
Report

A note on responses of juvenile Javan lutungs (*Trachypithecus auratus mauritius*) against attempted predation by crested goshawks (*Accipter trivirgatus*)

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Abstract

On October 31st, 2013, we unexpectedly observed attempted predation of two juvenile Javan lutungs (*Trachypithecus auratus mauritius*) by adult crested goshawks (*Accipter trivirgatus*), in Pangandaran Nature Reserve, West Java, Indonesia. The goshawks flew over a group of feeding lutungs, attempting attacks only on juvenile lutungs from the rear, while emitting tweeting calls. The attacks involved two different birds (probably a pair) in turn from different directions. The attacks by the goshawks were repeated six times during our observation period (between 13:51 and 13:58), but none of the attempts was successful. During the attacks, no other lutungs in the group showed any anti-predator behavior (such as emitting alarm calls or escaping) against the goshawks perhaps because their body weight (6–10 kg) was much larger than that of goshawk (0.4–0.6 kg). To our knowledge, this is the first detailed report of hunting-related behavior to primates by this raptor species.

Key words: *Accipter trivirgatus*, crested goshawk, Javan lutung, Pangandaran, predation, *Trachypithecus auratus mauritius*

Introduction

Predation is considered to be a principal selective force leading to the evolution of behavioral traits and social systems in primates (van Schaik, 1983; Hart, 2007), although there are few case studies on predation (Stanford, 2002). The potential predators of non-human primates include carnivorous mammals (Matsuda et al., 2008), raptors (Sherman, 1991; Ferguson-Lee and Christie, 2001), and reptiles (pythons and crocodiles) (Chapman, 1986; Gursky, 2002; Perry et al., 2003; Otani et al., 2012). Among these, avian predators pose a significant threat to arboreal primates in Madagascar and South America (Hart, 2007). In Asia, as many as 35 species of large raptors live sympatrically with groups of up to 45 diurnal primates, and detailed research on Asian

primates has been conducted for over 50 years. However, with the exception of Philippine eagles (*Pithecophaga jefferyi*) and hawk-eagles (*Spizaetus* spp.), reports on the predation of primates by raptors in Asia are limited (Ferguson-Lee and Christie, 2001; Hart, 2007; Fam and Nijman, 2011). Moreover, there have been very few reports describing the hunting behavior of predators, or the response of primates when under attack.

During the course of the long-term ecological study of wild Javan lutungs (*Trachypithecus auratus mauritius*) (Fig. 1), we unexpectedly observed the attempted predation of juvenile lutungs by a pair of adult crested goshawks (*Accipter trivirgatus*) (Fig. 2) in Pangandaran Nature Reserve (PNR hereafter), West Java, Indonesia. In this note, we describe details of the response of the lutungs against the attempted

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Figure 1. Javan lutungs (*Trachypithecus auratus*) sitting on a branch.

predation by the goshawks. Such observations will further our understanding of the predatory pressure posed by avian predators on Asian colobines.

Study site

The PNR is located at 108° 40' E and 7° 43' S on the southern coast of West Java, Indonesia, on a small peninsula approximately 3 km long and 2 km wide (see Sumardja and Kartawinata, 1977; Brotoisworo, 1991; Mitani et al., 2009). The elevation of this peninsula is within the range 0-150 m a.s.l., and its average height is approximately 100 m. The average annual rainfall from 1990 to 2010 is 2,940 mm, although there is some inter-annual variation (Rosleine and Suzuki, 2012). Air temperature and humidity were 22.5-35°C and 88.5-96.5%, respectively (Kool, 1993). The nature reserve is located at the peninsula, bordering the remainder of the island through an isthmus approximately 200-m wide, linking the peninsula to the mainland. The reserve is divided into two zones: a public-use zone (nature recreation park) of 38 ha, and the nature reserve, which consists of 370 ha and includes the remaining area (Mitani et al., 2009). A 5-m-wide paved forest path runs through the recreation park for visitors' convenience. Inside the recreation park, there were six groups (123 animals) of Javan lutungs in December 2013 (Tsuji, unpublished data). Studies on their ecology have been conducted since the 1980s (Brotoisworo, 1991; Kool, 1993; Mitani et al., 2009). Since 2010 we have followed three out of six groups (K, P, and J group), and group composition, diet, and ranging behavior have been studied (see Tsuji et al., 2013).



