Observations on Indian Grey Hornbill *Ocyceros birostris* in an Indian city reveal shifts in diet and nesting

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Indian Grey Hornbill (IGH) *Ocyceros birostris* is endemic to south Asia. It is widely distributed across the plains of India. It has adapted well to human-dominated landscapes and is often seen in urban gardens, forest or horticulture nurseries, orchards, and roadside plantations, apart from the agriculture areas. IGH feeds mostly on fruits, especially figs, and the chicks are fed invertebrates to complement the carbohydrate-rich diet with proteins.

In the central Indian city of Indore, it is very commonly seen in the Residency area. This locality is the greenest part of the city, with relatively high tree cover. This area still holds the remaining big and old trees, like the *Ficus benghalensis*, *Ficus religiosa*, *Ficus racemosa* and *Azadirachta indica*. These trees also have cavities for hornbill nesting. The majority of the hornbill nests are seen in this area. The IGH breeding period coincides with the fruiting of fig trees in central India. It breeds from March

Image 1. Male Indian Grey Hornbill with a piece of dry chapatti (Indian Bread) at the nest.

Table 1. Summary of nest entry dates across 12 years, number of nests monitored.

Year	Earliest entry date	Latest entry date	n	March Average Temp (min)	March Average Temp (max)	March Average Humidity	Comments
2011	22-Mar	4-Apr	5	13.23	32.44	77.08	
2012	25-Mar	31-Mar	6	11.69	33.79	78.61	
2013	19-Mar	2-Apr	8	15.15	33.97	75.94	
2014	19-Mar	3-Apr	7	12.77	32.13	79.29	
2015	26-Mar	3-Apr	7	16.76	31.06	73.39	
2016	20-Mar	1-Apr	7	23.77	35.05	65.55	
2017	5-Mar	12-Mar	6	19.03	34.48	68.26	Year of early nesting
2018	18-Mar	30-Mar	7	17.74	36.90	66.96	
2019	6-Mar	18-Mar	8	15.69	35.06	68.97	Year of early nesting
2020	No Data	No Data		15.37	31.44	83.37	
2021	7-Mar	14-Mar	7	24.19	34.81	87.61	Year of early nesting
2022	13-Mar	19-Mar	5	16.39	34.76	78.33	

to July (Ali and Ripley, 1983). Their breeding cycle was reported between 20th March and 22nd June in a study of six nest sites in Nagpur, Maharashtra (Kasambe *et al.*, 2011). As per another study in Eastern Ghats (Santhoshkumar and Balasubramanian, 2015) the nesting started early in March and ended in late June. The nesting period averaged 87 days, with the female sealed in the nest cavity. Here, I report aspects of IGH diet and nesting from more than a decade of monitoring IGH in an urban environment.

Since 2010, I have monitored an average of

Image 2. Indian Grey Hornbill feeding on Gathia (savoury snack made from chickpea flour) with House Crow Corvus splendens

Image 3. The male feeding the nest inmates in the hole in a concrete wall.

Image 4. The male feeding the female at another nest site in a concrete wall.

eight nests (range: 7 – 9) during their breeding season in the Residency area. The Residency area includes the residences of the Senior Government officers posted in the Indore district, Residency Kothi, Horticulture Nursery, Biodiversity Nursery, Forest Department Nursery, Agriculture college and its premises and Indore Zoo of Indore city. Only one of the nests was

Image 5. The nest entrance is sealed properly just like in naturally formed nest-cavities.

outside the Residency area. It was 1.2 km from the Residency area. I used Binoculars (Nikon Monarch 8 × 42 and Olympus 10×50) and a Nikon DSLR D90 Camera with a zoom lens for observing and taking records at the nest. As most of the nests were in close proximity, one observer was able to keep a watch of two to three nests at the same time. In 2013, I installed CCTV cameras to document the whole nesting cycle at one nest.

In the recordings at the nest, for the first time I documented the male IGH providing pieces of dry chapattis (Indian Bread) and biscuits regularly to the chicks (Image 1). Other than this, the Indian Grey Hornbill were also seen feeding on poha (a savoury dish made from puffed rice) (Gadikar, 2017a and 2017b) and gathia (a savoury snack made from chickpea flour) (Image 2). In the urban setting, thus I documented IGH having a changed diet.

In 2015, an IGH pair used a hole (cavity) of a concrete wall of a multi-storied residential building for nesting. Till then, it was known that the hornbill makes nests in cavities inside the tree trunk or artificial nest boxes. IGH has successfully nested in this artificial cavity in an apartment for three consecutive years (Image 3). Similarly, in 2018, an instance of successful nesting in an apartment cavity has been documented elsewhere in the city as well (Image 4). However, in this case, the cavity was only used for one year. These are examples of hornbills using modified structures in cities for nesting. The hornbills seal the opening of the concrete wall in the same way as they seal a naturally formed cavity entry (Image 5). In all three attempts, the nesting was successful, with two chicks fledging each year from it, almost the same success rate as compared to the other nesting attempts. This also points to a fact that nesting cavities may be limited in availability in urban areas like Indore.

The observations on female first entry dates in the nesting cavity at the start of the breeding cycle also yield some insights into shifting nesting timings. Table 1 displays the data of female earliest and latest entry dates in the nest cav-

ity over the years. The data observed on the female entry dates at the nest sites indicates earlier nesting in some years.

IGH are typically known to nest from the end of March onwards. For the first seven years of monitoring, I documented that IGH were mostly beginning to nest in the first week of April and occasionally in the last week of March. But in years 2017, 2019 and 2021, they began nesting at least two weeks before the usual nesting period. The reasons for early nesting in these years are not known. However, similar shifts in hornbill nesting have been reported from Eastern Himalaya as well (Datta, 2022). The temperatures of March (high and low) and the humidity do not show any clear association for their early nesting. Within these three years of early nesting, the nesting success was slightly higher in two of the three years, i.e., in 2017 and 2019. The breeding success was 12-15% higher for these two years, It is important that long-term monitoring of hornbill breeding should be initiated and determinants of variation in nesting and its impact on nesting success be determined.

There is very limited information on hornbills in urban environments. This note demonstrates that the Indian Grey Hornbill forages on non-natural food items and nests in artificial structures in a tier-two city in India (Gadikar, 2017). The long-term study also demonstrates variations in their nesting cycle. Future studies should aim to determine the drivers of these variations in nesting and their impact on hornbill populations.

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