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RESEARCH ARTICLE OPEN ACCESS

The Effect of Ambient Temperatureon Roost Tree Selection ofIndian Flying Fox, *Pteropusgiganteus*(Brünnich, 1782) inThazi, Mandalay Region, Central Myanmar

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Abstract:

The effect of ambient temperature on Roost treeselection of Indian flying fox, *Pteropusgiganteus*was undertaken from July, 2015 to April, 2016 in Yele precinct. It was situated in Thazi Township, Central Myanmar. A total of 20 roost trees were found as the diurnal roost of *Pteropusgiganteus*and these comprised of four different species. Mean height of the roost trees was 18.80±1.32m and mean girth is 1.37±0.54 m. Monthly population size roosted on *Holopteleaintegrifolia* was almost stable. The shifting roost tree selection on *Tamarindusindica* and *Samaneasaman*was observed from July to February. Although roosting on*Borassusflabellifer*was no remarkable fluctuation from November to February. However, the number of roosting bats on *B. flabellifer*increased abruptly in March, and April.

Keywards- **Roost tree, Population size, Shifting roost tree**

I. INTRODUCTION

Bats are ecologically and economicaly important animals. They are the only true flying mammals. Bats shelter in tree cavities, caves and building and the rest exposed on trees(Fenton,1983).

Bats spend over half of their lives in roosts, which provide them protection and sites for resting, mating, rearing young and social interactions. Roosts are also critical for bats, including influence of ecology, metabolic regulation and survival for their population (Kuzn, 1982). Bats also select roosts that reduce their energy expenditure for thermoregulation. In summer, they roost in cool site while in winter they prefer warm site, relatively stable temperature and humidity. The physical structure and the microclimate in roosts are significant factors in roost selection (Kunz, 1982).

Pteropusgiganteus is a social species, living in a large diurnal roosts, comprising several hundred or thousand individuals. They usually roost on the open branches of the huge tree as well as the top of the branches (Bate and Harrison,1997).

Knowledge on the roost preference of bat is a primary importance to establish the conservation practice of the species. Many other factors, such as climatic conditions around the roost site, characteristics of the roost, human disturbance and predators may influence the roost preference.

The study area, Thazi, located in the Dry Zone Belt of central Myanmar has a hot dry climate. Colony of *P. giganteus* took residence in this study site for over 40 years. Total of 141 trunk trees occupied in the area of study site. There is no knowledge about on the roost preference of Indian flying fox,*P. giganteus* in the study area. Thus the study was focused on monthly roost tree selection of*P. giganteus*with respect to environmental parameter especially ambient temperature.

II. MATERIALS AND METHODS

A. Study Area, Study Site and Study Period

This study was conducted in Thazi and it is located in the Dry Zone Belt of Central Myanmar.Thazi lies between North Latitudes of 20° 30' and 21° 05' and East Longitudes of 95° 28' and 96° 32'(Fig .1).Study site,Yele precinct is situated at the southern border of Thazi and its southern borders are lined with an irrigated channel. Roost tree selection of*Pteropusgiganteus*was recorded from July, 2015 to April, 2016.

B. Observation of Roost Tree selection and Number of Bats on Roost Trees

The number of bats on each roost tree was visually counted in twoconsecutive days per week with the help of binocular. Roost trees preferably selected by *Pteropusgiganteus* were recorded monthly.

C. Measurement and Identification of Roost Tree

Roost trees species in the study site were identified with the help of Botany Department, Monywa University. The height and girth of roost trees were measured by using clinometers and measuring tapewith the help of Forestry Department, Thazi.

D. Environmental Parameter

Ambient temperature was recorded by using thermohygrometer (Tm: −30°C~60°C, RH: 0%~100%, TH603, China) during day roost counts under the roost trees (Table 2).

III. RESULTS AND DISCUSSION

A. *Roost Tree Selection and Number of Bats on Roost Trees*

During the study, monthly numbers of individuals roosting on *Holopteleaintegrifolia*remained almost stable. But the lowest number (4.71± 2.81 individuals) was observed in January while the highest number (31.50±14.36 individuals) in December. From July to September,*Samaneasaman*appeared as the most preferable roost tree and *Tamarindusindica* followed next. Fluctuations in the numbers of individuals were observed from July to February. Peakfluctuationof individuals occurred in January. Regarding on *B. flabellifer*there was no individuals roosted on this tree from July to till October. However, bats started roosting on *B. flabellifer*in November, however relatively in small numbers and stable through February (Fig. 2A, B,C, D,E). Then the numbers soared in the following two months of March and April .According to the recorded number of individuals, number of bats roosted on *T. indica* was predominant, the highest roosting percentage (42%) was recorded. It was followed by 35% on *S. saman*and*H. integrifolia*constituted 15% and the lowest roosting percentage (8%) was observed on*B. flabellifer*(Fig. 3).

