

## Biodiversity Record: Predation and passive food sharing of a green crested lizard by long-tailed macaques

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**Subjects:** Long-tailed macaque, *Macaca fascicularis* (Mammalia: Primates: Cercopithecidae); Green crested lizard, *Bronchocela cristatella* (Reptilia: Squamata: Agamidae).

**Subjects identified by:** Yue Ling Sim.

**Location, date and time:** Singapore Island, Upper Peirce Reservoir Park; 26 March 2025; 1517–1525 hrs.

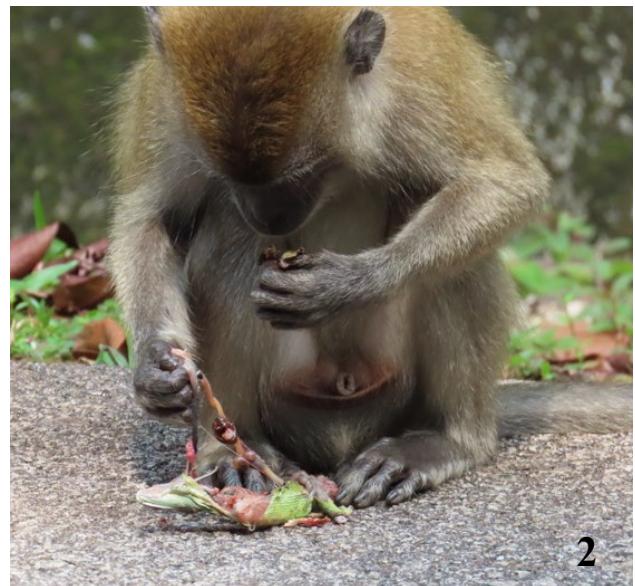
**Habitat:** Grass verge of road cutting through mature secondary rainforest.

**Observer:** Yue Ling Sim.

**Observation:** At 1517 hrs, an adolescent male long-tailed macaque dubbed Oliver was observed capturing a green crested lizard. He was pouncing around in his attempt to catch it with both hands, eventually succeeding in grasping the reptile. He immediately tore it apart using his hands and teeth, consuming portions of the lizard's flesh (Fig. 1).



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Fig. 1. Oliver tearing apart the lizard with his mouth. Fig. 2. Eyeyore handling the dismembered prey and sniffing a torn organ which he did not consume (Photographs by: Yue Ling Sim).

A juvenile male, dubbed Eyeyore, from the same social group soon approached, briefly observing Oliver and his catch before pulling the prey away from Oliver's grasp. Oliver displayed little resistance, maintaining only a brief hold of the prey before letting it go to Eyeyore. Eyeyore was exploratory in his handling of the prey. He sniffed it, picked at it with his fingers, and occasionally lifted it to his mouth to take small, tentative bites or tastes (Fig 2.), before leaving it on the ground. Oliver then retrieved the lizard from the ground and continued to actively consume the prey, lifting it to his mouth to rip and chew on the meat (see video at [https://youtu.be/1Kcexfy700Y?si=tmxvKKnB4\\_t1MzTY](https://youtu.be/1Kcexfy700Y?si=tmxvKKnB4_t1MzTY)). At one point, the dismembered reptile was left on the grass verge, where both individuals picked at it together, touching it simultaneously (see video at [https://youtu.be/koBiTG4Mxt4?si=in1VOzJ00\\_G7KnyX](https://youtu.be/koBiTG4Mxt4?si=in1VOzJ00_G7KnyX)). Following that, each macaque handled the remains once or twice more, picking up the carcass from where it had been left on the ground by the other.

After approximately seven to eight minutes of handling by both individuals, the lizard's body was discarded on the road (Fig. 3). At least ten other group members who later passed the location appeared unaware of the carcass.



Fig. 3. The discarded remains of the lizard left on the road after the food sharing episode was completed (Photograph by: Yue Ling Sim).

During the feeding episode, the two individuals were tolerant of each other and shared the prey without hostility or resistance. Over the two months preceding this predation and food sharing event, Oliver and Eyeyore appeared to share a stronger affiliative bond than most other pairs. This impression was later confirmed by systematic observations that followed over the next month and a half, which revealed that their relationship showed one of the highest affiliation scores in the group. Specifically, their combined grooming and proximity measures exceeded those observed in nearly all other dyads. This observation of food sharing was yet another component showing a very strong social bond between them.

**Remarks:** This ad libitum observation serves to record that macaque predation on small vertebrates opportunistically occurs in Singapore. This is notable because long-tailed macaques are primarily frugivorous (Fooden, 1995; Yeager, 1996), devoting up to 82% of foraging on fruit in natural habitats (Sterk & Steenbeek, 1997). In Singapore, they have been reported to eat at least 185 different species of fruit as the main component of their diet, playing an important seed dispersal role in these urban-impacted forests (Corlett & Lucas, 1990). They also consume flowers (Mishak & Lee, 2017) and synanthropic groups can consume high levels of anthropogenic food resources (Sha & Hanya, 2013).

