

**SELECTED CONSERVATION TOPICS**  
**WITH A CONCENTRATION ON SRI LANKA**

Authored by: Kittle, A.M & Watson, A.C. 2002 Colombo Sri Lanka.

**Module 1**

**Conservation and Research**

What is Conservation?  
The Importance of Biodiversity  
Economically Sustainable Conservation  
Research and Conservation  
    Conservation for Research  
    Research for Conservation  
Why is Research important to Conservation?

**Module 2**

**Island Habitats**

What Are Islands  
The Colonization of Islands  
Competition on Islands  
Threats to Island species  
Continental Habitat "Islands"  
The Sri Lankan Example

**Module 3**

**Primate Families**

Natural History of Primates  
Primates in Sri Lanka - Toque Macaque  
    Grey Langur  
    Purple-faced Langur  
    Loris (prosimian)  
The Need for Conservation

**Module 4**

**Big Cat Conservation**

Cats of the World  
Conservation status  
Big Cats in Sri Lanka  
Leopard research – a case study

**Module 5**

**Coastal Conservation**

What is a Coast Habitat?  
Importance of Coastal Conservation  
Its Importance and application to Sri Lanka  
Sea Turtles – a case study

## **Module # 3**

### Primate Families

#### **Content:**

Natural History of Primates Who are Primates Old World vs New World	Page 1-3
The Mystery of Madagascar	Page 3
Primates in Sri Lanka	
- Toque Macaque- <i>Macaca sinica</i>	Page 4
- Grey Langur- <i>Semnopithecus entellus thersites</i>	Page 5
- Purple faced Langur- <i>Trachypithecus vetulus</i>	Page 6
- Loris (prosimian)- <i>Loris tardigradus</i>	Page 7
The Need for Conservation	Page 7-8
Referances	

### **The Natural History of Primates**

#### **Who are Primates?**

Apes and monkeys are human beings' closest living relatives. The chimpanzee, for example shares 98.3% of our genetic material. When looking at our evolutionary chain it is easy to understand how this may be so. Even today the great Apes show great physical similarities to humans. In this evolutionary fork, another order-

Prosimians form the third prong (Fig 1). Though not as closely related or anatomically similar to monkeys, apes and humans, all are placed in the same taxonomic order of Primates. This grouping is usually separated into two (2) categories: lower order primates and higher order primates (Table #1).

**Table #1**

**Lower order primates (Prosimii)      Higher order primates (Anthrapoidea)**

Bush baby	Marmosets
Loris*	Macaques*
Aye-aye	Baboons
Lemurs	New World monkeys (eg. Capuchins, howlers)
Indri	Langurs*
Sifakas	Lesser Apes (siamang and gibbons)
Potto	Great Apes (gorilla, chimpanzee, orangutan)
	Humans*

\* Representative species found in Sri Lanka.

The 'higher' and 'lower' demarcates the status of evolution as understood today. It is thought that a small shrew-like nocturnal creature was the original hypothetical mammal from which primates evolved. The Prosimii (lower order) have maintained more of its anatomy and nocturnal habits whereas the Anthrapoidea have 'evolved' to a more advanced and complex level of organization, with humans at a current apex. There is a third, unique suborder that baffles classification because it shares characteristics with both Prosimii and Anthrapoidea. This is the suborder Tarsioidea, or more commonly tarsiers.

Some Distinguishing features:

Prosimii

Literally meaning 'pre-monkey' or 'early-monkey'.

- Longish noses ending in a hairless snout
- Prominent whiskers on muzzle and brow
- Side ways facing eyes (nocturnal adaptation)
- Large ears-very mobile
- Flat nails except for a 'toilet' claw on second digit
- 36 teeth
- Specialized scent glands, usually in genital areas

The possession of the above characteristics make prosimians very suited for their highly nocturnal life styles, where sense of smell and hearing play a more important role than sight as preferred by the diurnal Anthrapoidea.

Some Distinguishing features:

Anthrapoidea

Literally meaning 'man-like'.

- Short faces with dry noses as opposed to snouts
- Lacking prominent whiskers

- Small ears virtually immobile
- Forward facing eyes adapted for diurnal colour vision
- Single formation mandible (mouth part)
- Larger in body size

The taxonomic classifications for the world of primates are often confusing and convoluted with there being many suborders and families within each other, as well as many exceptions to the rule. However, amidst all this the basic framework remains the same as noted in Table 1.

