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MAMMALS OF THE MEGHAMALAI LANDSCAPE, SOUTHERN WESTERN **GHATS, INDIA - A REVIEW**

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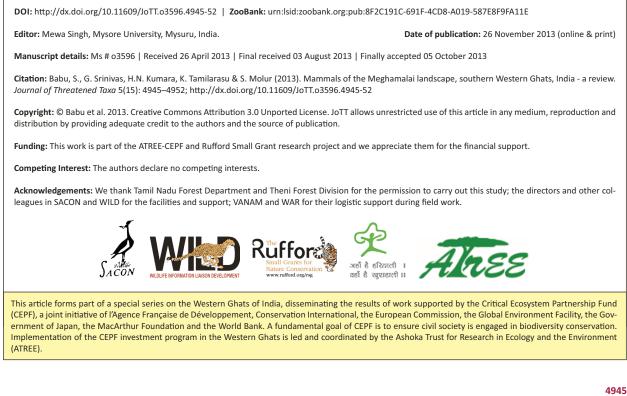
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Abstract: Reports on the concurrence of mammals in the Meghamalai landscape were collated from published literature and also the data obtained from a recent study spanning over 18 months (June 2011–December 2012). Sixty-three species belonging to 24 families occur in the landscape, which include 24 globally threatened (one Critically Endangered; seven Endangered; 11 Vulnerable and five Near Threatened) species. Of the recorded species, four species are endemic to India and nine are endemic to the Western Ghats. The present study added five species, viz., Rusty-spotted Cat Prionailurus rubiginosus, Malabar Spiny Tree Mouse Platacanthomys lasiurus, Grizzled Giant Squirrel Ratufa macroura, Common Palm Civet Paradoxurus hermaphrodites and the Indian Grey Mongoose Herpestes edwardsii to the six decade old mammal list. But, 13 species reported by Hutton were not recorded during the study. Among them, occurrence of Malabar Civet Viverra civettina and Fishing Cat

Prionailurus viverrinus in southern India remains unresolved. During our study, anthropogenic pressures such as conversion of natural habitats, encroachment, hunting, cattle grazing and tourism were observed to affect the distribution of mammals in the landscape.

Keywords: Arboreal mammals, conservation issues, endemism, species richness, Western Ghats.

The Meghamalai landscape is situated in the northeastern side of Periyar Tiger Reserve, encompassing High Wavy Mountains, Varusanad Valley and Hill, and Vellimalai. High Wavy Mountains is popularly referred





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to as 'Pachchaikoomachi' and 'Meghamalai' by locals that explicate dense forest and cloud covered hill respectively (Fig. 1). Summit ridges of the landscape receive high precipitation during the south-west and north-east monsoons and have a narrow strip of wet forests. Meghamalai forms an imperative wildlife corridor with Periyar Tiger Reserve to the south-west, Grizzled Squirrel Wildlife Sanctuary to the south and the Cumbum West forests to the north. Furthermore, it is bestowed with certain remnant patches of wet forests in high elevation plateaus (>1400m), which have been severely fragmented and over-exploited for raising commercial crops and plantations that have left the natural forests as fragments or islands.

In spite of being an important wildlife corridor, updated data on mammals of the landscape is lacking. The earliest survey on mamals in the hill range was started in the beginning of the 19th century by Prater. He explored and collected mammals from the Cumbum Valley and the northern slopes of High Wavy Mountains, and these specimens were preserved in Bombay Natural History Society (BNHS) Museum collections. Subsequently, Wroughton (1917) wrote the descriptions for collections made by Prater, from which he identified 24 species mainly of rodents and bats. After a lapse of three decades, Hutton (1949) made collections and described the behaviour, habitat and distribution of 56 mammalian species including a few range restricted and threatened species. More than two decades later (1972), while working on the specimens of megachiropterans at BNHS, Thonglongya had noticed that the specimen labelled Cynopterus sphinx, collected at the High Wavy Mountains, was wrongly identified. He identified it as a new genus Latidens and named the species Latidens salimalii (Thonglongya 1972), which is endemic to southern India. A subsequent survey by BNHS and Harrison Zoological Museum rediscovered L. salimalii at the High Wavy Tea and Coffee Estates (Kardana Coffee Estate). In addition, a few short surveys were also attempted to address the roost site characteristics of the bat (Singaravelan & Marimuthu 2003a,b). Kumara et al. (2011) highlighted that the landscape harbours one of the largest populations of globally threatened

