

SEASONAL MIGRATION OF GREAT HORNBILL *BUCEROS BICORNIS* IN THE HIGH FOREST AREAS OF NAMERI NATIONAL PARK¹

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Abstract. An important area for the Great Hornbill *Buceros bicornis*, placed as Near Threatened on the IUCN Red List, is Nameri National Park, India, within the Eastern Himalayan Mega Biodiversity Hotspot. The species in this area migrates to the lower forest for nesting, needing cavities in large, old growth trees; after nesting it returns to the high forest. Conservation of this species requires the protection of mature forests from logging and actions to substitute feathers and casques from captive bred birds for use in artisanal rituals.

Key words. Great Hornbill, India, logging, Nameri National Park

MIGRACIÓN ESTACIONAL DEL CALAO *BUCEROS BICORNIS* EN LAS ÁREAS DE BOSQUE ALTO DEL PARQUE NACIONAL NAMERI

Resumen. Una importante área para el calao bicorne *Buceros bicornis*, especie clasificada como casi amenazada en la Lista Roja de la IUCN, es el Parque Nacional Nameri, India, dentro del Punto Caliente de Biodiversidad del Himalaya Oriental. La especie en este área migra a los bosques bajos para anidar, ya que requiere de cavidades en árboles grandes y viejos; después de anidar regresa a los bosques altos. La conservación de esta especie requiere la protección de bosques maduros y acciones para sustituir plumas y cuernos de aves en cautividad para su uso en rituales artesanales.

Palabras clave: calao bicorne, India, tala, Parque Nacional Nameri

The home of the Great Hornbill *Buceros bicornis*, also known as Great Indian Hornbill or Great Pied Hornbill, occurs within the Eastern Himalayan Mega Biodiversity Hotspot, including Nameri National Park. It is one of the richest areas in the world in terms of plant functional type and complexity. Nameri National Park lies between 26°50' N to 27°03' N and 92°39' E to 92°59' E and covers an area of 200 km² in the northern bank of the mighty river Brahmaputra in Assam. Most parts of the park are covered by

Moist Mixed, Deciduous Forests that provide shelter to > 600 species of plants. The Tropical Evergreen and Semi-Evergreen Forests mingle here with the Moist Deciduous Forests. The other forest types like cane and bamboo brakes and narrow strips of open grassland can also be found in this park.

The Great Hornbill, is one of the larger members of the hornbill family and is found in the forests of Nepal, India, mainland Southeast Asia and Sumatra, Indonesia. The species was

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formerly broken into the subspecies *cavatus* from the Western Ghats in India, with the nominate form from the sub-Himalayan forest, sometimes named as subspecies *homrai*. The subspecies from Sumatra has sometimes been considered as *cristatus*. The variation across populations is mainly in size, with Himalayan birds being larger than from further south. The species is now usually considered monotypic. The status of the Great Hornbill as per the IUCN Red List is Near Threatened (NT).

This species frequents wet evergreen and mixed deciduous forests, ranging out into open deciduous areas to visit fruit trees; it ascends slopes to at least 1,560 m (Mudappa and Raman 2009). The abundance of this species tends to be correlated with the density of large trees, and it is therefore most common in unlogged forest; indeed, recent work has shown a significant nesting preference for larger trees, usually in old-growth forest (James and Kannan 2009). Within these habitats, the species is usually seen in small parties with larger groups sometimes aggregating at fruit trees. A congregation of 150 to 200 birds has been recorded in Eagle Nest Wildlife Sanctuary in Arunachal Pradesh, which is aerially close to Nameri National Park (Datta 1998).

The Great Hornbill is large, 95–130 cm (37–51 in) long, with a 152 cm (60 in) wingspan and a weight of 2.15–4 kg (4.7–8.8 lbs). Its most prominent feature is the bright yellow and black casque on top of its massive bill. The casque appears U-shaped when viewed from the front and the top is concave with two ridges along the sides that form points in the front, to which reference is made in the Latin species epithet *bicornis*.

Females are smaller than males and have bluish-white instead of red eyes although the orbital skin is pinkish. Like other hornbills, they have prominent 'eyelashes.' The back of the casque is reddish in females while the underside of the front and back of the casque is black in males. The male spreads the preen gland secretion, which is yellow, onto the primaries and bill to give them a bright yellow colour. The commissure of the beak is black and has a serrated and worn edge with age. The wing beats are heavy and the sound produced by birds in flight can be heard from a distance

(James 2009). They are sometimes known to fly at great height over forests. Male hornbills have been known to indulge in aerial casque butting, with birds striking each other in flight.

In the wild, the Great Hornbill's diet consists mainly of fruit. Figs are particularly important as a food source. They also forage on lipid-rich fruits of the *Lauraceae* and *Myristicaceae* families such as *Persea*, *Alseodaphne* and *Myristica* found in the park. They obtain water entirely from their diet of fruits. The *Ficus*, *Bischofia*, *Prema*, *Amoora*, *Terminalia*, and *Castanopsis* etc. seed bearing trees are available for the Hornbill and therefore the species migrates seasonally from Pakhui and Eagle Nest wildlife sanctuaries during fruiting season. They are important dispersers of many forest tree species. They also eat small mammals, birds, small reptiles and insects. It has been observed in Nameri National park that Assamese macaques forage alongside these hornbills. A rare squirrel, the Himalayan flying squirrel has been noted in the diet of the species while Collared Scops Owl *Otus bakkamoena*, Jungle Owlet *Glaucidium radiatum* and Grey-fronted Green Pigeon *Treron pompadora* have been noted as prey birds in the Nameri National Park (Datta et al. 2003).

