

**STATUS SURVEY OF THE ASIAN ELEPHANT (*ELEPHAS MAXIMUS*)  
ACROSS DIFFERENT ADMINISTRATIVE RANGES OF KALAKKAD  
AND MUNDANTHURAI TIGER RESERVE IN SOUTHERN INDIA**

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**Introduction**

Kalakkad - Mundunthurai Tiger Reserve (KMTR) is situated in the southern end of Western Ghats in Ashambu hills, with an area of 895 km<sup>2</sup>. It is biologically rich and known for high endemism (Kant 1994; Karthikeyan *et al.*, 2001; Parthasarathy, 2001). The rich forests of the reserve form the catchments for many rivers and streams (Johnsingh, 2001). The area is also unique as it has 5 primate species and is the home of the Nilgiri Tahr (*Hemitragus hylocrius*), a mountain goat endemic to the Western Ghats. KMTR is believed to support about 100 elephants (Dutt 2001; Melkani 2001), however their status is not well known. The reserve has 7 administrative ranges, viz., Ambasamudram (Ambai), Papanasam, Mundunthurai, Kadayam, Upper Kodayar, Kalakkad and Thirukarungudi. The main objective of the survey was to document the status of the Asian elephant, its distribution, movement, migratory routes and habitat management related information across the administrative ranges of the reserve. Information on range wise elephant status and habitat usage was important as some of the ranges are

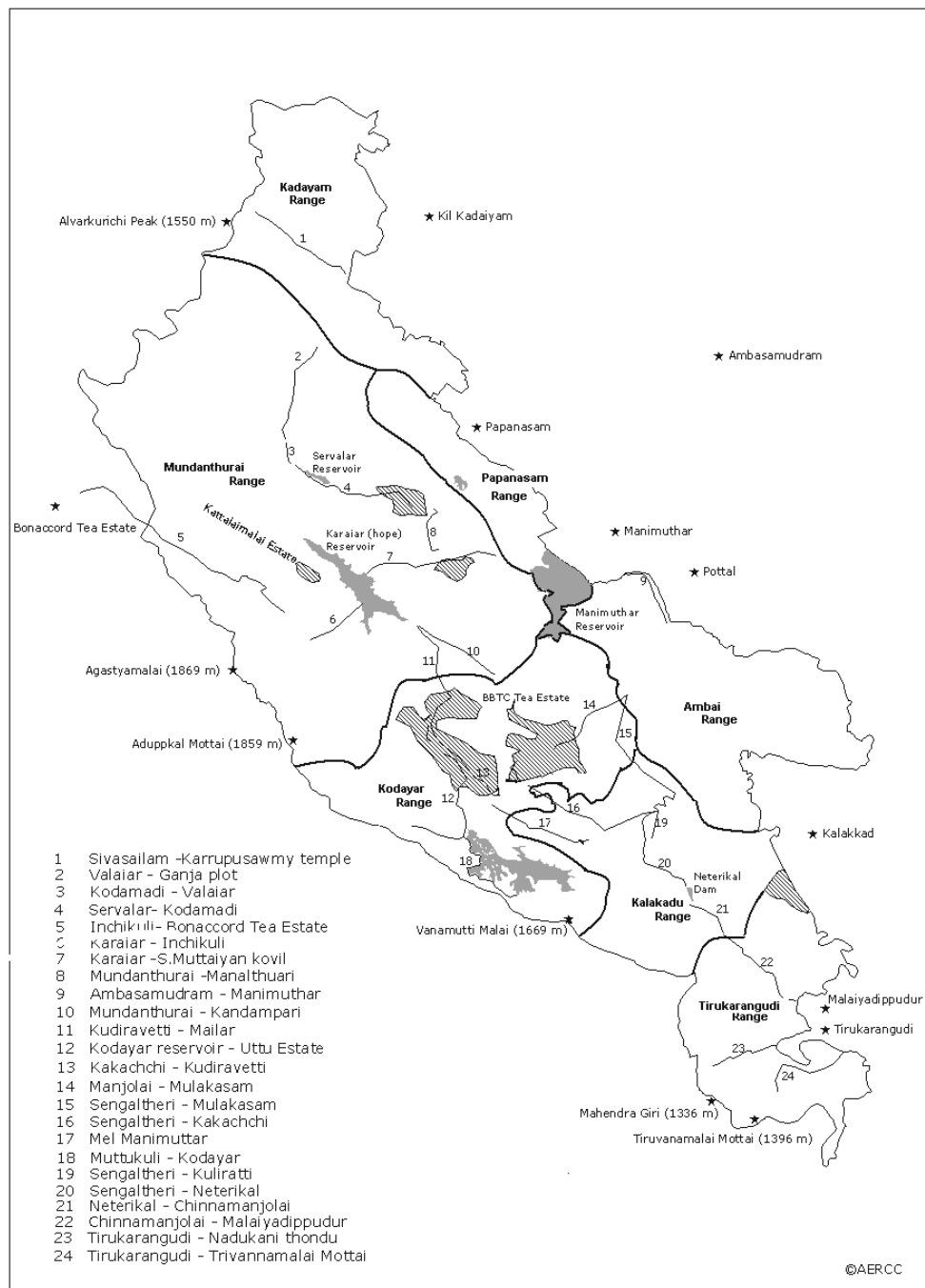
very crucial for elephants and some ranges report human-elephant conflict.

