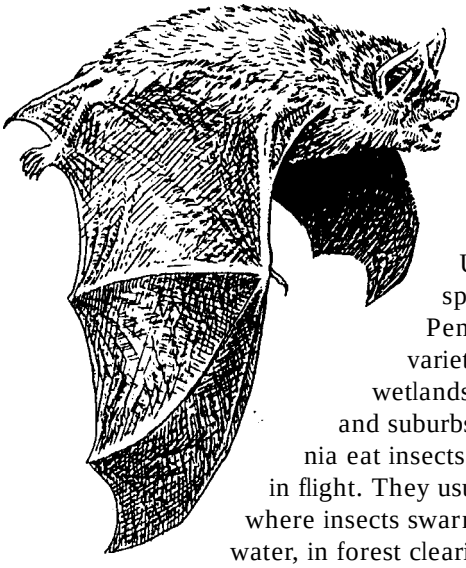
Bats



Nearly 1,000 species of bats are known throughout the world, and approximately forty species inhabit the United States. Eight species are common in Pennsylvania. Bats live in a variety of habitats, including wetlands, fields, forests, cities, and suburbs. All bats in Pennsylvania eat insects and capture their prey in flight. They usually feed in open areas where insects swarm, such as over open water, in forest clearings or farm fields, and around street lights. Bats are beneficial because they are efficient predators of insects. A single bat, for instance, may consume as many as 2,000 insects every night.

General Biology

Because flying insects are not active during the winter months, bats must either hibernate or migrate to survive the winter. Bats that remain in Pennsylvania throughout the year gather in caves and abandoned mines to hibernate. Hibernating bats survive on a very small amount of stored fat during the five- to six-month hibernation period.

Bats arouse from hibernation during March and migrate to their summer roosts in April. Pregnant females seek sheltered roosts for their pups in buildings, tree cavities, and tree foliage. In some species, females gather together prior to giving birth and form maternity colonies. Each bat gives birth to one to two pups in late May and early June. By mid-July, the pups are able to fly and begin hunting insects on their own. The females, however, continue to nurse their pups until they are able to adequately feed themselves.

Reducing Bat Conflicts

Bats and humans may come into conflict when a lone bat flies into a building or when a maternity colony roosts in a building.

A single bat in the house

Individual bats occasionally enter houses during summer evenings. Fortunately, these incidents can be dealt with quite easily. A bat flying in the house will usually circle a room several times in search of an exit. The best method for getting a bat out of the house is to allow it to find its own way out. Chasing or swatting at the bat will cause it to panic and fly erratically around the room, which needlessly prolongs the incident.

If you encounter a bat flying in a room, follow the procedure below:

- Shut all doors leading into other rooms to confine the bat to as small an area as possible.
- Open all windows and doors leading outside to give the bat a chance to escape.
- Remove pets from the room, leave the lights on, stand quietly against a wall or door, and watch the bat until it leaves.
- Do not try to chase the bat towards a window. Just allow it to get its bearings, and within ten to fifteen minutes the bat should settle down, locate the open door or window, and fly out of the room.

If the bat tires and comes to rest on a curtain or wall, you can easily remove it without directly touching it.

- Put on a pair of leather gardening or work gloves.
- Place a container, such as a coffee can or large plastic bowl, over the bat as it rests on the wall. At this point, the bat is probably exhausted and disoriented and will not fly as you approach it. (If it does take flight, follow the procedure for flying bats.)
- Slide a piece of rigid cardboard between the container and the wall to trap the bat. Hold the cardboard firmly against the container and carry the container outside.
- Place the container (facing away from you) on a secure surface above the ground—such as on a ledge, or against a tree—and slide away the cardboard. The bat will not fly right away, so releasing it above the ground keeps it safe from predators until it has its bearings. Unlike birds, most bats must drop from a perch and catch air under their wings before they can fly.

Occasionally, big brown bats may overwinter in a building and arouse during warm weather in mid-winter or early spring. Bats found in a building at this time are usually underweight and need special care to survive. If you find a bat in a building during the winter, capture it as described above, keep it in an escape-proof container in a warm, dark place, and call a local wildlife rehabilitator.

If you have recurring problems with bats entering your home, you may want to inspect your attic to determine if you are housing a bat maternity colony.

