Reports Needed

Each spring we present a synopsis of bat house findings based on Data Report Forms completed by Research Associates. These results are the basis for evaluating new bat house designs, materials, and locations. Now that the summer roosting season is over, we need your reports!

The Spring 1996 issue of The Bat House Researcher included revised report forms. If you joined since then, you should have received the appropriate forms with your other Research Associate materials. Please use only the 1996 data form; it covers important bat house characteristics not previously included. Also, please use one form per bat house (photocopy forms if necessary). We need your data whether or not your houses were successful, and we are especially grateful for photos that illustrate design and placement.

Please submit your reports before the January 15, 1997 deadline, and try to answer all questions as precisely as possible. Your data is essential for understanding bat preferences.

Observations from Successful Bat House Builders in Exceptionally Cool Climates
Jim Kennedy

Charles Robertson, a Research Associate and bat excluder in Toronto, Ontario, has been having consistent success getting big and little brown bats (Eptesicus fuscus and Myotis lucifugus) to move into bat houses in conjunction with exclusions he performs. Robertson has experimented with several designs but has the most success with bat houses custom built to fit under the eaves of homes.

Robertson uses several design modifications to maximize heat retention in cool Toronto summers. His bat houses have no external vents, since there is no danger of overheating in his area, and all external seams are well caulked. The houses are usually mounted high on the south side of the buildings, near the eaves. Sun-warmed air rises up the building face and gets trapped by the eaves; stored heat is radiated back at night.

His hinged floor design also aids in heat retention: the floors close off the bottom except for a 3/4-inch gap at the back for entry. One disadvantage to the bottoms is the necessity to open them and clean accumulated guano more often, although guano accumulation can be reduced with sloping bottoms. Other Research Associates have also noticed far more parasites in bat houses with bottoms than in those without. Further, the closed bottoms make visual observations more difficult. A better solution for increasing warm areas in a bat house may be to build taller houses that offer more dead air space near the tops or to restrict crevice width at entry points.

Another Toronto Research Associate, Dianne Devisor of the Metropolitan Toronto Zoo, is coordinating a large bat house project in Ontario and Quebec. With 71 bat houses reported, the project’s latest overall occupancy rate is 32.9%. Devisor reports that the
tall, multi-chambered bat houses are used most often, and that sun is critical. Originally project participants were told to leave bat houses unpainted, but now they are instructed to paint them a dark color to raise temperatures and increase occupancy.

In Cascade, Idaho, Bill and Jenni Blair discovered that their bats preferred unvented houses over vented ones [The Bat House Researcher, Spring 1995]. After success with bat houses attached to the south side of their cabin, additional houses were mounted on poles to receive more sun. The bat houses are also dark brown and constructed as the previous ones, but a 1/4-inch restriction was added to each of the 3/4-inch crevices. This allows the bats a 1/2-inch access opening, reduces outside air exchange, and eliminates the need to open a hinged bottom to remove the guano. Their bats consistently prefer the warmest houses, and the Blairs will continue to monitor them.

Gary Sproule of Keswick, Ontario has five occupied bat houses, with about 50 big brown bats in two. Twenty-three bats (which produced 20 offspring) were even attracted to one painted light brown. Sproule’s boxes are mounted on a brick building under the eaves. Although the brick is tan, the building itself apparently provides enough thermal mass to moderate temperature fluctuations, radiating heat to the bat house.

Sproule’s bat houses all have partial bottoms for heat retention, but he reports that his bats move from house to house whenever the guano and parasites build up. He is also experimenting with electrical heat tapes (the kind used to prevent water pipes from freezing) for added warmth. His early tests show that heated bat house temperatures can be up to 28°F warmer than the ambient temperature. He hopes that with this additional heating, the bats will be encouraged to overwinter in his bat houses. Use of supplemental heating in the summer months is also worth testing.

The success of these northern bat houses illustrates the importance of maximum heat retention. Specific guidelines for temperature are listed in the “Key Criteria for Successful Bat Houses” section in the latest edition of The Bat House Builder’s Handbook.

Expanding the Economy Bat House

The 1996 revision of The Bat House Builder’s Handbook offers two new “economy” bat house designs. These houses work best when mounted on a building, especially in northern areas (see previous article, this issue). When properly caulked, painted, and mounted with consideration to sun exposure and habitat, even this simple design can attract nursery colonies. If the roost becomes crowded, the economy houses can easily be expanded.

