

# Little Brown Myotis Bat



This Little Brown Myotis Bat found its way into our fireplace. S/he was successfully released without injury.

Some interesting [Wisconsin bat facts](#)

## I. BAT FACTS

1. Only winged or flying mammals
2. 70% are insectivorous (eat  $\frac{1}{4}$  to  $\frac{1}{2}$  their body weight nightly)
3. 23% are frugivory (fruit eating)
4. 5% are nectar and pollen eaters – generally slow flyers
5. 2 species are carnivory (meat eating)
6. 3 species are sanguivory (blood drinking)
7. few species live solitary lives
8. Bat parasites are so specialized that they will not survive outside or away from the bats, so they pose little threat to animals other than bats

The mammalian order of bats is Chiroptera, which is derived from the Greek language. It means hand wing. There are approximately 900 living species of bats. Each has a unique scientific name and is classified according to its relationships with other bats (Bats, Fenton, 2). There are

two orders of bats: Microchiroptera and Megachiroptera: the Megachiroptera are the Old World fruit bats or flying foxes; the Microchiroptera all the other insect-eating bats.

It has been difficult to study pre-historic bats because fossils of them are not commonly found. They have small, delicate, and lightweight bones that do not fossilize well. There is much yet to be learned about this mammal.

### Structure

As with most species on this earth, the basic body structure reflects their lifestyle. Bat body size is closely related to food habits and modes of flight. The vast majority of species weigh less than 100g (3.53 ounces) and most weigh less than 50g (1.76 ounces) – light enough to be posted as a first-class letter! Those with long, broad wings can lift heavy weights but have slow flight speeds. The insect-eating bats are smaller than others and require a fast, highly maneuverable, light body structure in order to capture their dinner. Bat leg bones are long and slender. They are not made for walking, they are made for suspension or hanging. And, like many other mammals, all bats have tails.

Bats are not known for their beautiful colors or striking patterns. This type of coloration is rare and occurs on few species, mostly those that roost outdoors in trees or in other exposed shelters.

Hair is important and has several functions. It provides insulation and protects the skin. It allows for camouflage and, in some cases, hair contains scent glands and is used for communication. Bats molt once a year; most other mammals molt two times annually. Bats are fastidious in their grooming and spend a great deal of time grooming themselves, using their toenails, their tongues, and their teeth.

### Flight

Bats are totally dependent on flight for their movement and their feeding needs. While some can walk for short distances, they are mostly incapable of other types of travel. Their legs are not made to sustain their weight. Insects are the only other group of animals to possess the capability of sustained flight. This mobility requirement creates high metabolic demands that require high rates of oxygen.

### Wings

The wing membranes of insect-eating bats are very strong and elastic. They have numerous blood vessels in them, so with all those nutrients and oxygen being rapidly pumped to the wings, wound healing is quite rapid and metabolic waste is removed quickly.

The wings of bats are used for a number of purposes. The obvious is to allow them to fly, but they also use their wings to capture insects, and for thermodynamics. The wings can be tightly wrapped around the body (to reduce surface area and heat loss) or can be used as a fan to cool off. Wings also provide the surface area necessary for gas exchange. There is a great deal of carbon dioxide created during flight and the wings serve as the means to remove this from their body.

### Head

The shape generally reflects not only the dietary habits, but also the roosting habits. Although this is true of all mammals, it is very obvious in bats. Head shapes range from long and narrow to short and high or short and flat. Interestingly, the head shape plays into aerodynamic considerations, especially for the insect eaters. The thickness of the muzzle and shape of the braincase reflect bite mechanics and the ability to chew hard food. This becomes apparent when comparing carnivorous head shapes to insectivorous head shapes.

### Ears And Eyes And Nose

The ears of bats vary greatly and the two classes of bats use their ears quite differently. Megachiroptera orient primarily by vision so lack specially adapted ears; this also means they have very large eyes and can see color, unlike the Microchiroptera who are color blind.

Microchiroptera have a variety of ear shapes and sizes – almost as many ear shapes as there are species. This order of bats relies exclusively on acoustic orientation and are so sensitive they can hear the footsteps of small insects (Bats, Fenton, xi). Because they rely heavily on hearing, they have especially small eyes, which are often hidden in their fur. With the eyes, hidden, people have mistakenly believed they were blind, hence the “blind as a bat” saying that we all have heard.

