

An Observational Note on Mating Behavior and Male-Male Combat of the Bengal Monitor *Varanus bengalensis* (Daudin, 1802) in the National Botanical Garden, Dhaka

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Abstract – A single observation of courtship, mating, and ritualized combat behavior is reported for *Varanus bengalensis* in Bangladesh. Some peculiar behaviors such as basking between copulations and post-mating combat behavior are also described.

Introduction

The Bengal monitor or common Indian monitor (*Varanus bengalensis*) has a broad distribution that ranges from Afghanistan to Java, including southeastern Iraq, Iran, and Afghanistan, Pakistan and India, Southern Nepal, Bhutan and China, Vietnam, Laos, and islands in the Strait of Malacca and the Greater Sunda Archipelago (Auffenberg, 1994; Pianka, 1995), and is widely distributed in Bangladesh (Hasan *et al.*, 2014). It is distinguished from *V. flavescens* and *V. salvator* which also occur in Bangladesh by its nostril being nearer to the eye than the tip of the snout (Hasan *et al.*, 2014). In Bangladesh, *V. bengalensis* reaches a maximum length of 100 cm (Khan, 1988). Courtship in *V. bengalensis* on the Indian subcontinent occurs from April to July, and female recrudescence (or true vitellogenesis) lasts from April to June when the ovarian follicles mature (Auffenberg, 1994). Ritualized male-male combat and courtship begins in late April when day length is increasing (Auffenberg, 1994).

This article reports on an observation of courtship, copulation, and ritualized combat in *V. bengalensis* in Bangladesh, as well as basking behavior between copulation attempts.

Study Site and Methods

Observations took place at the National Botanical Garden, in Dhaka, Bangladesh on 4 August 2015. The

National Botanical Garden of Bangladesh and the Bangladesh National Herbarium make up the largest plant conservation center in the country, comprising a total area of around 84 ha. It is located at Mirpur in Dhaka, adjacent to the Dhaka Zoo (23°49'21.0324" N, 90°20'52.5084"E; Fig. 1).

Observations were recorded with photographs and video using multiple cameras. We used a temperature and humidity sensor meter for recording temperature (29.3 °C) and relative humidity (86%) data.

Observations

While walking along a narrow trail through a partially shaded area with tall grasses, ferns, and tall trees at around 1200 h on 4 August 2015, we observed two *V. bengalensis* cross the trail, with one individual in close pursuit of the other (both measured > 90 cm, but one was noticeably heavier than the other, which, based on copulatory behaviors seen later, we suspect was male). At first, the male was seen chasing the female from behind, and then managed to pin the female down with its forelimb on the female's neck. During this time, the female was whipping its tail and jerking much of its body in an effort to escape from the male. The male attempted to keep the female from fleeing by using its forelimb to encircle and wrap around the forelimb of the female. In most cases, the female was able to escape from under the male, which often escalated into a fast chase. The male was able to stop the female once

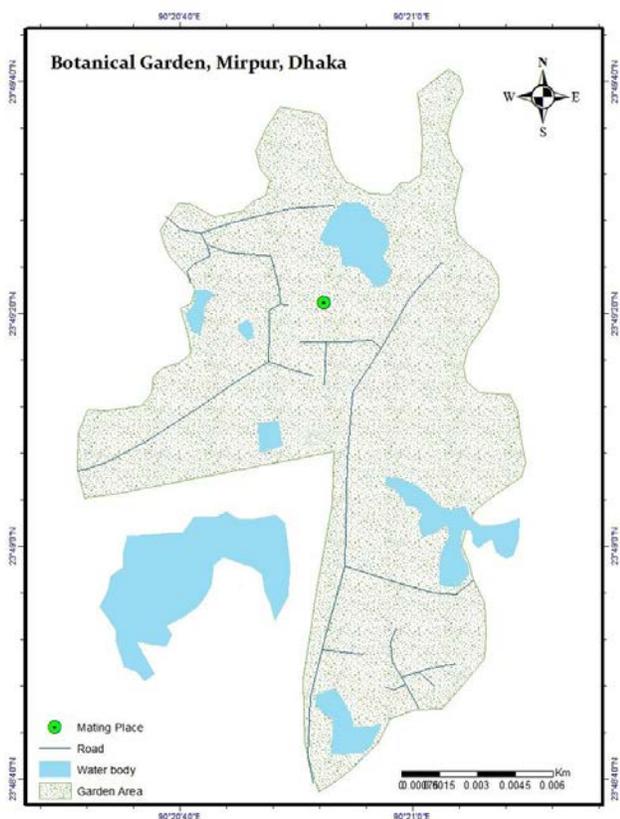


Fig. 1. National Botanical Garden, Dhaka, Bangladesh

again, approximately one meter from where she was first pinned down. These observations are consistent with the copulatory behavior described elsewhere for *V. bengalensis* by Auffenberg (1994) and by Cota (2011) for *V. salvator*.

