

## **DISTRIBUTION OF MAMMALS AND BIRDS IN CHINNAR WILDLIFE SANCTUARY**

P. Vijayakumaran Nair  
K.K. Ramachandran  
E.A. Jayson



KERALA FOREST RESEARCH INSTITUTE  
PEECHI, THRISSUR

December 1997

Pages: 31

## CONTENTS

	Page	File
Abstract		r.131.2
1 Introduction	1	r.131.3
2 Methods	4	r.131.4
3 Results and Discussion	7	r.131.5
4 References	24	r.131.6
5 Appendices	27	r.131.7

## ABSTRACT

A study was conducted during 1990-1992 in Chinnar Wildlife Sanctuary (10° 15' to 10° 22' N latitude and 77° 05' to 77° 17' E longitude) of Kerala State to gather information on the distribution of mammals and birds in the area.

The study revealed the occurrence of 17 larger mammals. A total of 59 elephants were recorded from the area. Age-sex composition of the herds were similar to that in other populations. Forty three individuals of sambar were sighted, the herd size and composition is comparable with that of other places. This pattern was applicable to the spotted deer also. Other animals include the wild pig, gaur, bonnet macaque, hanuman langur, leopard, wilddog. etc.

Hundred and forty three species of birds from thirty four families were recorded from the study area. The birds found in the study area is compared with distribution in other wild life sanctuaries in Kerala. Few birds are peculiar to the Chinnar area, few birds common in other parts of Kerala are rare in the area.

The riverine forests in the area is important for the survival of the endangered grizzled giant squirrel, *Ratufa macroura*. Fifty one individuals of this animal were sighted, evidence of 12 more individuals obtained. For the whole of the sanctuary, based on transect data, a total population of 150 animals were estimated. Management aspects in general are discussed giving specific suggestions for managing the grizzled giant squirrel habitat.

# INTRODUCTION

## Background Information

The Chinnar Wildlife Sanctuary is important from two points. This is the only wildlife sanctuary in Kerala with dry deciduous scrub vegetation and associated animals. Secondly this area contains the endangered grizzled giant squirrel. The study deals with the status of animals and habitat quality in general and the grizzled giant squirrel in particular. The area was declared as a wildlife sanctuary in 1984. The present study is the first investigation after declaring the area as a sanctuary. Therefore the aim has been to provide a status report on the animals and to provide an assessment of the habitat quality.

**Other studies** The first management plan for the Chinnar Wildlife Sanctuary was prepared by Ramesan (1989). Nair(1988) examines the area in a bio-geographical perspective and discuss many conservation issues.

**Importance of the sanctuary** The Chinnar region is the eastern most part of a contiguous belt of forests extending from the high ranges and the Pooyamkutty region. Chinnar Wildlife Sanctuary is the second locality of grizzled giant squirrel habitat in India. Chinnar Wildlife Sanctuary is contiguous with' Indira Gandhi Wildlife Sanctuary of Tamil Nadu. It also adjoins the Eravikulam National Park in the West.

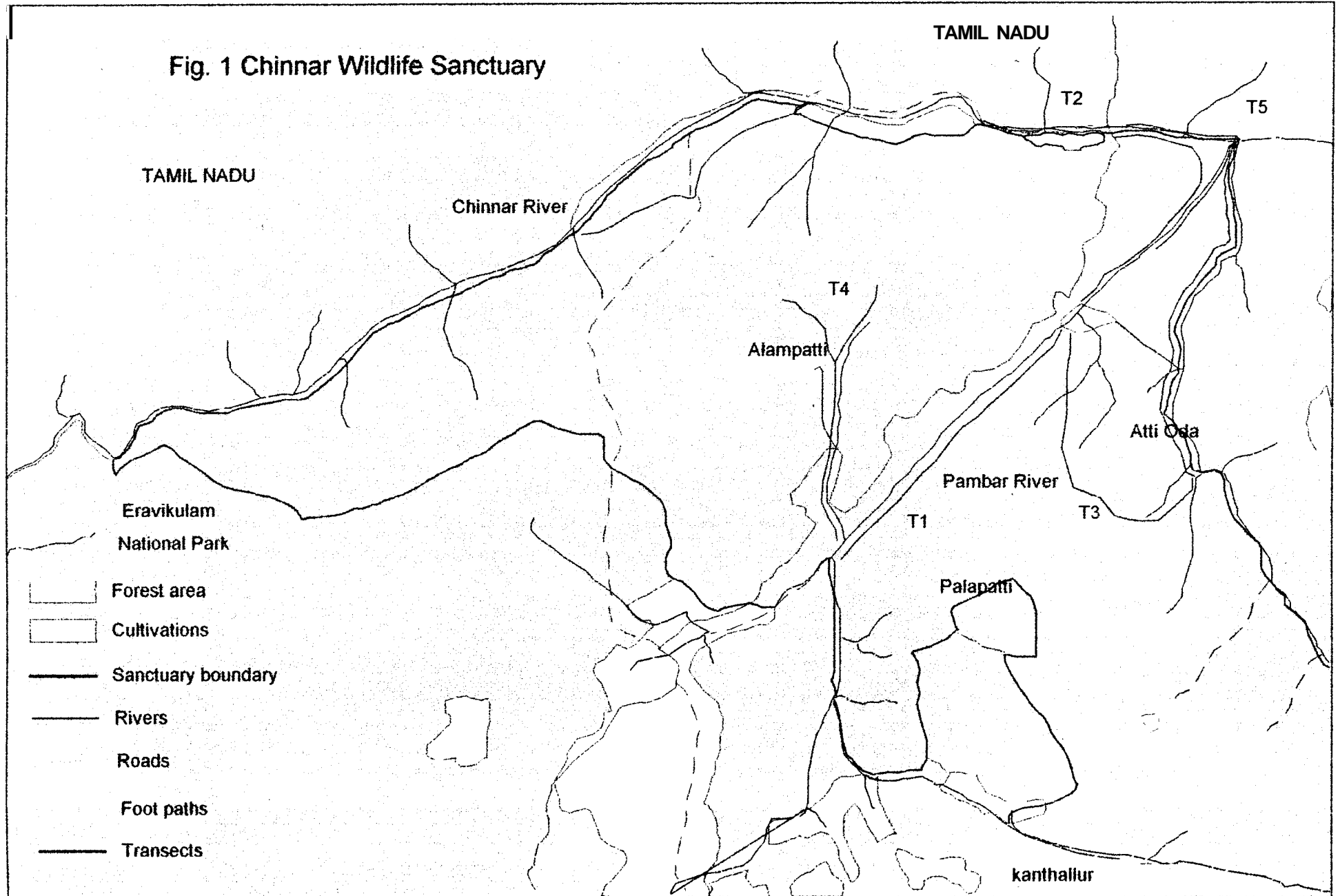
## Study area

---

The area comes under Devikulam Taluk of Idukki district, Kerala State. This wildlife sanctuary is under the control of an Assistant Wildlife Warden stationed at Marayur, who is under the authority of the Wildlife Warden of Idduki Wildlife Division.

**Location** Chinnar Wildlife Sanctuary is located in the rain shadow region of the Western Ghats between 10<sup>o</sup> 15' to 10<sup>o</sup> 22' N latitude and 77<sup>o</sup> 05' to 77<sup>o</sup> 17' E longitude (Fig. 1).

