

Predation and Feeding Behaviour of *Varanus salvator macromaculatus* on the Asian swamp eel (*Fluta alba*) in Lumpini Park, Bangkok, Thailand

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Introduction

The Asian water monitor (*Varanus salvator*), is second only to the Komodo dragon (*Varanus komodoensis*) in being the largest lizard species in the world (Shine *et al.*, 1996; Kulablong and Mahaprom, 2015). The Southeast Asian water monitor (*V. s. macromaculatus*), a subspecies within the *V. salvator* complex, has a wide distribution throughout mainland Southeast Asia, including offshore islands such as Sumatra and Borneo (Koch *et al.*, 2007). *Varanus* species have a high degree of cranial kinetic functionality, although not to the same degree that can be observed in snakes; which allows monitors to quickly ingest large prey items whole (Stanner, 2010). This adaptation is highly advantageous, as the amount of time required to consume food items is reduced. Therefore energy expenditure is also reduced and, in turn, the vulnerability period to potential predators during prey consumption (Stanner, 2010).

Due to the evident habituation to humans observed in the local population of *V. s. macromaculatus* in Lumpini Park, Bangkok,

Thailand, there is greater potential to observe and record unique behaviours.

Individuals within the park typically behave indifferently to human presence at a distance of a few metres away; however, they will quickly flee or retaliate upon approach (Stanner, 2010). Here, we describe a predation event from a juvenile/subadult *V. s. macromaculatus* on an Asian Swamp Eel (*Fluta alba*; synonym of *Monopterus alba*). Although these monitor lizards preying *F. alba* has been documented (Stanner, 2010), details of the capture, the actions used to subdue the prey item and subsequent ingestion is poorly documented; with the exception of a recent observation by Cota and Sommerlad (2013). Furthermore, there are no current recordings from Lumpini Park within the available literature.

Observation and Discussion

At 1349 h on 24 August 2016, a *V. s. macromaculatus* was observed actively foraging for prey items along a large pond in Lumpini Park, Bangkok, Thailand (13° 43' 50.11'' N; 100° 32' 19.77'' E; 4 m ASL).



Figure 1. *Varanus salvator macromaculatus* upon capturing a *Fluta alba*. The monitor can be observed carrying the eel away from the water's edge as the eel begins to wrap its body around the head and neck of the monitor lizard.



Figure 2. Prey manipulation before ingestion by *Varanus salvator macromaculatus*.



Figure 3. The use of lateral head movements by *Varanus salvator macromaculatus* and the ground in order to manipulate *Fluta alba*.



Figure 4. The use of rapid biting and lateral head movements in order to incapacitate and re-position the *Fluta alba*, ready for consumption by *Varanus salvator macromaculatus*.



Figure 5. Initial stages of ingestion of *Fluta alba* by *Varanus salvator macromaculatus*

V. salvator species rely heavily on both olfactory and optic cues during active foraging (Gaulke, 1992). Water monitors use visual cues to identify suitable shelter sites for prey items and will subsequently investigate the shelter with use of the nares and tongue (Gaulke, 1992). In this observation, once the swamp eel had been detected along the pond's edge, the

monitor began to dig into the shelter site with the use of its snout, until capture. The eel was quickly grasped in between the jaws of the monitor lizard by the same means described in Cota and Sommerlad (2013), which consisted of a sudden jerk forward of the head whilst elongating the neck. The eel was struck on the lateral portion of its head with the posterior portion of the eel's body free to



Figure 6. The use of the ground to assist with the rapid ingestion of the *Fluta alba* by *Varanus salvator macromaculatus*.



Figure 7. Lateral body and head movements, including the thrusting forward of the head during the pharyngeal compression stage of ingestion by *Varanus salvator macromaculatus*.

move. The monitor lizard immediately began to move away from the water side, with the eel still clutched between its jaws (Figure 1); and moved approximately 50-70cm away from the water's edge. Through the evidence from this observation, and the observation by Cota and Sommerlad (2013), it is evident that *V. s. macromaculatus* takes *F. alba* to an adequate distance away from the water's

edge in order to prevent the prey item from escaping (Figure 1). It is typical behaviour of species within the *V. salvator* complex to maintain hold of small and agile prey items with the mouth, in order to prevent prey escaping (Gaulke, 1992). This is reinforced in this observation where the eel did not leave the mouth of the monitor lizard from capture and throughout ingestion.

Upon capture, the eel had wrapped the posterior portion of its body around the neck and head of the monitor (Figure 1), as also observed in Cota and Sommerlad (2013); it can be postulated that this is done as a last-resort defence mechanism by *F. alba*.

However, the eel was quickly thrown off by sudden head jerks at an approximate 45 degree angle forward from the monitor lizard (Figure 2). The *V. s. macromaculatus* began to manipulate the eel within its mouth, using the ground to aid in maintaining grip and position of the eel (Figure 3).

Once a tight hold had been established on the lateral portion of the eel's head, the monitor proceeded with rapid biting and banging of the eel's head on the ground in order to completely incapacitate the eel (Figure 4). Once the eel ceased moving (presumably dead), the monitor immediately began to reposition the eel so that the anterior portion of the head faced towards the throat of the monitor (Figure 4). To do this, the monitor used quick head jerks to begin the repositioning before using the ground to completely shift the eel around. The monitor took exactly 62 seconds to swallow the eel whole; using head, throat, entire body movements and the ground as aid in the process (Figure 5 - 6). Subsequent behaviours included rapid tongue flicking following the ingestion, maintaining position on the level ground.

References

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