**Survey Methods**

Based on the literature review, past elephant sightings and habitat usage patterns, a number of survey routes (trails) were identified (Fig. 1) across the ranges. One observer and field tracker(s) walked in these routes and a total of 24 routes were surveyed on foot during the beginning of the North-East monsoon season (mid-September to mid-October).

The number of trails surveyed varied across the ranges and the selection of trails for each range roughly matched the total area of the range. The percentage of trails covered in Mundunthurai range was the highest (33%) followed by Kalakadu and Kodayar (25% for each), Thirukarangudi range (8%) and Kadayam and Ambai (4%).

Whenever elephant signs (track, dung, feeding and other signs) were located, time of sighting, location, number and their status as fresh or old were recorded. Observations of elephant signs were restricted to a width of 1 m on either side

**Fig. 1****Elephant and habitat survey routes in different ranges of KMTR**

of the survey route. Experienced forest staff and local people were interviewed, and villages, enclosures and other human establishments along the boundary and within the reserve were visited for past and current elephant sightings.

Elephant visits to villages; damage to crops and other elephant related information was also gathered. Forest department records provided very useful information on many aspects of elephant management. Except for Papanasam range the survey was carried out in all the ranges.

### Data analysis

Encounter rate of dung piles was calculated by dividing the total distance covered by the number of dung piles encountered for each route and each range. Comparison of dung pile encounter rate and sighting interval were made across the ranges. Survey routes were considered to be independent of each other. For each route, the encounter rate of dung piles was analyzed to develop the patterns of habitat usage and distribution.

### Results

#### *Elephant distribution in different ranges of KMTR*

The survey provided basic information on elephant usage of different administrative ranges of the reserve. All the 7 ranges of the reserve report elephants and the number of their sightings is highest in Kodayar and Mundanthurai. Free movement of elephants across ranges could be noticed and for Kadayam, the movement of elephants is through neighbouring Kerala State due to the steep nature of the terrain. The encounter rate of elephant

**Table 1**

*Distance covered, number, encounter rate and sighting interval of dung piles for different management zones of KMTR.*

