International Journal of Chemical and Biochemical Sciences
(ISSN 2226-9614)

Journal Home page: www.iscientific.org/Journal.html

The study of Indian flying fox (*Pteropus giganteus*) in selected areas of Peshawar, KPK, Pakistan

***Fayaz Ahmad*[1], *Ahmad Zamir* [1], *Arz muhammad umrani* [1], *Sidra Batool* [1], *Umair Safdar* [1], *Muhammad Siddique Akbar* [1], *Muhammad Sajawal* [1], *Syed Haider Abbas Bukhari* [1], *Khalid Ahmad* [2] , *Sami Ul Haq* [1] , *Muhammad Daniyal Ubaid* [1] , *Aziz Ullah Safi* [1]**

[1]*Pakistan Forest Institute Peshawar, Pakistan.*
[2]*University of Swat Shangla Campus, Shangla, Pakistan.*

Abstract

The study was conducted in the month of March to August 2021 to assess the population of flying fox in selected site of Peshawar city (Pakistan Forest Institute Peshawar, Agriculture University Peshawar, Hayatabad). The direct roost count method was used Therein one hundred bats were observed in hanging with electric power lines in Agriculture University Peshawar and Pakistan forest institute Peshawar. GPS co-ordinates of electrocuted sites of bats were taken. Relative abundance of each bats site, population density, and frequency of respondent's views about bats control was recorded. Bats were sighted at foraging and roosting sites. A total of 293 roost trees in all three sites with fifteen plant species was recorded. The population density of bat was assessed 1.3 (Bats/$m^{2)}$. The relative abundance of site one 20.9, 16.1, 2.9, 10.1, 13.7, 29.7, 13.1 Site two 26.8, 13.14, 27.7, 3.3, 28.5 and site three 16.5, 16.5, 40.3, 26.6, were recorded. Total 167 bats were sighted in site one (Pakistan forest institute Peshawar) 119 bats in site two (Agriculture university Peshawar) and 109 at site three (Hayatabad). Total number of 395 bats was observed in three sites. 34% of the respondents agreed upon shooting for Bats control, 53 disagreed, 37 respondent views were that tree may cut down to get rid of the bats ,60 disagreed, 60% agreed the bat should be left alone and 30% disagreed, 24% views where toxin should be used and 54% were disagreed. Occasionally Bat survive in the electrocution when bats stretch their large wings between two power lines while hanging on power lines the circuit gets completed and electrocution occur. Our study showed that bat having wingspan of less than one meters were not affected and their mortality rate also varies between power line types.

Keywords: Electrocution, Flying Foxes, Population Density, Electric Power, Relative abundance.

Full length article **Corresponding Author*, e-mail: *arz.forest87@yahoo.com*

1. Introduction

Bats having wide diversity in the world, according to the IUCN (International Union of Conservation of Nature) 15% of bat species are threatened with extinction, 18% are listed as data deficient and 57% have unknown population trends.They play role in the pest control (Bats, P.J.J.2013), the flying fox is threatened by the habitat due to cutting of native trees for the construction of road and house (mouler.s.set, 2008) Agriculture development, industrial development and increased human population (Huston A.M 2002) major threats include electrocution. According to Kjetil Bevanger (1997). In Southeast Asia, where half of the world's flyingfox species are found, these environmentally friendly creatures remain unstudied. In addition, there is extensive fruit bat hunting and natural habitat loss, and no official bat conservation assurance from governments (Whitmore,1997). In Pakistan, *P. giganteus* is not protected by law and is hunted by local medical practitioners for its body fats to be used as potions for rheumatic pains (Roberts, 1997). The largest South Indian fruit bat, the Indian flying fox (*P. giganteus*) is known to live in close proximity of humans and was observed roosting in botanical gardens, cities, and villages (Chakravarthy et al., 2008; Krystufek, 2009). Commonly bats select the fruits for their diet based on the shape, form and tasteful characters of fruit (Courts, 1998). Some authors reported that bats show a preference

