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Bats

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Wildlife Damage Management Series

BATS

USU Extension in cooperation with:

CNR—Wildlife Damage Management Program
Utah Division of Wildlife Resources
USDA/APHIS Animal Damage Control
Utah Department of Agriculture
The Berryman Institute

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Bats belong to the order Chiroptera which means "hand-wing." They are the only mammal capable of true flight. There are approximately 950 species of bats in the world, making up over 20% of all mammals. Of the 44 species of bats found in the United States, 18 occur in Utah during some time of the year. The big brown bat (*Eptesicus fuscus*) is the most common bat in Utah, and is one of the most widely distributed species in North America (Figure 1).

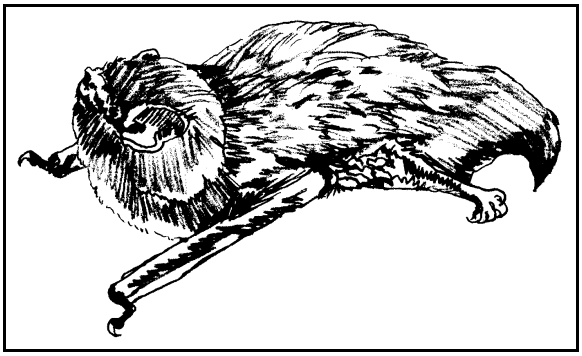


Figure 1. Big Brown Bat.

Bats are intelligent, shy creatures who benefit humans by eating from 30–100% of their body weight in insects each night. In Utah, bats eat only insects, with one species, the pallid bat, also consuming centipedes and scorpions. Bats use echolocation and are a major predator of night-flying beetles, moths, flies, ants, and other bugs, many of which are considered agricultural and timber pests. Thus, bats constitute an important component of Utah's ecosystems.

Human-bat conflicts most commonly result when bats use human dwellings as habitat. Bats rarely attack people, but can transmit two diseases, histoplasmosis (*Histoplasma capsulatum*) and rabies (*Lyssavirus spp*.), to humans. Histoplasmosis, a fungal disease that can cause a flu-like illness, is common east of the Mississippi River but rare in Utah's dry soils. Rabies occurs in less than 1% of bats, but if contracted and not treated, can be fatal. For that reason, any bat that behaves strangely (e.g., active during the day), or can be easily caught, must be suspected of being rabid and should be avoided.

LEGAL STATUS

All bat species are protected by Utah law. It is illegal to intentionally kill bats. Additional Federal protection is extended to bat species on the Endangered Species List.

BIOLOGY and BEHAVIOR

Utah's bats are from two families, Vespertilionidae (plain-nosed bats, 16 species), and Molossidae (free-tailed bats, 2 species). The largest Utah bat, the adult big free-tailed, has a wing span of 17 in. (530 mm) but weighs less than 1 oz. (28 g). The smallest, the adult western pipistrelle, is the size of a hummingbird and weighs 1/10 oz. (3 g). The fur color of each species is a mixture of tans, browns, rust, and black, sometimes accented in white.

Utah bats live in and use a variety of habitats as roost sites. These roosts may include caves and mines, tree foliage, hollow trees, cracks in rock cliffs, and buildings. Most Utah bat species are year-round residents of the state who hibernate during the winter. Some bat species migrate south and remain active all year. Hibernation is a special adaptation bats use to survive cold periods when insects are not available. In late summer, bats prepare for hibernation by feeding heavily and accumulating extra body fat. Most bats are able to store enough fat to last through the hibernation period, which can last 6 months. In the autumn, bats seek out cool environments where they are able to lower their body temperature, breathing, metabolism, and blood circulation to begin hibernation. If repeatedly disturbed during hibernation, the bats may starve to death before spring. Because good hibernation sites are becoming more scarce, thousands of bats, of several species, may gather in a single cave or abandoned mine. In 1992, nearly one million bats were discovered hibernating in a single abandoned iron mine in Northern Michigan.

Bats that hibernate usually mate in the autumn. Bats that migrate, mate in the spring. The gestation period for most bats begins in early spring and ranges from 50–90 days, depending on the species. In the late spring, female bats gather in large nursery colonies where young, called pups, are born in May or June. Most species have only one pup per year; a few species have twins. Tree-roosting red bats *(Lasiurus spp.)* frequently have quadruplets. Pups are blind and helpless at birth, but grow rapidly and are able to fly in 3–6 weeks. The average life span for a bat is 10–20 years. Natural enemies of bats include hawks, owls, cats, raccoons, snakes, bobcats, ringtails, and weasels.

BAT PROBLEMS

Many bats prefer open cavities such as house attics for nursery colony sites. These cavities protect the bats from predators, and offer the warmth that allows the newborn bats to use their energy for rapid growth. Large colonies can deposit sizable piles of droppings (guano) which can cause a strong, musty odor and stain ceilings and walls. In addition, bats can be noisy because of scrambling and squeaking. Bats do not chew entrances but can get into buildings through any existing openings 1/4 in. (5 mm) in diameter or larger.

