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Diurnal Primates in Sri Lanka and People's Perception of Them

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Abstract: Five species of non-human primates occur in Sri Lanka—the toque macaque (*Macaca sinica*), purple-faced langur (*Trachypithecus vetulus*), slender lorises (*Loris tardigradus* and *Loris lydekkarianus*) and the gray langur (*Semnopithecus priam thersites*). The primates of Sri Lanka are endemic and considered to be Critically Endangered or Endangered. Here we report on some observations, information from interviews with local people regarding primate-human interactions, and also morphological differences in the subspecies we observed during field visits in 2004, 2005, and 2007. When asked, most people stated that they believed that primate populations had increased over the years, and many consider them to be agricultural pests due to the damage they inflict on crops. Due to religious beliefs, hunting and killing of primates were reported in low frequency, but some eat the meat of purple-faced langur for medicinal purposes. The most common methods people use to prevent monkeys from damaging crops are throwing stones, and the use of firecrackers or any other way of producing loud noises. The major threat that these primates face is the destruction of their habitat due to deforestation, human population growth and the expansion of various rural development projects. Public awareness programs for schools and through the media are needed to encourage the protection of these animals and their habitats.

Key words: Toque macaque, purple-faced leaf langur, gray langur, human-primate conflict

Introduction

Sri Lanka is an island, situated between 79°39' and 81°53'E, and 05°54' and 09°52'N, in the Indian Ocean, off the southeastern tip of India. Although small (65,000 km²), Sri Lanka has many endemic species in its fauna and flora (Gunethilleke and Gunethilleke 1983; Erdelen 1988), including five primate species (Table 1) all of which are threatened (Dela 2007; Rudran 2007). The western purple-faced langur (*Trachypithecus vetulus nestor*) and the Horton Plains slender loris (*Loris tardigradus nycticeboides*) are Critically Endangered (IUCN 2008) and have been listed amongst the World's 25 Most Endangered Primates (Dela and Rowe 2006; Nekaris 2006). The toque macaques (three subspecies), the gray-handed crested langur (*Semnopithecus priam thersites*), the remaining three subspecies of the purple-faced langur, and the Sri Lankan subspecies of the lorises, *L. tardigradus* and *L. lydekkerianus*, are all Endangered (IUCN 2008).

The forest cover of Sri Lanka has been declining at a steady rate over the past few decades due to agricultural and irrigational developmental projects and to human settlements (Erdelen 1988; Wickramagamage 1998). Recent developments in the industrial and agricultural sectors and the growing human population have been particularly damaging to the country's remaining forests, and a greater awareness of their plight and measures for their protection are paramount for the survival of these primates. The total closed-canopy forest cover decreased from about 84% of the total land area in 1881 to about 30% in 2005. Rudran (2007) estimated that 81% of the habitat of the Critically Endangered western purple-faced langur is in deforested areas with dense human populations, and only two natural forest patches of about 21 km² remaining around two reservoirs. Owing to the expansion of the plantation industry, forest cover in the hill country has been reduced to isolated patches on hill tops and a handful of reserves above the 1,524 m contour (Wickramagamage 1998), posing a serious threat for the survival of the Endangered slender loris, *L. t. nycticeboides* (Mittermeier *et al*. 2007).

Most of the forests in wet zone and dry zone areas have been fragmented. As a result, primates tend to frequent farms and agricultural plots in search of food. This inevitably creates conflict, as has been reported in many parts of Sri Lanka

Table 1. Primate species and subspecies in Sri Lanka.