Fig. 1 Chinnar Wildlife Sanctuary



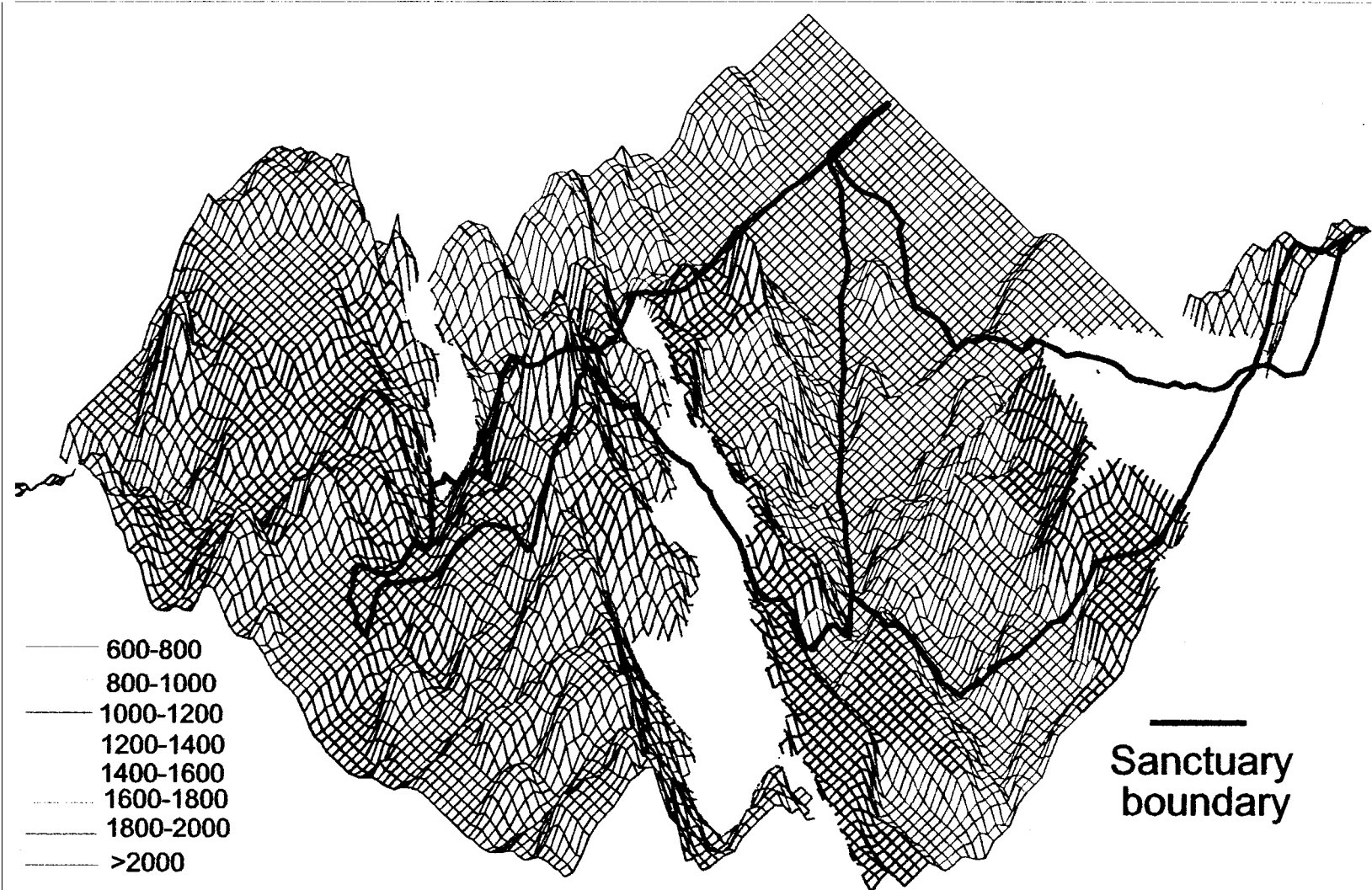


Fig.2 Elevation view of Chinnar wildlife sanctuary

**Boundaries** Chinnar Wildlife Sanctuary is bordered in the north and east by Amaravathi reserve forests of Indira Gandhi Wildlife Sanctuary of Tamil Nadu State. The western side merges with Eravikulam National Park. Kudakkad reserve forest and Vannanthurai sandal wood reserve forest lie adjacent to the southern boundary. The sanctuary is accessible by road from Munnar (about 43 km). It can be approached from Udumalpet by travelling 29 km by road to reach Chinnar, which is the boundary between Kerala and Tamil Nadu States. A stretch of 15 km of all weather road passes through the sanctuary between Marayur and Chinnar (Fig. 1). Extent of the sanctuary is 90.442 km<sup>2</sup> and terrain is undulating with altitudes varying from 440 m to 2372 m above mean sea level (Fig. 2).

**Drainage** The East flowing Pambar and its tributaries drains the area. Before it leaves the Kerala State, Pambar is joined by Chinnar river. River Pambar and its main tributaries are perennial as they originate from the evergreen sholas in the higher reaches of the ghat in the southern and western sides.

**Climate** Annual rainfall ranges from 500 to 800 mm with a minimum and maximum temperature of 12°C and 36°C respectively. The maximum rainfall occurs only in the upper reaches of the ghats from where the Pambar river and its major tributaries originate, making them perennial even during the dry season. Bulk of the rainfall is received from north-east monsoon during October to December and the rainy season lasts for about one month. Occasional rains, for 10-15 days are also received during the rest of the year. Thus altogether, on an average, there are only about 50 rainy days in an year at Chinnar.

**salt licks** There are a number of natural salt licks in the Chinnar Wildlife Sanctuary. Wild animals such as elephant, sambar and spotted deer visit these salt licks regularly.

**Past history** Chinnar comes under the Marayur village which is one of the five villages of the erstwhile Anjanad Valley which has historic significance. In this part there are extensive megalithic burial sites. Such burial sites, near

Kanthallur and Alampatti area are remarkable. The plain area in Chinnar Wildlife Sanctuary was clearfelled in 1971 and later plantation operation was carried out with a number of species like *Eucalyptus*, *Ailanthus sp.*, neem, bamboo etc. Trials of red sanders and medicinal plants were also attempted in small scale without much success.

## Vegetation

In the relatively plain areas, the vegetation is dry, deciduous scrub with xerophytic species dominating with interspersed grasslands (Fig. 3 ). Tall trees are found mostly on either side of the Pambar and Chinnar rivers and their tributaries. In general the hilly regions are more wooded.

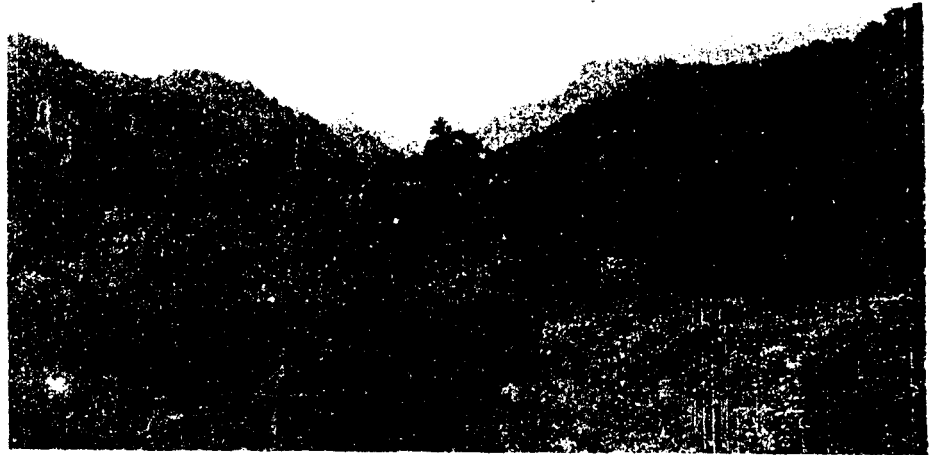
**Fig. 3 Dry deciduous scrub interspersed with grasses**



Tree species found in moist areas include *Mangifera indica*, *Terminalia arjuna*, *Chloroxylon sweitenia*, *Terminalia bellirica*, *Terminalia crenulata*, *Tetrameles nudiflora*, *Cassia fistula*, *Melia dubia*, *Tamarindus indica*, *Pongamia pinnata* and *Acacia catechu* (Fig. 4).



**Fig. 4 Wooded hilly regions have trees of medium height.**



**Riparian** The riparian zone on either side of east flowing Pambar river and its tributaries is the abode for trees species like *Terminalia arjuna*, *Mangifera indica*, *Terminalia crenulata*, *Terminalia bellirica*, *Tetrameles nudiflora*, *Melia dubia*, *Tamarindus indica*, *Pongamia pinnata*, etc. Other areas have trees like *Anogeissus latifolia*, *Acacia catechu*, *Careya arborea*, *Emblica officinalis*, *Sapindus laurifolia*, *Randia dumetorum* and other xerophytic plants like *Euphorbia tirucalli*, and *Opuntia* sp.

## METHODS

As mentioned earlier, the present study is the first investigation after declaring the area as a sanctuary and the aim has been to provide a status report on the animals and to provide an assessment of the habitat quality. The sanctuary consists of two types of habitat, the first one, plain scrub areas near Chinnar and second the wooded hilly regions. The observations were carried out from July, 1988 to September, 1992. These two regions are expected to have different densities of animals because of altitudinal, vegetation difference and water availability. From a conservation point of view, the most important animal of this region can be described as the endangered grizzled

giant squirrel. This animal has a peculiar habit of inhabiting trees beside rivers and streams. Therefore a different method was employed for enumerating these animals. This region, lying between different vegetation types is expected to have interesting distribution pattern of birds. Therefore this aspect was also looked into in detail.

**Routes** Two routes were chosen for regular perambulation representing the two types of habitats Fig 1. The first route started from Chinnar check post and extended up to the Pambar. The second route was from Pambar to Athioda. Both routes were along existing paths and had good visibility on either side. While moving through the routes following details of animals noticed on the both sides of the paths were recorded. i) Name of species ii) Number of animals in the group iii) Activity at the time of observation and iv) Vegetation type in which the animal was located.