Lion-tailed Macaque *Macaca silenus*. Bhupathy et al. (2012) have highlighted the conservation significance of the landscape using select vertebrates. Although the landscape has been well explored in terms of mammals over the decades (1917–2012) through a series of short-term studies at different time periods (1917–2012), the updated list of mammals and their current status

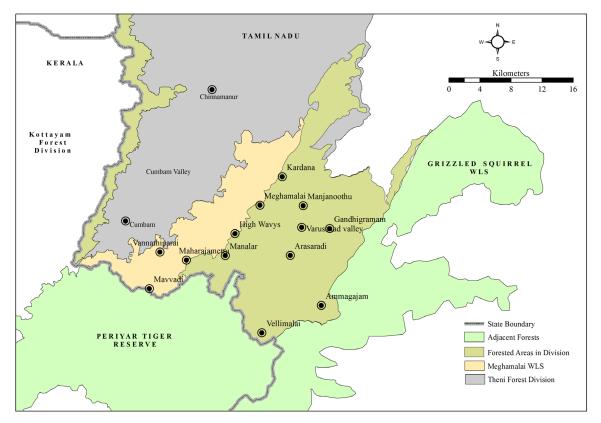


Figure 1. Surveyed areas in Meghamalai landscape, southern Western Ghats

(qualitative) in the landscape has not been attempted. In this context, we update the mammals of the Meghamalai landscape based on primary (June 2011–December 2012) and secondary information.

Materials and Methods

We carried out a study on the status and distribution of large mammals in the landscape between June 2011 and December 2012. The entire landscape was gridded into 133 grids on the base map and each grid was sampled for the presence/absence of the mammals by walking on pre-determined paths. During these walks all sighted animals were recorded, droppings on trail were recorded with species identity, and also animal presence was recorded based on tracks and signs. We also conducted night surveys using flash lights or by using a motor vehicle with lights by driving slowly and recording animals found on either side of the road. The total sampling effort amounted to 85km. Further, we also reviewed the literature to prepare a comprehensive list of mammals for the landscape (Wroughton 1917; Hutton 1949; Thonglongya 1972; Muni 1994; Singaravelan & Marimuthu 2003a,b). The status of each mammal species observed by Hutton was compared with the current population status (consolidated from the study) to understand the influence of six decades of disturbance on the distribution of large mammals (41 species). IUCN status, endemism and schedule category in Indian Wildlife Protection Act (1972) were compiled to highlight the conservation significance of the landscape in terms of mammals.

Results and Discussion

Sixty three species of mammals belonging to 24 families were recorded from the landscape. The

family Muridae (rats and mouse) was recorded with a maximum number of species (Fig. 2) followed by Sciuridae (squirrels) and Felidae (cats). Among the 63 species, 24 are globally threatened (including one Critically Endangered; seven Endangered; 11 Vulnerable and five Near Threatened species), nine are endemic to the Western Ghats and four to India (Fig. 3). The number of species recorded as common (C) and very common (VC) were lower than Hutton's observation, however uncommon (UC) and rare (RR) were higher than the earlier observation (Fig. 4). Five species, viz., Rusty-spotted Cat, Malabar Spiny Tree Mouse, Indian Grey Mongoose, Grizzled Giant Squirrel and Common Palm Civet were added for the first time to the existing list of mammals in Meghamalai. Further, three species of bats, viz., Salim Ali Fruit bat Latidens salimalii, Lesser Dog-faced Fruit Bat Cynopterus brachyotis and Rufous Horseshoe Bat Rhinolophus rouxii were not recorded by Hutton though recorded by Singaravelan & Marimuthu (2003a,b). Some of the sight records of earlier notes raise doubts of its accuracy, in particular the sightings of Malabar Civet and Fishing Cat. Detailed species information, for each new site record, obtained from the present study is presented here.

