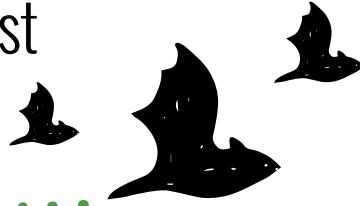


Natural History of Forest & Cave Dwelling Bats



There are more than 1364 species of bats in the world. Most bats live in tropical areas, but bats are found almost everywhere, except Antarctica and a few spots in high altitudes. Roost sites are used by bats for rest, socialization, hibernation, and raising pups. Roost settings and behaviors contribute greatly to the natural history and evolution of bats. More than half of all species of bats use plants as roosts. The rest roost in caves, crevices of rocks, mines, or manmade structures. Some bats roost opportunistically in structures constructed by other animals. This may include bird or insect nests, or cavities formed from fungi or fire, in the trunk of trees.

Night roosts, as opposed to day roosts or hibernacula, compliments a bat's foraging ecology. They are used for rest for saving energy, rest for digestion, refuge from predators, a place to socialize, weather retreat, and for those bats that sit-and-wait for their prey, a perch. Cavity-roosting bats will sometimes select a different day and night roost because of the vicinity to their foraging sites. With all roosts, proximity to food and water sources influence location.

TREE DWELLING BATS:

Trees serve as roost sites for bats in both temperate and tropical areas. Dead trees especially provide ideal cavities for roosting. Their peeling bark provides temporary shelter for many species when escaping inclement weather or predators. Cavity roosts are chosen to help with thermoregulation and as protection from predators or competitor species. The size and shape of the cavity determines the dynamics of the bats in that roost especially in areas abundant with arboreal predators like Australia. The proximity to water also influences the popularity of a roost site. Roosts with multiple emergency escape routes are also popular.

Some species have adapted foot and thumb pads that act as a suction cup, allowing these species to take temporary refuge in large curled leaves in a number of countries around the world. The pads allow them to hold onto the smooth leaf surface like banana leaves. In the Neotropics and Paleotropics, there are about 20 species of bats that roost in "tents". These bats nibble along, or perpendicular to, the vein of broad leafed plants to construct a temporary tent to take shelter under.

Forests have been threatened by human impact which in turn threatens bat habitats, and therefore populations. Understanding roost needs is imperative when analyzing the impact of human disturbance on bat survival. Those pushing conservation efforts rely on this information to make a case for those populations.

In temperate regions of western North America and Australia, most bats roost in trees. However, in areas that few native forests remain, like western Europe and eastern North America, many cavity-roosting bats utilize manmade structures instead. Buildings, bridges, tombs, and bat houses have replaced native tree cavities lost through deforestation and a lack of effective forest management plans.

Some bats have evolved morphological modifications that are advantageous when roosting in small spaces. Pelage with cryptic markings provide selective advantage to those that can be easily identified against their roost's foliage. Fur color provides camouflage against predation. Some bats even rest in a unique posture to blend in with their surroundings.



For more information about bats, visit www.batconservation.org
and www.fs.fed.us/global



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CAVE DWELLING BATS:

Caves are an optimal roosting site for many species on account of the various substrates, temperatures, and architecture. Thermoregulation is the primary factor to choosing a roost site. Depending on the altitude, volume, vicinity to water sources, number of openings, size, shape, humidity, and airflow a cave can be attractive to many species of bats. Caves are often used as hibernacula for temperature regulation and safety from predators. When hibernating, bats lower their internal body temperature significantly to conserve energy. Caves can provide a variety of microclimates, so bats can vacillate from warmer to cooler spots as needed to find ambient temperatures throughout the cold months. Remember bats are mammals and therefore endothermic. The various crevices, cavities, rocks, and crude walls also provide plenty of hiding spots. Cave bats' ability to echolocate has allowed them to radiate into this mostly uninhabited space. Small, flat skull anatomy have been selected for in nature making tight spaces less of an obstacle and more of a benefit.

Caves and other subterranean roost sites are utilized for hibernating, courtship, raising pups, and socializing. Stable climates, protection from predators, and a shield from inclement weather are all appealing benefits to cave environments. Bats have fast metabolisms and high rates of water and heat loss. Flight takes a lot of energy, but bats also have exposed wing membranes and small bodies with a high surface-to-volume ratio. This combination causes bats to lose a third of their body weight each night in water evaporation. Occupying caves with high humidity can slow this constant dehydration. Cave selection might be tough if the bats' foraging site is far from the ideal roosting site because commuting far distances to feed is energetically taxing so the benefits must be measured.

CONSERVATION:

Deforestation, urban sprawl, commercial development, mining, quarrying, irresponsible tourism, and large agricultural expansion are consistently the leading cause of habitat loss and therefore wildlife population decline on every continent. Hunting and predator species introduced by humans are also having significant impacts in some parts of the world. Bats will often have a hibernaculum, summer roost, day roost, night roost near their foraging sites, and/or a separate location for maternal colonies. All of these need to be considered when planning the conservation of a species. Misinformation and lack of knowledge about bats' natural history and benefit to the environment is also affecting bats. In many parts of the world, including the media, bats are given a negative portrayal which does not help individuals or natural resource managers in their consideration of their native species.

FOOTNOTES:

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