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A REPORT: URBAN*TAPHOZOUS MELANOPOGON* (EMBALLONUSIDAE) MANILA, PHILIPPINES

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ABSTRACT

In Metro Manila, it is very uncommon to observe bats due to they are being hunted for food or their own source of food in Metro Manila is rare or scarce. However, few numbers of the black-bearded tomb bat *Taphozous melanopogon*which is already in the IUCN Red list was observed flying in the University of the East, Manila Garden. The aim of the study is to determine why an IUCN red listed bat is present in an urban and busy area of the University of the East Manila, Philippines. As shown on the results of this paper, 4 different insects were subjected as part of the food diet for a 10-day period observation to determine the food intake of black bearded tomb bat, and it was Diptera that prevails as their selective food which is very common in Metro Manila due to high presence of anthropogenic wastes.

KEYWORDS: Black Tomb Bats, Urban area, IUCN red list, University of the East, Threatened.

INTRODUCTION

The black-bearded tomb bat *Taphozous melanopogon* Temminck, 1841(Chiroptera: Emballonuridae) is a pervasive species distributed in South and Southeast Asia (Bhargavi Srinivasulu and C. Srinivasulu 2008).

This is a highly expressive species living in diurnal roosts in caves ruins and temples, with a colony size varying from ten individuals to many hundreds (Brosset, 1962: Hill, 1967: Sapkal & Khamre, 1984: bates & Harrison, 1997: Molur et al, 2002).

In India this species lives in hill forests, with fresh water such as a lake, river or pond in the locale, at an altitude of 800 meters even in ruined temples (Bates and Harrison 1997).

In the Philippines, *Taphozous melanopogon* (Emballonusidae) is included in IUCN Red List of Threatened Species (Csorba et al 2008).

This species was also spotted in University of the East, Tan Yan Kee urban forest garden. They are roosting in the tall trees, ceilings and roof gutter of an old buildings, under the dark stairways, these are the place where other insects thrive that serves as their prey.

Taphozous melanopogon is poor predator of mosquitoes since they are very small. Bats use echolocation to navigate and find food in the dark. If detected presence of mosquitoes, they prey on them as many as they can.

Taphozous melanopogon can be a biological control of mosquitoes in the urban forest. Especially in the overcrowded city of Manila, some species of mosquitoes like *Aedes aegypti* are carriers of as dengue.

Bats have both ecological characters in the forest ecosystems, particularly for natural pollination, seed dispersal, forest restoration, population regulation, and pest control (Mohagan et al 2018).

Threats affecting bat diversity; rapid increase in the human population resulting to increase demand for land area and other natural resources contributes greatly to the diminishing populations of different species (Pimentel et al., 2007).

The aim of this study is to determine the food intake of Tomb bat *(Taphozous melanopogon*), explain its ecological importance and to determine the presence of *T. melanopogon in* the University of the East Tan Yan Kee Garden.

MATERIAL AND METHODS

Description of the sampling area

The old UE Campus has been built since 1946 and still existing as to date. University of the East is found along the vicinity of Claro M. Recto Avenue. It is the busiest street along the university belt of Manila. Claro M Recto Avenue is an old city of Manila where High rise building are located. Tan yan kee urban forest garden has many tall trees belong to a family of Fabaceae, Malvaceae, Annonaceae, Arecaceae, Lauraceae, Poacea, Cyperaceae, Rubiaceae, Apoycynaceae, Anacardiaceae, and other ornamental plants that was served as habitat for tomb bat and its insects for prey. Rapid sampling method was done once only on May 2019 at 18:00 to 19:00 time. There were five (5) individual bats collected since they are the same species, only one (1) individual was observed and the rest were set free for ecological conservation of the species.

Fig. 1: Google map of the Sampling site with the coordinates of 14°36'7"N 120°59'22"E,

Fig. 2: Actual sampling site is UE Tan Yan Kee Garden 2000 Square meters' lot area.

Figure 1 shows the map of the sampling site at the University of the East Manila, Philippines using Google Map and Figure 2 shows the University of the East Tan Yan Kee Garden which is the actual sampling site of the study where the researchers gather data.

Materials used

Insect net was used to collect black tomb bat at random sampling from pm to 12 midnights for seven days, and place in a wide mouth clear 5-gallon bottle covered with a mesh screen for proper observation of the diet. Insect net was also use to collect Dipthera, Odonata, Lepidoptera and Coleoptera species to feed the Black tomb bat. The Manila, Natural History museum, Mammalogy department experts, identified and verified the Tomb bat (*Taphozous melanopogon*) found on fig 3.