Rusty-spotted Cat *Prionailurus rubiginosus*: Four observations of the Rusty-spotted Cat (RSC) were obtained during the present study. This included two direct sightings (June 2012; Vannathiparai of Gudalur Range) and two indirect sightings (July 2012, a dead one found at Manjanoothu of Varusanad Valley and a road kill near Rajapalayam Town). The species presumably prefers low elevation, leeward side and next to human settlements in Meghamalai.

Malabar Spiny Tree Mouse *Platacanthomys lasiurus*: A single individual was located at No. 29 coffee estate,

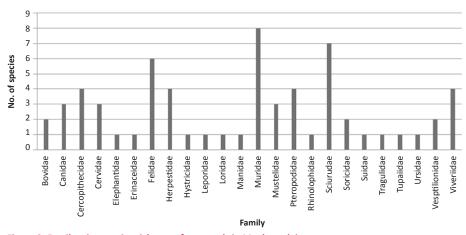


Figure 2. Family wise species richness of mammals in Meghamalai

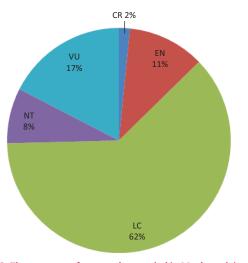


Figure 3. Threat status of mammals recorded in Meghamalai

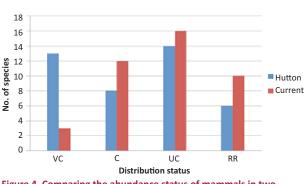
located in the south-eastern slopes of High Wavy Mountains, at 20:00 hours on 21 December 2011 during a night survey in the coffee estate areas. It was observed on a shrub at 1.5m height from the ground.

Grizzled Giant Squirrel *Ratufa macroura*: At five different occasions, seven individuals were observed along the tributaries and the main river of Vaigai. The western most location of the species in the Varusanad Valley is Arasaradi, where the rain-shadow region starts. The distribution of the species was confirmed down towards Gandhigramam near Kadamalaikundu and in other parts of Varusanad Valley. The hill ranges that extend towards the eastern side require an intensive survey. Although highly scattered in distribution, around 20 nests of the species were located in riparian forests in low elevations (>400m)

Indian Grey Mongoose *Herpestes edwardsii*: It was frequently seen in the dry zones of Varusanad Valley and the eastern portions of Meghamalai. Mostly single individuals were seen but occasionally they were observed in pairs.

Common Palm Civet *Paradoxurus hermaphrodites*: Although it is commonly seen along the foothills next to coconut plantations, Hutton (1949) had not reported the species during his survey. During the night survey in January 2012 at Meghamalai Tea Estate, a single individual was sighted. However, later it was found that the species had frequently been sighted in the plains than in the mountains. The species had been considered as a pest in the coconut plantations downhill.

Arboreal mammals: We recorded eight arboreal mammals including five primates, two giant squirrels and one flying squirrel. The distribution of Lion-Tailed Macaque *Macaca silenus* and Nilgiri Langur



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Figure 4. Comparing the abundance status of mammals in two different time periods in Meghamalai

Semnopithecus johnii was restricted to the high rainfall areas on the western side, viz., No. 29 Estate, Vellimalai, Ammagajam and Jyothi estates, whereas Bonnet Macaque Macaca radiata was recorded from all the elevation gradients while Tufted Grey Langur Semnopithecus priam was recorded only from drier forests mostly downhill. Grey Slender Loris Loris lydekkerianus was sighted frequently in the low elevation dry forests. Among giant squirrels, the Indian Giant Squirrel Ratufa indica was found in the high canopied forests of mid and high elevations, whereas a small population of Grizzled Giant Squirrel (seven individuals) was observed along the Vaigai River and its tributaries. The Indian Giant Flying Squirrel Petaurista philippensis was recorded during the night surveys in thick canopied forests areas such as Vellimalai and High Wavy estates.

