old heighted trees with natural holes, predators etc. However the MTR forest is dry deciduous type and during summer, the temperature raises up to 45^{o}C. So the less Population of Malabar Pied Hornbills in MTR might be due to this reason.

It was noticed that all the sightings of *A. coronatus* were recorded only from protected areas (Core and Buffer zone) but not a single sighting was recorded from the non-protected areas as well as outside the Melghat forest. Absence of records of *A. coronatus* in corridors or other forest patches in Amravati district might be due to less tree density, less number of old trees, less percentage of old *Ficus* trees, small sized and disjunct forest patches, anthropogenic pressure, agricultural land expansion and increase in the disturbances in the forest landscapes.

In MTR Malabar Pied hornbills mainly used fruits of Ficus species in most seasons of the year but during summer they preferred the fruits of the *Phoenix sylvestris* and *Syzygium cumini.* As Malabar Pied Hornbills are mainly frugivorous [20], they are important seed dispersers in the forest, acting as agents of forest regeneration. They can be considered as indicators of high moist forest, ensuring the continuance of forest health and species richness. Figs of *Ficus* trees were found to be as a major source of food for Malabar Pied Hornbill in Melghat Tiger Reserve. It was observed that in summer the Malabar Pied Hornbill disperses towards hilly regions, like Chikaldara and they prefer the fruits of *Ficus* species i.e. *Ficus benghalensis, Ficus religiosa, Ficus racemosa* and two non-*Ficus* species *i.e. Phoenix sylvestris* and *Syzygium cumini.*

No poaching or illegal killing by locals or tribes was observed during the survey in Melghat Tiger Reserves of the study area as it is a protected area. No natural predators of the *A. coronatus* have been observed so far. But, continuous tree felling by locals in buffer zones for agricultural expansion, intentional forest fires and old trees falling by heavy rains and storms were recorded to be the major threats to the habitat of *A. coronatus*.

Conservation of Malabar Pied Hornbill in Melghat Forest

General recommendations for the conservation of Malabar Pied Hornbill in Melghat Forest: Protecting old growth forest patches, controlling intentional forest fires, conducting systematic surveys to locate nests of the hornbills, regular monitoring and protection of the nest sites (trees) should be done. Creating awareness among forest staff and locals and conducting long term studies on the breeding biology of the species in Melghat is required.

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