As demonstrated in this observation, despite being primarily frugivorous, long-tailed macaques exhibit a high versatility in their diet. Being frugivorous omnivores, their preferred fruit diet is readily supplemented with leaves, flowers, seeds, grass, bark, fungus, eggs, insects and other invertebrates, and occasionally even small vertebrates (Wheatley, 1980; Sussman & Tattersall, 1986; Fooden, 1995). Predation on anything other than insects is uncommon, but there are records of predation on fish, frogs, cephalopods, shrimp, crabs, birds, and lizards (Fooden, 1995; Son, 2003; Stewart et al., 2008; Gumert & Malaivijitnond, 2012; Gamalo et al., 2022; Haslam et al., 2022). There are also some exceptional cases of regular predation on animal prey. For example, on coasts and islands in Thailand and Myanmar, Burmese long-tailed macaques (*Macaca fascicularis aurea*) prey on bivalves, molluscs, and crustaceans on a daily basis (Gumert & Malaivijitnond, 2012). Furthermore, high levels of animal consumption have been recorded in common long-tailed macaques feeding in the mangroves of Vietnam (Son, 2003).

Perhaps the more interesting aspect of this predation episode was the passive food sharing between these two closely associated immature males. Passive food sharing is where the possessor allows another to take and consume the food in their possession, in contrast to active food sharing, which is where the food possessor actively gives another individual the food source. When considering passive food sharing, it is important to note if the food was defensible (i.e., could the possessor keep the food from others), and that it must have been voluntary (i.e., no harassment or resistance was exhibited) (Feistner & McGrew, 1989). In this case, the larger adolescent, Oliver, could have defended the lizard from Eyeyore, but rather the transfer of the carcass occurred back-and-forth in a peaceful manner without any aggressive effort to obtain or defend it. While they were not actively handing food to each other, Eyeyore was able to take the food from Oliver's hands, and at another instance, the two macaques were touching the carcass simultaneously. Observing both macaques peacefully touching the lizard carcass at the same time exemplified the lack of contest over the food item, the willingness to allow the other access, and that the food transfers did not just occur because the other had discarded the food and no longer showed interest.

Food sharing is a notable observation because long-tailed macaques are not known to be typical food sharers. In long-tailed macaques, tolerated food transfers have long been reported to only occur between mother-offspring pairs (Kummer & Cords, 1991; Jaeggi & van Schaik, 2011), the most pervasive form of food sharing in the animal kingdom (Feistner & McGrew, 1989). However, in a recent report, food sharing of coconuts and termite-filled logs was observed in Nicobar long-tailed macaques (*Macaca fascicularis umbrosus*) on Nicobar and Katchal islands in the Bay of Bengal (Mazumder & Kaburu, 2021). They reported that sharing occurred most often between males, which is consistent with the present report of sharing between two immature males.

Oliver and Eyeyore showed a close social relationship, and we cannot exclude that they might have been siblings. In long-tailed macaques, food sharing could be involved in reciprocal social support between two males, a point also postulated by Mazumder & Kaburu (2021). Young male long-tailed macaques will emigrate from their natal group when nearing sexual maturity, and upon their natal dispersal event (i.e., first dispersal in life), most young males will disperse with other familiar males, even sometimes actively recruiting allies during the transfer process. These social alliances (i.e., supportive social relationships) in developing males are characterized by frequent proximity, grooming, and play (van Noordwijk & van Schaik, 2001). Oliver and Eyeyore showed a similar relationship pattern, and additionally the food sharing recorded here. Close relationships between young male long-tailed macaques from the same natal group appear to function to improve the chances of successful immigration following natal dispersal (van Noordwijk & van Schaik, 1985).

We must also report that Eyeyore had disappeared, and presumably died, approximately seven weeks after the food-sharing episode. He developed abdominal bloating by 17 April 2025, twenty-two days following the lizard predation event. His abdominal swelling progressively worsened until 13 May 2025 when he was last seen. There is a possibility that Eyeyore's pathological condition may have resulted from an infection contracted from the lizard, as reptiles are known to be host to a variety of pathogens that can lead to sickness and even death (Magnino et al., 2009). Another possibility is anthropogenic feeding, which has been regularly observed at this site. This could have also presented tainted food and other health risks.

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#### Literature cited:

Corlett RT & Lucas PW (1990) Alternative seed-handling strategies in primates: Seed-spitting by long-tailed macaques (*Macaca fascicularis*). *Oecologia*, 82(2):166–171. DOI: [10.1007/BF00323531](https://doi.org/10.1007/BF00323531)

Feistner ATC & McGrew WC (1989) Food-sharing in primates: A critical review. In: Seth PK & Seth S (eds.) *Perspectives in Primate Biology*, Vol 3. Today & Tomorrow's Printers and Publishers, New Delhi, India. pp. 21–36.