Figure 2. A crested goshawk (*Accipiter trivirgatus*) perching near the feeding site of the Javan lutungs.

Observations of responses of juvenile lutungs against attempted predation by the goshawks

On October 31st, 2013, starting at 06:20, we followed one habituated group of the Javan lutungs (named K troop), and recorded their behavior by scan sampling method every 10-minute. The group was composed of one adult male, 11 adult/sub adult females, 16 juveniles, and one infant (age-classes were defined by Brotoisworo, 1991). On that day, the lutungs repeated the behaviors of resting, moving, and feeding on the petioles of *Swietenia macrophylla* (Meliaceae) and *Kleinhovia hospita* (Sterculiaceae), young fruits of *Pterospermum javanicum* (Sterculiaceae), young leaves of *Bauhinia purpurea* (Leguminosae) and *Dalbergia latifolia* (Leguminosae), and flowers of *Barringtonia spicata* (Lecythidaceae). At 13:40, the lutungs came to the forest edge, and moved to three neighboring trees. Several animals started feeding on the petioles of *S. macrophylla* (S1 and S2), while others fed on the petioles of *K. hospita* in a tree next to the *S. macrophylla* tree (Fig. 3). At approximately 13:50, YT and a field assistant saw two adult crested goshawks flying over the *K. hospita* tree, and making a sudden attack from the rear on a juvenile lutung at the top of the tree (L1 hereafter; estimated body length: 20 cm, tail length: 40 cm, body weight: 0.8-1 kg). This attack was unsuccessful, and L1 turned around and attempted to counter-attack the bird by raising its hand, but the goshawk flew away and perched on an *S. macrophylla* branch. YT decided to record the response of the lutungs against the attempted predation by the goshawks ad libitumly, and started recording a movie at 13:50:45. At 13:51:27 (0:42 later), another goshawk (possibly the partner of the

first attacker) came from the south emitting tweeting calls, and attacked L1 from the rear. Similar to the first attack, L1 again turned around and tried to counter but the attacker had already flown away. During this time, the first goshawk repeatedly flew over the lutung troop or was perching nearby. L1 continued to feed on the petioles of *K. hospita* until 13:51 (1:02 later), when it moved to S2. A different juvenile (L2 hereafter) moved to the *K. hospita* tree from S1 at 13:52:13 (1:28 later). At this point, the goshawks appeared to change the target animal: at 13:52:11, the first goshawk attacked L2 from the east, and immediately after (13:52:15, 1:30 later), the second goshawk attacked L2 from the north. Both of the attacks came from the rear. L2 showed no aggressive behavior against these sequential attacks, and recommenced eating the petioles of *K. hospita*. At 13:52:38, the first goshawk returned to the *K. hospita* tree where it then perched. At 13:53:39 (2:54 later), the goshawk came flying from the north emitting a tweeting call, and L2 attempted to escape from the goshawk by moving to S2. At 13:54:13 (3:28 later), the goshawk came from the west and perched

nearby. During this period, the other members of the lutung group showed no sign of being disturbed, and no sudden movements were recorded. No other lutung troops were detected in the vicinity during our observations. At 13:56:00 (4:15 later), an airplane flew over the observation site. In response, the lutung group started vocalizing, and began to move northwards. Since we subsequently followed the lutungs, it is not known when the goshawk flew away from the location of the attempted attack.

