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NOTE

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VERTEBRATE PREY HANDLING IN THE INDIAN GREY HORNBILL *OCYCEROS BIROSTRIS* (AVES: BUCEROTIFORMES: BUCEROTIDAE)

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Most hornbills (Bucerotidae) are omnivorous, but the proportions of different types of food in the diet vary during the year; mostly frugivorous species include more animal protein in their diet when nesting (Kemp 1995, 2001; Kinnaird & O'Brien 2007; Poonswad et al. 2013). Besides the larger ground-hornbills of Africa (Bucorvidae), there are few specific records of how vertebrate prey are handled by Bucerotidae hornbills, particularly in Asia. This is likely to be due to dietary studies in the breeding season (when most vertebrate prey is taken) focusing on delivery to the female and young in the nest (e.g., Santhoshkumar & Balasubramanian 2014). Santhoshkumar & Balasubramanian (2014) consider information published on the Indian Grey Hornbill *Ocyrceros birostris* (one of the most common species in the Indian subcontinent) to be inadequate. This paper presents an observation of vertebrate prey handling in the Indian Grey Hornbill *Ocyrceros birostris* and compares this with other accounts for this species and other hornbill species.

Three Indian Grey Hornbills (including an adult male and female) were located in a large tree in the Lodhi Gardens, New Delhi, India, at approximately 10.00h on 30 June 2018. The hornbills were observed for

approximately seven minutes and photos and video were taken.

The adult male hornbill had a Garden Lizard *Calotes versicolor* in its bill by the neck with the head on one side and rest of the body on the other. The lizard was clearly dead at this stage and photographs show the head of the lizard had been crushed. The male hornbill rubbed the lizard's head on the branch 3–4 times at intervals of approximately 20 seconds (Image 1). After a few minutes, the male gave the lizard to the female perched next to the male (Image 2–4) who moved the prey in the bill while perched together, with the male calling. Further, the female 'wiped' the sides of the Garden Lizard on the branch (Image 5), before the pair flew off out of sight. It could not be determined if further manipulation of the lizard took place before consumption.

Asian hornbills are generally frugivorous but turn omnivorous in the breeding season (Poonswad et al. 1998), and this is true for the Indian Grey Hornbill (Santhoshkumar & Balasubramanian 2010, 2014; Kasambe 2011). The Garden Lizard is a common lizard in India (Das & Das 2018), and the Indian Grey Hornbill a known predator, but the proportion (and importance) of Garden Lizards in Indian Grey Hornbill diets during the breeding season varies between published studies. For example, Kasambe (2011) suggests Garden Lizards are an important source of protein for female and nestling Indian Grey Hornbills in the breeding season and both male and female hornbills hunt them. Lowther (1942) recorded Garden Lizard in their diet but Patel et al. (1997) did not. Charde et al. (2011a) observed one instance of a female bringing a Garden Lizard to the



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nest but Charde et al. (2011b) observed many instances of this. Santhoshkumar & Balasubramanian (2014) found Garden Lizards constituted 0.06–0.10% of food items in the breeding season. These differences may represent differences in survey techniques, differences in availability of Garden Lizards or differences in feeding preferences between individuals or populations of Indian Grey Hornbills. Garden Lizard and other *Calotes* species are also consumed as part of the diet of congenics, i.e., the Malabar Grey Hornbill *Ocyrceros griseus* (Mudappa 2000; Paleri 2007; pers. obs. 2018) and Sri Lanka Grey Hornbill *O. gingalensis* (Wijerathne & Wickramasinghe 2018).

Most dietary studies for Indian hornbills more generally document food types being brought to the nest (e.g., Santhoshkumar & Balasubramanian 2010, 2014; Charde 2011a,b) and not the capture, killing or handling of prey which mostly occurs away from the nest. An exception is Kasambe (2011) who stated the Indian Grey Hornbill “severely crushes and kills the Garden Lizard before it is swallowed”.

My observations, in late June and likely at the end of the breeding season, suggest the Garden Lizards may be further ‘processed’, after being killed and before consumption. This is supported by a 20-second video by Patil (2014) which shows an Indian Grey Hornbill undertaking very similar behaviour to my observations, but in that instance the lizard was still alive. The hornbill wiped the sides of the lizard on a branch but was clearly not trying to kill it with that motion.

Descriptions of other hornbill species using tree branches to process lizards before consumption clearly focus on killing or incapacitating the prey. Kannan & James (1997) noted “Larger prey [including Agamid lizards] were thrashed against the bough [by Great Hornbill *Buceros bicornis*] to incapacitate them”. Li (2016) observed an Oriental Pied Hornbill *Anthracoseros albirostris* preying on *Calotes versicolor*: “flicked the animal against a branch, perhaps to knock it unconscious” before consuming it head first. Hong (2014) similarly described Oriental Pied Hornbill preying on *C. versicolor*: “The lizard was swiped against the branch until it was dead”. These descriptions suggest a different, more forceful technique to purposefully kill large lizards, and are not consistent with the branch-rubbing behaviour observed in my observations or the video by Patil (2014).

An explanation for the observations described in this paper may lie in the techniques used by hornbills to process other food types. For hornbills, most food items are swallowed whole (Poonswad et al. 2013; Sivakumaran 2019) but Kemp (2001; repeated in Poonswad et al.



Image 1. Male adult Indian Grey Hornbill rubbing Garden Lizard either side of a branch.



Image 2. Male adult Indian Grey Hornbill holding Garden Lizard prior to giving it to the female bird.



Image 3. Male adult Indian Grey Hornbill holding Garden Lizard prior to giving it to the female bird.



Image 4. Female adult Indian Grey Hornbill moving the Garden Lizard through its bill.



Image 5. Female adult Indian Grey Hornbill wiping Garden Lizard on branch.

2013) stated that “Large items ... may be broken up, separated into edible and inedible parts, as by removing fruit husks or insect wings, and then crushed or softened in the bill. Certain distasteful foods, such as sticky fruits or hairy caterpillars, or slimy items, may be wiped on a branch or the ground before being swallowed”. Kemp (1995) provided further details: “Others are softened before swallowing, the hornbill passing them through and crushing them in the bill, which is serrated in many species, or cleaned of unwanted coverings by being wiped back and forth over a perch or along the ground, as in the case of hairy caterpillars, slimy toads, or juicy fruits”.

Garden Lizards do have spines (particularly around the neck) and elongated scales in places (Zug et al. 2006). Constant wiping of the head and both sides of the Garden Lizard on a branch could serve to remove spines, or make them less rigid, before the lizard is consumed whole and head first. It may also serve to further the ‘softening’ process, through breaking or dislodging bones, prior to consumption.

This observation and those of Gadikar (2017) suggest we still have more to learn on the ecology of *Ocyroceros* hornbills in India.

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