	Common name[1]	Reference
Macaca sinica sinica (Linnaeus, 1771)	Common toque macaque	Dittus (1975)
Macaca sinica aurifrons Pocock, 1931	Pale-fronted toque macaque	Dittus (1975)
Macaca sinica opisthomelas Hill, 1942	Hill zone toque macaque	Dittus (1975)
Trachypithecus vetulus vetulus (Erxleben, 1777)[2]	Southern purple-faced langur	Molur *et al.* (2003)
Trachypithecus vetulus monticola (Kelaart, 1850)[2]	Highland purple-faced langur	Molur *et al.* (2003)
Trachypithecus vetulus philbricki (Phillips, 1927)[2]	Northern purple-faced langur	Molur *et al.* (2003)
Trachypithecus vetulus nestor Bennett, 1833[2]	Western purple-faced langur	Molur *et al.* (2003)
Semnopithecus priam thersites (Blyth, 1847)[3]	Grey-handed crested langur	Molur *et al.* (2003)
Loris tardigradus tardigradus (Linnaeus, 1758)	Red slender loris	Nekaris & Jayawardene (2003, 2004)
Loris tardigradus nycticeboides Hill, 1942	Horton Plains slender loris	Nekaris & Jayawardene (2003, 2004)
Loris lydekkerianus grandis Hill & Phillips, 1932	Highland slender loris	Nekaris & Jayawardene (2003, 2004)
Loris lydekkerianus nordicus Hill, 1933	Northern Ceylonese slender loris	Nekaris & Jayawardene (2003, 2004)

[1]Common names follow Brandon-Jones *et al*. (2004).

[2]Brandon-Jones *et al*. (2004) and Dela (2007) consider that the purple-faced langur is a member of the genus *Semnopithecus*. Groves (2001, 2005), Molur *et al*. (2003), and Rudran (2007), on the other hand, place it in the genus *Trachypithecus*.

[3]Groves (2005) considers *Semnopithecus priam thersites* to be a junior synonym of *S. p. priam* (Blyth, 1844).

(McDougal 1987; Sukumar 1989; Nowell and Jackson 1996; Katugaha *et al*. 1999; Santiapillai and Jayawardene 2004). Many of the Sri Lankan primates are found near Buddhist and Hindu temples. The priests are more tolerant, and the constant supply of food received from large numbers of pilgrims (for example, Kataragama, Sellakataragama and Vadasitikanda) keep them around the temple grounds. Primates are otherwise generally restricted to certain National Parks, sanctuaries and remaining forest patches, and only the toque macaque is widespread.

In order to implement effective conservation strategies, it is important to know the current distributions of these primates and their remaining forest habitats in each province and district, as well as the threats they face. Our research aims to document the primate species, their group numbers and sizes, in the national parks and temples. Important too is an understanding of the perceptions that the local communities have of the primates, in order to better assess the context for conservation initiatives.

Methods

To date we have carried out three field trips in Sri Lanka; 2004, 2005 and 2007. Even though subspecies differences among these primates have been clearly described (Dittus 1975; Molur *et al*. 2003), there are no published photographs which effectively illustrate them. We collected photographic records of the toque macaques, purple-faced langurs and gray langurs for this purpose.

In 2004, we spent one week in the Anuradhapura and the Kandy-Udawattakele forest area; in 2005, two weeks traveling to Sinharaja and Polonnaruwa; and in 2007, the Wildlife Department provided permits to survey the primate populations of Bundala, Yala, Udawalawe and Horton Plains national parks. Our surveys, 5–20 February (16 days), consisted of walking the existing trails, accompanied by a guide, and recording all groups seen and their sizes. On our way to these national parks we also collected information on primates in Rumassala, around Kataragama, Badulla, Dambulla and Kandy (for further details of places visited see Table 2). We have also observed primates living in the suburbs of Colombo (Wijerama — around the University of Sri Jayawardenepura, Boralasgamuwa, Navinna).

In 2007, we interviewed people during the field trip using a questionnaire, accompanied by images of each primate species with their common names in Sinhalese, Tamil and English. The questionnaire included 28 questions on such topics as the primates that could be seen in the area, the approximate number of groups and their group size, whether they damage crops, whether measures are taken to prevent crop damage, about the extent of hunting and eating primates, land use, and about peoples' opinions of primates.

