

# A Study of the Bats in Different Temperature in May Jun Month on Balaghat District Madhya Pradesh

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## ABSTRACT

I present results of long-term field studies on the behavior, demography, and life history of bats, with a particular focus on my long-term studies on wild Bechstein's bats. I show that long-term studies on individually marked populations are invaluable to understand the social system of bats, investigate the causes and consequences of their extraordinary longevity, and assess their responses to changing environments with the aim to efficiently protect these unique mammals in the face of anthropogenic global change. Bats are found around Moti Garden Moti Talab in Balaghat district. They live in the trees around the Moti Talab. According to the study, the temperature in Balaghat city during the last week of May and the first week of June is approximately between 45- 46<sup>0</sup> degrees Celsius. Bats cannot survive in this temperature and the bats species gets destroyed.

**Keywords:** Climate Change, Conservation, Demography, Longevity, Social behavior

## INTRODUCTION

Bats is the common name for the “The most common bat species in the United States include”:

- Little brown bat (*Myotis lucifugus*): This bat is common in the northern two-thirds of the country. It's 3.1 to 3.7 inches long with a wingspan of 8.6 to 10.5 inches.
- Big brown bat (*Eptesicus fuscus*): This bat is common throughout its range, especially near farms and urban areas. It's 4.1 to 4.8 inches long with a wingspan of 12.1 to 12.9 inches.
- Mexican free-tailed bat (*Tadarida brasiliensis*): This bat is the most common species in the southwest.

In India, common bats include: Fulvous fruit bat, Black-bearded tomb bat, Naked-rumped tomb bat, Greater mouse-tailed bat, and Lesser mouse-tailed bat.

Emballonuridae is a family of microbats, many of which are referred to as sac-winged or sheath-tailed bats. They are widely distributed in tropical and subtropical regions around the world. The earliest fossil records are from the Eocene.

They also provide multiple ecosystem services, including plant pollination, seed dispersal, and consumption of pest insects (Kunz et al. 2011). Finally, bats can carry viruses of high zoonotic potential such as Ebola, Marburg, or Corona viruses (Calisher et al. 2006; Letko et al. 2020; Mollentze and Streicker 2020), but little is known about virus transmission pathways within and between bat colonies (Zeus et al. 2020).

**Bats** are flying mammals of the order **Chiroptera**, with their forelimbs adapted as wings, they are the only mammals capable of true and sustained flight. Bats are more agile in flight than most birds, flying with their very long spread-out digits covered with a thin membrane or patagium. The smallest bat, and arguably the smallest extant mammal, is Kitti's hog-nosed bat, which is 29–34 millimetres ( $1\frac{1}{8}$ – $1\frac{3}{8}$  inches) in length, 150 mm (6 in) across the wings and 2–2.6 g ( $\frac{1}{16}$ – $\frac{3}{32}$  oz) in mass. The largest bats are the flying foxes, with the giant golden-crowned flying fox (*Acerodon jubatus*) reaching a weight of 1.6 kg ( $3\frac{1}{2}$  lb) and having a wingspan of 1.7 m (5 ft 7 in). Depending on the culture, bats may be symbolically associated with positive traits, such as protection from certain diseases or risks, rebirth, or long life, but in the West, bats are popularly associated with darkness, malevolence, witchcraft, vampires, and death.

### Scientific classification

Kingdom: Animalia, Phylum: Chordata, Class: Mammalia, Clade: Scrotifera, Clade: Apo-chiroptera, Order: Chiroptera.

### Materials and methods -

The materials and methods followed the may and jun month during novtapa time (“**nine scorching heats**”) field trial was conducted in Balaghat district MP.

### Study area -

Our study area included the Balaghat district in moti garden near by ward no. 24 around by moti garden. Many types birds are stay here. They are eats fishes and many insects.

### Field methods

We conducted surveys in may month bat is found in approximately 1000 numbers in around by moti talab. In this days we found all bats are survivals for more difficulties in heat atmosphere.

### Food and feeding:

Different bat species have different diets, including insects, nectar, pollen, fruit and even vertebrates (Fenton and Simmons 2015). Megabats are mostly fruit, nectar and pollen eaters (Schwab, I. R.; Pettigrew, J. 2005). Due to their small size, high-metabolism and rapid burning of energy through flight, bats must consume large amounts of food for their size. Insectivorous bats may eat over 120 percent of their body weight per day, while frugivorous bats may eat over twice their weight (Fenton and Simmons 2015). They can travel significant distances each night, exceptionally as much as 38.5 km (24 mi) in the spotted bat (*Euderma maculatum*), in search of food (Rabe, M. J.; *et al.* 1998). Bats use a variety of hunting strategies (Gonsalves, L. *et al* 2013). Bats get most of their water from the food they eat; many species also drink from water sources like lakes and streams, flying over the surface and dipping their tongues into the water (Fenton and Simmons 2015).