Large herbivores: About 12 herds of Asian Elephant Elephas maximus were located during the survey, and the maximum herd size recorded was 10. Frequent sightings of Asian Elephants were made in Meghamalai, High Wavy, Manalar estates, Manjanoothu, Vellimalai, Vannathiparai and Arasaradi. Gaur Bos gaurus was recorded across the hill range but direct sightings were made in the Varusanad Valley i.e., the eastern slopes of Vellimalai. Among the ungulates, Sambar Rusa unicolor was observed widely across the landscape and indirect evidence was recorded in all the sampled grids. Chital Axis axis was recorded mostly in the dry eastern plains of Varusanad Valley and northern slopes of Meghamalai. Southern Red Muntjac Muntiacus muntjak was recorded across the altitudinal gradients. Indian Chevrotain Moschiola indica was recorded and found to be highly selective in habitat utilization and during our survey most of the sightings were made from the riparian forests. Nilgiri Tahr Nilgiritragus hylocrius was recorded in Varayattu Parai and the southeastern slopes of High Wavy Mountains.

Carnivores: Although the landscape shares the

Mammals of Meghamalai

western side with Periyar Tiger Reserve, direct and indirect evidence of Tigers Panthera tigris were mostly restricted to the western plateau of the landscape. Indirect evidence was recorded in Maavadi, upper Manalar, Vellimalai and along the forest road between upper Manalar and Vellimalai. Indirect evidence of Leopard Panthera pardus and Dholes Cuon alpinus was frequently observed across the sampling grids. Among other carnivore species, Jungle Cat Felis chaus, Leopard Cat Prionailurus bengalensis, Rusty-spotted Cat, Small Indian Civet Viverricula indica, Brown Palm Civet Paradoxurus jerdoni, and Common Palm Civet were seldom seen during the night surveys. Indian Grey and Striped-necked Mongooses Herpestes vitticollis were uncommon during the study but Ruddy (Herpestes smithii) and Indian Brown Mongoose Herpestes fuscus were observed occasionally. A single individual of Nilgiri Marten Martes gwatkinsi was sighted near the evergreen forests of Upper Manalar.

Sixty-three species of mammals are reported hitherto from the landscape. However, it is presumed that it is short of a few more species of mammals, in particular rats, mice and bats. The high species richness of mammals in the landscape can be attributed to wide elevation gradients (200–2000 m), varied rainfall pattern (rainfed and rainshadow) and highly mosaic vegetation. These characteristics of landscape endowed with diverse eco-climatic zones and niches act as a refuge for diverse species of mammals. Further, the landscape shares the corridor with important wildlife areas such as Periyar Tiger Reserve and Grizzled Squirrel Wildlife Sanctuary in the western and southern side of the landscape, and so it facilitates the mammals to utilize this area.

The scope of the present study (2012) was restricted to large mammals. Hence, bats and small rodents (rats, shrews and mice), were not considered for comparison with Hutton's (1949) anecdotal notes, as it involves capturing for species identification. Six decade-old data showed the distribution of 57 species of mammals including 41 species of large mammals, of which the persistence of 38 large mammals in the landscape was observed, and three were not recorded during the study, viz., Malabar Civet, Fishing Cat and Golden Jackal. The species level status of Malabar Civet in India remains unresolved but land-use practices in low elevations of Varusanad Valley (cashew plantations) matches with Elayur (Kozhikode District, Kerala) from where a dead specimen of the species was collected during the 1990s (Ashraf et al. 1993). Moreover, Hutton (1949) categorised the species as common in high elevations but we were informed by locals that there was no large

sized civet in the landscape. This raises the question on the report by Hutton (1949). Furthermore, recent surveys targeting the Malabar Civet had failed to locate them in previously known distribution localities (Nandini & Mudappa 2010). The distribution of the Fishing Cat in southern India is another doubtful record; however, the species is also reported from Periyar Tiger Reserve, the southwestern boundary of the landscape. In addition, Menon (2009) also sketched the southern Western Ghats as the distribution limit of the species. More intensive sampling employing camera traps may address this unconfirmed distribution record. Although we have not seen the Golden Jackal during our survey, locals and forest department staff have reported that they seldom see the jackal in the plains next to the foot hills. Though we have not quantified threats on mammals, during our study, anthropogenic pressures such as conversion of natural habitats (to monoculture plantations such as coffee, tea, silk cotton etc), encroachment, poaching, cattle grazing and tourism were observed to affect the distribution of mammals in the landscape.