**Larger mammals** The region has almost all the typical herbivores and carnivores of peninsular India. These include the elephant, sambar, spotted deer, gaur, wild pig, sloth bear, leopard, wild dog and jungle cat. Apart from this, all indirect evidences of animals such as presence of pellets, scats, spoor, pug marks, foot prints, dungs and droppings were recorded and identified. These were useful for knowing the status of Carnivores.

**Primates** The age-sex composition of hanuman langur and bonnet macaque were noted down in detail whenever these animals were encountered.

**Other animals** The region also has a rich fauna of other animals including snakes, tortoises and rodents.

**Birds** All the vegetation types were perambulated and the species and number of individuals of birds found were recorded. Check lists for birds for almost all the wildlife sanctuaries in Kerala are now available. The check lists for other areas used in comparison have been prepared by people of varying expertise, and as time goes, with the availability of more exhaustive check lists, the scope of the comparisons can be increased even

**squirrel** by one of the investigators, Dr. K. K. Ramachandran. Two exclusive census were carried out by him, the first in 1991 and the second in 1992. Five transects were identified for censusing the squirrel Fig. 3. They were 1) On foot from Karumutthithodu - Kombakayamkanam - Madhinaar - Mahalipara - Pambar to Chambakkad where the 220 KV power line crosses Pambar.(2) On foot from Chinnar to Churulipatti. (3) On foot from Chambakkad to Vesypara - to upper tributaries of Athioda - through Athioda to Kootar. (4) On foot from Alampattithodu to Alampatti Colony - Upstream shola of the Allampattithodu. (5) On foot from Chinnar to Chambakkad via Kootar.

The total length of the transects were about 40 km. The riverine habitat was perambulated and details of grizzled giant squirrel sightings, calls and nests were recorded. It may be noted here that the grizzled giant squirrel unlike the Malabar giant squirrel is a grey animal and merges with surroundings easily. Only an experienced investigator can spot these animals on top of trees. In some cases nests being currently used by the animal could be seen, but the animal itself could not be located. Such instances were recorded and analyzed separately.

During the census two truckers accompanied the investigator and the three persons could effectively cover a width of about 35 m on either side. This width of 35 meters on either side of the transect is assumed to be the effective transect width. So the area covered by the census is estimated as:

$$40000 \times 35 \times 2 = 2800000 \text{ m}^2 \quad (2.8 \text{ km}^2)$$

The density is calculated using the formula:

$$\text{Density} = \frac{\text{Total number of giant squirrels sighted in the transects}}{\text{width of transect} \times \text{total length of transects}}$$

## RESULTS AND DISCUSSION

### Status and distribution of mammals

**Elephants** The Asian elephant, *Elephas maximus*: The Chinnar area contains few herds of elephants. The area being contiguous with Eravikulam National Park in Kerala and Indira Gandhi Wildlife Sanctuary in Tamil Nadu., elephants have large area for movement. A total of 59 elephants were observed during the study period. There were seven males 41 females and 11 young ones. Male to female ratio of elephants was 1:6 and female to young ratio was 1:3.5. Maximum herd size of 12 individuals were seen on 28-7-1988 near Mangappara. Other places of sightings were at Cham-bakad, Chinnar check post, Thengamala, Alampatti, Palappetti, Sungam and near Variappara. Evidences of elephants feeding on the barks of certain riverine trees can also be taken as an indication of elephants using the habitat extensively. Group composition of elephant herds sighted is given below.

**Fig. 5** A small group of elephants



**Table 1 Elephants sighted during the study in different areas.**

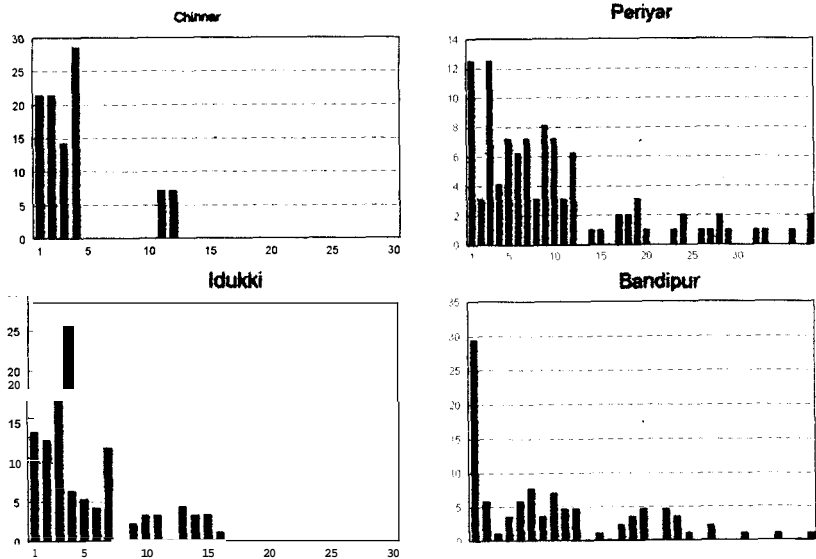
*Chinnar has mostly smaller herds. Number of males and young ones in the population are comparable with that in other populations. The high number of young ones indicate that the elephant population at Chinnar is in a healthy state.*

NO.	Date	Place	NO. of elephants	Male	Female	Young
1	27-7-88	Sungam	6		6	
2	27-7-88	Mangappara	11	1	9	1
3	28-7-88	Mangappara	12	2	9	1
4	28-7-88	Thengamala	1	1		
5	28-7-88	Alampetti	3		2	1
6	28-7-88	Vesypappara	2		1	1
7	28-7-88	Champakad	4		2	2
8	28-7-88	Sungam	3		2	1
9	29-7-88	Palapetti	4		2	2
10	29-7-88	Mangappara	3		3	
11	29-7-88	Mangappara	1		1	
12	29-7-88	Mangappara	4	1	2	1
13	08-3-89	Sungam.	1	1		
14	27-11-90	Near Chinnar	4	1	2	1
Total			59	7	41	11

A comparison of the herd size and age-sex composition is made with that of other populations. It can be seen that Chinnar has mostly smaller herds. It is quite possible that the larger groups are assemblages of smaller groups. Males are about 16% at Chinnar, is more than the same reported for Periyar (Nair *et al.*, 1985) but less than the 26% reported for Bandipur (Sharatchandra and Gadgil, 1975). The high number of young ones indicate that the elephant population at Chinnar is in a healthy state.

**Fig. 6 Frequency count of elephant herds.**

*It can be seen that Chinnar has mostly smaller herds. Bigger herds are probably groups of smaller herds.*



**Sambar** Sambar (*Cervus unicolor*) is the largest of the Indian deers and is found almost throughout western ghats. Unlike the spotted deer, they are found in more wooded areas. Details of groups sighted and their composition is given below. Male to female ratio of sambar was 1:1.17. Forty three individuals were seen at places like Thengamala, Palappetti, Chambakad, Mangappara, Chunilipetti, Kootar, Sungam and Chinnar check post. The group composition at Chinnar seem to be comparable with other places. Animals, the sex of which could not be ascertained are included in the last column.

**Table 2, Group composition of sambar sighted at different locations.**

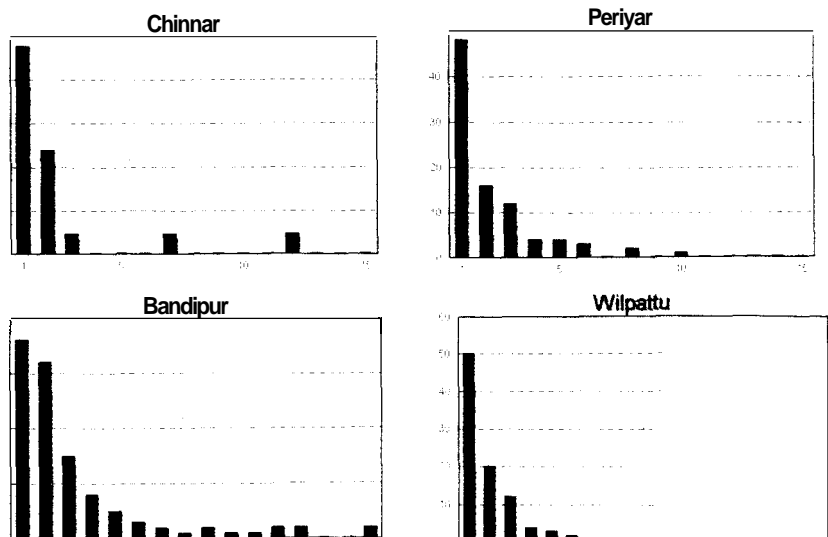
**The largest group seen consisted of 12 individuals. Most of the groups consisted of 1-3 animals. A total of 43 individuals were recorded of which 10 were males and 17 females.**

No.	Date	Place	No. of sambar	Male	Female	M/F
1	27-7-88		1			1
2	27-7-88	Churulipetty	2			2
3	27-7-88	Champakad	1	1		
4	27-7-88	Kootar	12			12
5	27-7-88	Sungam	1	1		
6	27-7-88	Behind checkpost	1		1	
7	28-7-88	Mangappara	2	1	1	
8	28-7-88	Thengamala	1			1
9	28-7-88	Palapetty	1		1	
10	28-7-88	Champakad	1		1	
11	29-7-88		2		2	
12	29-7-88	Churulipetty	1		1	
13	29-7-88	Left of bridge	3	1	2	
14	29-7-88	Kuttar	7	5	2	
15	29-7-88	Sungam	1	1		
16	29-7-88	Sungam	1		1	
17	09-3-89		2		2	
18	27-11-90		3		3	
Total			43	10	17	16

The herd frequency distribution is similar in the four places compared, with the solitary individuals being most frequent.