### **Old World/New World**

Another important classification in the natural history of the primate is the division of animals into Old world primates and New world primates. It is generally the suborder Anthroidea that is divided such. This is based on geographic location as well as resulting evolutionary traits exhibited by them.

#### **Old World Primates (OWP) -*Catarrhini***

The 'Old World' as we know it today comprises the Continents of Africa and Asia, plus the region known as Eurasia. Interestingly Europe, with the exception of a population of introduced "Barbary apes" (actually macaques) on the island of Gibraltar, is devoid of primates. The continent of Australia shares a similar fate to that of Europe in its distinct lack of primate species other than for the human primate.

(Fig 2 a.) - Monkeys: macaques, langurs, baboons & gibbons characterized by having tails, smaller in size, mostly arboreal with the exception of the baboon

(Fig 2 b.) – Apes: chimps, gorillas, orangutan, humans characterized by lack of tail more bipedal locomotion, larger body size & more terrestrial in nature.

(Fig 2 c.) – Prosimians: lemurs, lorises, mostly nocturnal and smaller in size.

#### **New World Primates (NWP) -*Platyrrhini***

The 'New World' is the continents of South and Central America. North America other than for the human primate is devoid of other primate species. It is thought that only within the last 15-20 000 years did 'Man' reach the New World.

(Fig 3 a.) – Cebidae: capuchins, spiders, howlers characterized by long often prehensile tails, extremely arboreal and larger in size

(Fig 3 b.) – Callitrichidae: marmosets –small 'squirrel-like', often with visible facial hairs/whisker formations.

#### **Differentiating Characteristics:**

- OWP have narrow downward facing nostrils/ NWP have broad flat noses with outward facing nostrils (Platyrrhini means 'broad flat nose').
- Skull differences in dentition and ear drum physiology.
- Ischial callosities- hard calloused skin pads fused to the rear 'ischial' bone are used as sitting cushions by the OWP monkeys and absent in the NWP.
- Broad chests and upright stance in some of the OWP apes.

#### **Humans distinguishing characters:**

- Short hands no longer used for locomotion with strong thumb for dexterity
- Unique strong one-unit foot for supporting upright body weight & to propel forward walking/running motion
- Lack of fur/hair

- Greatly enlarged brain thought to contribute to intellect

These are attributable primarily to its upright posture and bipedal gait as well as other more modern cultural adaptations such as use of body coverings (animal skins → clothes).

### **The Mystery of Madagascar**

Separated from the south-east African mainland by several hundred kilometers of Indian Ocean – the Mozambique Channel – Madagascar's isolation has generated a wealth of fascinating, unique species. Perhaps no faunal grouping on the island displays this trait more clearly than the primates. Best known, through the writings of Charles Darwin and numerous latter day television documentaries are the lemurs, a species characterized by its dog-like elongated muzzle, tails that are longer than bodies and arms that are shorter than legs. Of these, it is the ring-tailed lemurs that have most effectively caught the primate-loving world's collective imagination. Other primates endemic to this lush, tropical island are the closely related dwarf and mouse lemurs (all of which are under 500 grams in weight), the sifakas, the indri and the aye-aye. How these varied species -all prosimians - arrived in the absence of other primate species is unknown.

### **Primates In Sri Lanka**

Sri Lanka, with its equatorial island habitat is home to four non-human primate species. They are: The toque macaque (*Macaca sinica*), the grey and purple-faced langurs (*Semnopithecus entellus thersites* and *Semnopithecus vetulus* respectively) and the slender loris (*Loris tardigradus*). The former three higher order primates are more visible due to their diurnal and social lifestyles whereas the loris, a prosimian, often lives unseen in its chosen habitat. All of these species are endemic to the country though to varying degrees. Taxonomical arguments still continue as to their subspecies status and the differences from their Indian counter parts. As Sri Lanka is part of the Old World all primates here exhibit characteristics distinct to the Old World monkeys.

These primates have easily adapted to life on this lush island and have colonized large parts of the country. Most habitats have at least one of the species residing within its forests. The langurs and the macaque are a common site when traveling through the country and have had a close relationship with humans through the centuries. They are the most visible wildlife in Sri Lanka. Though only the four (4) species are found here often the outskirts of cities and even the heart of certain cities are still home to some of these monkeys making this island a diversely populated location for primates.