RESULTS

Fig 3: (A) Dorsal view and Fig 3 (B) Ventral view of the *Taphozous melanopogon* (Emballonusidae). It was collected using an insect net. This species was chasing the flying moth and dragonfly along the Tan Yan Kee garden. It was also spotted roosting in tall tree, on the ceiling of the tall building, rocks crevices side of the building which is under construction inside the campus of UE Manila. *Taphozous melanopogon* prey on housefly, mosquitoes, dragon fly and ladybird beetle on leaves for food.

Taphozous melanopogon (Emballonusidae) is included in the IUCN red list of threatened species according to (Csorba et al 2008).

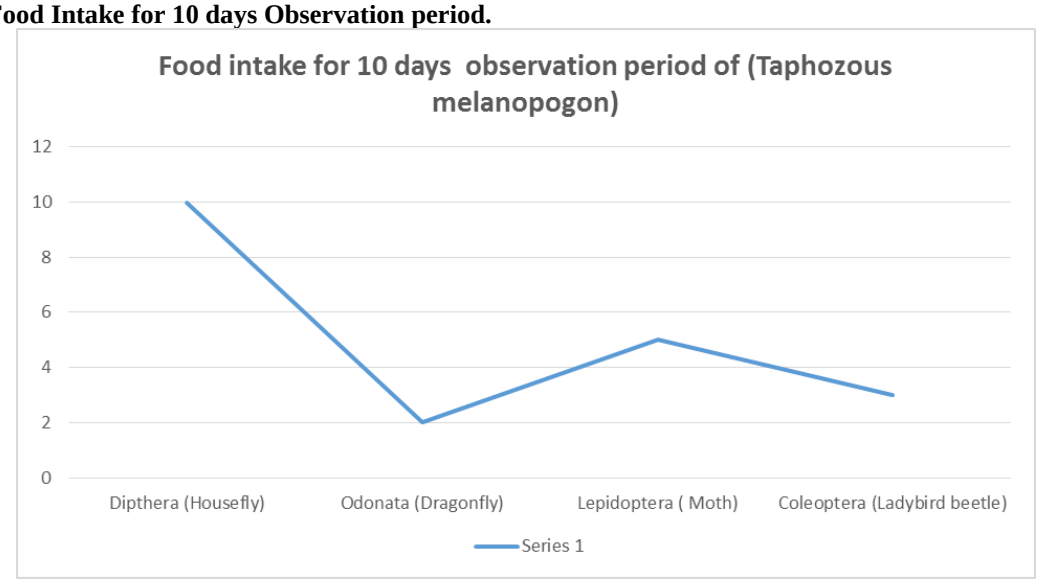
The morphological description: the dorsal hair is light brown to nearly blackish color. The ventral fur is greyish.

The Head has pointed muzzle with blackish beard but no throat sacs but with a hairy chin.

Body's length is 90–100 mm, looks flattened. The forearm measures 60 mm and the wingspan measures about 370–400 mm.

The posterior tip of the tail is prominent. The tail length measures between 20 and 35 mm. Claws has light violet color with white tip. Figure 3 A and 3 B shows that *Taphozous melanopogon* is a male species having to have pointed muzzle head, blackish bird, and no throat sacs and hairy chin and with the presence of a scrotum at the anterior part of the body near the tail. Ultimately, when dissected testis was identified and so it is a male.

Table 1: Food Intake for 10 days Observation period.



On table 1., interprets the following insect described on the succeeding statements that was feed to Black tomb bat inside the jar to test the diet for 10 days. On the 1st day, the bat was given 10 houseflies at 0600 hours, 10 houseflies were being eaten, on the 4th day, 10 tiny dragonfly species were given 2 individual of dragon fly was consumed, on the 7th day, 10 small size moth was served 4 individual moth was consumed, on 10th day 10 ladybird were served 2 beetle were eaten.

DISCUSSION

In the Philippines, *Taphozous melanopogon* (Emballonusidae) is included in IUCN Red List of Threatened Species (Csorba et al 2008).

Thomas & Baker (2016) The bats are identified as *Taphozous melanopogon* based on (i) the shape of the head, particularly the pointed muzzle, (ii) a relatively long, free tail, (iii) pointed ears, (iv) a short, broad, trapezoid tragus and (v) a patch of black fur beneath the chin in both bats in the first roost. A close-up of one of the bats from the first roost shows the extent of the black beard.