Bats may also get into rooms through open doors and windows, loose or torn screens, or gaps around attic doors. These bats are often lost youngsters just developing their flying skills. A bat flying around in a room may appear to be diving at people. In fact, it is merely swooping downward to regain flight speed and control which were lost when it slowed to make the turn at the end of the room. Opening an outside door, or window and screen, will allow the bat to exit. However, if it lands, a jar or other container can be placed over the bat and a piece of heavy paper or cardboard slid under the mouth of the container, trapping the bat inside. The bat can then be released outside away from children and pets. **Never attempt to touch bats with your bare hands.**

If a person is bitten by a bat, they should get medical treatment immediately. The wound should be washed with soap and water, and your doctor and the health department should be contacted. Every attempt should be made to capture the bat alive using the technique described above. The captured bat should then be taken to the health department for rabies testing. Occasionally pets catch bats. For this reason, keeping pets vaccinated against rabies reduces the risk to humans.

CONTROL

IDENTIFICATION OF DAMAGE

The first step in controlling bat-human conflicts is to determine what animals are causing the problem. Scratching, squeaking noises in walls, attics or chimneys can be caused by bats, birds, mice, squirrels, or raccoons. All of these animals may use human dwellings for refuge at some time if the opportunity presents itself. About half of Utah's bat species enter and use human dwellings. Bats may occupy dwellings for an entire season, or briefly during spring or fall migrations.

Evidence of bat activity may first appear as a brown stain on the ceiling or walls of a dwelling, and an accompanying musty, urine-like odor. The homeowner may also want to check for leaks in the roof which can

cause similar stains. If the attic or crawl space can be examined, live bats may be observed flying or roosting on the walls or beams. If no bats are present, the area should be examined for droppings.

Roosting bats tend to gather in clusters near the roof peaks causing their guano to collect in piles beneath these high points. Guano may also be found clinging to the rafters and roof beams. Rodent droppings will not be in piles or on rafters, and will occur more commonly along the base of walls. In addition, bat droppings are solid brown and666 crumble easily because they contain insect fragments. Rodent droppings contain plant fiber and do not crush easily.

Several types of small arthropod insects are commonly found with large colonies of bats in buildings. Some of these insects live on the bats themselves, while others feed on the guano. These bat ectoparasites rarely bite humans or pets, and do not cause diseases. Without bats or guano, the insects simply die.

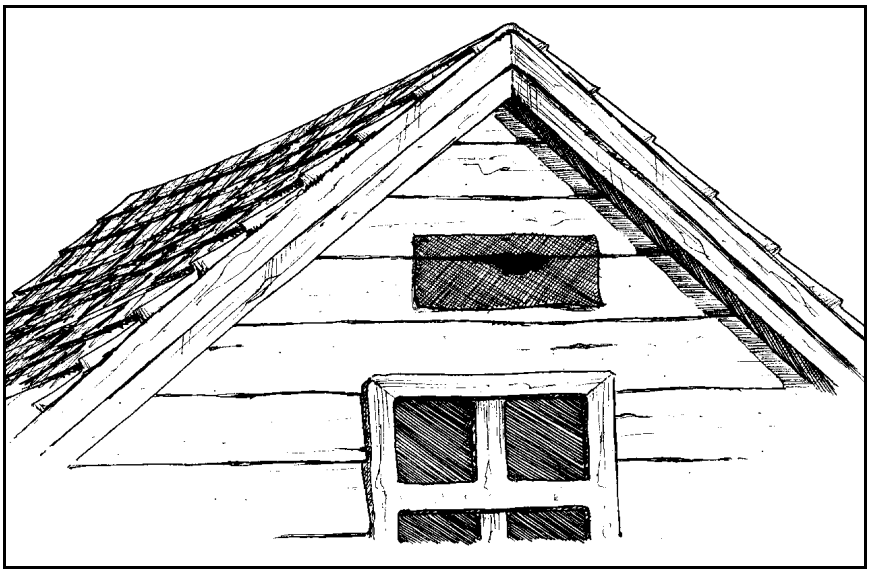


Figure 2. Bird netting is placed over the hole, and stapled tight along the top edge and down both sides. The bottom is left open. When the bats leave they hit the netting and crawl down the siding and out the open bottom. When they return they are unable to fly back up under the netting, and cannot return to their roost.

To determine how and where bats may be entering buildings, the outside of the building should be examined for small gaps in siding, openings around chimneys, or where walls meet the roof. Bats prefer entrances 12 ft. (3.6 m) up or higher, but will use any small natural gap they can fit through. When the bats emerge at dusk to feed, watch the building and note where they are exiting. Small accumulations of guano on the ground may provide another clue to the whereabouts of a difficult to locate entrance.

HABITAT MODIFICATION

The best way to stop bats from roosting inside dwellings is to locate and seal the cracks and holes the bats are using to enter the house or rooms. Entrance holes should not be sealed when flightless young are present (late May through July). Excluding the parents will starve the young, and could create a subsequent odor problem.