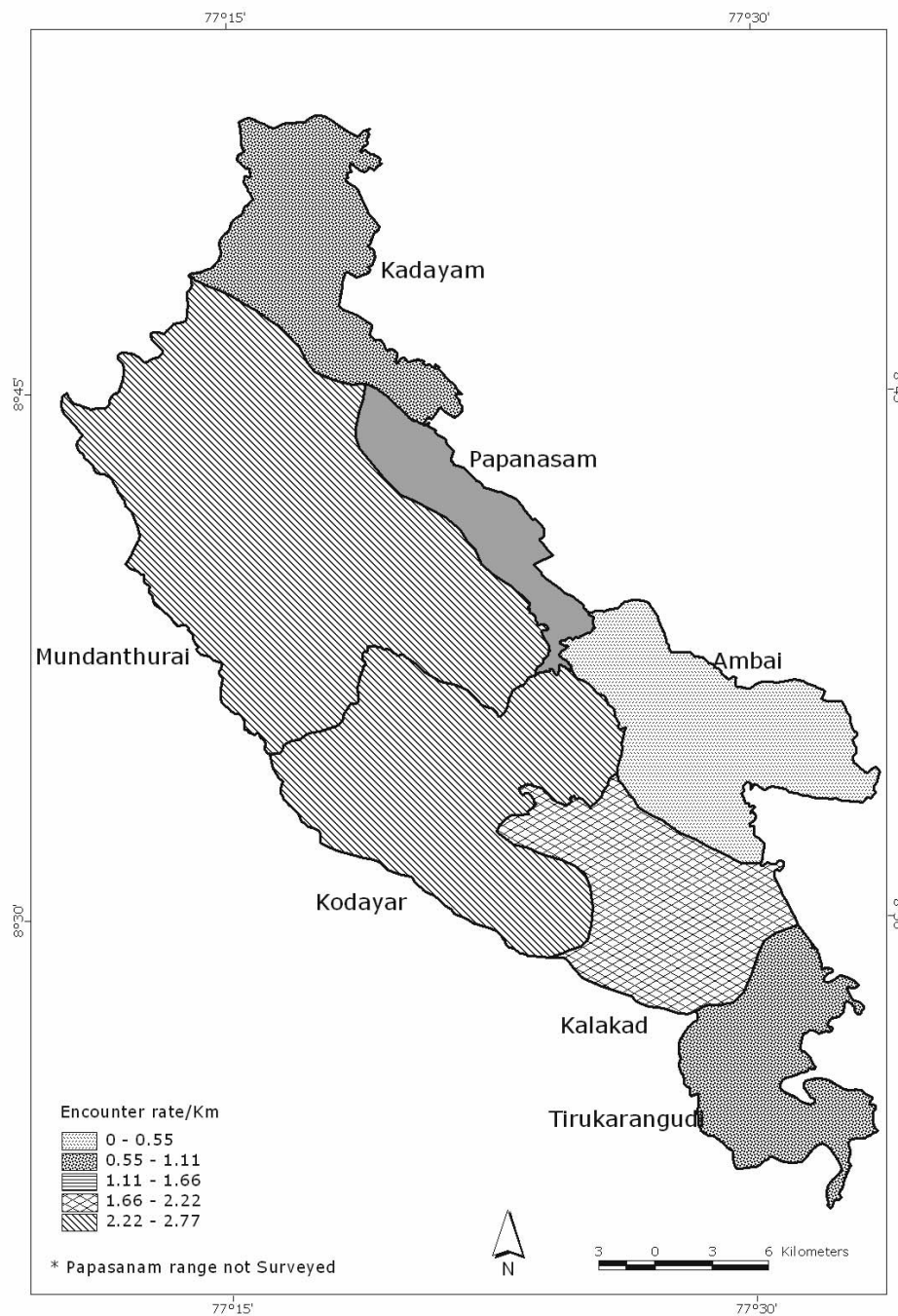
Sl. No.	Range	Dist	No.D	Er
1	Ambai	8	2	0.25
2	Kalakad	88	151	1.72
3	Kadyam	10	6	0.60
4	Kodayar	87	241	2.77
5	Mundanthurai	94	225	2.39
6	Tirukarangudi	14.5	16	1.10

Dist: Distance covered, No. D: Number of dung piles, Er: Encounter rate (expressed as number of dung piles/km)

signs (mainly dung piles) was highest in Kodayar (2.77/km) followed by Mundunthurai (2.39/km) and Kalakkad (1.77/km, Fig. 2).

*Mundunthurai* : Based on elephant distribution, this region can be classified into three parts; the area around Karayar reservoir, Mundunthurai plateau and the higher reaches. Within Karayar region, four Kani settlements such as Enchikulai, Periyamailar, Chinnamailar and Kattalamalai estates are located, among them, Enchikulai, Periyamailar and Katlamalai have elephant problems during the rainy season (November and December). Based on the direct and indirect evidences and interviews with the locals it is revealed that elephants use Karayar and the adjoining region from July to December.

Elephants are reported in Manalthurai, Mundal, Karaiyar road, Servalar, Thailarodai of Maundunthurai

**Fig. 2**

Encounter rate of elephant dung piles in different ranges of KMTR

plateau. The Mundunthurai plateau has an area of 50-60 km<sup>2</sup> of dry deciduous vegetation with tall grass, considered to be ideal elephant habitat. However, the area is small (only 6% of the park) and not connected to areas with similar forest types. The area has a low elephant density. Secondly, habitat from Sorimuthanurkoli to Manimuthar dam is known for firewood collection. Woodcutters from Ambasamudram and V.K. Puram use this region. The area is also known for heavy cattle grazing and the cattle from Sengampatti and adjoining villages come to this area. Elephants use Mundunthurai plateau during January to March and the largest elephant group seen in this region was 23 animals. The Valayar, Kodamadi and adjoining areas of the higher reaches, are known for their regular elephant presence. The rich *Ochlandra* reed brakes make this habitat prime elephant areas and they reportedly use this part throughout the year.