**Fig. 7 Frequency distribution of sambar herds sighted at Chinnar and comparison with same reported from other places.**

**The overall pattern is comparable. Chinnar has comparatively smaller herds.**



**Spotted deer** Spotted deer (*Axis axis*) is distributed in the Chinnar Wildlife Sanctuary along the relatively plain area between the altitude 440 m to 700 m. Above the 700 m altitude the terrain is very steep. The effective range of spotted deer is about 10 km<sup>2</sup>. They range between the Chinnar Wildlife Sanctuary and Indira Gandhi Wildlife Sanctuary. Details of herds observed are tabulated below. The male to female ratio was 1:1.1 and the female to young ratio was 1:0.14 which indicates that the population is in a healthy state.

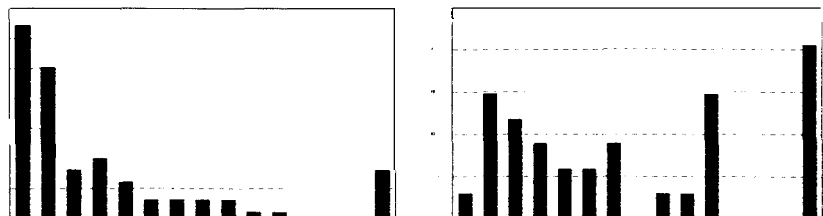
**Table 3 Sightings of spotted deer in the study area**

**Large groups of the deer are readily seen. Males in spike, velvet and hard antlers could be located. A total of 65 males, 110 females and 15 young were recorded. Sex of 66 individuals could not be ascertained.**

No.	Date	Place	No.	Spike	Velvet	Male	Female	young	M/F
1	27-7-88		2			1	1		
2	27-7-88		7				7		
3	27-7-88		5			4	1		
4	27-7-88	Churulipetty	13		1	1	8		3
5	27-7-88	Koottar	16			2	7		7
6	27-7-88	Sungam	2			1	1		
7	27-7-88	Sungam	2			1		1	
8	27-7-88	Sungam	10			2	7	1	
9	27-7-88	Sungam	9			3	5	1	
10	27-7-88	Behind checkpoint	1			1			
11	27-7-88	Behind checkpoint	7				7		
12	27-7-88	Behind checkpoint	4				4		
13	28-7-88		3			1			2
14	28-7-88		11			2		2	7
15	28-7-88	Churulipetty	7			5	2		
16	28-7-88	Koottar	5						5
17	28-7-88	Koottar	2			1	1		
18	28-7-88	Koottar	6						6
19	28-7-88	sungam	5			2	2	1	
20	28-7-88	Sungam	11			2	7	2	
21	28-7-88	Vesyappara	3				2	1	
22	28-7-88	Vesyappara	11					1	10
23	29-7-88	Churulipetty	11			2	8	1	
24	8-3-89	Champakad	2				2		
25	8-3-89	Champakad	2				2		
26	8-3-93	Champakad	6			2	3	1	
27	8-3-93	Champakad	4			1	3		
28	9-3-89	Koottar	3					3	
29	27-11-90	Near Koottar	16		4	2	8	2	
30	27-11-90	Near Kootar	20		2	2	10	5	1
31	8-11-90	Near Athioda	3			1	2		
32	29-11-90	chinnar	39		1	5	9	11	2
33	29-12-90		15						15
34		Chinnar	11			1	3	7	
Total			274	7	11	65	110	15	66

The group composition of spotted deer at Chinnar is compared with that of Bandipur (Sharatchandra and Gadgil, 1975).

**Diagram of spotted deer herds. It can be seen that Chinnar has comparatively larger herds.**





**Gaur** (*Bos gaurus*) is distributed almost through out the Western Ghats. At Chinnar, Mostly groups of two or three animals are sighted. A total of twelve individuals of Gaur were found at places like Churulipetti, Sungam behind Chinnar check post and Kuttar. Group composition of gaur herds sighted is given below.

**Table 4 Gaur herds sighted at different places A total of 12 individuals were sighted.**

No.	Date	Place	#animals	Male	Female	Young	M/F
1	27-7-88		3	1	1	1	
2	27-7-88	Behind Checkpost	2		2		
3	27-7-88	Churulipetty	3		2	1	
4	27-7-88	Sungam	2				2
5	29-7-88		1				1
6	29-7-88	Koottar	1		1		
<b>Total</b>			<b>12</b>	<b>1</b>	<b>6</b>	<b>2</b>	<b>3</b>

**Wild pigs** (*Sus scrofa*) are one of the most widely distributed non-ruminant ungulates in peninsular India. Sixty five individuals of wild boar were seen at places like Chinnar check post, Kuttar, Chumlipetti. Male to female ratio was 1:7. They were found to feed on roots of plant belonging to *Cyperaceae*. Group composition of wild boar sighted is given below. The sounders are smaller compared to other places.

**Table 5 Wild Boar sighted in different areas. Sounders of 2 to 12 individuals were sighted. A large number of young ones indicate a healthy state of population. A total of 65 individuals were recorded.**

No.	Date	Place	No. of animals	Male	Female	Young	M/F
1	27-7-88		3				3
2	27-7-88	Churulipetti	2			1	1
3	27-7-88	Churulipetti	3				3
4	27-7-88	Behind checkpost	2		2		
5	27-7-88	Behind checkpost	3		3		
6	29-7-88		8			1	7
7	29-7-88	Koottar	8		7	1	
8	29-7-88	Left of bridge	8		7	1	
9	27-11-90	Chinnar	8				8
10	28-11-90	Near Koottar	7	1			6
11	29-11-90		12	1	4	7	
12	27-12-90		1	1			
<b>Total</b>			<b>65</b>	<b>3</b>	<b>23</b>	<b>11</b>	<b>28</b>

**Barking deer** Six individuals of barking deer, *Muntiacus muntjack* were found near Sungam.

- Nilgiri Tahr** During the first census of wild animals in the sanctuary a herd of Nilgiri tahr (*Hemitragus hylocrius*) with eighteen individuals were reported near Mangappara. This has been the only report of these animals from the wildlife sanctuary, though the same is present in the adjoining Eravikulam National Park.
- Malabar Giant Squirrel** The Malabar giant squirrels (*Ratufa indica*) is more of an animal of the moist deciduous, semi evergreen and evergreen forests. In the sanctuary the Malabar giant squirrel is seen only rarely in the riverine tract. One Malabar giant squirrel was sighted in the riverine area near Churulipatti. Three individuals were reported near Mangappara during the first census of wild animals in the sanctuary. These animals were also observed out side the sanctuary, around Marayur.
- Bonnet macaque** Forty five individuals of Bonnet macaque (*Macaca radiata*) were seen during the study period in places like Chinnar check post, Marayur, Kuttar, Thengamala and Palapetty. This is a very adaptable and versatile monkey capable of existing in a variety of habitats. In Chinnar wildlife Sanctuary they have been seen mostly near habitations. At Chinnar proper, the monkeys visit habitations and stay mostly in the riverine habitat.
- Hanuman langur** Hanuman langur (*Presbytes entellus*) were seen near Chinnar check post area, near Kuttar, Alampatti and Churulipatti. These animals are also occasionally seen on the riverine trees.
- Carnivores** During the study period tigers (*Pantera tigris*) were not sighted by us. Pug marks of tigers were recorded near Kuttar and Mannala areas. Since the prey animals such as spotted deer and sambar deer are common, predators like panther (*Panthera pardus*) are also common. The visibility is fairly good, the visitors get chances of seeing panthers in the scrub jungles of the sanctuary. Two individuals were seen near Kuttar. Panther is reported to kill goats from tribal settlements. Scats of wild dogs (*Cuon alpinus*) with hairs of sambar and black naped hare were usually sighted.