B. Measurement and Identification of Roost Tree

A total of 141 trees occupied in the area of study site. Of these trees, twenty trees were found to be used as day roosts by *Pteropusgiganteus.* Twenty roost trees comprise of four different species: *Holopteleaintegrifolia*5% ,*Samaneasaman*25% , *Tamarindusindica* 35% and *Borassusflabellifer*35% respectively. The height of the roost tree and location were recorded (Table 1).

C. Environmental Parameter

Monthly ambient mean temperature was expressed in (Table 2).

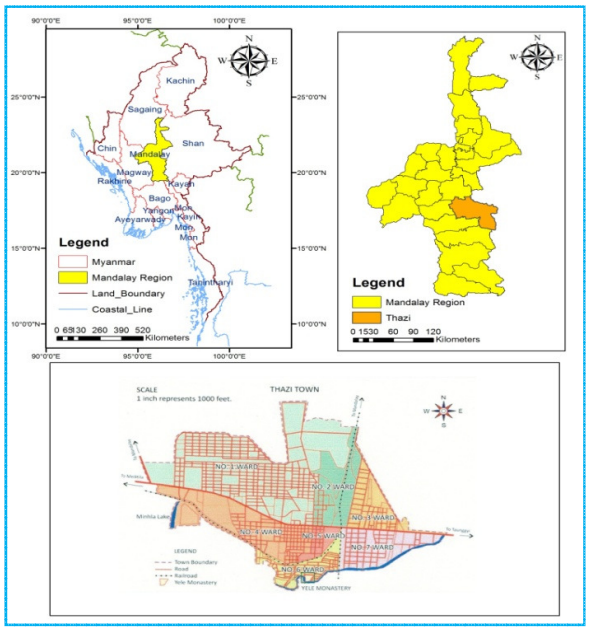

Fig.1.*Map of the study area (above) and close-up view of study site (below)*Source: Land Records Department, Thazi Township

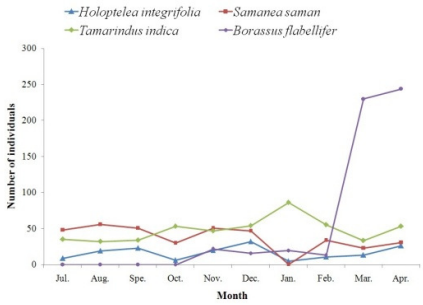

Fig.2*EMonthlyroosttreeselectionofPteropusgiganteus*

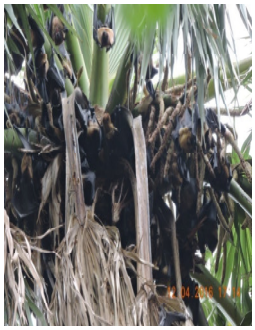

Fig. 2*A Roosting onBorassusflabellifer*

Fig .2 *B Roosting onSamaneasaman*

Fig. 2*C Roosting onHolopteleainntegriforlia*

Fig .2 *D Roosting onTamaarindusindica*

SPECIES, HEIGH AND GIRTH OF ROOST TREE

No.	Roost tree Species	Height (m)	Girth (m)	Location
T1	*HolopteleaIntegrifolia*	18.75	0.86	West
T2	*Samaneasaman*	17.86	0.84	West
T3	*Tamarindusindica*	16.84	1.65	West
T4	*Tamarindusindica*	16.33	1.50	West
T5	*Tamarindusindica*	20.32	0.76	West
T6	*Tamarindusindica*	19.33	0.86	West
T7	*Tamarindusindica*	18.87	0.99	South
T8	*Tamarindusindica*	19.91	2.20	South
T9	*Tamarindusindica*	20.40	0.74	East
T10	*Tamarindusindica*	19.94	1.63	East
T11	*Tamarindusindica*	19.67	0.89	East
T12	*Tamarindusindica*	19.28	2.46	East
T13	*Samaneasaman*	16.66	1.93	South
T14	*Borassusflabellifer*	18.93	1.43	South
T15	*Borassusflabellifer*	18.21	1.64	East
T16	*Borassusflabellifer*	18.87	1.02	East
T17	*Borassusflabellifer*	19.22	1.68	East
T18	*Borassusflabellifer*	19.99	1.93	East
T19	*Borassusflabellifer*	16.83	0.82	East
T20	*Borassusflabellifer*	18.28	1.50	East

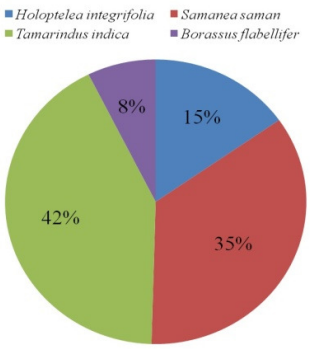

Fig. 3 Percentages of selected roost trees by *Pteropusgiganteus*

TABLE II

RECORDED AMBIENT TEMPERATURE

Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr
35 ℃	36 ℃	33 ℃	33 ℃	32 ℃	31 ℃	27 ℃	29 ℃	37 ℃	39 ℃

