

Habitat, Conservation Status and Ecotourism Potentiality of Indian Flying Fox (*Pteropus giganteus* Brunnich, 1782) (Chiroptera: Pteropodidae) Colony at Panbazar Roosting Site of Guwahati, Assam



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Abstract

Indian flying fox (*Pteropus giganteus* Brunn., 1782) is the largest fruit bat species of Assam. The roles of Megachiropteran or Old-World fruit bats are well recognized in the regeneration of the forest as these bats are well known for their involvement in seed dispersal and pollination activities. Panbazar Indian flying fox roosting site was originally located at the Kacharighat and Judge's field area of Guwahati (Metro) City of Assam which is also the capital and gateway of Northeast India. For the last 15 years, roosting site has been permanently dwelling in the Panbazar area of the capital city (Guwahati) of Assam. As of 20.11.2022, population of the site has gone up to 1527 from the previous 1063 which was recorded on 03.01.2017. Site is very rich in terms of roosting plants and habitat quality. The site is very much safe and protected from any danger. Only minor threat detected in the site was some mortality for electrocution. The site has the high potentiality for wildlife ecotourism from every angle and it can be a source of foreign and local revenue generation for the tourism sector of the Assam government. Already nearby the roosting site "Mahabahu Brahmaputra River Heritage Centre (MBRHC)" has been constructed and opened for the tourist by the state government.

Keywords: Indian flying fox; *Pteropus giganteus*; Chiroptera; Habitat; Conservation; Ecotourism

Abbreviations: MBRHC: Mahabahu Brahmaputra River Heritage Centre; GMC: Guwahati Municipal Corporation; H: Tree Heights; GBH: Girth at Breast Height; C: Canopy Cover

Introduction

Bats are known to occur all over the world except the Arctic and Antarctic regions and a few isolated oceanic islands [1]. Indian flying fox (*Pteropus giganteus* Brunn, 1782) is a fruit bat species of animal kingdom. From the evolutionary point of view, bats are the only flying mammals which can perform true flight like our birds. *P. giganteus* has been recognised as the largest fruit bat species of Assam [2,3]. Taxonomically it is recorded under the Order-Chiroptera, suborder-Megachiroptera and Family-Pteropodidae. Megachiropterans are also known as the Old-World fruit bats [1]. Old World fruit bats (Megachiropterans) are restricted to the Old-World tropics and subtropics and are almost exclusively phytophagous, whereas microbats are cosmopolitan and insectivorous [4].

The role of Megachiropteran or Old-World fruit bats are well recognized in the regeneration of the forest as these bats are well

known for their involvement in seed dispersal and pollination activities [5]. According to [6], fruit bats feed almost exclusively on plants, taking floral resources (largely nectar and pollen but also petals and bracts), and fruits and often seeds themselves and leaves. So, considering the economical importance of fruit bats the present study was planned to investigate the habitat status, ecotourism potentiality and conservation needs of the fruit bat species 'Indian Flying Fox' at the Panbazar area of Guwahati City of Assam, Northeast India, a biodiversity Hotspot.

Study area and climate

The Panbazar roosting site (Latitude: 26° 10' 58.44" & Longitude: 91° 44' 50.64") of Indian flying fox has been situated in the Kamrup (Metro) district of Assam. The study area of the Panbazar with the current population of Indian flying fox has been found to be surrounded by the hillock like area of Panbazar Water

reservoir ('Panitanky' in Assamese) which supplies water to various households under the "Guwahati Municipal Corporation (GMC)". Beneath the Roosting site, there is a very busy city bus stoppage on the M.G. Road (Mahatma Gandhi Road) of Guwahati Metropolitan City of Assam. Panbazar area is one of the busiest areas of the capital city, since there are lots of market areas, book stalls, Forest office, Court campus, Playground (Judge's filed), tourist spots, river cruise along with children parks area nearby where thousands of travelers, visitors, businessman along with local officials of the city congregate for transportation purpose. Guwahati city is also the Gateway of Northeast India. So, the creation of 'City Bat Park' with proper guidelines can be an ecotourism hotspot of the city with this live and economically important wildlife species to earn revenue by the government