for different food items Fleming and Heithaus (1981) Tidemann and Nelson (1987). Indian flying fox is one of the world's largest and it is distributed in India, Sri Lanka, Pakistan, Bangladesh, Nepal, and Burma (Simmons, 2005). In Pakistan, pteropodids consist of three genera and four species which includes the Indian flying fox (*Pteropusgiganteus*), the short-nosed fruit bat (*Cynopterus sphinx*), the Egyptian fruit bat (*Rousettus aegyptiacus*), and the fulvous fruit bat (*Rousettus leschenaultia*) (Roberts, 1997, Mahmood-ul-Hassan *et al.*, 2009). Indian flying foxes in Pakistan have been reported from Islamabad, Punjab, and Sindh (Eates, 1968, Roberts, 1991, Bates and Harrison, 1997). In Pakistan, the correct number of taxa of chiropterans is still a matter of debate (Bates and Harrison, 1997, Roberts, 1997, Walker and Molur, 2003, Wilson and Reeder, 2005).

In Pakistan *P.giganteus* was reported by Murray (1884) and Eates (1968) from Malir in Karachi. Moreover, it was reported from Mohlandar Mango Garden, Governor House, Jhelum in Multan, Mailsi in Punjab and Malakand in Pakistan by Roberts (1997).

2. Materials and methods:

The study area is situated in the Northwestern Pakistan (Peshawar: 34.020359° latitude and 71.486515° longitude. 34.0181° latitude and 71.4876° longitude (Picture 1). The study area is situated in the Northwestern Pakistan, regular survey conducted in the month of March to August 2021 at Peshawar university, Pakistan Forest Institute Peshawar, and Hayatabad urbanized area, therein power lines were focused near trees and roosting sites. Bats leads for searching food at night and collision with power lines which are near of their roosting and foraging sites. Pictures of electrocuted Bat were taken (Picture 2) and species identified. Bats Populations were also sighted near on roosting tree through the direct roost count method, recorded in study area through Random walk preferably during dawn and dusk.