IV. DISCUSSION

In the study period, *Pteropusgiganteus*were observed roosted on 20 root trees belonging to four families and four species, namely *Tamarindusindica, Samaneasaman*, *Holopteleaintegrifolia* and *Borassusflabellifer.*

KhinThanOo (2009) reported that, 13 roost trees were found as the roost tree of *Pteropusgiganteus*. Among these, two species, *S. saman* and *T. indica* were also occurred as roost trees the present study. Similarly, *S. saman, T. indica*and *B. flabellifer* were also reported as the roost trees of *P. giganteus* by Moe MoeAung (2006) and May MyoNyunt (2007). In the study site it was recorded the height of roost trees ranged from 16.33 to m and 20.40 m respectively. Moe MoeAung (2006) expressed that the roost trees from study site were ranged from 23.48 m to 34.0 m. According to Khin Than Oo (2009) also stated that the roost trees within study site were recorded 28.48m. Therefore, *P. giganteus* appear to select their roost tree on the type and height of the trees. However, it was reported that roost sites selected by *P. giganteus* often depend on the availability of certain tree species, which in turn reflect the extent and quality of available habitat (Kunz and Jones, 2000). In the study, *P. giganteus* roosts on tall trees because it is easier during take-off for flight. Most of *P. giganteus* species are likely to roost in the landscape with emergent trees providing shelter from strong winds, regulate temperature gives easy exist for upward flight and moreover food resources to the species (Kunz, 1982).t

In the study site, *P. giganteus*, roosted on a total number of 20 number of roost trees of which some are located to the east, west and south part of the study site. During the study period, the largest colony size observed on T2 (*S. saman*) at western part of the study site from July to September and the mean ambient temperature was 35ºC in three months duration. During the cold season, November to February the largest colony size was observed on T12 (*T. indica*) at in the eastern part of the study site and the ambient mean temperature was 29ºC. Colony of *Pteropusgiganteus*shift roosted on *T. indica,* it was assumed that staying close together in large numbers kept them warm and checked the body heat lost to the coldness of cold season.

It was found that in March and April when the ambient temperature gradually increased to 39ºC. Most of the *P. gigateus* species preferred to roost on *Borrasusflabellifer* rather than other roost trees. It is assumed that the palm trees may protect direct sunlight when temperature increased, that the flying foxes go after the juice of palm trees and March and April are the months when palm trees produce tender fruits. Therefore *P. giganteus* used ephemeral roosts when ambient temperature increased. All roost trees, in study site, except *Holopteleaintegrifolia* provided food sources for Indian flying fox *P. giganteus.* They preferred to roost in dense foliage trees to protect themselves against increased temperature and also these roost trees provided food sources, especiallyfruits and leaves of*Tamarindusindica and Samaneasaman*.

V. CONCLUSION

From the study, it appeared that *P. giganteus* preferred alternative to roost on *T.indica*and *S. saman* with respect to fluctuation in temperature. *B. flabellifer*was chosen when temperature increased, however, the former two species are especially preferred and thus is assumed that trees with very good bough and dense happened to be most preferred by *P. giganteus*to take roost. Since these trees not only provided ample spaces to roost and take shelter from the broad day light but also protected them from being easily spotted by prospective predators. During summer *P.giganteus*change roosted on *B. flabellifer* especially to go after the food source produced by the palm. *Pteropusgiganteus* display remarkable seasonal changes in roost composition and colony size and selection of roost trees. Thus according to the data not only the ambient temperature but also availability of food sources is important in roost tree selection for *P. giganteus.*

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REFERENCES

[1] Bate, P.J.J., and Harrison, D.L., 1997. *Bats of the Indian Subcontinent.* Harrison Zoological Museum Publication, Sevenoaks. 258 pp.

[2] Fenton, M.B., 1983. Roosts used by the African insectivorous bat, *Scotophilusleucogaster* (Chiroptera: Vespertilionnidea), *Biotropica,* 15: 129-132.

[3] KhinThanOo, 2009. Distribution, seasonal occurrence and roosting of Indian Flying Fox, *Pteropusgiganteus* Brünnich,1782 in Monywa Township and its environs. *PhD Thesis*, University of Mandalay.

[4] Kunz, T. H. and D. P. Jones (2000). Mammalian species, *Pteropusvampyrus.American Society of Mammalogists*, 642: 1-6.

[5] Kunz, T.H., 1982. *Roosting ecology of bats.*(Edited by Kunz, T.H.), New York, pp.1-55.

[6] May MyoNynnt, 2007. Ecology and seasonal abundance of Indian Flying Fox, *Pteropusgiganteus* Brünnich,1782 in NyaungHlaVillage,NyaungOo Township. *PhD Dissertation*,University of Mandalay.

[7] Moe MoeAung, 2006. Autecology of Indian Flying Fox, *Pteropusgiganteus* Brünnich,1782 within ShweSedi Pagoda Precinct, HpayarPyan Village, Wetlet Township. *PhD Dissertation,* University of Mandalay.

