

An observation of predation by a Scrub Python on a Striped Possum

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Abstract

We note a prolonged (>20 hours) predation event by a large tropical python, *Simalia kinghorni*, on a Striped Possum, *Dactylopsila trivirgata*.

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Handling editor: Gabriel Crowley

Citation: Kearney MR, Martin RW, Larson J, Phillips BL. 2023. An observation of predation by a scrub Python on a Striped Possum. *North Queensland Naturalist* 53: 17-21.

Endotherms in tropical environments must deal with ectothermic predators, including crocodiles, varanids and snakes. The roughly ten-fold higher metabolic rates of endotherms compared to ectotherms leads to an interesting dynamic of predation where the ectothermic predator has the advantage in sit-and-wait circumstances. In the Wet Tropics region of Far North Queensland, the Australian Scrub Python *Simalia kinghorni* (Stull, 1933) is a major predator of mammals (e.g. Martin 1995). This large python species – individuals growing to more than 5 m in length (Fearn & Sambono 2000) – can reach high abundances, especially in lowland habitats. They hunt mammals and birds on the ground and arboreally, using olfactory cues to find locations to sit-and-wait, for example along foraging trails or retreat sites of their prey (Natusch *et al.* 2022). Possums are diverse and reach high abundances in the highlands of the Wet Tropics, while Scrub Pythons are generally commonest in the lowlands where the most common possum is the Striped Possum *Dactylopsila trivirgata* Gray, 1858. Striped Possums and Scrub Pythons must have a long history of intense interaction in Australia and Papua New Guinea, and they almost certainly have coevolved specialised predator-prey behaviours.

We observed a >20-hour stand-off between a Striped Possum and a Scrub Python at the Daintree Rainforest Observatory. We were first alerted to the situation on Wednesday 28 September 2022 at 10:15 when the possum's alarm call was heard. The possum was located in a small, vertically oriented elliptical hollow (~15 cm x 5 cm) 8 m from ground, in a 20 m tree, with the python's head positioned ~20 cm from entrance (Fig. 1). In a group of eight people, we approached the tree within 10 mins of first discovery. The python was disturbed and was observed leaving its position and then moved at least 2-3 m before it was lost from view. This movement allowed us to observe the length of the snake, which we estimate to be between 1.6 and 2.2 m. During this time the possum continued to vocalise, roughly every few minutes, despite the presence of the observers, and continued to vocalise after the snake and observers had left (about 15 min total observation).

Four of us returned at 14:30 and heard the possum's alarm call on approach. The snake had returned and resumed a position near identical to its previous position. We watched continuously for a further 6.5 hours, during which the snake was observed to reset its position several times, backing away from the entrance and then reappearing either on the



Figure 1. The Scrub Python at the entrance to the Striped Possum's den at 16:00 on 28th September 2022. Photographer: Johan Larson.

side or near the top of the hollow entrance. During these resets, the python often approached very close to the lip of the hollow (whilst tongue-flicking), but rarely came within sight of the possum and did not attempt to strike (video: <https://youtu.be/wvA6Yo5Wqsg>). The snake would then pull back 10-15 cm and resume waiting. The possum called approximately every 2 minutes, for about 10 seconds, and was positioned with mouth slightly open. It appeared to be awkwardly wedged into the small hollow, and not in a position to rapidly exit.

We revisited 5 times from 21:00 Wednesday up until 00:05 Thursday and the situation remained unchanged, with the possum continuing to vocalise. We checked again at 6:55 Thursday, and the python had captured and killed the possum and was hanging with the possum wrapped in a coil; the snake with its head free and tongue-flicking the body preparatory to eating. The observers left after 1 minute and then returned at 7:47, when python and possum were gone.

Overall, the stand-off lasted at least 20 hours, but was likely longer as pythons are nocturnally active and the python may have cornered the possum at dawn on the first day. In general, snakes are vulnerable to being seriously injured by mammalian prey (Kornilev *et al.* 2023). That the python waited so long and did not simply enter the hollow indicates the risk the possum posed to the python. Striped Possums feed by extracting grubs and other invertebrates from rotting trees and have chisel-like teeth and a very powerful bite (Handasyde & Martin 1996; Rawlins & Handasyde 2002). The possum remained facing out of the hollow and, having its mouth open, appeared to be maintaining a defensive posture should the python have attempted to move its head into the hollow. The python needed to orient itself perpendicular to the tree and the brief periods during which it retreated from the hollow may relate to muscle fatigue due to the awkward striking posture (though it may also have been responding to the presence of human observers). The possum could not see the python; if it could have seen the python it could have escaped when the python was resetting. The possum was presumably aware of the python's nearby presence from its scent. There was thus some degree of uncertainty for the possum whereby it might have successfully escaped if it happened to leave while the snake was resetting. The python's lower metabolic rate presumably gives it a clear advan-

tage in this waiting game and the possum was spending considerable energy on calling. While we did not witness the strike and thus do not know if the possum ultimately tried to leave the hollow, the most likely scenario appears to be that the possum attempted to escape just before dawn. It is intriguing that the denouement of this drama occurred near dawn, when temperature is at its lowest point in the day and the snake is, presumably, less metabolically capable. Such a choice on the possum's behalf could well represent an evolved behaviour that exploits the relative advantage of endothermy over ectothermy when conditions are cold. The strike speed of the snake would be a function of body temperature which is a function of environmental temperature, whereas the possum's performance would be less sensitive to temperature. But, of course, in lowland tropical rainforest at this time of year, the lowest temperature is still in the low twenty degrees, and a large snake also has some thermal inertia. In this case, the overnight temperature only dropped to 24°C (it was ~25°C at midnight) and conditions were cloudy. The snake's body temperature, therefore, would have been close to ambient air temperature but this was clearly sufficiently high for it to capture, subdue, and consume the possum.

We found a rotting tree 12 m from the possum's den (Fig. 2) that showed damage consistent with Striped Possum feeding activity. There was a small amount of fresh wood debris on the ground under this tree suggesting that the feeding bout was recent and very brief. Thus, it is likely the possum was camped next to the tree to continue feeding. The possum may have been a juvenile because of the strong contrast between its black and white fur; this contrast reduces in older individuals and the possum may have therefore been naive in its choice of den (RM personal observation).

Observations of predation by snakes in the wild are rare. In lowland rainforest at Shipton's Flat in the 1990s, however, one of us (RM) was drawn to a similar stand-off between a Striped Possum and Scrub Python by the possum's vocalisations (the interaction in this case was interrupted by human interference). Our observation may thus reflect a drama that plays out regularly between Striped Possums and Scrub Pythons across the Wet Tropics.



Figure 2. Tree at which the Striped Possum was assumed to have been feeding, 12 m from the den and site of predation. Photographer: Johan Larson.

Acknowledgements

We thank Michele Schiffer and the Daintree Rainforest Observatory staff for logistical support, Rachel Grover for nutritional support, and Michael Anthony for constructive feedback on the manuscript.

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