

Biodiversity Record: Long-tailed macaque mother and infant constricted by a reticulated python

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Subjects: Long-tailed macaque, *Macaca fascicularis* (Mammalia: Primates: Cercopithecidae);
Reticulated python, *Malayopython reticulatus* (Reptilia: Squamata: Pythonidae).

Subjects identified by: Yue Ling Sim.

Location, date and time: Singapore Island, Upper Peirce Reservoir Park; 28 July 2025; 1134–1315 hrs.

Habitat: Secondary forest along a limited access road at the edge of a freshwater lake.

Observer: Yue Ling Sim.

Observations: A reticulated python of about 3.7 m (total length) was seen on the forest floor, coiled around two long-tailed macaques—an adult female and a black-coated infant, presumably a mother-offspring pair (Fig. 1). The macaques being constricted belonged to a neighbouring group of the authors' focal study group, in an area where their ranges overlapped. The sequence of events was as follows:

At 1134 hrs, during the observer's routine observation of the study group, intense alarm vocalisations erupted 100 m southward along an access road. The observer noted that several members of the neighbouring group were alarm calling and positioned 3–4 m away from a python that was constricting two other macaques. At the same time, four macaques from the study group rushed towards the commotion. They were two adult males (Henry and Darth), one adolescent male (Toothy), and one juvenile male (Pooh). Their appearance at the scene caused the observed neighbouring group members to flee into the forest.

After displacing the neighbouring group from the road, the four male macaques approached the python and its victims. They maintained a distance of 2–5 m away, pacing back-and-forth in a vigilant state, scanning each other, the snake, and the area (see Video Clip 1). Occasionally, Henry adopted a bipedal stance while closely watching the snake. Only the two adult males Henry and Darth vocalised, producing alarms. At one point, Henry and Darth approached each other while alarming simultaneously. None of the macaques approached closer than 2 m or had any aggressive contact with the snake. While this was happening, the displaced neighbouring group briefly emitted several alarm calls from within the forest. They subsequently fell silent and vacated the area.

At 1142 hrs, Darth moved into a patch of simpoh ayer (*Dillenia suffruticosa*) shrubs along the forest edge about 3 m above the python. He continued watching the snake while producing alarm calls. Around the same time, Henry, Toothy and Pooh, moved out of the observer's sight and were no longer heard.

The python had both macaques entrapped by its body. It was coiled around the adult female's abdomen. Her arms were hanging freely, but her right leg had been bent in half and bloodied due to an open fracture that was caused by the force of the python's constriction. She had appeared lifeless since the onset of the observation. The snake was also constricting the infant macaque around its abdomen. At 1146 hrs, the infant opened its eyes, stretched its neck, and moved its head left and right in an apparent struggle to free itself (see Video Clip 2). When Darth caught sight of the infant's movements, his alarm calls intensified in volume and rate. The infant then became motionless briefly, before moving its head a few more times after which it ceased moving and died.

At 1153 hrs, the python began to uncoil from its prey. Upon uncoiling, it left the infant's carcass at the forest edge and began to drag the adult female into an open drain along the road. After the snake moved, a well-defined cavity in the leaf litter became evident. It seemed to be the entrance of a burrow from which the snake may have emerged to capture the macaque pair. Darth, still perched in the tree above the snake, then uttered louder and more frequent alarm calls in

response to the python's movement. Henry, Toothy and Pooh returned to the roadside and approached the snake that was lying motionless with the dead female macaque in the drain. The three macaques on the roadside were calm and sat quietly 5–8 m away from the snake, but Darth continued to occasionally utter alarm calls from the shrubs.



Fig. 1. Reticulated python constricting the female-infant macaque pair.

Fig. 2. The carcass of the female partially wedged in the burrow, with the infant's carcass beneath.

Fig. 3. Juveniles, adolescent males, and adult males observing the macaque carcasses (indicated by arrow) following the python's disappearance.

Fig. 4. The infant's carcass left by the burrow.