Discussion

It is known that crested goshawks feed on birds, small-sized mammals (such as rodents), reptiles, and amphibians (Ferguson-Lee and Christie, 2001; Huang et al., 2006), and there have been no reports of them hunting primates. The lutungs that were attacked by the crested goshawk were juveniles, and not adults or infants staying with their mothers. Considering the body size of the crested goshawk (wing length: 231-234 mm for males, 208-260 mm for females, body weight: 352.3 ± 13.9 for males, 563.0 ± 29.8 g

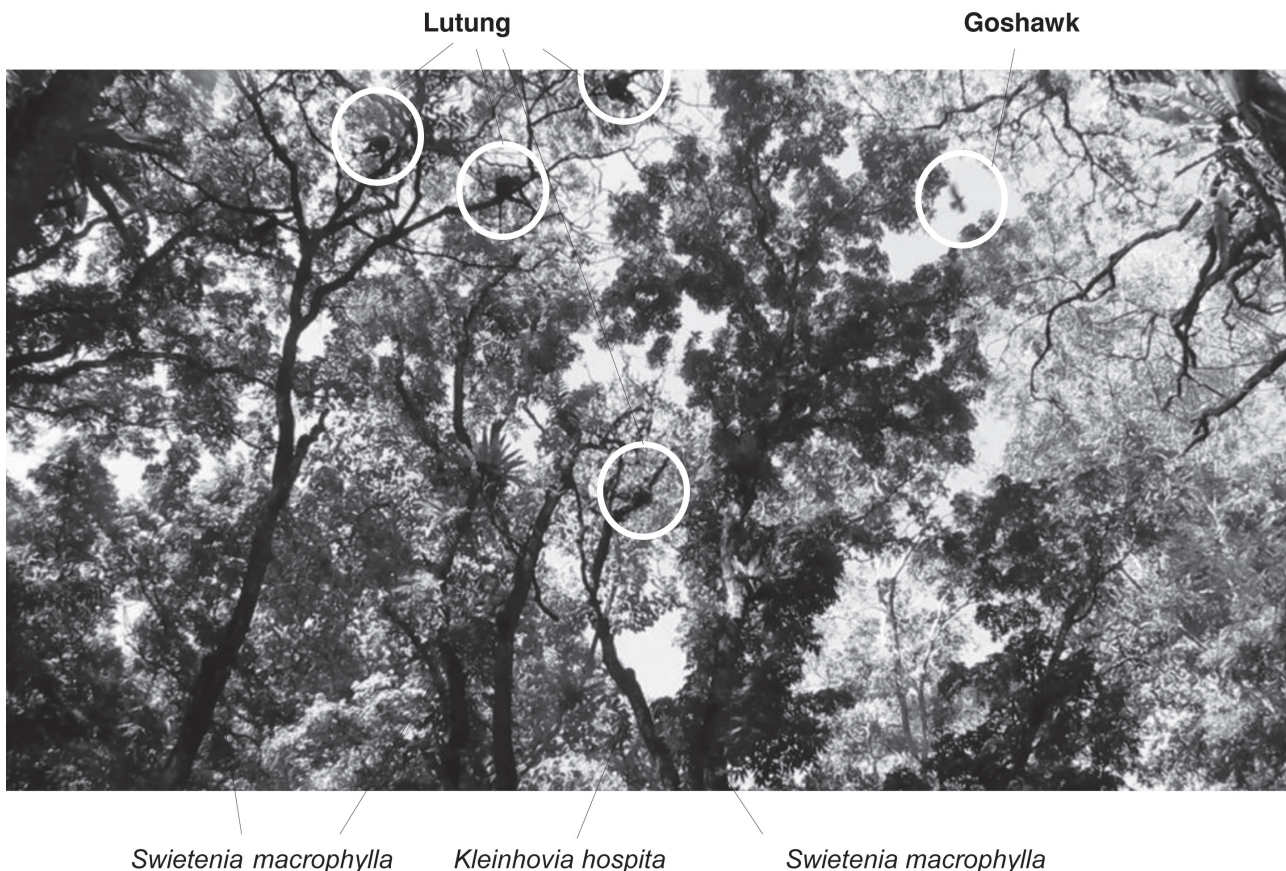


Figure 3. Location where the attempted predation on juvenile Javan lutungs by crested goshawks was observed. Animals are indicated.