A bat colony in the house

The maternity colonies of the little brown bat and the big brown bat once roosted in large hollow trees, but the settlement of Pennsylvania resulted in the loss of many of these trees. Over time, these species have adapted to roosting in buildings. These bats have only one or two pups

each year, so the protection of maternity colonies is important to the survival of these beneficial mammals. Fortunately, there is a safe and effective procedure for humanely removing a maternity colony from a building. This procedure, called bat-proofing, does not require hiring a professional pest-control service or using chemicals. Unlike other methods that may temporarily ward off bats, such as using ultrasonic noise-makers, shining a light, or playing a radio in the attic, bat-proofing is a permanent solution to any bat problem.

Description of Damage

Bats do not damage or destroy property by gnawing or chewing, but their droppings may cause odor problems. Also, homeowners are often uncomfortable with bats in their houses.

Damage identification

Correct identification of the animals causing a problem is always the first step in solving the problem. For instance, squirrels and mice in an attic make scurrying and squeaking noises that sound like bats, and chimney swifts look like bats when they fly out at night. The best way to tell if you are housing a bat colony is to look for roosting bats or bat droppings in your attic. During the day, bats usually roost in narrow crevices in the attic walls and between the rafters. When you enter the attic, the bats will quickly retreat out of sight (rather than take flight).

If you are uncomfortable entering the attic when bats may be present, you can inspect the attic at night for bat droppings. The dry, black droppings are about the size of a grain of rice and accumulate in piles below areas where the bats roost. Mouse droppings look similar, but they would be scattered in small amounts throughout the attic. If the colonies are large or have been in the house for many years, the droppings can be quite deep on the attic floor. Bat droppings are very dry (urine evaporates quickly in hot attics), so the presence of bats usually does not contribute to structural deterioration or wood rot.

Damage Control: Bat-proofing

Bat-proofing a building involves sealing the bats' entrance holes and providing the colony with an alternate roost, or bat box. To bat-proof your home, (1) stage a 'bat watch' to identify bat entrances, (2) seal the holes to prevent their entry, and (3) provide an alternative roost, or bat box, for the colony to occupy.

Identifying entrances

The first step in bat-proofing is to locate the holes that bats use to enter and exit the attic. Bats commonly enter at points where joined materials have warped or pulled away from one another, such as louvered vents with loose screening, the roof peak, and areas where flashing has pulled away from the building.

To identify which of these areas provide access, look for bat droppings on the side of the house below a suspicious crack or crevice. Entrances that have been used for a long time may have a slight brown discoloration at the edges. Inside the attic, bat droppings often accumulate below bat entrances and exits. During the day, turn off the attic lights and look for openings where outside light is visible. Bats may be entering through these openings.

Staging a bat watch can also help you locate bat entrances. At dusk, station a person on each side of the building and watch as the bats exit the building. Once the first bats are seen leaving, focus on that area of the building and watch for other exiting bats until you have pinpointed their exit(s).