**Other animals** No detailed studies were carried out on reptiles. *Python molurus* was recorded from Kootar area. During the course of the study, a tortoise was collected from Churulipetti area and it was identified as starred tortoise (*Geochelone elegans* (Schoepff)). This is the first record of this species from this region (Jayson, 1993). This tortoise was sighted at an altitude of 500m. The semi-arid and dry deciduous scrub forests of this area is conducive for the life of starred tortoise, which is reported to be common in semi-arid and desert tracts of South India (Daniel, 1983). It is further stated that precise information about the status of this tortoise in this range is lacking. Similarly, Das (1991) mentioned its distribution in Kerala as "South East Kerala". Apart from this, there is no information available on the geographical distribution of this species in the state.

Blacknaped Hare (*Lepus negricolis*), Jungle cat (*Felis chaus*) and Porcupine (*Hystrix indica*) are also recorded from the sanctuary.

## **Status and distribution of birds**

Hundred and forty three species of birds from thirty four families were recorded from the study area. The birds found in the study area is compared with distribution in other wild life sanctuaries in Kerala. For comparison, checklist of birds of Peechi Vazhani( NEST,1991), Chimmoni (NEST, 1992), Shendurney (Ahamed, 1996), Neyyar(Nair, M.V. 1993), Periyar(Nair *etal*, 1985), Kole lands(NEST, 1992), Wynad (Gopinathan Vallil,1990), Aralam(Gopinathan vallil, 1990), Silent Valley(Jayson, 1990), Eravikulam (Ramesan, 1990) were referred. Few birds are peculiar to the Chinnar area, few birds common in other parts of Kerala are rare in the area.

Among the water birds, only the pond heron was recorded from the study area. This is a very common bird in other parts of Kerala as well.

**kites, eagles and** Both black winged kite and brahminy kite were recorded.

**falcons** Both these are common birds in Kerala. Absence of the common pariah kite is notable. Four eagles have been noted, the black eagle, the grey headed fishing eagle, short toed eagle and the crested serpent eagle. Out of these the crested serpent eagle is seen almost throughout Kerala, the black eagle and the grey headed fishing eagle are seen only in 50% of the sanctuaries whereas the short toed eagle is found only in four sanctuaries. The falcon species could not be identified accurately. The Ceylon shikra is also a common bird in Kerala.

**Fowls and quails** The pea fowl is found in the sanctuary. This bird is found only rarely in sanctuaries in Kerala. The bush quail, Travancore red spur fowl, the grey jungle fowl and the white breasted water hen are found almost throughout Kerala including Chinnar. The common bustard quail is reported only from Chinnar and Silent Valley in Kerala.

**Pigeons and doves** The southern green pigeon, grey fronted green pigeon and Jerdon's imperial pigeon are found in Chinnar and other parts of Kerala, but the Nilgiri wood pigeon is found only in three other wild life sanctuaries in Kerala. The Indian spotted dove and emerald dove are found in Chinnar and other parts of Kerala, but the ring dove and the little brown dove are reported only from Chinnar.

**Parakeets** The rose ringed, blue winged and blossom headed parakeets and the Malabar lorikeet are found in Chinnar as well as other parts of Kerala.

The brain fever bird, koel and crow pheasant are common in Chinnar and other parts of Kerala, whereas the pied crested cuckoo and the small green billed malkoha are reported only from half the protected areas in Kerala.

**Ow/s,nightjars and swifts** The Indian great horned owl, the forest eagle owl, the brown fish owl, Malabar jungle owlet, South Indian hawk owl, southern spotted owlet and the brown wood owl found in the sanctuary are found only in about 75% of the protected areas in Kerala. The same is true of the Indian jungle nightjar as well. Both the brown throated and white rumped spine tail swift are common birds every where. Dusky crag martin, Nilgiri house swallow and red rumped swallow found here are not so common elsewhere.

**King fishers** The stork billed king fisher seen here is found only in about 50% of the protected areas in Kerala. whereas other king fishers such as pied, small blue and white breasted king fishers are common in Kerala.

**Wood peckers** The golden backed wood pecker is a common bird whereas other wood peckers such as the Indian great black wood pecker, heart spotted wood pecker, southern larger golden back wood pecker, Malabar golden backed three toed wood pecker, south Indian small yellow naped wood pecker, pigmy wood pecker and the little scaly bellied green wood pecker are found in less numbers in protected areas.

**Birds of prey** Out of the two shrikes seen here, the south Indian grey backed shrike is seen in other parts also but the bay backed shrike is reported in addition only from Walayar. The pied fly catcher shrike is very common while the large wood shrike is not so common in other parts.

**Bulbuls** Of the five bulbuls, the black bulbul is not common in all other areas, but the ruby throated yellow bulbul, the red whiskered bulbul, the red vented bulbul and the yellow browed bulbul are quite common every where.

**Babblers,fly catchers and warblers** Of the nine species of fly catchers found here only the paradise fly catcher is common every where, others are found only in 25% to 75% of other protected areas. This is true of the six species of warblers found here also. The tailor bird is reported from almost all areas.

**Other birds** The Malabar trogon is found only in two more protected areas. The Indian roller, chestnut headed and small green bee eaters and hoopoe are common birds. Both the Malabar grey and great Indian horn bills are common in Chinnar and elsewhere. Among barbets only the small green and large green barbets are found here. These are common in other parts of Kerala as well. Of the three species of orioles found here, the black headed oriole and the golden oriole are common every where. Of the Mynas, all the three are found here viz. the common myna, the grey headed myna and the hill myna are found in other areas. The tree pie and the white bellied tree pie are both common so also the scarlet and small minivets. The common iora is quite common, so also the gold fronted chloropsis. The fairy blue bird is common in all areas.

The grey tit is reported from only one more area and the yellow cheeked tit is slightly more common. The Indian tree pipit is not seen in many other areas. The rufous bellied, white throated and spotted munias and the rose finch are not so common in other areas. A good population of peacock (*Pavo cristatus*) and a variety of birds found in the dry deciduous scrub forests like small green billed malkoha (*Rhopodytes viridirostris*), white bellied drongo (*Dicrurus caerulescens*) and bush quail (*Perdiculiasp.*) are present in the sanctuary. A checklist of birds found in the area is given in Appendix - I.

**Drongo as a predatory bird** During this study a rare case of black drongo feeding on another bird was observed (Jayson and Ramachandran, 1994) on March 8th 1989. A black drongo was noticed perched on a tree branch feeding a small bird. After sighting the observers the drongo moved away to another tree with the prey. While moving nearer to the bird it dropped the prey, it was identified as a Tickell's blue flycatcher (*Muscicapa tickellie*). Ali and Ripley (1983) reported the species of birds such as *Prinia*, *Zosterops* and *Aegithina* being prey to of Black Drongo. Sridharan and Sivasubramanian (1987) have also recorded black drongo feeding on Indian wren warbler (*Prinia subflava*) in Bharathpur National Park. D'silva *al.* (1990) has also reported black drongo feeding on a small bird presumed to be a martin.

## Detailed studies on grizzled giant squirrel

The grizzled giant squirrel (*Ratufa macroura dandolena*) was earlier considered to be confined in its distribution to the Srivilliputtur Grizzled Giant Squirrel Sanctuary in Tamil Nadu. Second locality of this most endangered giant squirrel was reported by Ramachandran (1989a and 1989b) in the Chinnar Wildlife Sanctuary in Kerala State. The status, ecology and distribution of the animal are discussed. In addition to this, management aspects having a bearing on the grizzled giant squirrel are also discussed in this section.

**Distribution** The giant squirrels belong to the genus *Ratufa* and are confined to the Asia region. There are three species, *Ratufa indica* is the Malabar Giant squirrel, *Ratufa affinis* is the Malayan giant squirrel found in the North East India and Malaya. The grizzled giant squirrel *Ratufa macroura* is reported from eight locations in southern India. Sriviliputhur and Chinnar harbor viable populations of the animal. Two subspecies of the animal, *Ratufa macroura macroura* and *Ratufa macroura melanochra* are reported from the highland jungles of the Central and Uva provinces of Sri Lanka (Agarwal and Chakrabarthy, 1979).

**Feeding and ranging** This is a squirrel which lives in overlapping home ranges. The extend of movement can be said to be less than 500 m in most cases. This is comparable to the habit of the Malabar giant squirrel. The habitat of the grizzled giant squirrel is narrow and lies along the major rivers, their tributaries and sholas.

**Census** There have been considerable interest in the population of the grizzled giant squirrel at Chinnar and it was in this background that an exhaustive census of the species conducted (Ramachandran, 1993). Five transects with a total distance of about 40 km were covered, as mentioned in the methods.

**Table 6 . Number of grizzled giant squirrel sighted in different transects**

Transect No.	No. of squirrels sighted	No. of active nests seen
1	22	2
2	4	-
3	8	6
4	8	4
5	9	-
<b>Total</b>	<b>51</b>	<b>12</b>

**Population** During the census, a total of 51 grizzled giant squirrels were sighted. In 12 cases the squirrels themselves could not be located, but their active nests with green leaves were seen. This could be taken as a sure indication of the animal and for all practical purposes is as good as the sighting data. The animals recorded from the transects do not include all the animals in the sanctuary. The total population was estimated using the formula given in the method section. On the basis of these it is concluded that grizzled giant squirrel population in the entire Chinnar Wildlife Sanctuary is about 150 animals. Density of grizzled giant squirrel in the riverine area is 23 squirrels/km<sup>2</sup>. Both sightings and evidence of active nests are taken into account in this computation.