We observed a total of five copulations between the pair over the course of 26 min (1304 to 1330 h). Copulation took place under a secluded bush (Fig. 2). In between observed copulations, the pair left the bush



Fig. 2. Copulation in *Varanus bengalensis*

to enter into a patch of sunlight to bask. Following the first copulation, the female entered into a patch of sunlight while the male remained mounted to her back and remained in this position for the entire span of her basking activity. Each copulation lasted 46, 106, 94, 164 and 59 seconds, respectively (mean = 84 sec), and the time spent basking between each copulation was 113, 72, 112 and 127 seconds, respectively (mean = 106 sec).

Following the last observed copulation, a suspected male of similar size approached the male that had just copulated with the female. The original male approached the rival hissing, and the female left the area. Standing on their hind legs and grasping each other firmly about the neck and shoulders with their forelimbs (Fig. 3), they hissed and used sharp sideways jerking movements of the head to knock their opponent down, sometimes completely falling over. This struggle was interspersed with biting to the neck behind the ear, which did not appear to produce any signs of blood or injury. The combatants took turns pressing each other to the ground, swirling around each other on the ground, and were breathing heavily and visibly exhausted as previously described by Horn (1994). After having its head pressed to the ground with the original male's forelimb, the rival male jerked its body loose and fled the area. In total, the combat lasted for 456 sec.

Discussion

In India, male-male combat in *V. bengalensis* usually occurs during the breeding season, beginning in mid-April (Auffenberg, 1994). Ritualized combat has been documented in several varanid species (Sterling, 1912;

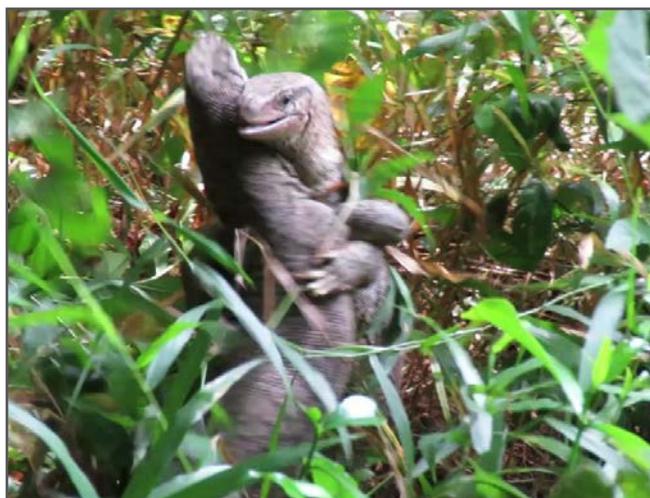


Fig. 3. Post-copulatory ritualized combat in *V. bengalensis*.

Lederer, 1929; Waite, 1929; Ali, 1944; Deraniyagala, 1958; Murphy & Mitchell, 1974; Vogel, 1979; Auffenberg 1981; 1988; 1994; Thompson *et al.*, 1992) and is a significant aspect of their reproductive biology because it represents a test that determines which males are available to copulate with females (Auffenberg, 1983). Auffenberg (1994) postulated that male-male combat usually occurs prior to mating, rather than after copulation as described in this report. Ritualized combat occurring after copulation has taken place has not previously been reported for *V. bengalensis*.

Although basking is a common thermoregulatory behavior in monitor lizards, basking in between copulations has not been documented in *V. bengalensis* before, nor has the duration of basking activity.

Acknowledgments – We are very appreciative of Amit Kumar Neogi, Shamsur Rahman Selim, Nasif Sadat, Hassan-Al-Razi, Md Faysal Ahmad, and Omar shahadat for their inspiration. We are also grateful to the Zoology department of Jagannath University for their support.

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