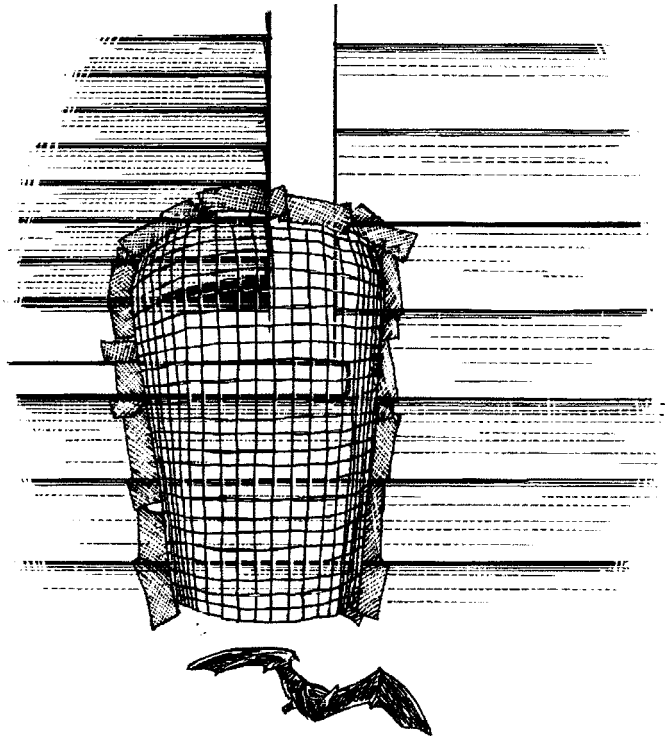
Sealing entrances

Once the bat entrances have been located, the next step in bat-proofing is to seal these openings. Use window screening or hardware cloth to cover louvered vents or large gaps and cracks in the building. To fill smaller cracks, use expanding foam insulation or caulking compound. After hardening, these can be trimmed or painted. Unlike mice, bats will not gnaw new holes in the building, so sealing the existing holes will keep them out. Most bat-proofing materials can be obtained in local hardware or building supply stores. A listing of suppliers of bat exclusion products is included at the end of this pamphlet.

Timing of bat-proofing. One important aspect to consider before bat-proofing your building is the timing of the procedure. *Because pups remain confined in the roost until they are old enough to fly, bat-proofing should never be completed from late May through mid-July. Otherwise the young, flightless bats would be trapped inside the building.* Bat-proofing during these months would result in potential health risks and obvious odor problems as the young bats die and decay inside the building. Also, the pups may enter human living areas in search of a way out, and females may frantically attempt to reenter the building to rejoin their young.

Occasionally, a homeowner may encounter the difficult situation of bat-proofing while the pups are still confined to the attic. This can happen when a roofing or siding contractor discovers bats at the worksite but cannot stop the project. In this case, the contractor should complete the project, but allow one of the bats' access points to remain open, so that nursing females can enter and exit the attic. Then, after the pups are able to fly, a one-way door can be installed to evict the bats. Once all of the bats have left the attic, the remaining bat entrance can be sealed.

The best time for bat-proofing is in the spring, before bats enter the roost, or in the fall, after the bats have left. If bat-proofing must be done while bats are inhabiting the building, it should be done by installing a one-way door *after mid-July when the pups are able to fly*. One-way doors, which are discussed later, are designed to allow bats to leave and not reenter a building.



Steps in Bat-Proofing

January–April: Seal entrances before bats return to the building.

May–August: Watch bats to identify entrances. *Do not seal the openings.*

August–October: Install one way door(s).

November–December: Seal entrances once bats have left the building. (If you suspect bats are hibernating in the building, install a one-way door in September or October)

One-way doors are pieces of mesh fastened over a bat entrance to form a long sleeve or tent. These doors allow bats to exit at night but prevent their reentry at dawn.

Installing One-way Doors

1. Choose 1/4 to 1/2 inch mesh (wire or plastic) to cover the bats' points of entry. Cut the screening so that it covers the width of the hole and extends approximately 3 feet below the hole. The screening should project 3 to 5 inches clear of the hole, so that the bats can crawl between the screen and the building and exit at the bottom.
2. Secure the mesh at the top and sides with duct tape or staples and leave the bottom open.
3. Leave the door in place for at least three to four days, or until you are sure that all bats have left the building, then remove the one-way door and permanently seal the opening.
4. Again, never use a one-way door from May through August, or young bats will be trapped inside and die.

