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ROOSTING ECOLOGY OF *PTEROPUS GIGANTEUS* (BRUNNICH, 1782) INDIAN FLYING FOX AND THREATS FOR THEIR SURVIVAL

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Abstract:

Bats are the only flying mammal. Megachiropteran bats belong to Pteropodidae family are necessary for reproduction and propagation of plants. They are of great importance for the maintenance and re-establishments of plant diversity by dispersing pollen and seeds. So they help in the survival of plants, animals and, thus, of mankind. But they are threatened by human interference. The present research work has been designed to focus the roosting ecology of flying fox *Pteropus giganteus* and threats for their survival in and around Tirunelveli with an aim to conserve these beneficial Chiroptera.

Key Words: Megachiropteran, Pteropodidae, Dispersing Pollen, Seeds, Roosting & Flying Fox

Introduction:

Bats are unique, elegant, fascinating and the only true flying mammals that exhibit sustainable flight. Mega bats act as "Key stone species" and keep the ecosystem in balance. They are one of the beneficial members of the animal community. They may fly up to 31 miles to find food. By pollinating plants and dispersing seeds they provide great benefit to humanity. But in India is not an unusual to believe in a lot of myths about the bat species. Indian bat population is threatened. They are highly susceptible to environmental disruption and they have declined drastically in response to human activity. Bats generally prefer to roost during daytime in diversified roosting habitats. Roosting site selection depends on their abundance, risk of predation, availability and distribution of food resources, body size and physical environment (Kunz, 1982). The present study is an attempt to study the roosting ecology of *Pteropus giganteus* and the need for their conservation.

Materials and Methods:

In depth analysis of bat roosting sites and details about the bats were made at various locations of in and around Tirunelveli. The distributions of bat colonies at various places were identified through oral enquiry among the local people of the towns and villages. Searches were made on open foliage. Visual observation and counting of bat populations in the roosting sites were made. Once bat colonies were located, they were periodically visited. The threats with reference to the various types of roost and bats were also studied by direct observation and through information collected from the local people. Based on the data suggestion for conservation measures and management were recorded.

Results:

In the present study *P. giganteus* roost on open foliage as their roosting site are shown in plate 1. *P. giganteus* bat species exploited a wide range of roosting environments, by their roosting adaptations and influence the availability of a wide spectrum of roosting places. Roost description, location of roosting sites and colony size of *P. giganteus* are given in Table 1. In and around Tirunelveli *P. giganteus* bat species form the larger colony. All the roosts are near water source, located at considerable distances from suitable foraging areas. Morphological adaptations for foliage are described. Threats to *P. giganteus* are shown in Plate 2.