Expanding an existing bat house during the bats’ winter absence is simpler and cheaper than replacing it with a larger house. Also, the bats are already accustomed to that house. Just

Lee Christerson’s back-to-back economy bat houses are in prime habitat at this Wisconsin site. The houses were used by several little brown bats in the first year, but could use the added stability of a second pole.
Cool Climate Mounting for Back-to-Back Economy Houses
(note the absence of vents in this diagram.)
Step 1—Cut a 3/4" access slot in the back of each house, the width of
the bat house and about 10" from the bottom edge.
Step 2—Cover the back of one of the houses with plastic mesh, not
blocking the access slot.
Step 3—Attach sides, creating a 3/4" roosting space between the two
houses. Caulk all exterior seams.
Step 4—Attach roof, allowing 1 1/2" overhang all around, caulking
well.
Step 5—Paint dark to black and install on poles in full sun.

Warm Climate Mounting for Back-to-Back Economy Houses
Follow steps 1 through 2 as in cool-climate house on left.
Step 3—Attach short 3/4"-inch thick horizontal blocks to top and bottom
of each side, leaving a 3/4" roosting space between the two
houses.
Step 4—Attach sides over the horizontal blocks, creating darkness in the
new roosting space while maintaining extra ventilation.
Step 5—Attach roof, allowing a 3" overhang to provide midday shade.
Step 6—Paint medium to dark and install on poles.

What if You Want Bats in Your Attic?
Jim Kennedy

Each year, BCI staffers field hundreds
of inquiries about excluding bats from
buildings. Occasionally, however, we
get a call from somebody wanting to
know how to increase the numbers of
bats in a building. Often, these are
abandoned buildings used for inter-
pretive purposes, structures housing
dangered or threatened species, or
buildings owned by bat-loving people
who simply realize that the benefits of
bat residents can outweigh drawbacks.
There are several things you can do to

cut a plywood panel the size of the
front and screw it to another set of
spacers cut to the original dimensions.
The resulting new crevice width
should fall within the 3/4 - to 1-inch
range. Don’t forget to add plastic net-
ting to the new roosting surface, and
caulk all exterior joints thoroughly
before painting. The optional roof,
mentioned under “Construction Pro-
cedure” in the plans in The Bat House
Builder’s Handbook, is strongly recom-
mended for multiple-chamber econo-
my bat houses. Be sure to adjust the
width of the roof to accommodate the
new section.

You can build a good, but simple,
nursery house by mounting two econ-
omy bat houses back-to-back with an
additional 3/4 -inch space between.
This three-chamber house should be
protected by a roof and mounted on
poles. The diagrams above show this
house in two designs: unvented (for
cooler climates), and vented.

Additional roosting crevices can be
created for almost any bat house by
adding another panel to the exterior.
The California Waterfowl Association
is currently considering addition of a
bat roosting chamber to one side of
their plans for wood duck boxes. Of-
ten the simplest ideas prove to be the
most successful.
accommodate more bats, while minimizing problems from guano or noise.

Consider the bat’s entry and exit points. Usually these are louvered vents, loose trim, or gaps in siding. Bats may use an open window or vent if attic ceilings are high enough to avoid predators. Otherwise, they typically use 3/4-inch crevice entries.

Roosting bats, particularly nursery colonies, need dark crevices with fairly high temperatures. Indeed, the number of adequate warm crevices may be the factor limiting the colony’s growth. Installing simple plywood partitions at the attic ceiling can create additional roost space. Cal Butchkoski, a wildlife biologist with the Pennsylvania Game Commission and an exceptionally successful collaborator in the North American Bat House Research Project, did this in an abandoned church attic in Pennsylvania. This work increased the colony by 1,000 bats a year over the past three years. The partitions should be roughened or covered on one side with a plastic mesh for gripping, be spaced 3/4-inch apart, and be at least two feet tall. The tops and sides do not need to be sealed, as the attic at large will maintain the crevice temperature. The deeper the crevices are vertically the better, since this permits bats to move up and down to meet their needs as the attic temperature changes. Half sheets of plywood with 3/4-inch spacing between are ideal.

If you want to use part of the attic for storage, you may be able to wall off a section for the bats, allowing them access to only one area from their entry point. Charles Robertson in Ontario reports great success with this method. He leaves a small access door to the attic bat roost for periodic cleaning, but otherwise seals that portion from the rest of the attic to prevent stray bats from wandering in. There should be a solid floor under the bats’ roosting areas, and it should be covered with a sheet of plastic for easy removal of guano. Any attic remodeling and cleanup should take place in the winter, when most bat colonies leave the roost to migrate southward or hibernate in caves and abandoned mines. Be careful not to inhale dust from the droppings. We recommend using a properly fitted respirator capable of filtering particles as small as two microns.