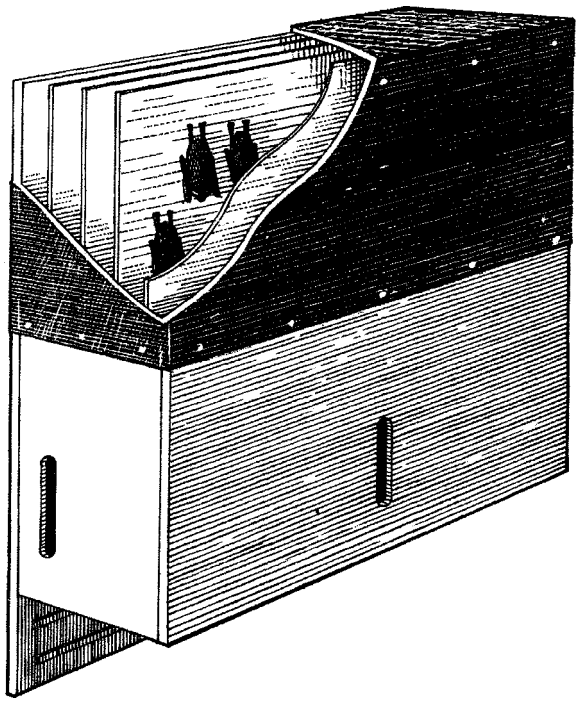
Providing an alternative roost

Bat-proofing has two potential drawbacks. First, exclusion can be very stressful for a maternity colony. Once excluded, the bats may move into a nearby building, where they may be expelled again, or even exterminated. Also, displaced colonies will not relocate in buildings that already house other maternity colonies. If a displaced colony cannot find a new roost, it may leave the area. Over time, excluding bat colonies can contribute to serious declines in local bat populations.

The second drawback is that homeowners may find it difficult to completely bat-proof their home. Bats can crawl through a crack as small as 1/2 by 1 1/4 inches, so persistent bats may find a way to reenter their traditional roost.

Bat boxes may solve both of these problems because they provide substitute roosting sites for maternity colonies. With bat boxes, the bats get a safe roosting site outside the home, while homeowners still benefit from the bats' control of insects. For detailed information on building bat boxes, refer to the Penn State publication *A Homeowner's Guide to Northeastern Bats and Bat Problems* available from county extension offices in Pennsylvania.

Bat box design. A bat box must be large enough to house a maternity colony. Therefore, boxes should be at least 7 inches deep, 24 inches wide, and 12 to 24 inches in height (depending on the size of the colony). Inside the box, several baffles divide the interior space into multiple roosting crevices. The crevices should measure from 3/4 to 1 inch in depth. All interior surfaces, including the baffles and the landing board below the box, should be roughened with saw cuts to provide footholds for bats. Bat boxes should be stained dark brown to enhance the box's ability to absorb sunlight.



Bat box placement. Bat boxes in Pennsylvania should face southeast or southwest, so that they receive at least seven hours of direct sunlight per day during the spring and summer. A bat box intended to house a displaced maternity colony should be placed on or very near the building from which the bats were evicted. Place the box on a wall or chimney, or on a pole within 10 to 20 feet of the building. The box should have at least 3 feet of open space under it, so that bats can enter and exit from the bottom. Do not place a bat box in an area that is heavily trafficked by people, or anywhere that droppings from the box will pose a problem. Bat boxes also can be placed on trees—as long as the boxes will receive the required seven hours of sunlight. Whether on a building, pole, or tree, bat boxes should always be placed at least 10 to 15 feet above the ground.

Once the bats move into the box and establish it as their roost, the box can gradually be moved farther away from the building. This should be done in the fall or winter when bats are *not* present. Moving the box more than 20 yards per year is not recommended.

Timing of installation. Ideally, bats should be allowed to familiarize themselves with the bat box before being expelled from their traditional roost. This can be done by installing the box in the winter or spring, then allowing the bats to remain in the attic over the summer. Bat-proofing should be completed in the fall after the bats have left the building. The following spring, when the bats return, they will not be able to get into the building, but they will be familiar with the bat box and ready to inhabit it. This timing of events makes the task of bat-proofing easier for the homeowner, because the bats should be less persistent in trying to reenter the house.

Bat Box Timing

January–April: Install a bat box near the building in a location where it receives seven hours of sunlight.

May–August: Allow bats to remain in the building and watch them exit at dusk to identify openings.

September–April: Seal openings.

Legal Status

Because bats feed on insects, they are beneficial and should not be needlessly destroyed. Bats are protected by Pennsylvania game laws when flying and hibernating. However, if bats are causing problems in a building, it is left to the homeowner's discretion to solve the problem.

Toxic chemicals should *never* be used for bat control because they cause dead and dying bats to be scattered throughout the building, yard, and neighborhood, thus increasing the chance of contact between bats and people. *Currently there are no toxicants registered for bat control in Pennsylvania.* Chlorophacinone, also called tracking powder or Rozol, can no longer be used legally for bat control. Naphthalene, also called moth balls or moth flakes, is registered as a bat repellent. This repellent may be useful when bats are in very confined areas such as crawl spaces or between walls, but is not very useful in large open areas such as attics. Also, bats will recolonize a building once the repellent wears off.

