

Biodiversity Record: Predation of Sunda slow loris by small-toothed palm civet

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Subjects: Small-toothed palm civet, *Arctogalidia trivirgata* (Mammalia: Carnivora: Viverridae);
Sunda slow loris, *Nycticebus coucang* (Mammalia: Primates: Lorisidae).

Subject identified by: Andie Ang and Sabrina Jabbar.

Location, date and time: Singapore Island, Central Catchment Nature Reserve, northeast sector; 28 May 2022; 2212–2312 hrs.

Habitat: Secondary forest.

Observer: The event was recorded by a camera (Reconyx HyperFire 2 Covert IR) installed 14 m up a *Calophyllum rubiginosum* tree since 18 April 2022. It was set at medium-high sensitivity to take three photos (rapid fire), followed by a five-second video. Data from the camera was retrieved on 25 October 2022 after 190 trap nights.

Observation: At 2212 hrs, a male small-toothed palm civet was captured by camera sniffing his surroundings (Fig. 1). At 2244 hrs, presumably the same individual (from the short time interval and sex of the animal) was recorded with a dead slow loris hanging from his mouth (Fig. 2). At 2245 hrs, the civet began eating the loris from the head (Fig. 3). Thirteen minutes into eating the loris at 2258 hours, the civet paused with eyes half-closed and appearing unfocused (Fig. 4). For the next four minutes, the civet did not move much and appeared dazed (see video in <https://youtu.be/hefy9Jywrsk>). He resumed feeding on the loris at 2302 hours and moved out of sight with the loris at 2312 hours.

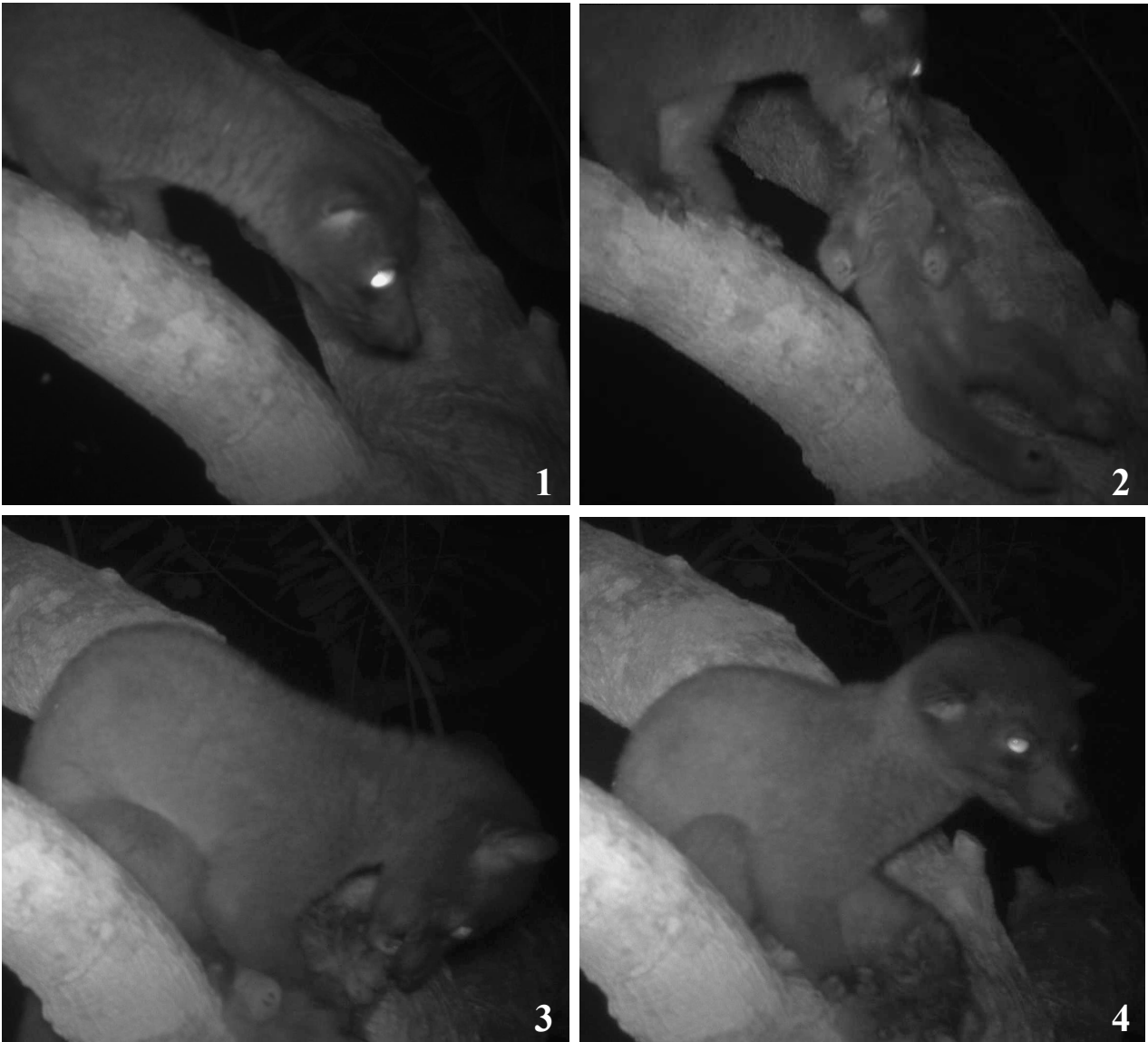
Remarks: The Sunda slow loris is one of three native non-human primates in Singapore where it is classified as Endangered, while the small-toothed palm civet is one of five viverrids there and is considered locally Critically Endangered. Given that they are rare, nocturnal, arboreal, and typically solitary, field observations of the two species are few in Singapore.