If you want to count how many

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If you want to count how many bats you have, an exit count is usually the best way.

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Cal Butchkoski of the Pennsylvania Game Commission inspects bats in the new roosting crevices installed in the old Canoe Creek Church.
bats you have, an exit count is usually the best way. Counting roosting bats in the attic is difficult and may cause them unnecessary stress. Some bat lovers have set up closed-circuit television monitors to watch their bats with no disturbance, but the easiest method is to simply count the bats as they emerge from the building in the evening.

Update on Plastic Bat Houses

Previously we reported on experimental plastic bat houses made by Marvin Maberry [The Bat House Researcher, Spring 1995 and Fall 1995]. An early prototype in Central Texas has been used by approximately 700 Mexican free-tailed bats (Tadarida brasiliensis) for the past two summers. This bat house is the first one reported from Texas in which Mexican freetails reared young. In order to test effectiveness in other areas, we placed an improved model in several other locations this past spring. Early reports from those sites are encouraging.

In Wisconsin, Lee Christenson has set up three Maberry houses on a wooden barn: one painted dark brown, another two-tone, and another white. Several bats moved into the dark brown house in the first year, while the others remain unoccupied.

Cal Butchkoski of the Pennsylvania Game Commission installed a plastic bat house at the Shaver’s Creek Environmental Center in central Pennsylvania. Butchkoski has been doing extensive bat house testing at this location for several years. The plastic bat house was two-toned, with the top two-thirds painted dark brown for heat absorption. The rest was left natural white, although the interior and landing area were painted black to block light. By mid-August, more than 50 little brown bats had taken up residence.

The plastic Maberry design is very promising. It is lightweight, holds more bats, and should last for many years. Because plastic has different thermodynamic properties than wood, we are continuing with field testing. Maberry has agreed to supply a limited number wholesale at $62.50 each for project researchers. This special price includes shipping and handling. If you are interested in obtaining one or more and installing them for specific tests, contact Jim Kennedy at (512) 327-9721. The plastic bat houses will be assigned on the basis of availability, participant’s location, habitat, and previous success.

Protection from Predators

Merlin Tuttle

All bat house owners need to be aware that predators can be a serious problem for bats. Research Associates have reported that bats sometimes abandon their houses because of hawks, owls, snakes, and house cats homing in on their territory. Although it is normal for bats to move among roosts within a season, when they do not return at the same times in subsequent years, predator problems may be the cause (assuming your bat house has not developed leaks, another common problem). Last summer, when we took a television crew to film the hundreds of bats Carol and Baxter Adams have attracted to their bat houses near Medina, Texas, we found a rat snake instead of bats in one of their houses. Unfortunately, the more bats you attract, the more likely predators are to follow.

Because bats enter and exit roosts rapidly, owls typically need to watch from a nearby perch to be successful. This may explain why purple martins and many bats prefer house locations in open areas away from branches and other potential perches for birds of prey. Mounting evidence suggests that bats prefer houses at least 20 feet from potential owl perches, a problem most often encountered when houses are mounted on trees. Tree-mounted houses are undeniably more vulnerable to predators than are those mounted on buildings or poles. Houses located in open areas, but within 20-50 feet of river, lake, field, or yard
edges seem most attractive to bats. Snakes are most troublesome in warm climates. While they typically cannot climb the side of a smooth building, they are expert climbers of trees and poles. Most can be stopped by predator guards sold by wildlife catalogs such as the Purple Martin Conservation Association Products Catalog (814-734-4420), which includes Top Guard Animal Barriers for $17.95 each. You can make your own barrier by cutting the bottom out of a round, five-gallon waste paper basket, replacing it with 1/4-inch hardware cloth, and running your bat house pole through the center of the hardware cloth with the basket inverted to face downward. Smaller baffles may work fine if local snakes are not large. Climbing raccoons can also be foiled by a snake guard placed at least three to four feet above ground.

Cat problems can be reduced by placing houses between 12 and 20 feet above ground on buildings or poles. Cat predation is usually the worst when young bats, especially Mexican free-tails, are learning to fly.

Predator avoidance is a primary reason why so many North American bats prefer to roost in locations entered through 1/2-inch to 3/4-inch wide crevices. We also find that many bats roosting in woodpecker holes squeeze into equally narrow crevices after entering through larger openings. Bats frequently reject houses with roosting crevices that exceed 3/4 inch in width. Bats that accept wider spaces typically choose high places in buildings, caves, or tree hollows that are difficult for predators to reach without detection.