All bats use their sense of smell to collect information. Odor senses are more evolved in bats who feed on fruit, nectar, or blood. The long muzzle, similar to a dog’s nose, is indicative of the bats who use their sense of smell to detect food.

### Facial Foliations

Most of the bats in Wisconsin do not have noseleaves. These are fleshy appendages of skin that ornament the face. They appear leaf-like around the nose, hence their names. The function of these is not known, but they are thought to contribute to acoustic orientation. There are other types of facial foliations, such as flaps and plates of skin not around the nose region and large fleshy lips.

### Reproduction

The reproductive cycles of bats are closely linked to the seasons and availability of insects. Copulation occurs before hibernation and an amazing adaptation with the female uterine mucosa allows the live sperm to be maintained throughout the hibernation period. Ovulation and fertilization occur in spring at the time of emergence or shortly before. This is

because the spring and summer months are too short for females to breed, bear young, and raise them to sufficient size and yet have the ability to sustain themselves through hibernation.

Adult females must wean their babies in a timely manner; this is usually mid to late summer. The timing must be such that babies can eat enough to accumulate sufficient fat stores to survive hibernation. Because of this, reproduction overlaps hibernation.

Sexual maturity is based on local climates and conditions. Most females begin their estrous cycle in August—the mating season. Its beginning is marked by courtship rituals, aerial displays, displays of wing-shaking and mutual grooming, scent marking, and vocalizations.

Normally one litter of one baby is born in a year. Gestation is 40-60 days and can be as long as eight months, depending on the species. The larger the body size, the longer the gestation period. Males and females do not interact during gestation period. This separation reduces competition for food.

Newborns weigh 25-30% of their mother's weight and are usually one-quarter to one-third of the mother's mass. They are born bottom-first so their wings do not get tangled in the uterus. Their thumbs and hind feet are adult-sized at birth. Newborn bats attach to the mammae and remain in this position for a week or two. After that time, the young bats will nurse as well as eat the insects that mom brings home. Nursing lasts one to three months.

The care and feeding of the babies are the exclusive responsibility of the female. Many form nursery colonies that vary from 50 to 5,000 babies. These "baby clusters" roost huddled together while the moms are out searching for food. The very young bats will call continuously when separated from

their mom.

Juvenile bats will begin to fly approximately two weeks after birth. Young bats must master a very sophisticated system quite soon. They must fly in the dark well enough to avoid obstacles and be able detect, track, and capture prey.

### Food Habits And Feeding

Insectivorous bats eat a variety of types and sizes of insects. Some insectivorous bats use smell and taste to determine whether to eat their prey. The most desirable species consumed are considered pests to humans; these are beetles, moths, flies, and mosquitoes. But in the end, the choice of prey is somewhat dependent upon the local abundance.

Bats are creatures of habit and foraging begins a little before or at dusk. They are more active on dark nights with little or no moonlight and less active in rain or high winds and are known to return to the same site to feed night after night.

The teeth structure and shape affect eating habits. Insect-eating bats remove the wings and legs of the insect before eating the body. Wings and legs have little food value and would only add extra weight to the bat, thereby increasing the energy required to fly. Rapid digestion is one reason bats have such gigantic appetites. For example, a Little Brown can eat and 20 minutes later pass the indigestible remains as feces and a lactating Little Brown can eat more than 5,000 mosquitoes a one night. All totaled, a bat that eats its body weight in insects can deposit 5-10% of this as droppings nightly.

Bats have two main types of foraging methods:

1. Aerial. This is the most energy efficient. They forage, on the wing, for extended periods. Insects fly slower than bats the insects, therefore, the insects depend on

quick direction changes to avoid attack.

2. Foliage gleaning. A bat will scan for insects and when one is spotted, the bat lands on the foliage and captures the prey, much like we see birds do.

### Roost Selection And Hibernation

Bats use a wide variety of nighttime roosts and daytime roosts. The most common types of roosts are trees and shrubs; caves; rock outcrops; fallen hollow logs; tree cavities such as those made by woodpeckers or termites; cracks and crevices; holes or pockets in cliff faces (particularly those crevices that slope downward to protect them from weather; and man-made structures, such as buildings.

Bats do not build nests or roosts. Roost selection is dependent upon the environmental nature of the site. The three critical site elements are temperature, humidity, and airflow. Roost sites can be outside or inside and it is not uncommon for bats to occupy boxes originally intended for birds. The reason they need a variety of roosts is they will modify roosting position as daily temperatures fluctuate. Keeping a constant body temperature is exceptionally energy intensive for small animals like bats with small energy reserves.