of Assam under tourism sector. The roosting site is can also be traced easily as it just adjacent the newly opened "Mahabahu Brahmaputra River Heritage Centre (MBRHC)" which is situated at the southern bank of River Brahmaputra of Assam valley. The Brahmaputra or Assam valley is an alluvial plain, about 750 km long and 80 km wide enclosed by hills on all sides, except in the west [7]. In the Brahmaputra valley, the river Brahmaputra is apparently a much-broken sheet of water with numerous islands including the biggest River Island of the world "Majuli". Through most of its courses, the river Brahmaputra is bounded on either side by stretches of fertile marshes and thick grasses but in further inland the river level rises. The plain area of the valley is intensively cultivated or covered by boundaries of nature on a fertile alluvium plane [8].



Figure 1: Glimpses of the Panbazar roosting site of Indian flying fox on the busy M.G. Road of Guwahati city of Assam.

Assam dwells in different moods at different points of time. She has three well-defined, Seasons Spring-Summer; Rainy which includes Pre monsoon, Monsoon and Retreating monsoon and winter. A mild and moderate climate-never given to extreme cold

or heat is the main feature of Assam's climate. The climate of lower reach of Brahmaputra valley of Assam has been found to be mostly influenced by the rainy seasons resulting from south-west monsoon [9]. The general climatic condition of the study area of

Kamrup, district in the lower reach of Brahmaputra valley showed the muggy climatic condition characterized by high humidity and moderate temperature [10]. The high humid condition throughout the years has transformed this zone into a distinctive ecosystem of nature's hot spot with rich biodiversity of India.

Materials and Methods

The study was conducted by direct spot observation method mostly with naked eyes. Though sometime high powered binocular was also used to locate and confirm the fruit bat species identification of hiding bats. Species was identified by following the works of [2,3,11]. Roosting trees were identified with the available botanical field guides on Indian trees. In a few cases, helps of local experts were also taken. Populations were counted following the protocol of [3]. Threats and conservation related data were collected through direct observation and through personal interviews taken in the surrounding areas of the roosting site. For tourism potentiality and prospects of the site, I have suggested it being a pioneer in fruit bat research from Assam, northeast supported along with my available fruit bat research data with special reference to my

Ph.D. work which was awarded in 2009 by Gauhati University of Assam [3] since it was the first fruit bat research work conducted

at Gauhati University of Assam, Northeast India.

Results and Discussion

Panbazar Indian flying fox roosting site was originally located at the Kacharighat and Judge's field area of Guwahati (Metro) City of Assam which is also the capital and gateway of Northeast India [3,12]. The average monthly population of the original site was recorded at 574.28 bats during the period 2000-2003 [3]. However, in the later part of 2007, entire colony was shifted to plantations of the hillock like area of the water reservoir (Panitanky in local language-'Assamese') of Panbazar bus stoppage on the busy Mahatma Gandhi Road (MG Road) of Guwahati [13]. For the last 15 years (2007-2022), Indian flying foxes were seen permanently using the Panbazar habitat for roosting purposes. Population of the newly shifted Panbazar roosting site was recorded at 1063 on 03.01.2017 and the population has gone almost double in ten years from the first shifting. It signifies that the new habitat has worked in favor of the Indian flying fox colony. Last population survey was conducted very recently on 20.11.2022 and the current population of the Panbazar roosting site (Figure1&2) has been recorded at 1527 with an annual increase of 9.3% in last five years which could be considered as a healthy growth for the Guwahati city bat roosting site.



Figure 2: Overview of the roosting site from the Brahmaputra River end showing the water reservoir (Panitanky) with author Dr. Azad Ali.

Some of the major roosting trees of Panbazar roosting site were *Ficus religiosa*, *Delonix regia*, *Polyalthiya longifolia*, *Terminalia arjuna*, *Eucalyptus globossus*, *Caesalpania inermis*, *Samanea saman*, *Grevillea robusta*, *Artocarpus heterophyllus*, *Psidium guajava*, *Cocos nucifera*, *Eugenia jambolana*, (Figure 1,2,3).