#### **1. Toque macaque (*Macaca sinica*)**

Commonly seen on 'edge habitats' these highly intelligent omnivores are locally called 'rilawa'. Quite adapt at living in close proximity to human settlements they can often be seen on roadsides having come down from the nearby forests.

**Description:** These are mid-sized, light tan to dark brown monkeys with long tails and light coloured, hairless faces. The female of the species has a pinkish tinge to the face that changes to a dark red, sometimes scarlet hue during estrous. Their distinguishing morphological feature is the fringe of long hair on the head - the 'toque', which is manifested in a variety of "styles" (Fig 4). It is this 'hair-do' that often distinguishes each individual and can be a hereditary trait passed on from parent to offspring.

**Distribution and Range Use:** Toque macaques are endemic to Sri Lanka and are a wide-ranging species within the island, inhabiting diverse forest types. They can be found throughout the island from the dry, lowlands of scrub forest to the moist, highlands with their sub-montane forests. Each is a sub species of *Macaca sinica*, with a total of four subspecies thought to be extant within the island in varying geographic zones. Those in the cooler, wetter hill country have thicker fur and longer toque hairs.

Often found in the mid level of fruiting trees they are not averse to spending time on the ground, whether it be for feeding or simply resting. Toque macaques move in groups and have an established home range, which they will utilize according to food availability within the groups range. A heavily fruiting tree such as a *Ficus* sp. could become a 'territory' within the home range and will be steadfastly defended from marauding neighbouring groups. This food dependent movement pattern and range use of the groups allow for a mostly smooth coexistence of many macaque groups within a single forest patch. The size of a home range is largely dependent on group size, its hierarchical status within the whole society inhabiting the forest concerned and the quality of the forest within its range.

**Diet and Niche Habitats:** Toque macaques are omnivores with a large percent of their diet consisting of fruits. Insects as well as birds eggs, lizards and caterpillars provide them with essential proteins. Their diet varies through the seasons heavily dependent on what is currently fruiting in the forest. As a result of this, macaques are mostly found in areas where there is a diversity of fruiting trees. This niche habitat allows for them to survive year round without having to migrate out of their established home ranges. This is the reason why they are not found in arid scrub jungle and high montane forest, which lack the diversity of fruit trees. The leaves and/or flowers of a variety of *Ficus* species, *Drypetes*, *Syngium* and yellow and red cassias are some of the more commonly eaten tree species.

**Behaviour & Sociability:** The Toque monkey belongs to that category of primate that is highly social. Their societal structure is extremely complex and tight knit, with related females and their offspring forming the core of the group. This matrilineal social structure is the most common type found within animal societies. Males will leave their natal group at puberty (around five (5) years for these macaques) in order to join up with a different group. Therefore some unrelated males attach themselves on to the matrilineal core to form the rest of the group and even though it may seem like these males are the leaders ongoing studies (Dittus.W.J) show that in fact it is the leading female and her family that rule. There have been instances when a leading male, unpopular with the group has been literally 'kicked out' by the leading matriline and a preferred male 'allowed' to assume leadership of the group. There is a strict hierarchy both within the group as well as between groups. Thus ensuring that the individuals at the top of each group as well as the groups at the top of each population, wins the best resources available.

## **2. Grey Langur (*Semnopithecus entellus thersites*)**

Also known as the Hanuman langur after the mythical figure of Hanuman, the monkey god in the great Hindu epic of Rama and Sita, this monkey is widely seen all over the island. Locally called the 'wandura' their black faces make them difficult to differentiate between individuals unlike the easily distinguishable light faced macaque (Fig 5).

**Description:** Greyish in colour with black faces. The tallest of the four species found in Sri Lanka with approximate head and body lengths of 25 inches with a long dark tail of 30 inches or so. These tails are carried above the body in a highly visible 'S' shape formation when walking, quadrupedally on the ground. Their long limbs give them a distinct gait and locomotive style known as semi brachiation. This species of langur has a whorl or parting of the hair above its brow, which causes a 'brushed up' fringe, locally compared to a 'thopi' - a form of hat. Their body is covered with grey hairs but the face is naked with the hairline radiating out all around it. The young are born dark brown and only change to the silvery grey of adults after several weeks.