Results

External morphological subspecies traits

Characteristic external morphological differences of some of the different subspecies observed are shown in Figures 1–3 (see Table 1 for subspecies listings). The toque macaque of the wet zone (*Macaca sinica aurifrons*) has the darkest pelage color of the three subspecies. The dry zone subspecies (*M. s. sinica*) has the lightest pelage and is the smallest. It has the shortest crown hair length, while the highland subspecies (*M. s. opisthomelas*) has the longest, and *M. s. aurifrons* is intermediate (Fig. 1).

Among the four purple-faced langurs (*Trachypithecus vetulus*), the southern subspecies *(T. v. vetulus*) has the darkest pelage color and their white rump patch is more apparent than in the western (*T. v. nestor*) and northern (*T. v. philbricki*) subspecies. The montane *T. v. monticola* lacks a rump patch, is the largest of the four, and has the longest cheek hairs (Fig. 2). During our surveys, we found that gray langurs (*Semnopithecus priam*) in the southern dry zone are generally lighter in pelage color than in the north (Fig. 3).

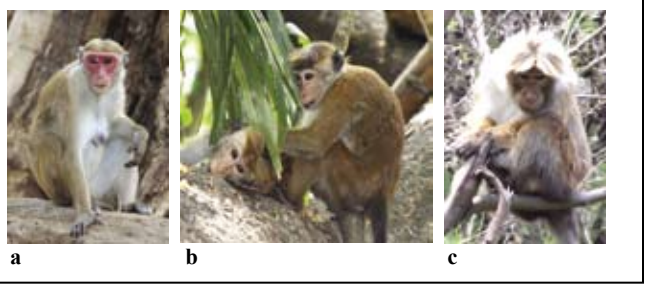

Figure 1. The three macaque subspecies found in Sri Lanka; **a.** *Macaca sinica sinica* – (Sellakataragama); **b.** *Macaca sinica aurifrons* – (Kandy: Peradeniya Gardens) and **c.** *Macaca sinica opisthomelas* – (Ohiya). Photographs by Charmalie Nahallage.