for females, Ferguson-Lee and Christie, 2001; Huang et al., 2006), it is likely that the goshawks preferred juvenile lutungs due to their relative smaller body size (body weight < 1 kg) compared with adults (6-10 kg, Oates et al., 1994). This means that the juveniles are easier to capture and handle. This tendency to prey on smaller-primates is similar to other hunting attempts that have been made on Asian primates by raptors (Choudhury, 2010; Fam and Nijman, 2011). Even if that is the case, considering the body size of the goshawks, attacking middle-sized animals like lutung is unusual. The goshawks might be starved at that time, though we have no data to support this speculation.

Interestingly, in our study, the other members of the lutung group showed no signs of being disturbed, and neither the emission of alarm calls nor sudden movements occurred. In New World monkeys, in contrast, group members cooperate and sometimes chase off avian predators (Eason, 1989), or attempt to rescue the victims from the predators (Tello et al., 2002). In Asia, the emitting of alarm calls against middle-to large-sized raptors (> 1.7 kg, Fam & Nijman, 2011) has been reported for prosimians, macaques, and colobines (Cui, 2003; Gursky, 2002; Choudhury, 2010; Otani et al., 2012). A lack of interest in small- to middle-sized predators (< 1.7 kg, Fam & Nijman, 2011) by other group members has also been reported in other colobines, such as black and white snub-nosed monkeys (*Rhinopithecus bieti*) and banded leaf monkeys (*Presbytis femoralis*) (Li et al., 2006; Fam and Nijman, 2011). A likely reason for this is the difference in body sizes, and consequent predation risk, among different ages: the body weights of adult lutungs range from 6 to 10 kg (Oates et al., 1994), and are much larger than those of the goshawks. Therefore, the adults are at a lower risk of being attacked by small avian predators than isolated infants or juveniles. Brotoisworo (1991) reported that a large-sized (wing length: 80-90 cm, body weight: 2.5-4.5 kg) sea eagle (*Haliaeetus leucogaster*), was raided by two sub-adult female lutungs whilst perching, and was made to fly away, thus supporting this hypothesis. Thus, compared to the New World species, the relative body size of the colobines is much larger than that of the raptors, and constant predation risk should not have been a selective force for the behavioral traits regarding predator avoidance. Furthermore, the unique social system of the lutungs may also account for the lack of clear anti-predator behavior. For example, recent

studies have found that in Asian colobines, both the males and females sometimes leave their natal group and move to a neighboring group (Sterck, 1997; Tsuji, unpublished). Bonds between female lutungs, which often contribute to anti-predator behavior, might be weaker than those in other female-philopatric species. For a better understanding of anti-predation strategies among Asian primates, including testing the above hypotheses, more information on hunting in conjunction with the responses of primates through direct observation is required.

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カンムリオオタカ (*Accipter trivirgatus*) による
ジャワルトン (*Trachypithecus auratus mauritius*) 幼獣の襲撃事例

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2013 年 10 月 31 日に、インドネシア共和国・西ジャワ州パガンダラン自然保護区においてカンムリオオタカ (*Accipter trivirgatus*) がジャワルトン (*Trachypithecus auratus mauritius*) の幼獣 2 匹を相次いで攻撃する様子を観察した。カンムリオオタカによる霊長類の襲撃はこれまで例がなく、またアジア産コロブス類の捕食者に対する行動の詳細を記録した事例も乏しいので報告する。2 羽のカンムリオオタカが採食中のルトンの群れの上空に接近し、声を上げながら幼獣を背後から攻撃した。攻撃は、2 羽により異なる方角から 6 度にわたって繰り返されたが、いずれの攻撃も捕獲には至らなかった。オオタカによる攻撃の最中、攻撃された幼獣と同じ群れの成獣個体は採食を続けており、対捕食者行動（警戒音、逃走など）を一切とらなかった。