**Distribution and Range Use:** Found in most forest types excepting high montane cloud type forest and highly arid zones these monkeys are widely distributed throughout the island. Their range use is dictated by availability of fresh leaf shoots making them frequent occupants of the higher parts of trees. However, differing from most langur species, the terrestrial habitat is more heavily used by them, whether it is for eating fresh leaves and buds of bushes or simply to rest and relax. It is quite usual to see large groups of these langurs virtually passing the morning away seated on the ground in the shade or on low tree stumps or walls.

**Diet and Niche Habitats:** Grey langurs are strict vegetarians, feeding almost exclusively on fresh and mature leaves for which their protuberant stomachs have evolved special bacteria to effectively break down the plant's protective cellulose. To supplement this leafy diet they also indulge in fruit, flowers, stems, seeds and buds. This preference for leaves allows grey langurs and toque macaques to share the same resource area without an undue amount of direct competition. Each creating its own niche habitat within the larger habitat in which they reside. An interesting association has been observed between these langurs and axis deer during feeding, whereby the deer forage on the food that has been dropped by the hungry primates above.

**Behaviour & Sociability:** Hanuman langurs live in mixed groups that range in size from 10 to 125 members. These often exuberant groups are either one male or multi-male congregations with the usual ratio between males and females being anywhere from 1:2 to 1:6. While it is the females of the group that do all of the child rearing the job of the dominant male is to lead the group by selecting feeding areas and sleeping trees and by using select vocalizations to maintain contact within the group as well as ensure adequate distance is maintained between neighbouring groups. Like macaques, grey langurs find group grooming sessions an integral part of their daily activities. These relaxed periods usually occur during the heat of midday in the relative cool of shady trees. It is during this time that the young are often handled by many other females, often being apart from its mother for long periods.

## **3. Purple-Faced Leaf Monkey (*Semnopithecus vetulus*)**

A large, burly monkey this langur is commonly known as the “bear” monkey in the highlands of Sri Lanka where its coat is thicker and more protective to combat the cold weather. Four (4) subspecies are recognized within Sri Lanka.

**Description:** The bulkiest of Sri Lanka’s non-human primates, the purple-faced leaf monkey is easily identifiable due to its distinctive dark grey fur and bushy white “beard” that rims its broad, purple-black tinged face (Fig 6). Like the grey langur they possess long, slender hands and feet but these monkeys differ in having extremely short thumbs. Their tails are long and thick and can often be seen drooping from branches where the rounded shape of the owner is perched. Infant purple-faced langurs are pale grey.

**Distribution and Range Use:** This is an adaptable species that ranges from the low, dry zones of the northeast to the cool, moist high central hills all the way to the humid rainforest and jungles slopes of the southwest. Sometimes they share their habitat with the other primate species on the island (as seen in Polonnaruwa) but at other times the purple-faced langur exists by itself (Sinharaja and higher altitudes of Horton Plains). Similar to the toque macaque these primates have evolved slight variations of fur thickness and colour in accordance with the area in which they are found. Much more arboreal than either the macaques or the grey langurs, the purple-faced monkey rarely descends to the forest floor and those occasional visits are generally to move from one distant tree to the next. Their preferred habitat and most often used section of a forest are canopy trees.

**Diet and Niche Habitats:** As its name indicates, the purple-faced leaf monkey is another vegetarian, eating both young and mature leaves of a variety of species. Often they will concentrate their feeding efforts on one particular, usually frequently occurring species in a given area. In one area of the Polonnaruwa sanctuary it is thought that almost 70% of their diet is made up of the leaves of the Adina tree, a common canopy tree found in this dry zone forest. By being more gastronomically selective than the grey langur it allows the two species to share forested areas without the need for direct competition. Unlike the macaques or grey langurs they require very little water further allowing them to colonise drier areas.

**Behaviour and Sociability:** Single adult males lead small groups of 5-10 females and young. These tight-knit groups browse the treetops for selected foliage remaining high in the canopy trees for most of the day. Heavily built their mode of locomotion is also that of semi-brachiation. This involves much leaping from branch to branch at high speeds and the resultant take-offs and landings involve the constant crashing of branches often creating a lot of noise. The loud hooting call can often be heard miles away and is reminiscent of the ear-shattering calls of the New World’s howler monkeys. As in grey langur societies, baby leaf monkeys are passed around between adults in a group never being seen as the sole property of the mother.