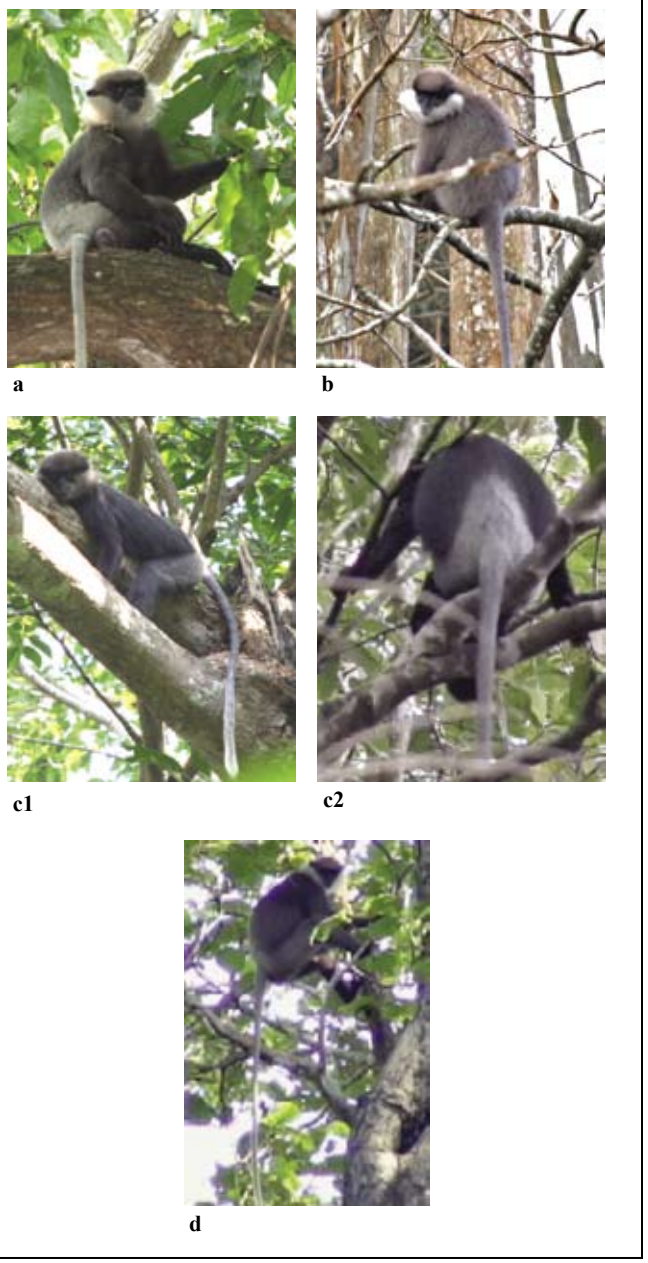

Figure 2. The four purple-faced langur subspecies found in Sri Lanka; **a.** *Trachypithecus vetulus nestor* – (Wijerama: Colombo); **b.** *Trachypithecus vetulus monticola* – (Pattipola); **c.** *Trachypithecus vetulus vetulus* – (**c1**. Rumassala, **c2**. Sinharaja); and **d.** *Trachypithecus vetulus philbricki* – (Polonnaruwa). Photographs by Charmalie Nahallage.

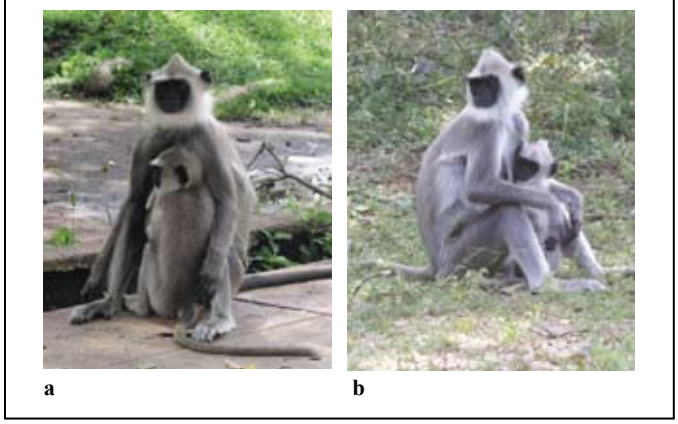

Figure 3. The gray langur *Semnopithecus priam thersites* found in Sri Lanka; **a.** north central dry zone (Anuradhapura) (photograph by Michael Huffman); and **b.** southern dry zone (Bundala National Park) (photograph by Charmalie Nahallage).

Distributions of primate species in National Parks and surrounding areas

We observed only two primate species in the three southern national parks of Bundala, Yala and Udawalawe: the toque macaque and the gray langur. The gray langur was the most commonly seen. We saw more groups of gray langurs than macaques, and they were larger (Table 2). The gray langurs in the parks were more habituated to humans and easier to observe. The situation was similar outside the parks. In the Kataragama area (Southern province), grey langurs were seen mostly in Buddhist and Hindu temples, where they were partially provisioned by devotees and priests, and were quite tame. Few macaque groups were observed around these temples, and their groups were smaller (Table 2).

In Horton Plains National Park we recorded four purple-faced langur groups and one macaque group. The langur groups were relatively small and very shy. The macaque group we saw was quite tame, commonly begging for food from people along the road. Outside the park, in the areas of Ohiya and Pattipola, we observed one macaque group and one langur troop (Table 2). The langurs were again quite shy compared to the macaques.

The macaque groups we encountered in the Kandy-Peradeniya Botanical Gardens and in Dambulla were small, except for one we saw in Udawattakale (Table 2). They were quite habituated and commonly begged or stole food from local residents and tourists.

Results of the Questionnaires

We interviewed 39 people in 2007: 14 women and 25 men, 20 to 85 years old. Twelve were small-scale fruit or vegetable vendors, whose livelihoods were affected by primate activities. Housewives and government officers each accounted for six. Wildlife officers and guides working in the park accounted for four each, retired government officers, teachers, traditional doctors, a justice of the peace, fisherman,

Table 2. Number of places visited and primate species observed.