Because most bats in Utah vacate their roosts in the fall, this is the best time to close the openings. A variety of materials, such as caulk, self-expanding foam sealant, foam rubber, fiberglass, oakum, or steel wool can be used to close any openings. Metal screening, small mesh (<1/4 in. diameter) wire hardware cloth, or tar paper can be tacked over larger holes. Corrugated steel or Spanish tile roofs can be blocked at the edges with coarse steel wool or crumpled balls of metal screening. Since steel and tile roofs can accumulate considerable heat they should not be sealed air-tight. To keep bats and birds out of chimneys, spark arresters or bird screens may be installed.

When eviction cannot wait for the fall season, an alternative exclusion technique can be used. Heavy plastic sheeting or quarter-inch or smaller polypropylene fruit-tree bird netting (purchased at garden shops or hardware stores) can be hung, using duct tape or staples, several inches directly above the exit holes. The netting should extend at least 1 ft. (350 mm) to each side and below the exit hole (Figure 2). The sides may be attached to the buildings, but the bottom must hang free permitting the bats passage to the outside. They will have no trouble dropping down to leave, but will be unable to reenter the building through the covered hole. Leave the netting in place for at least 4–5 days because bats do not always go out each night, especially if the weather is cool and rainy. When all the bats have exited, remove the excluders and seal the holes using materials described earlier.

If the roosting area is to be cleaned of guano droppings, a mask should be worn to block dust particles as small as 2 microns. If possible, the area should be moistened as well as ventilated while working. Deodorizing chemicals can be sprayed on urine soaked areas. In addition, area fumigation with a total release pyrethrum-based aerosol may be an appropriate solution for arthropod knockdown within an enclosed space, but only after bats have departed. For long-term arthropod control, lightly dust appropriate surfaces (affected attic beams, soffits) with boris acid powder or diatomaceous earth. Carefully read all product labels before using any pesticide.

REPELLENTS

Unfortunately, no ultrasonic or chemical repellents appear to be even moderately effective in permanently eliminating bats from their roosts in buildings. The Environmental Protection Agency (EPA), which regulates all chemicals used on wildlife, permits only one chemical, naphthalene (crystals or flakes) as a bat repellent for indoor use. Naphthalene, applied at the rate of 5 lb. (2.3 kg) per 2000 ft^3 (60 m^3) of attic space, will create a strong disagreeable odor for a short period of time. This may help encourage the bats to leave. However, caution should be taken because such concentrations of fumes can affect humans. All exit holes should be sealed as soon as the bats leave or they will return when the naphthalene fumes evaporate

Aerosol dog and cat repellent may discourage bats from using a particular outdoor roosting spot for up to several months. The spray may be applied to the roost when the bats are away, but never on the bats themselves.

POPULATION MEASURES

There are no chemicals or toxicants registered for lethal control of bats. In the past, the Environmental Protection Agency permitted the use of chemicals such as DDT and RoZol (chlorophacinone) to kill unwanted bat populations. All such registrations have been withdrawn.

BEHAVIORAL APPROACHES

Providing bats with alternative roosts can encourage them to remain in the area and reduce their mortality when they are excluded. Potential roost sites may include hollow trees, unused barns or out-buildings, providing the roofs are intact and large openings are closed to provide additional protection from inclement weather. In addition, bat houses can be constructed and placed around the property. Ideally, alternative roosts should be prepared before the bats are excluded from the original site. Plans for bat houses are available from bat books, through your local Utah Division of Wildlife Resources, or local Utah State University County Extension Service Office.

ADDITIONAL SOURCES OF INFORMATION AND ASSISTANCE

For further information, contact:

Utah Division of Wildlife Resources, 1596 West North Temple, Salt Lake City, UT 84116-3159. Phone (801) 538-4700.

USDA/APHIS Animal Damage Control, P.O. Box 26976, Salt Lake City, UT 84126 . Phone (801) 975-3315.

Extension Fisheries and Wildlife Specialist, Department of Fisheries and Wildlife, Utah State University, Logan, UT 84322-5210. Phone (801) 797-3975.

Utah Department of Agriculture, 350 North Redwood Road, Salt Lake City. UT 84116. Phone (801) 538-4171.

Berryman Institute, Utah State University, Logan, UT 84322-5210. Phone (801)797-2436.

References and books on bats:

Fenton, M. B. 1983. **Just Bats**. University of Toronto Press. Toronto, Can.

Fenton, M. B. 1992**. Bats**. Facts on File, Inc. New York, NY.

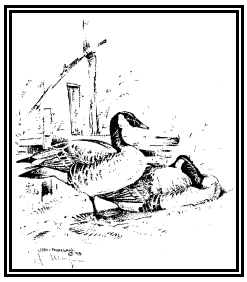
Graham, G. L. 1994**. Bats of The World.** Golden Guide. Golden Press. New York, NY.

Greenhall, A. M. 1982. **House Bat Management.** United States Department of the Interior. Resource Publication 143. U. S. Government Printing Office. Washington, DC.

Tuttle, M. D. 1989. **America's Neighborhood Bats**. University of Texas Press. Austin, TX.

Bat Education Organizations:

Bat Conservation International. P.O. Box 162603. Austin, TX. Phone (512) 327-9721.



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