**predators** During the study, Crested serpent eagle was found attempting to catch the grizzled giant squirrel four times. From the presence of a fairly large number of birds of prey, it could be presumed that the grizzled giant squirrel population of Chinnar is in a dynamic state with predators and therefore the population can be considered as healthy.

**Comparison with Malabar giant squirrel** In some parts of Chinnar Wildlife Sanctuary, grizzled giant squirrel occurs sympatrically with Malabar giant squirrel. In the forest near Marayur, the latter species was seen only on some occasions. During the present census, one Malabar giant squirrel was sighted in the Churulipatti area. In the upper reaches of Alampatti thodu and other lower elevation sholas only grizzled giant squirrel is seen.



**Habitat continuity** Chinnar Information Center area with discontinuous tree canopy is very important while considering the continued survival of grizzled giant squirrel. The discontinuity of the tree canopy of the area, restrict the movement of the grizzled giant squirrel from the trees of Chinnar river side to the area along the back side of the Chinnar forest quarters. The only arboreal connection is through a *Tamarindus indica* tree adjacent to the Chinnar check post. There was small private land holding near to the Chinnar Information Centre, but the same has now been taken over by the forest department. This location is a critical corridor for the movement of grizzled giant squirrel to the back side of Chinnar quarters complex. Canopy continuity can be established in this area by careful planting of trees.

The 220 kV power transmission line which passes across the sanctuary is a major factor to be examined while discussing habitat continuity. It passes strip of about 35 m wide and 18 km in length. The power line has fragmented the riverine vegetation near Champakkad, breaking up the previous continuous habitat into four fragments, of which two are too small to be viable.

**Habitat improvement.** Afforestation of the area with native riverine species is suggested as these are important food and nesting trees for the grizzled giant squirrel. The area along the back side of Chinnar building complex should be improved through planting of indigenous trees like *Tamarindus indica*, *Terminalia bellirica*, *Terminalia arjuna*, *Terminalia crenulata*, *T. paniculata*, *Mangifera indica*, *Artocarpus heterophyllus*, *Schleichera oleosa*, *Metrephora hyaenaenia*, *Pterocarpus marsupium*, *Eugenia* sp., *Cassia Antidesma bunius*, *Pongamia pinnata*, *Acacia catechu*, etc. Basketed seedlings with proper tree guards should be planted. If tree guards are not provided the plants may be destroyed by the cattle, goat or wild boar in the sanctuary.

**Adjoining areas** Chinnar Wildlife Sanctuary acts as a buffer to the much larger Indira Gandhi Wildlife Sanctuary of Tamil Nadu. It also adjoins the Eravikulam National Park in the West. The only contiguity remaining to be established as a protected area is the Kudakkad RF. If all these areas are included in the protected area network an area of 2,000 km<sup>2</sup> will be established. This will broaden the potential habitat of a number of endangered and endemic species such as the elephant, tiger, Nilgiri tahr and Nilgiri marten.

**Conservation status** Chinnar Wildlife Sanctuary affords protection to the endangered grizzled giant squirrel which is reported to exist in the biotic province 6A (Deccan dry forest) of the classification of Rodgers and Panwar (1988) and limited to a single population in India, in the three forest beats in the proposed Meghamalai Wildlife Sanctuary in Tamil Nadu. Chinnar population of grizzled giant squirrel is about 100 km North of the first. This squirrel is one of the most important examples of isolated populations. In fact, this animal is more endangered than the lion-tailed macaque which is represented in at least 20 protected areas in three southern States. Protection of the forest of the Chinnar Wildlife Sanctuary and adjacent areas is of prime importance for conservation of the species in Kerala. So with the present knowledge at hand one can be sure that grizzled giant squirrel population will be with less than 50 km<sup>2</sup> of prime habitat occurring in the whole of India mainly in the two sanctuaries. According to recent census conducted in Tamil Nadu there are about 130 grizzled giant squirrels and majority surviving in about 15 km<sup>2</sup> in Srivilliputtur RF (Paulraj, 1991). It is also notable that no zoo in India is having grizzled giant squirrel as an exhibit nor any attempt made for captive breeding of this animal.

## **Management aspects**

---

Important management problems of the sanctuary are maintaining habitat contiguity, incidence of forest fire, human habitations, cattle grazing, and poaching of wild animals.

**Habitat contiguity** Rodgers and Panwar(1988) has made a proposal to make larger conservation area by joining the areas of Chinnar Wildlife Sanctuary, Eravikulam National Park, Upper Pooyamkutty areas, Indira Gandhi Wildlife Sanctuary, Kudakkad reserve etc. This deserves special mention, since this area is the habitat for many endangered and endemic mammals. If this is implemented a continuous area of about 2000 km<sup>2</sup> can be protected.

**Salt licks** There are a number of natural salt licks in the Chinnar Wildlife Sanctuary. A cursory look at the area brings into notice the evidence of elephant feeding in the natural salt licks in the banks of Atti odai, Mannalar area and other similar localities. Elephant and deer species use natural salt licks present in the sanctuary (Ramachandran *et al.* 1995). Wild animals such as elephant, sambar and spotted deer visit these salt licks regularly. This should be taken into account while conducting census, construction of paths, etc.

**Check dams** As this area falls under the rain shadow region of Western Ghats there is acute shortage of water for ungulates during the months from January to May. The animals are more concentrated towards the major rivers and their tributaries. There is a urgent need for dispersing the water availability uniformly by way of constructing check dams.

**Forestry Operations** As a wildlife sanctuary there are no timber or minor forest produce extraction in Chinnar Wildlife Sanctuary. The relatively plain area between Chinnar to Kootar up to Chambakad is an ideal habitat for ungulates, especially spotted deer and sambar. The present management practice of weeding may be continued.

**Habitations** There are 15 distinct settlements inside the sanctuary. The study was confined to the plain areas mostly, and this study do not bring out the details of how the people living inside the sanctuary interact with the habitat. The habitats are mostly in inaccessible areas. There are two groups of people with slightly different life styles. The Muduvas stay near the hill tops and the Hill Pulayas at lower locations. Both groups indulge in cultivation. A group of people by name Valazanmar, is reported to be capable of catching snakes. The tribals in the sanctuary do shifting cultivation in a minor scale. Over a period of two decades the tribals have shifted their hamlets at least once. They shift the place because their land becomes degraded due to lemon grass cultivation. Chambakad kudi was shifted like this from Pambar. Of the recent shifting of Muduva settlement is that of Pudukudi shifted from the earlier location and when it was known as Kalyanavarasukudi.

**Table 7 Tribal settlements in Sanctuary and adjacent areas**

Name of colony	Tribals	Cultivation
1 Chambakkad	Hill Pulaya	Sericulture, tapioca, Ragi, Pear, Lemon, Emblica, Mango
2 Alampatti	Hill Pulaya	Lemon grass
3 Palapatti	Hill Pulaya	Lemon grass
4 Inchampatti	Hill Pulaya	Lemon grass
5 Kudakkad	Muduva	Paddy, Lemon grass
6 Inchampatti	Muduva	Lemon grass
7 Iruttalakudi	Muduva	Lemon grass, Ragi, Millet, Cheera
8 Pudukudi	Muduva	Lemon grass, Keppa, Thuvara, Paddy
10 Maveli	Muduva	Lemon grass
11 Vellakkal	Muduva	Keppa, Millet, Lemon, Banana
12 Ulikkudi	Muduva	Lemon grass, Keppa, Cholan
13 Molangampatti	Muduva	Lemon
14 Mangappara	Muduva	
15 Churulipatti	Non-tribals	Paddy, Lemon grass, Coconut

**Lemon grass cultivation** Tribals in all the settlements practice lemon grass cultivation. Distillation of lemon grass oil needs large amount of firewood and this is collected from the sanctuary. Hence leading to severe habitat deterioration. There is also heavy demand for firewood for distillation of lemon grass oil from the local people living in the settlements inside the sanctuary.

**Grazing** Most of the tribal settlements have cattle including goats. Goat population within the sanctuary limits does considerable habitat deterioration by way of grazing. There is a very heavy influx of cattle population from Marayur side through the Karumutti area into the sanctuary. Cattle lifting from the tribal settlement by carnivores is reported occasionally. Ownership and origin of cattle is often difficult to trace, some are reported to be feral.

**Fire** After the declaration of the sanctuary and subsequent implementation of fire protection management practices adopted, the fire incidences are rare. Fire lines are maintained on both sides of the road and around each tribal village. Since the vegetation is dry deciduous type, there is need for strict fire protection measures in future also.