**Kalakkadu :** Elephants come down to Kalakkadu from Mundunthurai through Banatheertham, Kandamparai to Kalakkad, and they are reported only in rainy season. The elephant areas in Kalakkadu are Sengaltheri, Kovapatti, Kuluratti, Multalar, Mulakasam, Nettrical and Kakachi. From Sengaltheri elephants move to Karungalkasam and they are reported here from December to January. The swampy grassland patches within the Netrikal dam and Chinnamanjolai estate area attracts a number of elephants to this region. But no elephant signs have been reported from Chinamanjolai to Mailadipudur region. It appears that if the area is very steep and has only grassland with a few scattered trees; elephants may not use such habitat.

**Kodayar :** Elephants in Upper Kodayar region are mainly found in Muttukuli, Kudaravetti, Kakachi and Nallumukku and Ottu tea estates. Elephants use the estate region regularly and one of the reasons for elephants frequently using tea estate areas could be due to the area being dominated by *Ochlandra* reed brakes, which adjoins the tea estates. Elephants that visit villages such as Potal, Singampati, Papankulam during summer use this region. However towards the foothills, close to Manimuthar dam area, no record of elephants or their signs have been reported. The habitat near Kodayar reservoir has swampy grassland, *Ochlandra* reed brakes and evergreen forest and is considered to be another well-known area for elephants.

**Kadayam :** Elephants enter the Kadayam region from the Kerala side. The nearest place in KMTR to come to Kadayam is Amburveli, but elephants from Chinnapullu (Kodamadi) cannot come to Amburveli as the place is very steep. So they enter Kerala and from there they come to Kadayam. Elephants from Kerala come via Kadayam to Sivasailam and Talamalai boundary. In Kadaiyam range, elephants were reported in only two places of the foothills, Govindaperi and Sivasailam (Bangalakudiyirrupu). Elephants are known to use the region from, Alwarkuruchi peak to Karruppusamy kovil to Kallar River and to foothills (near Kadana reservoir), particularly to visit the villages during January and February. They do not use the foothills of this range regularly.

**Ambai :** Elephants are seen in Singampatti forest beats 1,2 and 3, Kulundumamarai forest beat and Thekkuveeranallur forest beat. All these 5 forest beats are in the

foothills near the Manimuthar dam in Ambai range. Elephants come from Mulakasam and the route they follow is Mulakasam, Kathodai mottai, Nakarichan odai, Othapanai and Elumbachaiar (Mardamkasam). Elephants come to foothills and villages through Keerakaranthoundu (saddle). The saddle adjoins Vadagari beat of Kalakadu range. From the saddle the elephants come to Elumbachaiar. During rainy season between December and January, elephants use this region. The habitat within the foothill region is very dry, but villages with their cultivation of banana, paddy, sugarcane and coconut, along with old palm tress along the boundary attract elephants towards villages. However, they visit only few villages.

*Trirukarangudi* : Elephants from Keeripari, (Alagiapandiyapuram range of Kanayakumari) via Naduganithoundu (saddle) reach higher reaches of Thirukarangudi region. From Naduganithoundu up to Agailandampillai Kadu (private estate) elephants are reported, and beyond this point towards the foothills (Anaiadithambiran temple) no elephants are reported. From the saddle to the estate, the path is negotiable and the habitat is rich in reeds. Other hill ranges such as Thrivannamalai mottai, and Nadugani mottai are adjoining the saddle but are very steep. There is a possibility that elephants from Nattrikal and Chinnamanjolai come to Naduganithoundu.

### **Conservation issues**

All the 7 ranges of the reserve report elephants and the number of their sightings is more in Kodayar and

Mundunthurai. This is due to availability and abundance of elephant food plants, and their varying geographical and seasonal distribution. Therefore the elephants move extensively from one patch to the other. Secondly, except in Mundunthurai plateau and a few lower regions (Singampatti ex-jamin), most of the areas in the reserve are steep with many valleys rising to the peaks. This pattern has a major impact on the movement of elephants and does not allow them to come down into the valley. They, therefore, restrict themselves to the upper reaches mostly. However, elephants do come to the foothills, mainly for the crops cultivated in the villages and palm trees grown to demarcate the boundary along the foothills or grown naturally.