Public Health Concerns

The incidence of rabies in the wild bat population is low, and the spread of rabies within individual colonies appears to be very rare. Surveys of wild bats in the United States and Canada indicate that the incidence of rabies in clinically normal bats is less than 0.5 percent. However, of the sick, dead, or suspect bats submitted for testing in Pennsylvania, roughly 5 percent test positive for rabies. Thus it is import to take precautions when handling grounded bats.

Rabies Precautions

Bats of all sizes will bite in self-defense, but they almost never attack people. If you must handle a bat, take the following precautions to minimize the chance of being bitten.

- Wear leather gloves and scoop the grounded bat into a container to prevent the bat from biting you.
- If you are bitten by a bat, immediately wash the bite with hot, soapy water and call a physician. If there is any possibility that you have been infected, the physician will recommend rabies shots. Today, most people receive the rabies vaccine in a series of five relatively painless shots in the arm administered over a one-month period.
- If the bat is captured, it should be killed (without destroying the head), placed in a jar or plastic bag, and then refrigerated (not frozen). For advice on submitting specimens for testing, call the Pennsylvania Department of Agriculture, Bureau of Animal Industry Laboratory at (717)-787-8808.

Summary

With a little patience and effort, you can exclude bats from your building permanently and successfully, without the expense of hiring a professional pest-control service. With a bat box, you can take advantage of the bats' ability to control insects, while making a valuable contribution to the protection and management of these beneficial mammals.

For more information on bats, and further details on bat boxes and bat-proofing, refer to the Penn State booklet *Homeowner's Guide to Northeastern Bats and Bat Problems*, and the video "Bat-Free Belfries: A Guide to Bat-proofing" available at your Pennsylvania county extension office.

Bat-proofing Materials and Suppliers

Materials for Sealing Holes

Expanding foam insulation and caulking compound are available from most building supply stores. Expanding foam insulation comes in an aerosol can and can be sprayed into cracks and crevices. The foam expands to fill the opening then hardens so it can be trimmed or painted.

Flashing Repair

"Flashband" is a self-adhesive, aluminum-faced sealant that permanently adheres to almost any surface. It can be useful for sealing roof junctions, loose flashing, eaves, and gaps between chimneys and walls. It is easily applied with no special tools, and resists water, rust, mold, and mildew.

Copper Mesh

"Stuff-It" is a copper gauze product useful for plugging holes that are too big to caulk and too small to warrant carpentry, such as openings around eaves. It will not rust, stain, or degrade.
Allen Special Products, Inc.
Box 605
Montgomeryville, PA 18936
(800) 848-6805

Chimney Caps

Critter Control
9435 E. Cherry Bend Rd.
Traverse City, MI 49684
(800) 451-6544
http://www.crittercontrol.com
(Chimney caps and other supplies for exclusion)

One-Way Doors

Metal hardware cloth, window screening, and plastic "bird-netting" are available from most garden supply stores. Any material used for one-way doors should be of 1/4 to 1/2 inch diameter mesh size. (Mesh diameter is measured on the diagonal, from corner to corner.) Larger mesh sizes will allow bats to crawl through and reenter the building. There are also several companies that carry plastic bird netting especially designed for bat exclusion. These companies are listed below:

InterNet, Inc.

4299 7th Ave.
Minneapolis, MN 55428
(800) 328-8456
http://www.internetplastic.com
(Netting plus fastener clips)

Wildlife Control Technology, Inc.

2513 Girdwood Rd.
Timonium, MD 21093
(410) 252-4635
(Bat Net)

Wildlife Management Supplies

Critter Control
9435 E. Cherry Bend Rd.
Traverse City, MI 49684
(800) 451-6544
http://www.crittercontrol.com
(Chimney caps and other supplies for exclusion)

Controlling Bat Parasites

"Diatomaceous Earth" scratches the outer cuticle of insects as they crawl through it, causing them to die of dehydration. It may be useful in eliminating the external parasites of bats from an attic after the bats have been evicted. This product is organic, non-toxic, and works on many other insects.
Biocontrol Network
5116 Williamsburg Rd.
Brentwood, TN 37027
(800) 441-2847
http://www.biconet.com

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College of Agricultural Sciences • Agricultural Research and Cooperative Extension

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