

Use of Bats to Enhance Insect Pest Control

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Bats are the most important predator of night-flying insects and consume vast numbers of pests. A single little brown bat can catch 600 hundred mosquitoes in an hour, and a typical colony of 150 big brown bats in the midwest easily eats 38,000 cucumber beetles, 16,000 June bugs, 19,000 stinkbugs, and 50,000 leafhoppers as well as thousands of moths. The 20 million Mexican free-tails from Bracken Cave, Texas, eat 250 tons of insects nightly.

Bats are mammals and belong to the group Chiroptera, which means "hand-wing", as their wings resemble extended arms with fingers and thumbs. They're not rodents, and are more related to us than they are to mice. They mate in the fall and generally have one 'pup' the following spring. If food is scarce bats may re-absorb the embryo and fail to reproduce until the following year. Many bats live for 30 years or more.

Most of the bats in our area of the Sacramento Valley migrate south or to the coast for the winter, where food is more abundant. Others may hibernate in caves where they remain dormant during the winter months. Bats often return to their original roosting sites in the spring when the weather begins to warm and insects become more abundant.

Bats are frequently associated with people and are often found in man-made structures. They prefer places that are warm and dry, and protected from disturbance. This includes behind raincoats or burlap sacks, in rafters, behind chimneys, in old water towers, and in expansion joints under bridges.

Bat house construction and installation

Many people have had success in attracting bats to certain areas by putting up bat houses. The species of bats most likely to occupy bat houses in the central valley include pallid bats, big brown bats, Mexican free-tails, little brown bats, and pipistrelles. The following information describes how to build a structure that meets the needs of bats, and where to place the houses.

Bat house design. There are many different bat house designs, but in general bats prefer larger and taller houses with long crevices. Suggested dimensions are 20 inches wide by 32 inches long, with a 3 inch landing pad extended below (see Figure 1). Chambers should be kept within a 3/4 to 1- inch size. Line the walls with fiberglass window screen to give the bats something to hold on to inside. A loft or attic where mothers can leave their 'pups' while they're out foraging for young is preferred. Build your bat house to be as draft free as possible.

Effect of solar radiation. Bats prefer day time temperatures in their houses to be around 96°F, so exposure to the sun is the most critical and important factor affecting occupancy. Be sure that the houses get at least 4 to 6 hours of sun during the day. Temperature extremes on either side of this number will likely deter bats. In the central valley, it may be best to put the houses facing west for the morning sun, as southeast facing exposures may get too hot in the summer.

Effect of type and age of wood. Studies show that exterior plywood is most preferable to bats followed by cedar, pine, and cypress. This apparent preference for plywood is because its availability in large sheets enables construction of the longer and taller houses that bats prefer. Bats also generally like older wood.

Painting, staining and treating bat houses with guano. Some bat house builders report that bats more readily colonize houses treated with a solution of bat guano diluted with water. Be sure to use bat droppings from the immediate vicinity. Painting and staining bat houses appear to have no effect on occupancy rates.

Effect of height above ground. The higher the better as studies indicate that bats prefer houses at least 21 to 30 feet above the ground.

Mounting substrate. Houses can be mounted on buildings, poles, trees, or other structures. As long as the houses get 4 to 6 hours of sun every day, mounting substrate does not appear to affect occupancy rate.

Location. Bats prefer houses located in agricultural more than in urban areas. They need to drink water every night, so those houses located near water sources (<1 mile) have the highest occupancy rates. Bats also prefer houses that are at least 20 feet from any obstacle, so avoid putting them up in areas directly in front of trees or other objects. They also prefer areas with minimal disturbance. Keep bat houses and owl boxes separate as owls prey on bats. Raccoons may also prey on bats, so if these animals are problems in your area, put a two foot wide metal band around mounting poles or trees.

Observations

Other bat house designs. Some people are also working to increase the size of their bat colonies by expanding existing roosting areas to make room for more bats. Some examples include putting more burlap sacs, or expanding existing cracks or crevices in rafters.

Time until first occupancy. Most houses used by bats are occupied in the first or second season. If you don't see occupancy after the second year, move the house to another location. Bat houses up for 5 years with no activity had less than a 1% chance of being occupied in successive years.

Checking for occupancy. The best way to check for occupancy is to observe the houses at dusk on a warm evening to see whether bats emerge. You can also look for droppings on the ground which are similar in size and appearance to rat droppings.

Artificially introducing bats into houses. Bats can't be introduced into areas where they do not already live. Like honeybees, they have strong homing instincts and probably return to their original roost if you try to move them to another place.

Attracting unwanted bats. Attracting bats to bat houses will not increase the likelihood that they will move into unwanted spaces as they would already be living there if they liked those places.

Health Concerns

Contrary to popular believe, bats are not blind, do not become entangled in human hair, and seldom transmit diseases to other animals or humans. Less than 1/2 of 1% of our colonial bats contract rabies, and when they do, they develop a type of paralysis, fall to the ground and quickly die. There has never been an epidemic outbreak of rabies in bats. If you see a bat on the ground, simply leave it alone and you won't be in any risk of contracting diseases.

Bat droppings do not pose a health threat any more so than bird or cat droppings. Inhalation of dust associated with animal feces of any kind should be avoided.

Removing Bat Colonies

Sometimes bats inhabit areas where they are not wanted. To remove bats, watch to see where the bats emerge at dusk. Then place a piece of fiberglass window screen over the exit hole so that the material hangs at least a foot down. This serves as a one way valve so that the bats can crawl out, but they can't get back in. Avoid sealing areas where bats occur during late spring and early summer when flightless young are often in the roosts.

North American Bat House Research Project

The information presented in this paper on bat house design and placement was obtained from Bat Conservation International (BCI), P. O. Box 162603, Austin, TX 78716, (512) 327-9721. Contact BCI for more information on bat houses, or to become a member of BCI's North American bat house research project.

Figure 1. Bat House Designs