Plate 1: Open foliage as the roosting site of *Pteropus giganteus*

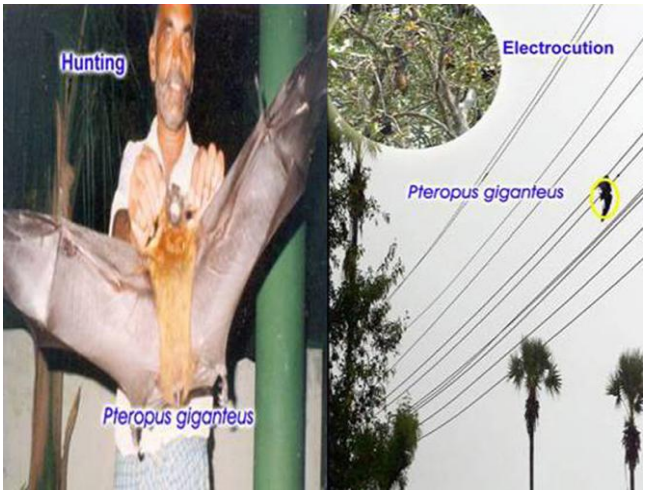

Plate 2: Threats to Pteropus giganteus

S.No	Location of Roost	Roost Type	Name of the Roosting Site	Colony Size (Approximate)
1.	Padmaneri Ele : 366 ft, N: 8°32.416', E: 77°34.053'	Open foliage	*Ficus benghalensis* (3 trees) near Sudalaimadaswamy Thirukovil on road side	400
2.	Nanguneri Ele : 335 ft, N: 8°29.523', E: 77°39.489'	Open foliage	*Terminalia arjuna* on road side	100
3.	Panakudi Ele : 316 ft, N: 8°19.485', E: 77°34.759'	Open foliage	*Terminalia arjuna* near Police Station	3000
4.	Thirupudai maruthur (Foot hills) Ele : 246 ft, N: 8°43.662', E: 77°29.892'	Open foliage	*Aegle marmelos* – Sacred groove (Arultharum Gomathy Ambal Sametha Arulmigu Narumpoo Nathar Swamy Thirukovil)	500
5.	Kallidai kurichi Ele : 222 ft, N: 8°41.332', E: 77°28.187'	Open foliage	*Mangifera indica, Tarmarindus indicus, Madhuca indica* (Thiruvaduthurai Atheenam madam- Sacred groove)	600
6.	Sivasilam Ele : 220 ft, N: 8°47.077', E: 77°20.456'	Open foliage	*Terminalia arjuna* (4 trees- Sacred groove) on river edge	800
7.	Pattamudukku Ele : 218 ft, N: 8°46.622', E: 77°25.241'	Open foliage	*Terminalia arjuna* (Arulmigu Poorani Ambal Sametha Sri Poosan Perumal Sastha Thirukovil - Sacred groove)	500
8.	Murappanadu Ele : 208 ft, N: 8°42.170', E: 77°49.081'	Open foliage	*Terminalia arjuna* in agricultural field	300
9.	Melapalayam Ele : 208ft, N: 8°42.456', E: 77°40.092'	Open foliage	*Terminalia arjuna* (3 trees) on railway lines	2000
10.	Athalanallur Ele : 193 ft, N: 8°43.371', E: 77°29.270'	Open foliage	Thambirabarani river side	500

Table 1: Roost location and characters of Pteropus giganteus (Pteropodidae)

Discussion:

In the present study all the roosting sites were located near water sources like rivers and streams of Tirunelveli. The same view has been reported by several authors that roosts frequently are found in proximity to water (Fenton and Barclay, 1980; Kunz, 1982; Herd and Fenton, 1983; Thomas, 1988; Brigham et al., 1992). Roosting of Pteropus giganteus Fruit bat P. giganteus mainly roost on the exposed branches of the trees. The size of the colony ranges from 100 to 3000. Large colony number ranges from 2000 to 3000 bats found in the villages, Panakudi and Melapalayam. The roosting sites of the flying fox P. giganteus were located in a variety

of habitats that included sacred groves of temples (Sivasilam, Kallidaikurichi, Pattamudukku, Thirupudaimaruthur), private agricultutural land (Athalanallur, Murappanadu) and public places like roadsides (Padnaneri, Nanguneri, Panakudi) and railway lines (Melapalayam) with locations adjacent to rivers and streams. Bates and Harrison (1997) described as P. giganteus always roost near human settlements. All the preferred roosting trees are comparatively large and tall. In the present study P. giganteus prefers tall trees like Tamarindus indicus, Terminalia sp., Aegle marmelos, Ficus benghalensis and Mangifera indica rooted at the banks of river line areas of Thamirabarani and its irrigation canals near the human habitations as their diurnal roost. Similar observation also has been made by Richardson (1990) that Pteropus conspicillatus in Australia prefers tall trees like Eucalyptus and Acaciah species. This tall nature of the tree can give protection and further enable them to become air borne and also to escape from enemies. These arguments also supported by Wiles et al (1991) in Pteropus mariannus of the Pacific Islands.

Morphological adaptation to suit their roosting pattern Morphological, physiological and behavioural characteristics of bats are commonly regarded as an adaptation for roosting (Kunz, 1982). P. giganteus use their thumbs and claws for climbing among branches. According to Bennet (1993) the pendent postures of megachiropteran are hanging from one or both feet facilitated by locking mechanism. P. giganteus has well rounded skull that facilitate hanging like pendent in their roosting site for easy take off during flight.

Threats to Pteropus giganteus

The survival of P. giganteus in and around Tirunelveli is severely threatened due to human interference. Hunting The Indian flying fox P. giganteus is facing a drastic decline in its population. It is hunted for food and medicine in all villages of Tirunelveli. It is used to cure asthma / breathing disorders, backaches, chronic pains and for using menstrual problems in women in a few villages around Mysore in Karnataka. These fruit bats are sold in markets in Calcutta and Bangalore as food and medicine (Molur, 2005).

Eloctrocution

Electrocution is one of the threats faced by P. giganteus. During the study on many occasions P. giganteus were found electrocuted near the feeding trees like Banyan, Ficus, Neem located close to the high voltage at electric lines. Similar incidents were also reported in Coorg by Molur et al (2007).

Conclusion

The decline of P. giganteus raised serious ecological and economic concerns. If this mammal becomes extinct in the ecosystem, the impact on ecosystem will be substantial. Understanding the importance of bats in the ecosystem is a key to conserve these species. In India, fruit bats are listed under Schedule V of the Indian Wildlife Protection Act, 1972 which is the only Schedule that carries no penalty or restriction at all for the killing or capturing of animals. There is an immediate need for the revision in Indian Wildlife Protection Act to remove Fruit bats from schedule V (Vermin category). Protection of roosts has been identified as a priority in conserving species of bats (Pierson, 1998). Legislation should be formulated to protect the key roosting sites of bat species. Action plans are needed to prevent the disturbance to the roosting sites, and trading of bats for food and medicinal use, and hunting of bats for sports.

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