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### Full Length Research Article

## POPULATION STATUS OF GRIZZLED GIANT SQUIRREL (*Ratufa macroura*) IN CHINNAR WILDLIFE SANCTUARY, SOUTHERN INDIA

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#### ABSTRACT

The study of status and conservation of Grizzled Giant Squirrel in the Chinnar Wildlife Sanctuary was studied. Line transect method was used to assess the population and focal animal sampling was used to collect data on feeding habits of Grizzled Giant Squirrel. One hundred and seven animals were sighted during the study period, mainly along the riverine patches during the period of study. In the riverine forest, fifty-four tree species were observed in Chinnar and Pambar forest of which *Terminalia arjuna* (45.1 per cent), and *Pongamia pinnata* (33.3 per cent) were the dominant species twenty-one species were found used by Grizzled Giant Squirrel for feeding. The total density of trees species of Grizzled Giant Squirrel in the riverine forest was 140.5/ha comprising of twenty-one species. Among these *Terminalia arjuna* (45.1 per cent) and *Pongamia pinnata* (33.3 per cent) comprised (78.4 per cent) of the total individuals from the sampled areas.

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#### INTRODUCTION

Grizzled Giant squirrel widely distributed in the forested tracts of Dharmapuri, Salem, Attur, Pollachi, Palni, and Srivilliputhur in the State of Tamil Nadu and in Chinnar Valley of Kerala. The distribution and population status of the species varied much in its range. The Grizzled Giant squirrel habitats are being fragmented due to felling of trees from its habitats leaving only a few isolated undisturbed patches of forest. Joshua (1992) reported that heavy woodcutting resulted disappearance of canopy cover as well as continuity of forests and that resulted in forest fragmentation of Grizzled Giant Squirrel habitats. Poaching for meat also could be one of the possible factors for the loss of the species from its distributional ranges in India. The loss of plant diversity along the crucial habitats of Grizzled Giant Squirrel because of grazing pressure coupled with woodcutting altered the vegetation diversity. Such a trend would indirectly affect the population of Grizzled Giant Squirrel. The status of Grizzled Giant Squirrel population in the Chinnar Wildlife Sanctuary is possible to be recorded and maintained because of a strong awareness among the minds of people on the

conservation needs of the species. Only few studies have been carried out on the biology and ecology of Grizzled Giant Squirrel (Ramachandran, 1989; Joshua 1992, Paulraj and Kasinathan 1993, Justus & Johnsingh, 1994). Therefore the present study made attempt to reveal to the population and its habitat of Grizzled Giant Squirrel in the Chinnar Wildlife Sanctuary.

#### Study Area

The Chinnar Wildlife sanctuary is located at the rain shadow region of the Western Ghats between 10° 15' to 10° 22' N latitude and 77° 17' E longitude. Indira Gandhi Wildlife Sanctuary on the North and East of Tamil Nadu borders and Eravikulam National Park on West and Marayur range of Munnar Division on the East. The extent of the Chinnar Wildlife Sanctuary is 90.44 sq. km and the altitude varies from 440 mts to 2372 mts. The annual rainfall ranges from 500 mm to 6000 mm. Temperature varies from 12° C to 36° C.

#### METHODS

The study was conducted in Chinnar Wildlife Sanctuary, Kerala

#### Population estimation and Food preference

Line transect method was used to assess the population of Grizzled Giant Squirrel (Burnham, 1980). The transect was

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surveyed on foot between 0600-1800 hrs and the transects were laid in Chinnar and Pambar areas (Five transects) were monitored twice during the study period as they formed crucial home of the Chinnar Wildlife Sanctuary. The information such as sighting time, name of the tree on which the animal was sighted, number of individual, age and sex classes were recorded for each sighting. Focal animal sampling was used to collect data on feeding habits of Grizzled Giant Squirrel (Altman, 1974). The observation on feeding included, name of the food species and parts eaten by Grizzled Giant squirrel. The parts were divided broadly into vegetative and reproductive phases. Sprouting leaves, young leaves, matured leaves and dry leaves were brought under the vegetative phase. Young flower, young fruit, mature fruit, and dry fruit were brought under reproductive phase. Moreover bark used by Grizzled Giant squirrel was also recorded.