Province District	Location	Species	*T. vetulus* No. of groups (size)	*S. priam* No. of groups (size)	*M. sinica* No. of groups (size)
Western					
Colombo	Wijerama	*T. v. nestor*	3 (6±1.5)	—	—
	Navinna		1 (5)		
	Boralasgamuwa		1 (7)		
Sabaragamuwa					
Ratnapura	Sinharaja Forest	*T. v. vetulus*	1 (8)	—	1(5)
		M. s. aurifrons			
Ratnapura	Udawalawa National Park	*S. p. thersites*		3 (22±27)	1 (20–25)
		M. s. sinica			
Southern					
Galle	Rumassala	*T. v. vetulus*	2 (8±0.7)		
		M. s. aurifrons			
Hambantota	Bundala National Park	*S. p. thersites*		3 (22±17)	2 (13±10)
		M. s. sinica			
Hambantota	Vadasitikanda	*S. p. thersites*		3 (8±6)	2 (8±3)
	Kataragama	*M. s. sinica*		3 (27±12)	1 (9)
	Sellakataragama			2 (5±0.7)	1 (8)
	Katagamuwa			1 (7)	1 (10)
	Sithulpahuwa			1 (31)	1 (26)
	Yala National Park			7 (13±9)	
Uva					
Moneragala	Wellawaya	*M. s. aurifrons*			1 (6)
Badulla	Rawana Ella	*T. v. monticola*			1 (15)
	Ohiya	*M. s. opisthomelas*	1 (20)		1 (10)
Central					
Nuwaraeliya	Horton Plains National Park	*T. v. monticola*	4 (7±3)		1 (15)
	Pattipola	*M. s. opisthomelas*	1(6)		
Kandy	Peradeniya Gardens	*M. s. aurifrons*			
	Udawattakele				1*
	Victoria Reservoir				1*
Matale	Dambulla	*M. s. sinica*			3 (8±5)
North Central					
Anuradhapura	Anuradhapura	*M. s. sinica*		*	*
Polonnaruwa	Polonnaruwa	*M. s. sinica*	*	*	*
North Western					
Kurunegala	Kurunegala	*M. s. sinica*?			*

* Observed but could not determine the number of groups nor their size.

priests and a postmaster accounted for one each. In 2007, we spent the most time in the Southern and Uva provinces, so the results of the questionnaire strongly reflect conditions there rather than in the other provinces we visited. Sixty-one percent of the questionnaires were from the Southern Province, 21% from Uva Province, 10% from the Central Province and 8% were from the Western Province.

When asked about primate numbers, 82% of the people believed that numbers had increased over the years, and 95% informed us that the primates raid crops. All primates except for the lorises were considered pests in all the provinces we visited. Of the people we interviewed, 67% considered them to be pests, 13% did not, and 20% failed to comment. Fifty-one percent said that people do not hunt or kill monkeys, 38% said that some people in their area were known to kill monkeys (all from the Southern and Uva provinces), and 10% made no comment or were unsure.

The most common cause of primate deaths was reported as predation by dogs (26%), leopards (18%), crocodiles (8%) and pythons (8%). Twenty-one percent of the interviewees indicated that there were no natural predators of monkeys in their areas. Other factors reported to be responsible for deaths were electrocution from power lines (13%), hunting (8%) and road kill (3%).

People use a number of methods to prevent monkeys from raiding their crops and gardens. The most common was to use firecrackers (37%) to chase them away. Other frequently used methods were throwing stones (16%) or making loud noises (8%). Others reported using catapults/sling shots (5%) and dogs (3%). Less frequently used were electric barriers, covering fruit trees with nets, hanging red flags or mirrors on crop plants or in the vicinity, and scarecrows. Mostly, these methods were effective and harmless. Only in a few areas did people shoot them (6%) or use traps (2%).