Fooden J (1995) Systematic review of Southeast Asian longtail macaques, *Macaca fascicularis* (Raffles, [1821]). *Field Museum of Natural History*, 81:1–206. DOI: [10.5962/bhl.title.3456](https://doi.org/10.5962/bhl.title.3456)

Gamalo LED, Sabanal BT & Torrefiel JT (2022) Predation on a parachute gecko *Gekko* sp. by long-tailed macaques *Macaca fascicularis* (Raffles, 1821) in Mt. Apo Natural Park, Philippines. *Philippine Journal of Science*, 151(1): 153–156.

Gumert MD & Malaivijitnond S (2012) Marine prey processed with stone tools by Burmese long-tailed macaques (*Macaca fascicularis aurea*) in intertidal habitats. *American Journal of Physical Anthropology*, 149(3): 447–457. DOI: [10.1002/ajpa.22143](https://doi.org/10.1002/ajpa.22143)

Haslam M, Malaivijitnond S & Gumert MD (2022) Stone-tool-assisted hunting by a wild monkey (*Macaca fascicularis aurea*). *Behaviour*, 159(13–14): 1365–1373. DOI: [10.1163/1568539X-bja10174](https://doi.org/10.1163/1568539X-bja10174)

Jaeggi AV & van Schaik CP (2011) The evolution of food sharing in primates. *Behavioral Ecology and Sociobiology*, 65(11): 2125–2140. DOI: [10.1007/s00265-011-1221-3](https://doi.org/10.1007/s00265-011-1221-3)

Kummer H & Cords M (1991) Cues of ownership in long-tailed macaques, *Macaca fascicularis*. *Animal Behaviour*, 42(4): 529–549. DOI: [10.1016/S0003-3472\(05\)80238-6](https://doi.org/10.1016/S0003-3472(05)80238-6)

Magnino S, Colin P, Dei-Cas E, Madsen M, McLauchlin J, Nöckler K, Maradona MP, Tsigarida E, Vanopdenbosch E, & Van Peteghem C (2009) Biological risks associated with consumption of reptile products. *International Journal of Food Microbiology*, 134(3):163–175. DOI: [10.1016/j.ijfoodmicro.2009.07.001](https://doi.org/10.1016/j.ijfoodmicro.2009.07.001)

Mazumder J & Kaburu SSK (2021) First report of food sharing among Nicobar long-tailed macaques. *Quaternary International*, 603: 31–39. DOI: [10.1016/j.quaint.2020.11.049](https://doi.org/10.1016/j.quaint.2020.11.049)

Mishak S & Lee BC (2017) Long-tailed macaque feeding on flowers of the mangrove apple tree. *Singapore Biodiversity Records*, 2017: 66–67.

Sha JCM & Hanya G (2013) Diet, activity, habitat use, and ranging of two neighboring groups of food-enhanced long-tailed macaques (*Macaca fascicularis*). *American Journal of Primatology*, 75(6): 581–592. DOI: [10.1002/ajp.22137](https://doi.org/10.1002/ajp.22137)

Son VD (2003) Diet of *Macaca fascicularis* in a mangrove forest, Vietnam. *Laboratory Primate Newsletter*, 42(4): 1–5.

Sterck EHM & Steenbeek R (1997) Female dominance relationships and food competition in the sympatric Thomas langur and long-tailed macaque. *Behaviour*, 134(9–10): 749–774. DOI: [10.1163/156853997X00052](https://doi.org/10.1163/156853997X00052)

Stewart AME, Gordon CH, Wich SA, Schroor P & Meijaard E (2008) Fishing in *Macaca fascicularis*: A rarely observed innovative behavior. *International Journal of Primatology*, 29: 543–548. DOI: [10.1007/s10764-007-9176-y](https://doi.org/10.1007/s10764-007-9176-y)

Sussman RW & Tattersall I (1986) Distribution, abundance, and putative ecological strategy of *Macaca fascicularis* on the island of Mauritius, southwestern Indian Ocean. *Folia Primatologica*, 46(1): 28–43. DOI: [10.1159/000156234](https://doi.org/10.1159/000156234)

van Noordwijk MA & van Schaik CP (2001) Career moves: Transfer and rank challenge decisions by male long-tailed macaques. *Behaviour*, 138(3): 359–395. DOI: [10.1163/15685390152032505](https://doi.org/10.1163/15685390152032505)

van Noordwijk MA & van Schaik CP (1985) Male migration and rank acquisition in wild long-tailed macaques (*Macaca fascicularis*). *Animal Behaviour*, 33(3): 849–861. DOI: [10.1016/S0003-3472\(85\)80019-1](https://doi.org/10.1016/S0003-3472(85)80019-1)

Wheatley BP (1980) Feeding and ranging of East Bornean *Macaca fascicularis*. In: Lindburg DG (ed.) *The Macaques: Studies in Ecology, Behavior and Evolution*. Van Nostrand Reinhold, New York, USA. pp. 215–246.

Yeager CP (1996) Feeding ecology of the long-tailed macaque (*Macaca fascicularis*) in Kalimantan Tengah, Indonesia. *International Journal of Primatology*, 17: 51–62. DOI: [10.1007/BF02696158](https://doi.org/10.1007/BF02696158)