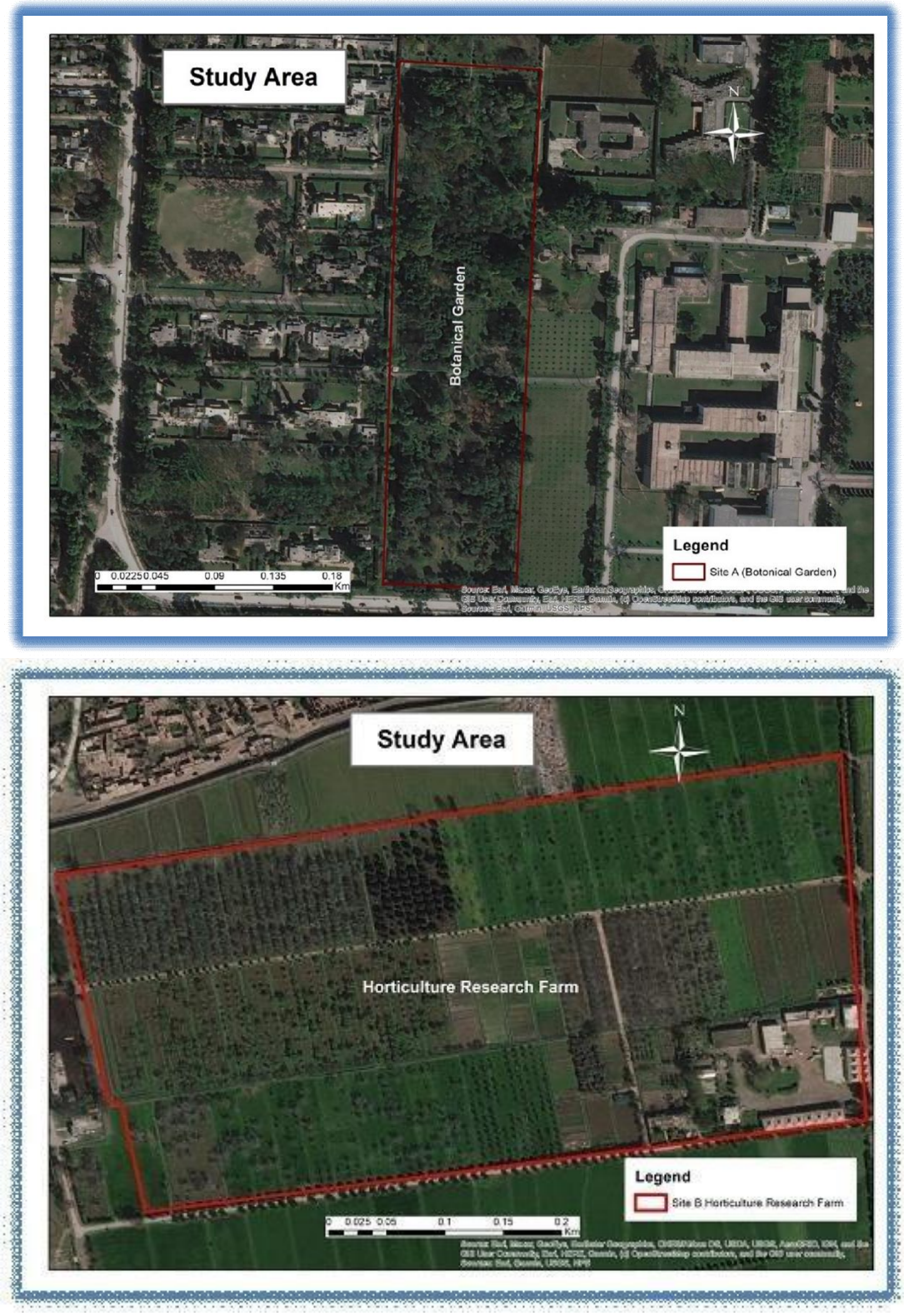
3. Results and discussion

According to Secondary information collected from respondents which shows that the prey Species of Indian Flying Foxes has the maximum frequency 50, relative frequency 46.73 of Species *Fixes carica* followed by *Prunus angustifolia* 32 (F) 29.91 (RF) and *Prunus armeniaca* (F) 10 (RF) 9.35.Bats are essential contributors to our planet and sustain role in ecosystem. The Power lines near the bat habitats may be cover-up with plastic tubes or increase the distance between power lines to minimize mortality of flying fox, insulation may be considered. The power lines are responsible for the death of many flying animals, it is important that public may report each electrocution not only to remove dead animals but to alert concern department to see potential hotspots so they can improve infrastructures and prevent future death of our Bat. Finally, further research is needed to assess the actual impact of electrocution in this and other species of large fruit bats. The local people from Peshawar City reported that during fruiting season (April-July) these flying foxes comes in form of groups and feed on the fruits of plants species in their gardens.

The Indian flying of population is declining throughout its geographic range. Moreover, extreme heat events and local extinction of flying foxes in the southern region of Pakistan seem to be related. Pakistan is the fifth-most severely affected country by climate change worldwide. Installing light bulbs on every tree to illuminate the area and make it less attractive to the bats. Firecrackers to frighten the bats. Pruning tress could minimize the impact of bats, the present study also show some conservation measures are required to minimize mortality of flying fox, electrocution not only may contribute their population decline but also put their ecosystem service at risk

Table 1:

S. NO	LATITUDE	LONGITUDE
01	34° 0'50.81"N	71°28'59.41"E
02	34° 0'50.38"N	71°28'59.34"E
03	34° 0'59.02"N	71°29'1.32"E
04	34° 1'0.52"N	71°29'8.43"E
05	34° 0'58.96"N	71°29'6.14"E
06	34° 1'3.47"N	71°29'8.04"E
07	34° 1'6.00"N	71°29'9.47"E
08	34° 1'15.84"N	71°29'12.23"E
09	34° 1'12.94"N	71°29'21.44"E
10	34° 0'53.01"N	71°29'3.37"E



Picture 1. The Study Area Maps

Picture 2. Electrocuted Bats Sites on Electric Cables at Peshawar University and Pakistan Forest Institute Peshawar

Table 2:

RESPONDETS VIEWS ABOUT CONTROL OF BAT	Agreed (%)	Disagreed (%)	Do not know (%)
Shooting	34	53	13
Tree May be cut down to get rid of the bats	37	60	3
Bats should be left alone	60	30	10
Toxin should be used	24	54	22

Table 3:

Site (1) Premises of Pakistan Forest Institute Peshawar (March and April)				**R/A**
Plant Species	No of Plants	Bats	Bats	
Verrhoa carambola	20	27	8	20.9
Ziziphus mauritiana	16	7	20	16.1
Phoenix dactylifera	10	2	3	2.9
Ziziphus jujube	11	7	10	10.1
Flacourtia indica	22	14	9	13.7
Punica granatum	13	22	16	29.7
Pyrus communis	6	9	13	13.1
Total bats		88	79	
Site(2) Agriculture University Peshawar (May and June)				
Prunus persica	18	20	12	26.8
Prunus bokharensis	17	7	9	13.4
Eriobotrya japonica	14	11	22	27.7
Diospyros embryopteris	32	1	3	3.3
Prunus persica	21	24	10	28.5
Total bats		63	56	
Site (3) Hayatabad (July and August)				
Prunus Fasciculata	24	10	8	16.5
Syzygium cumini	34	7	11	16.5
Cordia dichotoma	22	20	24	40.3
Morus alba	13	16	13	26.6
Total bats				
Total Number of Bats	395			
Bats/m^2	1.3			
Bats/roost tree	293			

Table 4: Prey Species of Indian Flying Foxes in District Peshawar (Secondary Information)

Prey species	**Frequency (F)**	**Relative frequency (RF)**
Ficus Carica	**50**	**46.73**
Prunus angustifolia	**32**	**29.91**
Prunus armeniaca	**10**	**9.35**
Diospyros embryopteris	**5**	**4.67**
Pyrus communis	**4**	**3.74**
Eriobotrya japonica	**3**	**2.80**
Psidium guajava	**2**	**1.87**
Citrus sinensis	**1**	**0.93**
Total	**107**	**100**

There was a tendency to increase calcium level (–15.64%) compared to the control. Based on the above, it can be concluded that the inclusion of various doses of Cellobacterin-T in the diet does not significantly affect the morphological and biochemical parameters of the blood of experimental chickens.

4. Conclusions

According to the obtained results on the effectiveness of the use of the enzymatic Cellobacterin-T probiotic in the diet of young Brown Nick cross, it can be concluded that the optimal dose of its introduction into the diets is 100 mg per 100 g of compound feed, which contributes to an increase in live weight by 48.03 g or 3.87%, compared to the control group. The introduction of the optimal dose of the Cellobacterin-T probiotic into the feed has a positive effect on the indicators of digestibility and use of nutrients in diets, the development of internal organs, and hematological indicators. Hematological parameters of the experimental chickens when using Cellobacterin-T at a dosage of 100 mg/100 g of compound feed were within acceptable physiological norms.

References

[1] I.A. Semenova, M.V. Frolova, M.I. Slozhenkina, I.F. Gorlov, A.A. Mosolov, and N.A. Karabalina. (2021). Method of growing broiler chickens using new feed additives. In IOP Conference Series: Earth and Environmental Science, 848: 012065.

[2] D. Mihaylova, A. Krastanov, and N. Vasilev. (2020) Non-hormonal feed additives as an alternative in animal reproduction. Trakia Journal of Sciences, 18(4):405.

[3] G. Ogorodnichuk, and I. Datsyuk. (2021a) Influence of enzyme preparations on productive and morphological indicators of broiler chickens. Sciences of Europe. 64: 3-10.

[4] G.M. Ogorodnichuk, and I.V. Datsyuk. (2021b). Productivity and killing quality of rabbits under the action of complex probiotic enzyme additive" celozyme-probiol". Annali d'Italia, 17: 6-18.

[5] R. Tolve, F. Tchuenbou-Magaia, M. Di Cairano, M.C. Caruso, T. Scarpa, and F. Galgano. (2021). Encapsulation of bioactive compounds for the formulation of functional animal feeds: The biofortification of derivate foods. Animal Feed Science and Technology, 279:115036.