Panbazar roosting site has been found to be very suitable for the Indian flying foxes. High altitude nature of the site gives them an extra height for flying freely in the atmosphere which is very important for safe foraging as well as obstacle free emerging and return at dusk and dawn respectively. At the same time, presence

of series of plant species in a linear stretch provided a continuous aerial canopy for large scale roosting. From distance it looks like as a single spot, though the close observation spottifies all the trees as a different entity with some small population group of Indian flying foxes. Presence of the large water bodies in the form of River Brahmaputra provides enough water to satiate the need of the thirsty bats before foraging at the time of emergence. At the same time, it keeps the environment moist and maintains a moderate temperature required for the day roosting bats.



Figure 3: Some roosting trees with roosting population groups.

Tree heights (H), girth at breast height (GBH) and canopy cover (C) were also found to be very suitable for the fruit bat species since tall trees of ranges 40 to 60 feet heights were available and also selected for the roosting purposes by the Indian flying foxes. However, GBH of selected roosting trees were ranged from 20 cm to more than 500 cm. Canopy covers were found to be dense during summer and nude or light dense during winter to combat with the changing seasonal conditions of the area. Wander & Carey [14] also mentioned that the specific roost sites selected by various bats species may be determined by several factors such as morphology, flight capabilities, proximity to food resources climatic factors and roost availability among others.

Conservation Status

From conservation point of view, site was very safe since

the entire area comes under governmental jurisdiction of GMC and other government agencies. Hunting is almost nil in the roosting area. After the opening of the “Mahabahu Brahmaputra River Heritage Centre (MBRHC)” the area became more safer for constant security provisions provided for the visitors. However, electrocution has been detected as a minor threat with about 1% mortality since electric wires were mostly naked in our city [3]. During daytime we can see a few bats hanging in the electric wires in different parts of the city basically in residential areas with more planted fruiting and flowering trees. During foraging for feeding, they accidentally fall (Figure 4) victims of the electric wires since this fruit bat species is said to be less successful in avoiding unexpected obstacles at night [15]. Sinha [2] also reported that one of the mortality causes is electrocution.



Figure 4: Threats and Conservation related photos.

Ecotourism Potentiality of the roosting Site: Wildlife ecotourism has been emerged as one of the best livelihood ways of Northeast Indian people with special reference to Assam since it has been regarded as one of the most unique biodiversity hotspots. However, bat roosting sites were not yet highlighted under ecotourism projects by the government. Huge colony of Indian flying foxes of Guwahati city at Panbazar area could be a good ecotourism spot since it could be very easily accessible and most importantly it is most importantly it is permanent in nature. One can enjoy the hanging bats with their naked eyes in the spot very easily. Forest department of Assam government can declare the area as first “Bat Park” of Assam and adopt some measures for tourism purposes. ‘Watch Tower’ should be constructed from slight distance for viewing the colony without disturbing them in their day sleep at rest time. Government can build ‘Bat Museum’ along with a ‘Bat Research Laboratory’ near the bank of River Brahmaputra just by the side of the Panbazar roosting site to study the taxonomical and ecological research on the

available bat species of Northeast India with special reference to Assam. By this way, visitors will be aware about the economical importance of insectivorous and frugivorous bats of our area. As Indian flying fox has been taken as a flagship species by me, I will also try to develop a database on the involvement and interaction of the fruit bat species (*P. giganteus*) with the various roosting, fruiting and flowering trees of our locality to help the government in establishing the Bat Park. It will give us a complete picture of Indian flying fox’s role in pollination and seed dispersal activities. It will again indirectly give us the percentage values of forest regeneration to strengthen our forest ecosystem ultimately to make our city more “GREEN” along with climatecontrol! Thereby a bat roosting site can be a potential ecotourism spot for those visitors who are really interested in wildlife ecotourism and it will generate good amount of Indian and foreign revenues for the state government! Ultimately some amount (Figure 5) can be used by the forest department in rehabilitation and conservation of the concerned fruit bat species and our future “City Bat Park”!



Figure 5: Highly tourism potential area as “Mahabahu Brahmaputra River Heritage Centre (MBRHC)” already exists.

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