Discussion

The majority of people we interviewed told us that monkey populations and the incidence of crop-raiding had increased over the years. Macaques (*Macaca*), baboons (*Papio*) and guenons (*Cercopithecus*) are the principal crop-raiding monkeys in Asia and Africa (Else 1991; Hill 1997; Naughton-Treves 2001; Osbern and Hill 2005; Riley 2007). This is partly due to their complex social organization, adaptable and intimidating behavior, ability to travel on the ground and in the trees, and their reliance on unspecialized and omnivorous diets (Frothman-Quick 1986; Else 1991; Hill 2000; Webber *et al*. 2007). We have no information on primate population sizes in the past, and so it is difficult to determine whether the perceived increase in numbers is real or due to changes in behavior or forest loss (increased, and forced, proximity to humans). We believe that the last of the three possibilities is the most likely.

Threats to each of the primate species differ in different parts of the country and depend in part on the presence of other primates and the socio-economic status of the area. For example, the purple-faced langurs are the most common primate in the Western Province, and there they are considered pests, damaging houses and raiding garden crops (Dela 2007; Rudran 2007). In Nuweraeliya district (Central Province) they co-exist with macaques, which people consider to be the more troublesome, being more present in human settlements, and stealing food from houses and raiding crops more often than langurs, which are more shy and tend to avoid human habitations. The more terrestrial and omnivorous lifestyle of macaques, compared to the arboreal leaf-eating langurs, brings them closer to humans, and they are considered as pests in many areas. In a similar study around Kibale National Park in Uganda, Hill (2000) found that red-tailed guenons (*Cercopithecus ascanius*) and L'Hoest's guenons (*C. lhoesti*) were more frequent visitors to farms than olive baboons (*Papio anubis*), but the baboons caused more damage to the crops. In the Western Province, langurs can be mostly found in gardens and they eat fruits grown for household consumption but not crops grown for commercial use. In these parts, primates were considered to be more of a nuisance than crop raiding pests, and people were quite tolerant of them. In the Southern and Central provinces, however, macaques and langurs raid commercial crops with more serious consequences. People have a harsher opinion of them as pests. Macaques are considered pests in the districts of Anuradhapura, Polonnaruwa, Kandy and Matale. Gray langurs were considered to be more serious pests than macaques in the areas of Bundala, Kataragama, Sellakataragama, Vadesitikanda and Sithulpahuwa due to their large group sizes and their habit of stealing food from shops as well as damaging crops. More systematic long-term data collection is planned to verify these trends.

In Sri Lanka, people are generally tolerant toward animals due to religious beliefs, and the major threat to their survival is more likely to be the loss of their forest habitats. The few reports we received of killings were all secret operations and on a small-scale since primates are protected by law. Hunting primates for food was not a common practice in most of these areas since most of the people are Buddhists and against the killing of any animal. In some areas, however, especially in the Southern Province, people believe that monkey meat can cure certain illnesses and some use especially the purple-faced langur for medicinal purposes. In the Southern Province it is a common belief that the meat of the purple-faced langur is good for asthma or that it can cure sight defects. Of course, none of this has been medically proven. Another interesting belief of people in the south is that monkey organs (heart and lungs) are being used in the cities for organ transplants in humans due to their close similarity to humans. Some believe that the monkey's right leg contains human flesh, and even if they eat the meat they usually avoid eating this part. When we inquired about the macaques, many reported that they would not eat them because they are smaller and have too little meat—only the meat of the larger langurs was eaten. Consumption of monkey meat can be fatal if it is not prepared properly. Lamabadusuriya (1992) reported an outbreak of salmonella following consumption of monkey meat in the Southern Province (the species eaten was not reported). The author believed that the meat was probably contaminated because the monkey was already dead when the people found it.

Although most farmers believe that primates cause more damage to their crops than other species, some researchers have systematically quantified the crop damage caused by primates and other animals and shown that the damage is far less than the farmers believe (Siex and Struhsaker 1999; Riley 2007). The larger size and large group sizes of primates can give people the wrong impression as to the extent of crop damage. In Sri Lanka too, it is necessary to systematically quantify the damage caused by primates and inform farmers of these results. Together with their help, it will be possible to implement methods to control crop damage, benefiting both primates and farmers alike. Public awareness programs for schools and through the media are needed to encourage the protection of these animals and their habitats.

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