**Pilgrimage** There is a small temple located near the banks of Chinnar river. Three days a week, people from adjacent areas come to this temple for worship which consist of sacrificing animals like chicken and goats. Waste of animals discarded in to Chinnar river foul up the water for considerable distance down stream.

**MFP Col/ection** During the summer months tribals and local people engage in soap nut collection. They often lit fire for facilitating easy collection.

**Killing of wild animals** Poaching of animals for meat occurs occasionally. Most of the poachers are supposed to come across the inter state boundary. During the period of study we have come across poachers' camp near Kootar.

## REFERENCES

- Agarwal, V. C. and Chakrabarty, S. 1979 *Records of the Zoological Survey of India*. Catalogue of mammals in the Zoological survey of India. Rudantica Part I Sciuridae Zoological Survey of India. Vol. 74 (Part 4) :333 - 481.
- Ahmed, A. 1996. Birds of Shendurney wildlife sanctuary. News letter for bird watchers 36(1):8-9.
- All, Salim and Dillon Riply, S. 1983. *Handbook of the Birds of India and Pakistan Together With Those of Bangladesh, Nepal, Bhutan and Sri Lanka*. Oxford University Press, New Delhi. 353p.
- Aravindakshan, M.; Gopikumar, K.; Sreekumar, K. and Jayachandran, Nair, C. S. 1986. Natural variability in economic characters of *Phyllanthus emblica* (Indian gooseberry) a tree species suitable for restoration of degraded areas of Western Ghats. *Proc. Seminar on Ecodevelopment of Western Ghats* pp. 130- 132, Kerala Forest Research Institute.
- Daniel, J. C. 1983. *The Book of Indian Reptiles*. Bombay Natural History Society:30-31.
- Das, Indraneil. 1991. *Colour Guide to the Turtles and Tortoises of the Indian subcontinent*. R and A. Publishing Limited, Avon, England.
- D'silva Carl; Ravisankaran; Mohapatra, K. K. and Jagadish Chandra. 1990. Indian Black Drongo *Dircurus adsimilis* eating a bird. *J. Bombay nat. Hist. Soc.* 87(2): 301.
- Gopinathan Vallil. 1990. The first management plan for the Aralam wildlife sanctuary. *Kerala Forest Department*.
- Gopnathan Vallil, Anilkumar Bharadwaj. 1990. The first management plan for Wynad wildlife sanctuary. *Kerala Forest Department*.
- Jayson, E. A. 1990. Community ecology of birds in Silent Valley. In Ecological studies and long term monitoring of Biological process in Silent Valley national Park. KFRI Research Report.

- Jayson, E. A. 1993 Starred Tortoise, *Geochelone elegans* (Schoepff) in Chinnar Wildlife Sanctuary, Kerala. *J. Bombay nat. Hist. Soc.* 90(1):112
- Jayson, E. A.; Ramachandran, K.K. 1994. Indian Black Drongo (*Dirurus adsimilis* Vieillot) feeding on a small bird. *J. Bombay nat. Soc.* 91: 320.
- Nair, M. V. 1993. Avifauna of Neyyar wildlife sanctuary. News letter for bird watchers 33(4);62-65.
- Nair, P.V., Ramachandran, K. K., Vijayan, V. S., Easa, P.S., Balakrishnan, P.V. 1985. An ecological study in Periyar Tiger Reserve with special reference to wildlife. KFRI Research report.
- Nair, P.V. 1990. Wildlife studies. In Long term Environmental and Ecological studies of Pooyamkutty hydroelectric project in the Westernghats of Kerala. KFRI Research report No.24.
- Nair, S.S. 1988. Long term conservation potential of natural forests in the southern western ghats of Kerala. Report submitted to the Government of India.
- NEST (Nature Education Society, Trichur). 1991. Birds of Peechi-Vazhani wildlife sanctuary: a survey report.
- NEST (Nature Education Society, Trichur) 1992. Birds of Chimmoni wildlife sanctuary: a survey report.
- NEST (Nature Education Society, Trichur) 1992. Birds of Kole wet-lands: a survey report.
- Paulraj, S. 1991. Grizzled giant squirrel in the final throes of extinction process. *Zoosprint* 6:1-2.
- Ramesan, R. 1990. The first management plan for Eravikulam national Park. *Kerala Forest Department.*
- Ramesan, R. 1990. The first management plan for Thattakkad bird sanctuary. *Kerala Forest Department.*
- Sreedhara Menon, A. 1975. *Kerala District Gazetteers, Kottayam* Government Press, Trivandrum.
- Ramachandran, K. K. 1988. Ecology and behaviour of Malabar giant squirrel (*Ratufa indica maxima* Shreber). Kerala Forest Research Institute Research report No. 55.
- Ramachandran, K. K. 1989a. Endangered Grizzled Giant Squirrel habitat. *J. Bombay nat. Hist. Soc.* 86: 94-95.
- Ramachandran, K. K. 1989b. Chinnar Wildlife Sanctuary - Home of endangered Grizzled Giant Squirrel. *Evergreen* 23: 9-1

- Ramachandran, K. K. 1993. Status survey and distribution of endangered Grizzled Giant Squirrel in Chinnar Wildlife Sanctuary, Kerala, India. *Indian Journal of Forestry* 16:226-231 .
- Ramachandran, K. K. Balagopalan, M. and Nair, P. Vijayakumaran. 1995. *Use Pattern and chemical characterisation of the natural salt licks in Chinnar Wildlife Sanctuary*. KFRI Research Report No.94.
- Ramesan, M. A. 1989. *The First Management Plan for Chinnar Wildlife Sanctuary from 1990-'91 to 1999-2000*. Kerala Forest Department.
- Rodgers, W. A. 1991. *Techniques for Wildlife Census in India. A field manual*. Wildlife Institute of India, Dehra Dun: 46- 51.
- Rodgers, W. A. and Panwar, H. S. 1988. *Planning protected area network in India Vol I and II*. Wildlife Institute of India, Dehra Dun.
- Sharatchandra, H. C. and Gadgil, M. 1975. A year of Bandipw. *J. Bombay nat. Soc.* 72(3):623-647.
- Sridharan, V and Sivasubramanian, C. 1987. Additional records of the Black Drongo (*Dicrurus adsimilis*) feeding on birds. *J. Bombay nat. Soc.* 83 (Suppl.) 212-213.



## APPENDIX I

### List of birds recorded from the area.

<b>Family Ardeidae</b>	
1 Indian pond heron	<i>Ardeola grayii</i>
<b>Family Accipitridae</b>	
2 Blackwinged kite	<i>Elanus caeruleus</i>
3 Brahminy kite	<i>Haliastur indus</i>
4 Ceylon shikra	<i>Accipiter badius</i>
5 Black eagle	<i>Ictinaetus malayensis</i>
6 Greyheaded fishing eagle	<i>Ichthyophaga ichthyaetus</i>
7 Short-toed eagle	<i>Circaetus gallicus</i>
8 Crested serpent eagle	<i>Spilornis cheela</i>
<b>Family Falconidae</b>	
9 Falcon	<i>Falco</i> sp.
<b>Family Phasianidae</b>	
10 Bush quail	<i>Perdica</i> sp
11 Travancore red spurfowl	<i>Galloperdix spadicea</i>
12 Grey jungle fowl	<i>Gallus sonneratii</i>
13 Common peafowl	<i>Pavo cristatus</i>
<b>Family Turnicidae</b>	
14 Common bustard-quail	<i>Turnix suscitator</i>
<b>Family Rallidae</b>	
15 Whitebreasted waterhen	<i>Amaurornis phoenicurus</i>
<b>Family Columbidae</b>	
16 Southern green pigeon	<i>Treron phoenicoptera</i>
17 Greyfronted green pigeon	<i>Treron pompadora</i>
18 Jerdon's imperial pigeon	<i>Ducula badia</i>
19 Nilgiri wood pigeon	<i>Columba elphinstonii</i>
20 Indian spotted dove	<i>Streptopelia chinensis</i>
21 Emerald dove	<i>Chalcophaps indica</i>
22 Ring dove	<i>Streptopelia decaocto</i>
23 Little brown dove	<i>Streptopelia senegalensis</i>
<b>Family Psittacidae</b>	
24 Rose ringed parakeet	<i>Psittacula krameri</i>
25 Bluewinged parakeet	<i>Psittacula columboides</i>
26 Blossomheaded parakeet	<i>Psittacula cyanocephala</i>
27 Malabar lorikeet	<i>Loriculus vernalis</i>
<b>Family Cuculidae</b>	
28 Pied crested cuckoo	<i>Clamator jacobinus</i>
29 Brainfever bird	<i>Cuculus varius</i>
30 Koel	<i>Eudynamys scolopacea</i>
31 Southern crow-pheasant	<i>Centropus sinensis</i>
32 Small greenbilled malkoha	<i>Rhopodytes viridirostris</i>
<b>Family Strigidae</b>	
33 Indian great horned owl	<i>Otus bakkamoena</i>
34 Forest eagle-owl	<i>Bubo nipalensis</i>
35 Brown fish owl	<i>Bubo zeylonensis</i>
36 Malabar jungle owlet	<i>Glaucidium radiatum</i>
37 South Indian hawk-owl	<i>Ninox scutulata</i>