During the hibernation period, bats may move around or between caves searching for the best temperature and humidity mix. Caves used for daily shelter in the summer may not be used by the same species for winter hibernation. Caves that flood regularly are not a chosen site. The best hibernation places provide a stable temperature and a stable, yet high level of humidity. High humidity is important because bats lose water by breathing.

The number of bats roosting or hibernating in one place will depend on the available space. Air quality is important to them because their guano and urine breakdown to produce ammonia, which in high levels is fatal to bats. Large numbers

can reduce the oxygen level at the site.

Hibernation is a period of prolonged torpor when the body temperature stays close to the temperature of the roost. Bats enter hibernation with 25% of their body weight as fat. They do not cache winter snacks nor do hibernating bats eat. Waking up during hibernation can be costly because it burns a great deal of fuel to raise the body temperature. This is why it is important not to disturb bats during their hibernation period. It could be fatal to them.

### Echolocation And Vocalization

Bats produce a diversity of sound. The range of echolocation differs with the size of the target. It uses discrete pulses of sound rather than a continuous beam. Echolocation expends energy, which is another reason for their large appetites.

Echolocation is ultrasonic, meaning people cannot hear it. Only the Microchiroptera can echolocate.

Pulses and echoes from other bats do not interfere with echolocation because each bat is listening for echoes of its own voice. Most species emit with an open mouth, which is why photos show them with mouths open and teeth exposed. This depiction also explains why people have stereotyped bats as mean or vicious. Bats that emit through nostrils have the elaborate facial ornamentation (noseleaves).

Echolocation is increased as bats close in on their prey – bat biologists call this a “feeding buzz” (Bats, Fenton, 45). Echolocation is so specialized that bats can distinguish one species of insect from another, but unfortunately for the bats, potential prey have the ability to hear the echolocation calls!

### Population Ecology

Bats are found on all continents and on the majority of



islands, except Antarctica. Many species are partly or wholly tropical or subtropical. Because they are nocturnal, they have almost unlimited access to competition-free food resources. They also have few predators because their small size isn't much of a meal for potential predators. However, the most common avian predators are owls, hawks, and falcons.

Bats are more often killed by man-made structures and processes than by animal predators. They have been found impaled on barbed-wire fence; shocked by electrical power lines; hit by autos; and poisoned by toxic chemical use. Bats in agricultural areas can ingest loads of insecticides through the insects they eat. These pesticides store in the body fat and are particularly lethal for females and young. Loss of habitat is also a cause for bat deaths.

## **II. WISCONSIN BAT SPECIES**

[Wisconsin DNR](#) is a good site with quality information on the species in Wisconsin.

## **III. FOLKLORE and MYTHS**

Often myths and folklore are founded in a lack of understanding animal behavior. It is no different with bats. Rabies is commonly thought of as a problem with bats. In the U.S. and Canada, between 1955 and 1985, only 8 people have died from rabies caught from bats. More people die from bee stings and dog bites. (Bats, Fenton, 161)

Bats are not blind. As explained before, their hair may cover their eyes, making it to appear they have no eyes. People believe echolocation is the only resource bats have for hunting, but in reality, many bats see very well and use vision to find food.

The myth that bats get in your hair is because people do not understand bat behavior. A person's hair is not what the bat is after. When people are out on a summer night and surrounded

by mosquitoes, a bat might swoop in to feed on the numerous flying insects. This can be perceived as getting in a person's hair. Another possibility is when a bat is caught in a room. Their flight is stalled by the walls, so to counter this, a bat will swoop low to regain airspeed. If a person is in the room, they assume the bat is headed for their hair.

#### **IV. WHAT CAN YOU DO?**

##### ***Citizen Monitoring Programs***

We have identified 2 bat monitoring programs that are in process or already operational. We encourage you to check them out and if you can, participate in these important projects.

[DNR](#) is developing a citizen-based monitoring program for bats with a good website that will provide descriptions, updates, and ways for folks to get involved.

##### ***Bat House Information***

There are a number of good websites listed in the Bibliography that will have quality and proven-successful bat houses or bat house kits for sale. Several of these sites will also provide books on how to build a proper bat house and how and where to mount the house(s).

Having a successful bat house can certainly lead to a higher quality of outdoor life. The bats will happily rid you of the unwanted mosquitoes and other human-considered insect pests.

#### **V. BIBLIOGRAPHY and RESOURCES**

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[Bat Conservation International](#)