Species richness of mammals in the Meghamalai landscape is comparable with other protected areas/ reserved forests in the eastern slopes of the southern Western Ghats with similar landscape features, viz., Kalakkad-Mundanthurai Tiger Reserve, Grizzled Squirrel Wildlife Sanctuary, Palani Hills and Anamalai Tiger Reserve. The distribution of mammals in Meghamalai is also comparable with a few key sites in the southern Western Ghats such as Periyar Tiger Reserve and Parambikulam Tiger Reserve.

As a positive sign in the conservation initiative of the landscape, a portion of the landscape was recently declared as a wildlife sanctuary. Although Vellimalai, the entire stretch of High Wavy Mountains and high elevation of Varusanad Hills are rich in terms of biodiversity, it is still under the non-protected area category which requires further consideration for management and conservation initiatives.

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Table 1. List of mammals observed in Meghamalai landscape, southern Western Ghats, India

	Common name	Scientific name	Endemic	IUCN status	Source	Meghamala status
	Cercopithecidae					
1	Nilgiri Langur	Semnopithecus johnii	WG	VU	1,2	UC
2	Tufted Grey Langur	Semnopithecus priam	IN	NT	1,2	UC
3	Lion-tailed Macaque (Image 1)	Macaca silenus	WG	EN	1,2	RR
4	Bonnet Macaque	Macaca radiata	IN	LC	1,2	С
	Loridae					
5	Grey Slender Loris	Loris lydekkerianus		LC	1,2	UC
	Felidae					
6	Tiger	Panthera tigris		EN	1,2	RR
7	Leopard	Panthera pardus		NT	1,2	UC
8	Jungle Cat	Felis chaus		LC	1,2	UC
9	Leopard Cat	Prionailurus bengalensis		LC	1,2	RR
10	Fishing Cat	Prionailurus viverrinus		EN	2	?
11	Rusty-spotted Cat (Image 2)	Prionailurus rubiginosus		VU	1	RR
	Canidae					
12	Dhole (Image 3)	Cuon alpinus		EN	1,2	UC
13	Golden Jackal	Canis aureus		LC	2	RR
14	Indian Fox	Vulpes bengalensis		LC	1,2	с
	Viverridae					
15	Small Indian Civet	Viverricula indica		LC	1,2	UC
16	Malabar Civet	Viverra civettina	WG	CR	2	?
17	Common Palm Civet	Paradoxurus hermaphroditus		LC	1	UC
18	Brown Palm Civet	Paradoxurus jerdoni	WG	LC	1,2	UC
	Herpestidae				,	
19	Indian Grey Mongoose	Herpestes edwardsii		LC	1	UC
20	Ruddy Mongoose	Herpestes smithii		LC	1,2	UC
21	Indian Brown Mongoose	Herpestes fuscus		VU	1,2	UC
22	Stripe-necked Mongoose	Herpestes vitticollis		LC	1,2	c
	Mustelidae				_/_	-
23	Smooth-Coated Otter	Lutrogale perspicillata		VU	1,2	UC
24	Asian Small-clawed Otter	Aonyx cinerea		VU	1,2	UC
25	Nilgiri Marten	Martes gwatkinsi	WG	VU	1,2	RR
25	Sciuridae				_)_	
26	Indian Giant Squirrel	Ratufa indica	IN	LC	1,2	UC
27	Grizzled Giant Squirrel (Image 4)	Ratufa macroura		NT	1	RR
28	Common Palm Squirrel	Funambulus palmaram		LC	1,2	VC
29	Western Ghats Striped Squirrel	Funambulus tristriatus	WG	LC	1,2	с
30	Dusky-Striped Squirrel	Funambulus sublineatus	WG	VU	1,2	c c
30	Indian Giant Flying Squirrel	Petaurista philippensis		LC		UC
					1,2	NE
32	Travancore Flying Squirrel	Petinomys fuscocapillus		NT	1,2	INE
22	Cervidae	Buse unicolor			1.2	
33	Sambar (Image 5)	Rusa unicolor		VU	1,2	С
34	Southern Red Muntjac	Muntiacus muntjak		LC	1,2	С