(Photographs by: Yue Ling Sim)

At 1158 hrs, the python began moving again. It gripped the female's carcass with its tail tip and pulled the body out of the drain and dragged it to the forest edge. Other members from the observer's study group were more than 50 m north on the access road and had showed no response to Darth's alarm calls. However, some of these macaques started to move towards the moving snake and joined the alarm calling. At 1201 hrs, 13 monkeys had formed a mob, including Henry, Toothy and Pooh, as well as Darth who had descended from the shrubs (see Video Clip 3). The mob remained 1–5m away from the python and emitted alarm vocalisations. Henry stood in front, closest to the snake (1–2 m), and mostly assumed a bipedal stance. A few others also, occasionally, stood bipedally. The mob formed a 90° arc around the snake. Two of the mobbing individuals were adult females who stood silently watching the snake. In less than a minute, these females moved away northward up the road.

While being mobbed, the python entered the burrow entirely, pulling the female's body halfway in, and leaving her hindquarters and tail exposed (Fig. 2). The infant's carcass remained lying next to the burrow's entrance, under the female's legs. Following the snake's disappearance, the mob's alarm calls quickly subsided. Although they had stopped calling, the macaques continued to watch the carcasses and vigilantly scanned the surrounding area (Fig. 3). Two pairs of macaques in the mob began grooming one another. Both pairs consisted of an adolescent male grooming a juvenile. The mob began to gradually disperse, and by 1225 hrs, all the macaques had moved out of the observer's sight. The observer also left the scene to follow the study group.

At 1245 hrs, alarm calls from macaques were again heard from the area of the abandoned carcasses. The observer promptly headed back to the site and found that the adult female macaque's body had disappeared, but the dead infant remained untouched (Fig. 4). Darth and Toothy were perched 3–5 m up in a tree at the forest edge, looking vigilantly into the forest (see Video Clip 4). Due to the thick foliage, the observer was unable to see what the two macaques were looking at, but the acoustic characteristics of their alarm calls were audibly consistent with their alarm calls for a snake. It was, therefore, most likely that the python had returned and claimed the carcass of the adult female. No other potential predators, such as feral dogs, were observed in the area.

This bout of renewed alarms by Darth and Toothy did not attract other macaques from the study group, who were then 50–100 m northward along the road, primarily engaged in grooming and feeding. At 1300 hrs, Henry and Pooh returned. They climbed up the trees and looked down into the forest. Henry and Pooh left after a few minutes, moving northward along the road. Darth and Toothy remained and continued alarm calling for half an hour, after which they groomed each other.

The python-macaque encounter reported here lasted approximately 1 hr 40 min, of which 1 hr 20 min were directly witnessed by the observer. Apart from the victims, no other macaque was seen to have made physical contact with the python. The infant's carcass was observed at the same resting location at 1615 hrs, three hours after the snake was last seen. Considering that the snake had departed, the observer left the field site. Returning to the location the following day at 0730 hrs, the infant's carcass was no longer present. It is unknown what took it.

Remarks: Observations of predation on non-human primates happen opportunistically and infrequently (Cheney & Wrangham, 1987). A testament to its infrequency is that van Shaik and colleagues (1983) spent over three thousand hours observing long-tailed macaques in northern Sumatra but recorded only one event of a python capturing a juvenile. A factor contributing to the low number of observations is that human observers around primates may actually deter predators (Isbell & Young, 1993; LaBarge et al., 2020). Because of the infrequency, anecdotes of predation on primates are a valuable contribution of scarce data. The more we can collect, the better we can understand predation risks and rates across populations (Hill & Lee, 1998), antipredator strategies in primates (Isbell, 1994; Carlson & Griesser, 2022) and the degree to which primates serve as prey species (LaBarge et al., 2020).

Here, we provide a detailed documentation of a directly observed case of wild long-tailed macaques being preyed on by a reticulated python, which is not surprising for its occurrence, but difficult to directly observe. We also described the antipredator responses of macaque bystanders. Our observation was markedly unusual because the python had constricted to death a mother and an infant simultaneously—an occurrence that, to our knowledge, has never been reported in the natural history literature of this species. We were able to observe the constriction in progress, but not the initial capture or the subsequent consumption of the victims.