### Skull and dentition

The head and teeth shape of bats can vary by species. In general, megabats have longer snouts, larger eye sockets and smaller ears, giving them a more dog-like appearance, which is the source of their nickname of "flying foxes"(Fleming, T. 2003). Among microbats, longer snouts are associated with

nectar-feeding (Jones, G. 2001). While vampire bats have reduced snouts to accommodate large incisors and canines (Greenhall, A.M. *et al* 1983). Small insect-eating bats can have as many as 38 teeth, while vampire bats have only 20. Bats that feed on hard-shelled insects have fewer but larger teeth with longer canines and more robust lower jaws than species that prey on softer bodied insects. In nectar-feeding bats, the canines are long while the cheek-teeth are reduced. In fruit-eating bats, the cusps of the cheek teeth are adapted for crushing (Jones, G. 2001). The upper incisors of vampire bats lack enamel, which keeps them razor-sharp (Greenhall, A.M. *et al* 1983). The bite force of small bats is generated through mechanical advantage, allowing them to bite through the hardened armour of insects or the skin of fruit (Senawi, J. *et al* 2015).

### **Bat detector**

A bat detector is a device used to detect the presence of bats by converting their echolocation ultrasound signals, as they are emitted by the bats, to audible frequencies, usually about 120 Hz to 15 kHz. There are other types of detectors which record bat calls so that they can be analyzed afterward, but these are more commonly referred to by their particular function.

Bats emit calls from about 12 kHz to 160 kHz, but the upper frequencies in this range are rapidly absorbed in air. Many bat detectors are limited to around 15 kHz to 125 kHz at best. Bat detectors are available commercially and also can be self-built.

### **How it is used**

The operator guesses the likely species to be present and tunes the frequency accordingly. Many users will start listening around 45 kHz. If a bat is seen or a bat-like call is heard, the frequency is tuned up and down until the clearest sound is heard.

Species like Pipistrelles which end their call with a "hockey stick" CF component can be recognized according to the lowest frequency which gives the clearest "plop" sound. Horseshoe bats give a peeping sound at a frequency depending on their species. FM calls all tend to sound like clicks, but the start and end frequencies and the call repetition pattern can give clues as to the species.

### **Thermoregulation**

Most bats are homeothermic (having a stable body temperature), the exception being the vesper bats (Vespertilionidae), the horseshoe bats (Rhinolophidae), the free-tailed bats (Molossidae), and the bent-winged bats (Miniopteridae), which extensively use heterothermy (where body temperature can vary) (Nowack, 2017), (Stawski, C.; *et al* 2014). Compared to other mammals, bats have a high thermal conductivity. The wings are filled with blood vessels, and lose body heat when extended. At rest, they may wrap their wings around themselves to trap a layer of warm air. Smaller bats generally have a higher metabolic rate than larger bats, and so need to consume more food in order to maintain homoeothermic (Altringham, J. D. 2011).

Bats have few non-human predators, though raccoons, skunks, weasels, martens, cats, snakes, hawks and owls occasionally take a few. Humans pose the biggest danger to bat populations. Some people who fear bats will go out of their way to kill them.

### **Economics**

Insectivorous bats in particular are especially helpful to farmers, as they control populations of agricultu-



ral pests and reduce the need to use pesticides. It has been estimated that bats save the agricultural industry of the United States anywhere from \$3.7 billion to \$53 billion per year in pesticides and damage to crops. This also prevents the overuse of pesticides, which can pollute the surrounding environment, and may lead to resistance in future generations of insects (Boyles, *et al* 2011)



Fig-









## Results and Discussion

As per study we are found in bats are black color is a not accepted on heat because black colour is good reflector of heat. A black object absorbs all wavelengths of light and converts them into heat, so the object gets warm. So we are doing study different temperature and different time. We saw eagle was survives in normal temperature in atmosphere.

In the afternoon of 27th May 2024, the temperature has been recorded more than 45 degrees. Due to the temperature increasing every day, the number of eagles falling down from the trees is killing them. This is the way it has been seen since last 2 days, bats has become a victim of heat stroke due to heat and died due to infectious disease and we have seen that the bats are falling from the trees like mangoes, this is the way it has been seen in the last 2 days, about 50 to 70 After observing the death of the bats, veterinarian also observed that the death of the bats is due to temperature or due to some infectious disease. After studying the time, veterinarian found that the temperature was high in the afternoon after 12:00 o'clock. Eagles are dying because bats are black in colour and are not able to accept the temperature.

One notable aspect of long-term studies on bats is that they often depend on collaborations between citizen scientists, conservationists, and professional scientists. This is by no means a caveat but instead enables a fruitful exchange of knowledge among bat researchers with a different training background and facilitates the transfer of the obtained scientific results into conservation practice. (Gerald Kerth 2022)

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