	Common name	Scientific name	Endemic	IUCN status	Source	Meghamalai status
	Tragulidae					
36	Indian Chevrotain	Moschiola indica		LC	1,2	с
	Bovidae					
37	Nilgiri Tahr	Nilgiritragus hylocrius	WG	EN	1,2	RR
38	Gaur	Bos gaurus		VU	1,2	UC
	Suidae					
39	Wild Boar	Sus scrofa		LC	1,2	С
	Elephantidae					
40	Asian Elephant	Elephas maximus		EN	1,2	с
	Soricidae					
41	House Shrew	Suncus murinus		LC	2	NE
42	White-toothed Pygmy Shrew	Suncus etruscus		LC	2	NE
	Erinaceidae					
43	Madras Hedgehog	Paraechinus nudiventris	IN	LC	1,2	с
	Hystricidae				,	
44	Indian Crested Porcupine	Hystrix indica		LC	1,2	VC
	Manidae				_/_	
45	Thick-tailed Pangolin	Manis crassicaudata		NT	1,2	RR
45	Ursidae				1,2	
46	Sloth Bear	Melursus ursinus		VU	1,2	UC
40				VO	1,2	
47	Leporidae			LC	1.2	
47	Indian Hare	Lepus nigricollis		LL.	1,2	VC
	Muridae					
48	Greater Bandicoot Rat	Bandicota indica		LC	1,2	VC
49	House Rat	Rattus rattus		LC	2	NE
50	White-tailed Wood Rat	Madromys blanfordi		LC	2	NE
51	Indian Bush Rat	Golunda ellioti		LC	2	NE
52	Asiatic Long-tailed Climbing Mouse	Vandeleuria oleracea		LC	2	NE
53	House Mouse	Mus musculus	_	LC	2	NE
54	Little Indian Field Mouse	Mus booduga		LC	2	NE
	Platacanthomyidae					
55	Malabar Spiny Tree Mouse (Image 6)	Platacanthomys lasiurus	WG	VU	1	RR
	Tupaiidae					
56	Madras Treeshrew	Ananthana elliotti	IN	LC	2	NE
	Pteropodidae					
57	Indian Flying Fox	Pteropus giganteus		LC	1,2,4	с
58	Lesser Dog-faced Fruit Bat	Cynopterus brachyotis		LC	3,4	NE
59	Greater Short-nosed Fruit Bat	Cynopterus sphinx		LC	2	NE
60	Sálim Ali Fruit Bat	Latidens salimalii	WG	EN	1,3,4,5	RR
	Rhinolophidae					
61	Rufous Horseshoe Bat	Rhinolophus rouxii		LC	5	NE
	Vespertilionidae					
62	Painted Woolly Bat	Kerivoula picta		LC	2,4	NE
63	Lesser Asiatic Yellow House Bat	Scotophilus kuhlii		LC	2,4	NE

Endemics: WG = Endemic to Western Ghats, IN = Endemic to India; IUCN Status: CR = Critically Endangered, EN = Endangered, VU = Vulnerable, NT = Near-Threatened, LC = Least Concern; Sources: 1 = Present study (2012), 2 = Hutton (1949); 3 = Muni (1994); 4&5 = Singaravelan & Marimuthu (2003 a,b); Meghamalai status: VC = Very Common, C = Common, UC = Uncommon, RR = Rare, NE = Not Evaluated, ? = Unconfirmed record.



Image 1. Lion-tailed Macaque



Image 5. Sambar



Image 2. Dead specimen of Rusty-spotted Cat



Image 3. Dhole



Image 4. Grizzled Giant Squirrel near the Vaigai River



Image 6. Malabar Spiny Tree Mouse

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