

Varanus bengalensis Predation by *Ophiophagus hannah* in Rajaji Tiger Reserve, India

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Abstract: In 2017, an adult *Ophiophagus hannah* was observed preying upon an adult *Varanus bengalensis* in Rajaji Tiger Reserve, northern India. Upon its capture, the snake took about 7–8 minutes to render the monitor unconscious, and another 20 minutes to swallow half of the monitor before disappearing with the lizard in the bush. Although a few records of *V. bengalensis* predation by *O. hannah* exist, this account constitutes the first record of this occurrence in Rajaji Tiger Reserve.

The king cobra *Ophiophagus hannah* (Cantor, 1836) (Serpentes: Elapidae) is the largest species of venomous snake in the world and has a broad distribution across India, Nepal, Bangladesh, Bhutan, Myanmar, and most of Southeast Asia (David & Vogel, 1996; Stuart *et al.*, 2012). In India, it is distributed in the Western Ghats, the Shivalik and Terai regions of Uttarakhand and Uttar Pradesh, Bihar, Odisha, West Bengal, and the Andaman Islands (Whitaker & Captain, 2004). *Ophiophagus hannah* is known to feed primarily on snakes including their own species, and the only other prey items reliably reported from the wild have been two species of monitor lizard: the common Indian monitor (*Varanus bengalensis*) and the water monitor (*V. salvator*) (Bhaisare *et al.*, 2010).

Varanus bengalensis (Daudin, 1802) occurs from southeastern Iran through south-central Asia (ranging from Afghanistan in the north as far south as Sri Lanka), and eastwards throughout Southeast Asia as far as Java and the Anambas Islands in Indonesia (Papenfuss *et al.*, 2010). In India, this monitor is distributed in tropical and subtropical regions of the states of Assam, Himachal Pradesh, Madhya Pradesh, Tamil Nadu, Gujarat, Mizoram, Maharashtra and Kerala where it occurs in almost all biotopes from evergreen forests to dry grasslands (Soni & Jarulla, 2010). It is one of the largest reptile species in southern Asia, but has several natural predators. In a recent study carried out in Sri Lanka, 24 species of animals including mammals, birds

and reptiles were recorded as predators of *V. bengalensis* (Karunarathna *et al.*, 2017).

Rajaji Tiger Reserve (29° 50' – 30° 10' N; 77° 50' – 78° 30' E, elevation 250–1100 m) is a crucial wildlife habitat in the Shivalik landscape, forming the north-western limit of the range of Asian elephants, tigers, great pied hornbills and king cobras in the Indian subcontinent. It falls within the Gangetic Plains biogeographic zone and upper Gangetic Plains province (Rodgers *et al.*, 2002), and a major portion of this area is dominated by tropical moist deciduous forest.

On 8 June 2017 (0845 h), we observed an adult *O. hannah* preying upon an adult *V. bengalensis* in Mundal forest of the Rajaji Tiger Reserve (29° 56' 29.8" N; 78° 16' 28.1" E, 382.7 m; Fig. 1). While studying the behavior and ecology of Asian elephants in the area, an adult *V. bengalensis* (~120 cm in total length [TL]) was seen lying in a pool of rain-water on a rough forest road. Following the rustling of some dry grasses near where the monitor was lying, we observed that a large (~3.0 m TL) *O. hannah* of unknown sex had captured the monitor. The snake held the head of the monitor with its jaws for about 7–8 minutes until the monitor stopped resisting and became unconscious, when it then started to swallow it. At the same time, the snake was also attempting to drag the monitor into the grass from which it had originally emerged. It took the *O. hannah* approximately 20 min to swallow half of the monitor, before it retreated to the grass patch with the monitor



Fig. 1. *Ophiophagus hannah* preying on *Varanus bengalensis* in Rajaji Tiger Reserve, India. Photographed by **Ritesh Joshi**.

and disappeared. Since the observed case of predation, two specimens of *O. hannah* have been observed in this area. In 2013, Indian wildlife photographers filmed and photographed an *O. hannah* consuming a *V. bengalensis* (Tankha, 2013).

Some of the plant species recorded from the site include *Cynodon dactylon* (Bermuda grass), *Saccharum munja* (sarkanda), *Ficus benghalensis* (Indian banayan), *Aegle marmelos* (wood apple), *Mallotus philippensis* (kamala) and *Lantana camara* (lantana).

Varanus bengalensis is listed under Schedule I of the Indian Wildlife (Protection) Act of 1972 (Anonymous, 2003), CITES Appendix I (CITES, 2017), and as Least Concern in the IUCN Red List of Threatened Species (Papenfuss *et al.*, 2010). Increasing development and anthropogenic activities across the riparian corridors of the Ganges, shrinkage of natural water sources inside protected areas, expansion of the road network across a long chain of protected habitats, and lack of awareness among the local people regarding the species' ecological role include some of the threats observed in the study area.

Although only a few records of *V. bengalensis* predation by *O. hannah* exist (Whitaker & Captain, 2004; Tankha, 2013), this account constitutes the first record of such predation in Rajaji Tiger Reserve, which forms an important repository of diverse fauna and is home to several species of threatened herpetofauna. Long-term scientific studies are needed to map the

distribution of both *V. bengalensis* and *O. hannah* in different ecosystems within the State.

Acknowledgments – Thanks are due to Mr. Veeru Negi for assisting us in the collection of field data.

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