MIGRATION OF GREAT HORNBILLS

The current study was conducted in Pakhui Tiger Reserve (862 km², 92°36'–93°09'E and 26°54'–27°16'N) in East-Kameng district of western Arunachal Pradesh and adjacent Nameri National Park of Assam. The park is surrounded by contiguous forests and delineated by rivers in the east, west and north. Numerous small rivers and perennial streams drain the area. The forests are multistoreyed and rich in epiphytic flora, woody lianas and climbers. A total of 343 woody species of flowering plants (angiosperms) have been recorded from the foothill areas of both the park, with a high representation of species from the Euphorbiaceae and Lauraceae families (Datta and Goyal 1997, Datta 2001). The study area was located in the south-eastern part of the park near the Arunachal Pradesh–Assam border (150–600 m).

As hornbills depend on tree cavities for nesting, an intensive search for nest cavities was carried out during the breeding season, after

which they migrated to high forest area of adjacent Nameri National Park. Cavities of trees being actively used by hornbills were identified by following breeding pairs or breeding males carrying food to the nest, as well as by examining midden deposits of seeds below the nest cavity. Of a total of 18 active nests located in one year, 10 were selected for monitoring.

The nesting season lasted for three months, from March to June. The hornbills started to prepare themselves for breeding in early December, when such pre-nesting behaviour as nest-cavity searching, mating and courtship feeding were exhibited. Both male and female hornbills were noticed peeping into tree cavities, one after the other, and this often continued until the female entering into the nest cavity. The male hornbill feeding the female hornbill was recorded, where the female sat near the nest cavity or perched in a tree, giving loud calls until the male arrived and offered her food. This was also recorded in fruiting trees during migration in the high forest areas of Nameri National Park, where *Syzygium fruticosum*, *Kayea assamica*, *Ficus*, *Bischofia*, *Prema*, *Amoora*, *Terminalia*, and *Castanopsis* are abundant. In the study area, females entered their cavity in the first week of March and some late nests were also recorded in April. All 18 active nests identified were in live trees. All nest trees were in stream/riverine habitats. The majority of the nests were in *Melia dubia* (8) followed by *Syzygium cumini* (4) *Albizia odoratissima* (2), *Mangifera indica* (2), *Terminalia arjuna* (1) and *Terminalia bellirica* (1). Selectivity index indicated that the most preferred nest tree species was *Melia dubia*.

FINAL THOUGHTS

Their impressive size and colour have made hornbills important in many tribal cultures and rituals (Bingham 1897). Therefore, tribal peoples threaten the Great Indian Hornbills with their desire for its various parts, including beaks and heads used in charms, and the flesh as being medicinal. The squabs are considered a delicacy. Tribesmen in parts of northeastern India, particularly Arunachal Pradesh, use their feathers for head-dresses, and their skulls are often worn as decorations. Their flesh is considered unfit for eating by the Nishi tribe with the belief that they

produce sores on their feet as in the bird. When dancing with the feathers of the hornbill, the tribesmen avoid eating vegetables as it is also believed to produce the same sores on the feet. Conservation programmes have attempted to provide tribes with feathers from captive hornbills and ceramic casques to substitute natural ones (Poonswad 1994).

Logging is likely to have negatively impacted this species throughout its range, particularly as it shows a preference for forest areas with large trees that may be targeted by loggers (Sethi 2009). Forest clearance for agriculture is also likely to have contributed to population declines. Hornbills are particularly susceptible to hunting pressure as they are large and visit predictable feeding sites (such as fruiting trees), and its casques are kept or sold as trophies. It is also probably impacted by the pet trade.

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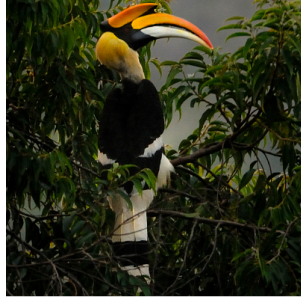
the Great Hornbill *Buceros bicornis*, Brown Hornbill *Ptilolaemus tickelli*, and Wreathed Hornbill *Rhyticeros undulatus* in Khao Yai National Park, Thailand. *Conservation Biology* 8:79–86.

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Great Hornbill in Nameri National Park



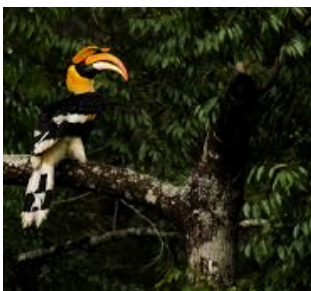
Traditional use of Hornbill Casque



Hornbill in *Bischofia javanica* tree in High Forest Area



Great Hornbill in *Tetrameles nudiflora* Tree



Hornbill Soaring in High Forest Area in the Park