**RESULTS**

**Population estimation**

Forty individuals of Grizzled Giant squirrel comprising of fifteen males, sixteen females and nine sub-adults were recorded from twenty-eight km transects in the riverine forest. Almost similar population size with variation in the demography was observed in the stream forests, where females dominated in the population (n = 18; sample size 16 km). In the dry deciduous forest, males were sighted more (n = 11), followed by females and sub adults from 12 km sampled areas.

**Grizzled Giant squirrel Population across the month.**

Twenty-nine days were spent to assess the population of Grizzled Giant squirrel in various months during the study period (Table 1). Adult females were sighted more than other sex classes. Sub adults formed less proportion in the survey.

**Table 1. Sighting of various age and sex classes of Grizzled Giant Squirrel across months in Chinnar Wild life Sanctuary**

Month	Number of days spend	Sighting of animals					
		AM	Percentage	AF	Percentage	SA	Percentage
January	6	8	20.5	8	19.0	2	7.7
February	16	21	53.8	21	50.0	15	57.6
March	7	10	25.6	13	30.9	9	34.6
Total	29	39	99.9	42	99.9	26	99.9

AM = Adult Male, AF = Adult Female, SA = Sub adult

**Grizzled Giant squirrel in relation to tree species - Pambar**

In the Pambar riverine forest the Grizzled Giant Squirrel sightings were commonly seen on *Tamarindus indica* and *Terminalia arjuna* (Table 2). Grizzled Giant Squirrel less attracted the other tree species as indicated the (Table 2).

**Grizzled Giant squirrel in relation to tree species - Chinnar**

Out of nineteen sightings of Grizzled Giant Squirrel in various tree species in Chinnar riverine forest, the most preferred trees by various age and sex classes was *Terminalia arjuna* (Table 3). *Mangifera indica* was also used by Grizzled Giant Squirrel followed to *Terminalia arjuna*.

**Table 2. Sighting of Grizzled Giant Squirrel in relation to selection of tree species in Pambar riverine forest in Chinnar Wild life Sanctuary**

Sl. No.	Age/Sex Classes	Selection of trees					
		T-In	T-ar	C-st	S-cu	S-cu	M-in
1.	Adult male	2	1	0	0	1	0
2.	Adult female	1	2	0	0	0	2
3.	Sub adult	1	1	1	1	0	0
Total		4	4	1	1	1	2

T-in = *Tamarindus indica*; T-ar = *Terminalia arjuna*, C-st=*Canarium stictum*, S-cu = *syzigium cumini*. P-pi = *Pongamia pinnata*; M-in = *Mangifera indica*.

**Table 3. Sighting of Grizzled Giant Squirrel in relation to selection of tree species in Chinnar riverine forest in Chinnar Wild life Sanctuary**

Sl. No.	Age/Sex Classes	Selection of trees				
		T-In	T-ar	S-cu	P-pi	M-in
1.	Adult male	1	3	2	0	2
2.	Adult female	1	4	0	1	0
3.	Sub adult	1	0	1	1	2
Total		3	7	3	2	4

T-in = *Tamarindus indica*; T-ar = *Terminalia arjuna*; S-cu = *syzigium cumini*. P-pi = *Pongamia pinnata*; M-in = *Mangifera indca*.

**Food resources**

In the riverine forest, fifty-four tree species were observed in Chinnar and Pambar forest of which *Terminalia arjuna* (45.1 per cent), and *Pongamia pinnata* (33.3 per cent) were the dominant species. Twenty-one species were found used by Grizzled Giant Squirrel for feeding. The total density of trees species of Grizzled Giant Squirrel in the riverine forest was 140.5/ha comprising of twenty-one species. Among these *Terminalia arjuna* (45.1 per cent) and *Pongamia pinnata* (33.3 per cent) comprised (78.4 per cent) of the total individuals from the sampled areas.

**Preference Index**

Total of twenty-one tree species were consumed by the Grizzled Giant Squirrel at Chinnar Wildlife Sanctuary. Food tree species namely *Terminalia arjuna* and *Pongamia pinnata* had high density that accounted for 49.8 per cent of the total individuals of 230. Only seven species had a preference index value of more than 1 indicating many species formed important food resource to Grizzled Giant Squirrel.

**Threats to the Grizzled Giant squirrel**

Out of 57 villagers interviewed in both the settlements, majority of them (57.9 per cent) expressed a high incidence of decline of population of Grizzled Giant Squirrel before the declaration of the Sanctuary (Table 4). 17.5 per cent of the interviewed people indicated that the population was moderately affected while rest of them opined a low threat to the population (Table 4). None of the interviewed people did say that poaching was not there in the past.