Human elephant conflict is more in areas under Ambai range. Since 1995, three human deaths by elephants have taken place in the reserve. Forest exploitation for irrigation and power projects, severe cattle grazing pressure, frequent fires, road construction and uncontrolled encroachments along the foothills have caused severe damage to the reserve. A total of 150 villages are located within a width of 5 km of the reserve, stretching for 200 km and 30% of them are located close to the forest.

In addition, staff colonies of the State Electricity Board and private estates are located within the reserve. Fuel and other forest resource needs of the villages particularly in the fringes are very high (Melkani 2001; Dutt, 2001). Habitat along the foothills, particularly in Ambai range is very dry and has extensive biotic pressure. In the foothills of this range, an irrigation canal runs along the boundary.



If a barrier is constructed along the canal, it would improve the habitat quality. It would prevent many problems including

cattle entry and elephant entry to human habitation and forest fires, which are known to be set by the villagers.

### Acknowledgements

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### SUMMARY

This paper documents the status of the Asian elephant (*Elephas maximus*), its distribution, movement, migratory routes, and other elephant and habitat management related information across the administrative ranges of Kalakkad and Mundanthurai Tiger Reserve (KMTR) in Southern India. The knowledge of range wise elephant status and habitat usage was important as some of the ranges have very crucial elephant habitats, and some ranges report human-elephant conflict. The survey was based on the insights of past elephant sightings and habitat usage pattern and through ground survey of a number of routes (trails) across the ranges. All the 7 ranges of the reserve report elephants and the number of their sightings is more in Kodayar and Mundanthurai. Free movement of elephants across ranges could be noticed and for Kadayam the movement of elephants is not direct but through neighbouring Kerala State due to the steep nature of the terrain.

**Key words :** Asian Elephant (*Elephas maximus*), Status survey, Kalakkad-Mundanthurai Tiger Reserve, Southern India.

दक्षिण भारत के कालक्काड के विभिन्न प्रशासन परिक्षेत्रों और मुण्डनथुराई बाघ संरक्षित क्षेत्र में होते हुए एशियाई हाथी (*एलिफस मैक्सिमस*) का स्थिति-सर्वेक्षण

सुरेन्द्र वर्मा

सारांश

इस अभिपत्र में दक्षिणी भारत के कालक्काड के विभिन्न प्रशासन परिक्षेत्रों और मुण्डनथुराई बाघ संरक्षित क्षेत्र में होते हुए एशियाई हाथी (*एलिफस मैक्सिमस*) की स्थिति, उनके वितरण गतिविधियों, प्रवजन मार्गों तथा हाथियों से सम्बन्धित अन्य जानकारी और उनके प्राकृतावास प्रबन्धन को प्रलेखित किया गया है। परिक्षेत्रवार हाथियों की स्थिति और प्राकृतावास उपयोग की जानकारी महत्वपूर्ण है क्योंकि परिक्षेत्र हाथियों के प्राकृतावास की दृष्टि से अति संवेदनापूर्ण रहे हैं तथा कुछ परिक्षेत्रों से मानव हाथी संघर्ष की सूचनाएं भी मिली हैं। यह सर्वेक्षण विगत में देखे गए हाथियों की अन्तरंग जानकारी, उनके प्राकृतावास उपयोग की रूपसज्जा और परिक्षेत्रों में होते हुए उनके अनेक मार्गों (पदचिह्नों) का पूरा-पूरा भूमि सर्वेक्षण कर उस पर आधारित किए गए हैं। संरक्षित क्षेत्र के सातों परिक्षेत्रों से हाथियों और उनके देखे जाने की संख्या की जानकारी कोडयार और मुण्डनथुराई से ज्यादा सूचित हुई है। परिक्षेत्रों में होते हुए हाथियों की निर्बन्ध गतिविधियां भी चलती रहती देखी गई है तथा काडायम में हाथियों की गतिविधियां सीधे-से नहीं होती, किन्तु भूमि के तीखे ढलान होने के कारण पास लगते केरल राज्य में से होते हुए चलती है।

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