38	Southern spotted owlet	<i>Athene brama</i>
39	Brown wood owl	<i>Strix leptogrammica</i>
<b>Family Caprimulgidae</b>		
40	Indian jungle nightjar	<i>Caprimulgus indicus</i>
<b>Family Apodidae</b>		
41	Brownthroated spinetail swift	<i>Chaetura gigantea</i>
42	Whiterumped spinetail swift	<i>Chaetura sylvatica</i>
<b>Family Trogonidae</b>		
43	Malabar trogon	<i>Harpactes fasciatus</i>
<b>Family Alcedinidae</b>		
44	Pied kingfisher	<i>Ceryle rudis</i>
45	Small blue kingfisher	<i>Alcedo atthis</i>
46	Indian whitebreasted kingfisher	<i>Halcyon smyrnensis</i>
47	Stork billed kingfisher	<i>Pelargopsis capensis</i>
<b>Family Meropidae</b>		
48	Chestnutheaded bee-eater	<i>Merops leschenaulti</i>
49	Small green bee-eater	<i>Merops orientalis</i>
<b>Family Coraciidae</b>		
50	Indian roller	<i>Coracias benghalensis</i>
<b>Family Upupidae</b>		
51	Hoopoe	<i>Upupa epops</i>
<b>Family Bucerotidae</b>		
52	Malabar grey hornbill	<i>Tockus griseus</i>
53	Great Indian hornbill	<i>Buceros bicornis</i>
<b>Family Capitonidae</b>		
54	Small green barbet	<i>Megalaima viridis</i>
55	Large green barbet	<i>Megalaima zeylanica</i>
<b>Family Picidae</b>		
56	South Indian small yellownaped woodpecker	<i>Picus chlorolophus</i>
57	Little scalybellied green woodpecker	<i>Picus myrmecophoneus</i>
58	Malabar goldenbacked threetoed woodpecker	<i>Dinopium javanense</i>
59	Goldenbacked woodpecker	<i>Dinopium benghalense</i>
60	Indian great black woodpecker	<i>Dryocopus javensis</i>
61	Heartspotted woodpecker	<i>Hemicircus canente</i>
62	Southern larger golden- backed woodpecker	<i>Chrysocolaptes lucidus</i>
63	Pygmy woodpecker	<i>Picoides nanus</i>
<b>Family Pittidae</b>		
64	Indian pitta	<i>Pitta brachyura</i>
<b>Family Hirundinidae</b>		
65	Dusky crag martin	<i>Hirundo concolor</i>
66	Nilgiri house swallow	<i>Hirundo</i>
67	Redrumped swallow	<i>Hirundo daurica</i>

**Family Laniidae**

- 68 South Indian greybacked shrike *Lanius schach*  
69 Bay backed shrike *Lanius vittatus*

**Family Oriolidae**

- 70 Indian golden oriole *Oriolus oriolus*  
71 Blackheaded oriole *Oriolus xanthornus*  
72 Blacknaped oriole *Oriolus chinensis*

**Family Dicruridae**

- 73 South Indian blackdrongo *Dicrurus adsimilis*  
74 Bronzed drongo *Dicrurus aeneus*  
75 Racket-tailed drongo *Dicrurus paradiseus*  
76 Indian grey drongo *Dicrurus leucophaeus*  
77 White bellied drongo *Dicrurus caerulescens*

**Family Sturnidae**

- 78 Common myna *Acridotheres tristis*  
79 Grey headed myna *Sturnus malabaricus*  
80 Hill myna *Gracula religiosa*

**Family Corvidae**

- 81 Whitebellied treepie *Dendrocitta leucogastra*  
82 Tree pie *Dendrocitta vagabunda*  
83 Jungle crow *Corvus macrorhynchos*  
84 House crow *Corvus splendens*

**Family Campephagidae**

- 85 Pied flycatcher - shrike *Hemipus picatus*  
86 Large wood shrike *Tephrodornis virgatus*  
87 Cuckoo shrike *Coracina* sp.  
88 Scarlet minivet *Pericrocotus flammeus*  
89 Small minivet *Pericrocotus cinnamomeus*

**Family Irenidae**

- 90 Common iora *Aegithina tiphia*  
91 Goldfronted chloropsis *Chloropsis aurifrons*  
92 Fairy bluebird *Irena puella*

**Family Pycnonotidae**

- 93 Rubythroated yellow bulbul *Pycnonotus melanicterus*  
94 Redwhiskered bulbul *Pycnonotus jocosus*  
95 Redvented bulbul *Pycnonotus cafer*  
96 Yellowbrowed bulbul *Hypsipetes indicus*  
97 Black bulbul *Hypsipetes madagascariensis*

**Family Muscicapidae**

- 98 Spotted babbler *Pellorneum ruficeps*  
99 Scimitar babbler *Pomatorhinus*  
*s. sp, schisticeps*  
100 Blackheaded babbler *Rhopocichla atriceps*  
101 Rufous babbler *Turdoides subrufus*  
102 Jungle babbler *Turdoides striatus*  
103 Yellowbreasted laughing  
thrush *Garrulax delesserti*  
104 Quaker babbler *Alcippe poioicephala*

**Subfamily Muscicapinae**

105 Greyheaded flycatcher	<i>Culicicapa ceylonensis</i>
106 Bluethroated flycatcher	<i>Muscicapa rubeculoides</i>
107 Tickell's blue flycatcher	<i>Muscicapa tickelliae</i>
108 Brownbreasted flycatcher	<i>Muscicapa muttui</i>
109 Verditer flycatcher	<i>Muscicapa thalassina</i>
110 Black and orange flycatcher	<i>Muscicapa nigrorufa</i>
111 Paradise flycatcher	<i>Terpsiphone paradisi</i>
112 Blacknapedblue flycatcher	<i>Monarcna azurea</i>
113 White browed fantail. flycatcher	<i>Rhipidura aureola</i>

**Subfamily Sylvinae**

114 Streaked fantail warbler	<i>Cisticola juncidis</i>
115 Wren-warbler	<i>Prinia hodgsonii</i>
116 Largebilled leaf warbler	<i>Phylloscopus magnirostris</i>
117 Dull green leaf warbler	<i>Phylloscopus trochiloides</i>
118 Bright green leaf warbler	<i>Phylloscopus nitidus</i>
119 Largecrowned leaf warbler	<i>Phylloscopus occipitalis</i>
120 Tailor bird	<i>Orthotomus sutorius</i>

**Subfamily Turdinae**

121 Malabar whistling thrush	<i>Myiophonus horsfieldii</i>
122 Whitethroated groundthrush	<i>Zootheracitrina cyanotus</i>
123 Orangeheaded groundthrush	<i>Zoothera citrina</i>
124 Black bird	<i>Turdus merula</i>
125 Magpie-robin	<i>Copsychus Saularis</i>

**Family Paridae**

126 Grey tit	<i>Parus major</i>
127 Yellowcheeked tit	<i>Parus xanthogenys</i>

**Family Sittidae**

128 Velvetfronted nuthatch	<i>Sitta frontalis</i>
----------------------------	------------------------

**Family Motacillidae**

129 Indian tree pipit	<i>Anthus hodgsoni</i>
130 Paddyfield pipit	<i>Anthus novaeseelandiae</i>
131 Yellow wagtail	<i>Motacilla flava</i>
132 Grey wagtail	<i>Motacilla cinerea</i>
133 Large pied wagtail	<i>Motacilla maderaspatensis</i>

**Family Dicaeidae**

134 Thickbilled flower-pecker	<i>Dicaeum agile</i>
135 Tickell's flowerpecker	<i>Dicaeum erythrorhynchos</i>

**Family Nectariniidae**

136 Purple sunbird	<i>Nectarinia asiatica</i>
137 Small sunbird	<i>Nectarinia minima</i>
138 Little spiderhunter	<i>Arachnothera longirostris</i>

**Family Zosteropidae**

139 White-eye	<i>Zosterops palpebrosa</i>
---------------	-----------------------------

**Family Ploceidae**

140 House sparrow

141 Yellowthroated sparrow

142 Rufousbellied munia

143 Whitethroated munia

144 Spotted munia

**Family Fringillidae**

145 Common rosefinch

*Passer domesticus*

*Petronia xanthocollis*

*Lonchura kelaarti*

*Lonchura malabarica*

*Lonchura punctulata*

*Carpodacus erythrinus*