Small-toothed palm civets are omnivorous, consuming plant and animal matter including fruits, nectar, bark sap, insects, and a variety of vertebrate prey such as frogs, snakes, birds, and squirrels (Wroughton, 1915; Davis, 1962; Nakabayashi, 2020). Given this diet, civets may be classified as potential predators of slow lorises. However, there were no documentation of them preying on slow lorises. Civets and slow lorises were observed to come close to each other on multiple occasions but neither one of this supposed predator-prey combo showed any discernible reaction (Wiens & Zitzmann, 1999; Rode-Margono & Nekaris, 2014).

The civet was believed to have killed the loris, as this species is not known to scavenge. Hence this is the first record of a slow loris predation event by a viverrid. Other natural predators directly observed to have taken slow lorises include reticulated python (*Malayopython reticulatus*), changeable hawk eagle (*Nisaetus cirrhatus*), Sumatran orangutan (*Pongo abelii*), and Asian water monitor lizard (*Varanus salvator*) (Utami & van Hooff, 1999; Wiens & Zitzmann, 1999; Hardus et al., 2012; Huda et al., 2018).

Slow lorises (*Nycticebus* spp. and *Xanthonycticebus pygmaeus*) are the only known venomous primates. It has been proposed that their toxin is used primarily for intraspecific communications and as a defensive mechanism against olfactory-oriented predators such as civets, cats and sun bears (Alterman, 1995; Nekaris et al., 2013), though the amount and toxicity are typically not enough to prevent them from being eaten (Hagey et al., 2007). Nonetheless, it is possible that the loris had rubbed venom on its head and/or neck as a defensive repellent, and the civet could have ingested the venom, which might have a narcotic effect and perhaps stupefying him momentarily. It is also possible that the civet was bitten by the loris during the hunt. Otherwise, the civet could be taking a break from consuming his meal.

Predation of nocturnal arboreal animals is difficult to document in the wild. When both the predator and prey are nocturnal, solitary, and arboreal, direct observations of predation events are virtually unobtainable (Isbell, 1990). Arboreal camera traps in this case provide researchers with the possibility of documenting rare and opportunistic events which are otherwise difficult to obtain through night spotting surveys. Given that predation is a powerful selection pressure in an animal's life history (Burnham et al., 2012) but little is currently known of the predator-prey relationship particularly of nocturnal and arboreal vertebrates, we encourage more studies into this aspect of wildlife ecology using camera traps.



Figs. 1–4. Camera trap images of a male small-toothed palm civet on 28 May 2022 about 14 m up a *Calophyllum rubiginosum* tree. Fig. 1. At 22:12:54 hrs showing the civet sniffing his surroundings. Fig. 2. At 22:44:59 hrs showing the civet carrying a dead loris from his mouth. Fig. 3. At 22:45:28 hrs showing the civet eating the loris from the head. Fig. 4. At 22:58:04 hrs showing the civet appearing dazed after eating the loris.

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