#### **4. The Slender Loris (*Loris tardigradus*)**

The only prosimian species on the island, the fantastic slender loris is as different from the three Anthropoids as night from day. Next to the other primates that inhabit



Sri Lanka comparatively few people have been fortunate enough to get a good look at these elusive dwellers of the night.

**Description:** Perhaps this is one of the species that has lent its distinct countenance to the makers of science fiction films about aliens. With large, prominent eyes for seeing in the dim light of the moon, large, rounded and very mobile ears and long stick-like limbs the slender loris stretches the traditional image of a primate. (Fig 7) They are small, light creatures, tailless with soft, thick fur and short pointed muzzles. A light brown to grey colour, they are usually seen in dim light which makes their colouration difficult to discern. Their faces are light coloured with slightly oblong, darker patches around the eyes. Like other prosimians they possess specialized “toilet” claws on both the hands and feet which is used for self-grooming.

**Distribution and Range Use:** The slender loris lives in both dense forest and lighter woodland and are spread fairly evenly throughout the island under four (4) separate sub species classifications. They seem to prefer higher forest types and even in dry scrub zones colonize the riverine high forests.

However due to their incredibly elusive nature their numbers and detailed range use is little known. As they are nocturnal creatures they do not have to compete in any direct way with the other primates on the island.

**Diet and Niche Habitat:** Innocuous though they look slender lorises are actually renown hunters, their prey ranging from small lizards, to birds eggs to all manner of insect. There exists an old jungle legend stating that peacocks roost at night on the very ends of branches in order to avoid being crept up to by hungry lorises! The capacity for a loris to successfully hunt anything more than the smallest of baby peafowl is remarkably low, but legends are legends.

**Behaviour and Sociability:** Nocturnal animals, they were once thought to be solitary, however research is proving that the slender loris is not the cantankerous hermit it was first imagined to be but instead lives a semi-solitary life. A male will tend to live in an area that overlaps the home range of two or three females, meeting up with them during estrous periods for mating. The individuals communicate with each other in a way similar to that of many semi-solitary species, primates and non, by using olfactory methods or scent marking to leave messages to one another. The slender loris also has a loud, high-pitched whining call that it makes in the night when it is active. This is used to announce its presence to other lorises in the vicinity and is thought to be a signal for maintaining spatial distribution. They spend their days tucked away in the hollows of trees or nestled in the crook of a high branch waking when night falls to start their foraging. Using slow, deliberate movements the loris appears extremely cautious in its habits yet a quick sudden movement aided by surprise is what allows it to stalk and capture its prey so successfully.

### **The Need for Conservation**

Other than for the loris the other three species of non-human primates discussed are widely seen around the country. However their numbers have depleted drastically within the last 40 years, due primarily to large-scale hydro projects that have resulted in inundation of large forest lands. Habitat fragmentation is also causing the existing populations to become pocketed causing a decrease in genetic variability due to the inability of males to migrate between populations. Another alarming problem on the rise is the urbanization of monkeys. A problem common in India, Sri Lanka too is

quickly facing the realities of this phenomenon. An increased demand for development and housing fueled by unplanned urbanization on borders of remaining swathes of forest land will heighten this problem if conservation steps are not taken immediately. In the short term monkeys are able to adapt to urbanization, seemingly thriving off the increase in food sources such as plantations and garbage. However this is an unnatural population increase which in turn breeds a population of monkeys that will be more aggressive and habituated towards human foods. A new generation of 'urbanized' monkeys will be the end result. Conservation of these primate species in their natural habitats is essential now before change occurs, as is the case in many areas of India.

#### How can you Help prevent this?

1. Do not feed monkeys at any location be it a forested area, roadside, ancient ruins area or waterfall. They are wild animals and do not need food from us even though at times they may 'beg'. This is a simple reaction of their sociability and curiosity.
2. If you see others feeding monkeys please tell them not to and explain why.
3. If you live in an area that has monkeys close by make sure your garbage is securely closed and not exposed to attract them.
4. Do not encourage monkeys to be kept as pets.

#### **Reference**

Dittus, W. J. ongoing 30-year research, Polonnaruwa, Sri Lanka. Personal communications and numerous research papers.

Napier, J.R & Napier, P.H. Natural History of Primates. Massachusetts Institute of Technology.