

Record of a Water Monitor with a Foreign Bone Protruding from its Tympanum

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Abstract - Records of injured monitor lizards and how they cope with their injuries in the wild are limited. This report documents observations made in Sumatra, Indonesia over the course of 28 months of an Asian water monitor (*Varanus salvator*) afflicted by a foreign bone protruding from its tympanum. The monitor's body condition, feeding behavior, nocturnal activity, social status, and ritualized combat are noted.

Introduction

The Asian water monitor, *Varanus salvator*, is a large (ca. 2 m total length) predator and scavenger, with a wide distribution throughout southern and southeastern Asia (Bennett *et al.*, 2010; Das, 2010). This species is semi-aquatic and diurnal, and occurs in many different habitats including mangrove swamps, along riverbanks, dipterocarp forests, and urban areas (Bennett, 1995; Bennet *et al.*, 2010; de Lisle, 2007; Uyeda, 2015). The diet of *V. salvator* is comprised of large invertebrates and small vertebrates such as insects, crabs, fishes, lizards, turtles, birds, and rats (Das, 2010; Traeholt, 1993, 1994), with carrion, including large mammal carcasses such as wild pigs and deer (Gaulke, 1991), also known to be a significant part of its diet. *Varanus salvator* often habituates to human presence and can be found in areas of anthropogenic disturbance such as human settlements and garbage areas (Bennet *et al.*, 2010; Das, 2010; Uyeda *et al.*, 2015).

In Sumatra, Indonesia, *V. salvator* is often found in lowland tropical rainforest (Teynie *et al.*, 2010). The Way Canguk Research Station is a tropical

ecosystem research station established in 1997 by the Wildlife Conservation Society Indonesia Program in collaboration with The Indonesian Ministry of Environment and Forestry (WCS-IP, 2001). It is located in Bukit Barisan Selatan National Park, the largest protected area in southern Sumatra (5° 39' 32" S; 104° 24' 21" E). The station's study area encompasses a 900 ha mosaic of primary and burned rainforest bisected by the Canguk River (WCS-IP, 2001). Approximately three months after the establishment of the Way Canguk Research Station, several *V. salvator* began visiting the station, frequently foraging on human food leftovers such as bones and meat from the kitchen. The average number of *V. salvator* typically seen around the camp on a daily basis has been five, but as many as 11 individuals have been recorded. All age classes are represented, from juveniles to adults.

Among the *V. salvator* present at Way Canguk, one individual was observed over the course of 28 months from March 2014 to June 2016 with a large bone protruding through its tympanum. As there is limited information on the biology of injured monitor lizards in the wild, here we report observations on the body



Fig. 1. The “tusked” monitor of Way Canguk Research Station, with approximately 20 cm of foreign bone protruding from its tympanum.

condition, feeding behavior, nocturnal activity, social status, and ritualized combat of this “tusked” monitor in a tropical rainforest of Sumatra.

Observations

Research staff first observed an adult *V. salvator* (ca. 2 m total length) foraging around the station in March 2014 with a foreign bone protruding from the tympanum on the side of its head (Fig. 1). This particular individual had been visiting the station daily to forage for food leftovers before it was observed with the bone protruding. It is presumed that the monitor attempted to swallow part of an extremity bone from a primate carcass, possibly a Siamang (*Symphalangus syndactylus*) or Sumatran surili (*Presbytis melalophos*). Although there was no direct observation of the bone’s ingestion, one possible scenario is that the long bone

became stuck inside the throat and when the monitor attempted to regurgitate it through vicious shaking, and the sharp, broken tip of the bone pierced through its tympanum.

In April 2014, research staff captured the “tusked” individual and attempted to remove the bone by pulling it from the side of the monitor’s head. However, there was a possibility that the tip of the bone inside the throat was stuck, and attempts to remove the bone were immediately discontinued upon observation of blood dripping from the tympanum.

During 2014, the monitor was observed in an emaciated state, and the injury to the tympanum area was still fresh and appeared to be impairing the monitor’s ability to ingest food. By January 2015, eleven months after the first observation of the protruding bone, the injury had healed and showed no overt signs of disease (Fig. 2). Once again able to ingest food without complication, it began to gain weight and was able to return to a normal body condition.

Since monitors are generally diurnal, nocturnal activity has rarely been reported (*e.g.*, Milenkaya & McKay, 2016; Uyeda *et al.*, 2013). Uyeda *et al.* (2013) documented 16 observations of nocturnal activity by a single *V. salvator* on Tinjil Island, Indonesia between 0128 and 0530 h. In Way Canguk, nocturnal activity by the “tusked” monitor was observed on more than three occasions in which it was seen feeding on food leftovers in the garbage area of the station (Fig. 3).

Following the suspected death of the station’s dominant *V. salvator* in April 2016 (this individual was observed with severe swelling to the left hind leg in January 2016 and had not been seen around the station since April 2016), the “tusked” monitor appears to have



Fig. 2. Close-up of the “tusked” monitor taken on 11 November 2016, two and a half years after it was first seen with the protruding bone. The injury to the tympanum area had healed and the monitor’s body condition had dramatically improved since 2014.



Fig. 3. The “tusked” monitor ingesting a leftover fried catfish head in the garbage area at night (2345 h) on 29 June 2016.

become the dominant individual around the station. Although there are two other individuals of similar body size in the area, the “tusked” monitor frequently elicits greater agonistic interactions by displacing and briefly pursuing other monitors, including smaller individuals. In order to become dominant, the monitor would have had to prevail in a greater number of interactions with rivals (Uyeda *et al.*, 2015). Opportunistic observations have shown that other monitors around the station tend to avoid the “tusked” individual when encountered, suggesting its dominance (Fig. 4).

At 1423 h on 9 August 2016, the “tusked” monitor was observed engaged in ritualized combat with another individual of similar body size in the Way Canguk River that lasted about 10 minutes (Fig. 5). Such combat is needed to establish or maintain the dominance hierarchy



Fig. 4. Another *V. salvator* slowly approached the “tusked” monitor as both were searching for a basking site near the station, but then avoided the latter, even though it did not exhibit any aggression.

which may yield greater access to food and females (Horn *et al.*, 1994). However, we were unable to identify the winner of the combat as the monitors followed the current of the river and were too far away to be seen once the combat concluded.

Discussion

Monitor lizards typically ingest their food whole, which can occasionally lead to health issues. This account documents a *V. salvator* that ingested a long and sharp bone, likely as part of a scavenged food item. Previous records of similar cases include a *V. varius* found with a sharp bone from a T-bone steak protruding from its throat (Fillett & Jackson, 2010) and a deceased *V. komodoensis* found with a deer antler piercing through its abdomen (A. Ariefiandy, pers. comm.). In the case of the *V. varius*, surgery was performed to successfully remove the bone from the monitor (Fillett & Jackson, 2010).

Fortunately for the *V. salvator* in the present account, it was able to recover from its injury on its own. In the Phillipines, Auffenberg (1988) found that there was a higher percentage of water monitors (*V. salvator* complex) encountered with scars (62%) when compared to *V. olivaceus* (52%), which may suggest that water monitors are more resilient and capable of withstanding injuries than other species. Observations on its current feeding behavior, dominance over other individuals, and ritualized combat illustrate the monitor’s ability to recover from the detrimental effects of such a highly invasive foreign bone protrusion.



Fig. 5. A video screen shot of ritualized combat observed between the “tusked” monitor and a rival male in the Way Canguk River.

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