**Table 4. Extent of threats to the population of a Grizzled Giant Squirrel before declaration of the Sanctuary (1984)**

Sl. No	Age Group	No. of people interviewed	Level of threats			
			Low	Medium	High	Nil
1.	20 - 25	5	-	2	3	-
2.	26 - 35	15	3	2	10	-
3.	36 - 45	17	5	3	9	-
4.	46 - 55	9	2	2	5	-
5.	56 - 65	6	2	1	3	-
6.	66 - 75	4	2	-	2	-
7.	>76	1	-	-	1	-
Total		5	14	10	33	0

Number of people sampled - 57

Data on the present status of Grizzled Giant Squirrel population from the villagers belonging to both the settlements revealed that the population was not subjected to any mortality (71.9 per cent). A moderate (7 per cent) level of threat was observed to the population as opined by a few villagers. Thirty-three villagers expressed that poaching was not at all occurred in the recent years (Table 5).

**Table 5. Extent of threats to the population of a Grizzled Giant Squirrel based on the survey**

Sl. No	Age Group	No. of people interviewed	Level of threats			
			Low	Medium	High	Nil
1.	20 - 25	5	3	1	-	1
2.	26 - 35	15	3	-	-	12
3.	36 - 45	17	4	1	-	12
4.	46 - 55	9	1	-	-	8
5.	56 - 65	6	-	1	-	5
6.	66 - 75	4	1	1	-	2
7.	>76	1	-	-	-	1
Total		57	12	4	0	41

Number of people sampled – 57

## DISCUSSION

One hundred and seven animals were sighted during the study period, especially along the riverine patches. Ramachandran (1989) estimated 50-75 individuals in the Chinnar Wildlife Sanctuary. Joshua (1992) reported from the riverine vegetation in Pampar, Chinnar and Athiodai in Chinnar Wildlife Sanctuary. He has reported 75 squirrels in total, with an effective breeding population of 53 individuals from the entire area of 90 sq. km. The current sighting rate suggests concluding that the population appears to be increasing now indicating a possibility for available population in the Chinnar Wildlife Sanctuary. A viable population is one that maintains its genetic vigor and potential for evolutionary adaptation (Soul, 1987). It is to be pointed out that the population of Grizzled Giant Squirrel is the second viable population in the country after the Srivilliputhur. Conservation the species in Chinnar assumes great significance against the backdrop of biodiversity conservation in the Country (Status report and Proposal 2000-2001). About 150 individuals reported as per the forest department records at Chinnar Wildlife Sanctuary. The sightings of Grizzled Giant Squirrel were associated with a few altitudinal differences. The altitudinal variation of 440 mts to 2372 mts is reflected in the vegetation types prevalent in the area. Grizzled Giant Squirrel were largely confined to selected tree species namely *Albizia amara*, *Acacia nilotica*, *Eoicarpus orientalis*, *Gyrocarpus asiatica*, *Terminalia arjuna*, *syzigium cumini*, *Lepisanthus sengalensis*, *Oxoxylum indicum*, *Cortia matrica*, *Mangifera indica*, *Terminalia bellerica*, *Pterocarpus marsupium*, *Staycnos vomica*, *Diospyros buxifolia* and *Mitraagyna narrifia*. These nest trees are unevenly distributed in relation to area specific. For instance, more nest trees were observed in the riverine habitats than other forest habitat. The sighting trend of Grizzled Giant Squirrel was progressively

increased from 300 to 500 mts. altitude with more sighting incidences was observed in the altitude ranges between 500 and 600. Adult females were seen more occasion than other sex classes. Sighting of animals were more during season followed by forty individuals of Grizzled Giant Squirrel comprising of fifteen males. Sixteen females and nine sub adults were recorded. The more sighting of Grizzled Giant Squirrel was corresponded more number of people visiting the forest between 0700 and 1200 hrs in the study area. Tree species namely *Tamarindus indica*, *Terminalia arjuna* and *Syzigium cumini* were largely used by Grizzled Giant Squirrel for various activities. The villagers expressed high incidences of decline of population of Grizzled Giant Squirrel before the declaration of the Sanctuary. By contrast, the villagers' interview showed that there was a tremendous improvement in terms of population of Grizzled Giant Squirrel after declaration the Sanctuary.

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