**Bat Houses and Temperature**

Temperature is one of the most important ingredients in bat house success, and probably the least understood. Unpainted bat houses and those mounted in the shade are seldom warm enough, and thus are

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**Bat House Color Recommendations and Average Daily High Temperatures in July in the U.S.**

- **Black areas = less than 85° F.**
  - Recommend black paint.
- **Dark areas = 85°-95° F.**
  - Recommend dark shade of paint.
- **Medium areas = 95°-100° F.**
  - Recommend medium shade of paint.
- **Light areas = 100° F or greater.**
  - Recommend light shade of paint.

- **JM KENNEDY**
Bat House Dos & Don’ts

**Do**
- Use a large enough bat house to have proper temperatures.
- Paint your bat house the appropriate shade.
- Make sure all exterior seams are tightly sealed (caulked).
- Mount your bat house on a pole or building.
- Place the house within 1/4 mile of a lake or stream, the closer the better.
- Check for occupancy throughout the year.
- Clean and repair the house each winter.

**Don’t**
- Use small bat houses that don’t meet bats’ needs.
- Leave your bat house unpainted.
- Allow excessive ventilation or water leaks.
- Mount it on a tree or metal-sided building.
- Think bird baths are adequate water sources.
- Forget to make regular observations.
- Allow wasp nests, cracks, or peeling paint.

Guano Treatments

In the Fall 1995 issue, we wrote about the success of Research Associates, like Tony Koch of Oregon, in treating their bat houses with guano before installation. To date, no one has tested identical side-by-side bat houses with a guano treatment on one and no treatment on the other. In Arizona, Chuck Rau attracted a nursery colony of big brown bats to a house treated with guano from yuma bats (*Myotis yumanensis*). Guano treatments may have the sole effect of “pre-aging” the bat house, masking the new odor. One project participant reported success by a similar treatment, filling his bat house with potting soil overnight before mounting it. Until careful comparisons are made at a single site, we will not know whether such treatments help, though they are unlikely to hinder. If you are interested in testing guano treatments, or conducting any other experiments, please don’t hesitate to call for advice.

Frequently Asked Questions

Q. How can I get the recommended plastic netting?
A. After several reports from project participants, we called Internet (1-800-328-8456) to confirm earlier ordering information. They will still accept any size order, but they have added a $10 service charge for orders below their minimum of $50. You may find a local dealer that will sell smaller quantities. Look under “plastics” in the Yellow Pages. If you are building many bat houses, or can get together with some friends, place a bulk order. We no longer recommend the plastic (“fiberglass”) window screening after several reports of early deterioration. Apparently, some brands are inferior and don’t last. If you can find another small-diameter plastic mesh that is sturdy enough, use it. We would also be interested in hearing of such products and their availability.

Q. How should I mount my bat house?
A. It depends on the substrate, tools, and materials available. Most wooden bat houses can be screwed directly to a wooden pole or building. Pieces of 3/4-inch lumber can be fastened to the bat house first, if necessary, to provide more attachment area, and roosting space behind the bat house. Secure with long screws on buildings or wooden poles, or with bolts when mounting on metal poles.

Q. How do I count my bats?
A. If there are only a few, visual observation at midday is the easiest.
Briefly shine a bright light inside, or use a mirror to reflect in some sunlight. For larger colonies, a more accurate estimate is made by counting the bats as they exit in the evening. Make occasional counts throughout the year to adequately track usage.

Q. How do I identify the bats?
A. Without training (such as BCI's Bat Conservation and Management Workshops) or help from a local bat expert, a good field guide is your best bet. *America's Neighborhood Bats* (available from BCI) and *The Audubon Society Field Guide to North American Mammals* both have photographs and range maps for the most common species. At least 10 North American species are known to use bat houses, and many are very similar, making identification difficult. Only experienced biologists should attempt to capture or handle bats for identification. We may be able to assist in finding an expert willing to check.

Q. Will bats overwinter in my bat house?
A. Southern bat houses often have year-round residents, and big brown bats have been reported overwintering in bat houses as far north as Kentucky and coastal New York. However, most bat houses are summer roosts only, used primarily as nursery sites, as stopovers during migration, and as temporary bachelor roosts (the latter especially for smaller houses).

Q. How long should I wait to make changes if my bat house is unoccupied?
A. If your bat house has been up for less than a year, wait at least one more year. Of course, if it is on a tree, unpainted, and has no landing area, make the appropriate changes as soon as possible.