[6] A. Anadón, I. Ares, M.R. Martínez-Larrañaga, and M.A. Martínez. (2019). Prebiotics and probiotics in feed and animal health. In Nutraceuticals in Veterinary Medicine. pp. 261-285. Springer, Cham.

[7] V.D. Lucio, B. Susana, E.M. Hernández-Domínguez, M. Villa-García, G. Díaz-Godínez, V. Mandujano-Gonzalez, B. Mendoza-Mendoza, and J. Álvarez-Cervantes. (2021). Exogenous enzymes as zootechnical additives in animal feed: a review. Catalysts, 11(7):851.

[8] J. Zhao, G. Hu, Q. Tang, Z. Song, Z. Fan, and X. He .(2018). Effects of supplementation with compound enzymes and probiotics on sorghum diets on growth performance, serum antioxidant indexes and intestinal morphology of Liangfenghua broilers. Chinese Journal of Animal Nutrition. 30(6):2318-27. https://www.cabdirect.org/cabdirect/abstract/20183221052

[9] M.J. Kim, D.G. Jeon, H.S. Ahn, I.G. Yoon, E.S. Moon, C.H. Lee, Y. Lim, and I.S. Jang. (2020). Effects of probiotic complex on performance, blood biochemical and immune parameters, digestive enzyme activity, fecal microbial population and noxious gas emission in broiler chicks. Korean Journal of Poultry Science. 47(3):169-80.

[10] S.H. Siddiqui, C.Y. Hwang, H.S. Choe, and K.S. Shim. (2020). Effects of Complex Probiotics on Productivity Index, Fatty Acid Composition and Immune Response in Broilers. Korean Journal of Organic Agriculture, 28(3):431-47. https://doi.org/10.11625/KJOA.2020.28.3.431

[11] K. Gibbs, l. Lacharme-Lora, Y. Dersjant-Li, C. Evans, and P. Wigley P. (2021). A probiotic and mixed-enzymes combination reduces the inflammatory response, faecal shedding and systemic spread of Campylobacter jejuni in broilers. Journal of Applied Animal Nutrition, 9(2):65-75.

[12] S. Kaushal, R.K. Sharma, D.V. Singh, S.K. Shukla, S. Kumar, J. Palod, and M.K. Singh. (2018). Effects of Dietary Inclusion of Enzymes and Probiotic on Organ Weights and Intestinal Morphology of Broiler Chickens. Journal of Animal Research, 8(6):1035-1039.

[13] N.N. Ivanova. (2019). The use of enzymatic probiotic" cellobacterin-t" for broiler chickens. In urgent issues of agricultural science, production and education, Voronezh, 1: 218-222. https://elibrary.ru/item.asp?id=37404059

[14] W. Afrilasari, and A. Meryandini. (2016). Effect of probiotic Bacillus megaterium PTB 1.4 on the population of intestinal microflora, digestive enzyme activity and the growth of catfish (Clarias sp.). HAYATI Journal of Biosciences. 23(4):168-72. https://doi.org/10.1016/j.hjb.2016.12.005

[15] A.E. Abou-Zeid. (2007). Practical aspects of enzyme-probiotics preparation supplemented to quail diets. Fayoum Journal of Agricultural Research and Development, 21(2): 63-81. https://journals.ekb.eg/article_197553_1ce47d1590047b93f6b54908aed3bad8.pdf

[16] M.I. El-Kelawy, A.S. El-Shafey, and R.M. Ali. (2017). Impact of dietary supplementation with multi-enzyme and/or probiotics on productive performance and nutrients digestibility of broiler chickens. Egyptian Journal of Nutrition and Feeds, 20(3), 535-543.

[17] K. Hidayatiningtyas, S.H. Bintari, and R.S. Iswari. (2020). The Effect of Papain Enzymes and Probiotic Addition on Feed Towards the Catfish Growth Performance, Feed Utilization Efficiency and Survival Rate in Biofloc Techniques. In International Conference on Science and Engineering (Vol. 3, pp. 419-423).