Predation on long-tailed macaques has been confirmed through direct observation and indirect evidence for several different predators (Riley et al., 2015). Predation by reticulated pythons has been directly observed by researchers at least twice (this report; van Shaik et al., 1983), and confirmed by necropsy examinations (Shine et al., 1998). Predation by dogs has been directly observed in two reports (Ridley, 1895; Riley et al., 2015) and indirectly supported in two other reports (Lim & Sasekumar, 1979; Gumert et al., 2013). Other predators include crocodylians (Galdikas & Yeager, 1984; Otani et al., 2012) and felids (Seidensticker et al., 1980). In some regions, we can find examples of strong predation on long-tailed macaques. The Philippine eagle (*Pithecophaga jefferyi*), also known as the monkey-eating eagle, is the largest eagle on earth by body size, and has been confirmed through direct observation, necropsy, and nest inspection to be a regular predator of long-tailed macaques (Clemens, 1907; Gonzales, 1968; Kennedy, 1977; Abaño et al., 2016). A study on prey brought to their nests showed that long-tailed macaques made up the largest biomass component of this raptor's diet on Mindanao Island in the Philippines (Ibañez, 2007). On Rinca Island in Komodo National Park, Indonesia, long-tailed macaques are a major prey species of Komodo dragons (*Varanus komodoensis*), having been found through examination of faecal remains to contribute 20% of the reptile's diet near the island's visitor centre (Imron et al., 2018). Both studies verify that long-tailed macaques can be a significant prey component in an ecosystem where suitably sized and adept predators are present.

The reticulated python could be a common predator of macaques, but due to its cryptic hunting strategy (i.e., hiding in wait) actual attacks are almost never observed by researchers, and they leave little, if any, evidence behind. This makes it difficult to obtain a true estimate of macaque predation rates by pythons. In a sample of 1,070 reticulated python

carcasses examined from commercial trade in Sumatra, Shine et al. (1998) found long-tailed macaque remains in the gut of two adult male snakes. While the necropsy examination confirmed that pythons do prey on macaques, it cannot be used to derive actual rates of python predation, since we do not know if all the python specimens originated from areas inhabited by macaques.

Long-tailed macaques are highly vigilant and reactive to constricting pythons. When they encounter pythons, they commonly alarm call at and mob them, as documented in this observation and others. In another more recent observation, several adult females and juveniles from our study group encountered a reticulated python and briefly stopped to alarm call at it before moving on. More intense reactions to pythons have been observed elsewhere. For instance, long-tailed macaques in Tanjung Puting National Park, Kalimantan Tengah, Indonesia were observed mobbing a python. The entire group encircled, alarmed vigorously, showed vigilant attention, and physically harassed the snake (Gumert, personal observation). Wheatley (1999) also shared a second-hand account of observations made by villagers at the Monkey Forest in Padangtegal, Ubud, Bali, Indonesia, where many long-tailed macaques mobbed, severely bit and killed a python that had captured an infant macaque. Wheatley also directly observed Balinese macaques mobbing snakes, during which they alarmed and hit them.

As we accumulate more observations of predation events in the literature, we may eventually be able to better understand the significance of natural predation on long-tailed macaque mortality, identify which predators contribute most significantly to their deaths, and clarify the importance of long-tailed macaques as prey within an ecosystem. Mortality by predation is likely to vary across long-tailed macaque populations, as they are widely distributed across a large variety of tropical habitats, each containing different types and abundance of predators. Such ecological variation makes it possible that vigilance and response to pythons could vary across regions depending on the degree of snake predation — a question that future research can address. The reticulated python is distributed throughout Southeast Asia, west of the Wallace line (Murray-Dickson et al., 2017), thus likely has the largest range overlap with the long-tailed macaques than any other predator. Given this, we can expect most long-tailed macaque populations to face some degree of reticulated python predation, and where both species are common, pythons are likely a regular predator of long-tailed macaques.

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Supplementary videos:

Video Clip 1: <https://youtu.be/-NucGQ9gQVw>

— Macaques approaching and reacting to python that had caught two macaques from another group.

Video Clip 2: <https://youtu.be/7lLzgEuoDno>

— Infant macaque in python's coils showing signs of life.

Video Clip 3: https://youtu.be/NFsCLO_1I4Q

— Python dragging dead macaque out of drain being mobbed by a group of macaques.

Video Clip 4: <https://youtu.be/-NucGQ9gQVw>

— Macaques reacting to an entity [possibly a python] on forest floor beneath them.