Males of this species usually have a black beard (the hairs of which are specialized and are related to the dispersal of glandular secretions), but this may not be obvious in younger bats (Kingston et al, 2006). The same with Thomas & Baker (2016) and Kingston et al, (2006) *Taphozous melanopogon* (Emballonusidae) has the same basis of description found on Figure 3 A and B. and the Male gender analysis as to black tomb bat diet, they are very selective in their prey, which was also observed on Figure 3 A and 3 B. This was supported by the study of Wei et.al, that on their study on the feeding habits of *T. melanopogon* shows that *T. melanopogon*eats Hemipteran and Dipteran insects disproportionately more, and Coleptera disproportionately less, than expected based on our light trapping results, which only suggest that *T. melanopogon* is a specialized feeder. Likewise, the size of the prey is also important, I presumed they consider if it's digestible or not. When it was fed of Coleoptera, the bat consumes only 2 ladybeetles. However, they were attracted to Diptera species as shown on Figure 3 A and 3 B.

For T. me -
lanopogon, aspect ratio and wing loading were high, wing-span was long, while tip length ratio, tip area ratio and wing tip shape index were low. These fea- tures suggest an ability to fly fast in open areas, over treetops, and along the edge of forest or semi-clut- tered habitats. However, bats with high aspect ratio wings (relatively longer, narrower wings) and wing loadings (relatively smaller wing area) have reduced maneuverability, thus potentially limiting them to relatively uncluttered habitats. For high maneu- verability, the wings should have a relatively large wing area, shorter wingspan and lower aspect ratio (Norberg and Rayner, 1987). A relatively long wing span and high aspect ratio enables T. melano- pogon to fly fast with reduced energy, an advanta- geous ability for a bat that flies over long distances (e.g., Miniopterus natalensis — Mills and Hess, 1997).

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For *T. melanopogon*, feature ratio and wing loading were high, wing-span was long, while tip length ratio, tip area ratio and wing tip shape index were low. These features suggest an aptitude to fly fast in open areas, over treetops, and along the edge of forest or semi-cluttered habitats (Wei et.al 2008). This, likewise enables them to catch Diptera on an urban but uncluttered garden of Tan Yan Kee garden at the University of the East Manila Philippines.

A comparatively long wings pan and high aspect ratio enables *T. melanopogon* to fly fast with concentrated energy, an advantageous ability for a bat that flies over long distances (e.g., Miniopterus natalensis — Mills and Hess, 1997). These characteristics help the black tomb bat to fly consistently in the Tan Yan Kee of the University of the East Manila, Philippines. Garden even

if there are few of number of trees that are distant apart to rest on.

More responsive bats tend to have relatively pointed wingtips (low Ts), low wing tip shape index and high aspect ratio wings (Norberg and Rayner, 1987). These features are completely constant with the wing shape of *T. melanopogon*. While this characteristic somehow aids in the ability of the *T. melanopogon* to fly in the crowded and narrowed area of the Tan Yan Kee of the University of the East Manila, Philippines.

Information of the diet of bats gives us a clear understanding of the ecology and their feeding behavior (Kurta & Whitaker, 1998). Which only shows on this study that since Diptera is the selective food of *T. melanopogon*at the Tan Yan Kee Garden in the UE Manila, determines that there is a booming population of Diptera in the area. Likewise, rising population of Diptera should further be addressed due to its possible and high risk of diseases carrier.

Bats tend to be discriminatory of their prey, the richness of which in turn differs spatially, temporally and seasonally (Whitaker et al., 1996).

Numerous other factors such as the size of the prey and the mode in which the prey presents itself tends to rule the dietary composition and feeding behavior of the bat (Verts et al., 1999).

It has been observed that bats switch between selective feeding and opportunistic feeding depending on the availability of preferred prey and availability of prey based alone (Whitaker, 1995; Whitaker et al., 1999).

The high diptera content in the diet of insectivorous bats is interesting especially because the sampled population is located in an urban area of Manila, Philippines. The high percentage of Diptera consumption on the diet of *T. melanopogon* as shown on this study is potentially important in the control of urban disease vectors in this insect family.

CONCLUSION

Taphozous melanopogon is very selective in their food intake (diet) however, based on the Table 1. Given the Diptera, Odonata, Lepidoptera and Coleoptera, they preferred Diptera. This suggests the ecological importance of this species that we must protect the habitat to keep them visible in the Urban Ecosystem. They serve as biological control on the over population of insects belong to Dipthera like Mosquitoes and houseflies, which can be a carrier of disease. *Taphozous melanopogon* is in the red list of IUCN so we have to educate people not to destroy the habitat and not to harm or kill them because they contribute in the balance of the ecosystem.

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