Thanks for Reporting!

The current issue of the Bat House Researcher is based on reports of 359 bat houses from 133 Research Associates in 31 states. This represents a 69% increase in reporting over the previous year and is deeply appreciated. Important discoveries are already being made, and we are expanding rapidly toward the numbers required to achieve project goals. By next fall we hope to more than double the number of new houses reported. We also hope to add a staff member next year who can personally investigate unusual use patterns and confirm species identities.

We are particularly pleased to welcome the participation of biologists from the U.S. Forest Service and the Natural Resources Conservation Service (NRCS), who will be leading experiments across the United States. Seventy-five Forest Service biologists, representing 68 ranger districts, have agreed to test three pairs of houses each, and NRCS biologists plan to test 200 houses through their cropland restoration programs in Kansas, Ohio, and Maryland. With so many collaborators and more volunteering daily, discoveries in the next several years should be especially exciting.

Results from 1994 Season

The overall occupancy rate for our 1994 sample came in at 31%, a very encouraging result when you consider the facts: that an estimated 30% of occupancy does not occur until the second season or later, that half of all the houses reported this season were just put up in 1994, and that more than 80% of our total sample has been up for less than two years. Also, since we are experimenting with bat house design, treatment, and placement, we must expect that in most tests, some houses will not be accepted.

Size alone remains a consistent factor in success, as does knowledge regarding placement. Large nursery houses achieved 44% occupancy rates this season. Small houses (Models 1 to 5), many of which are either poorly built by commercial vendors or are sold without adequate instructions, achieved 17% occupancy, compared to 38% for larger houses that typically are built at home. Since current estimates suggest that at least 15% of houses not occupied in the first year do attract bats in the second, with an additional 15% within five years, we can reasonably expect our 31% occupancy rate to increase to more than 50% over time, with substantially better rates for larger nursery houses.

Current knowledge suggests that bat house locations or treatments should not be changed until at least two seasons have passed without use, unless there are obvious deficiencies. We especially need clear comparisons in which only one variable is changed. Often the best test is to repaint an unsuccessful house a lighter or darker color or to move it a short distance into more or less sun. When placing new houses, you can mount two or more side by side on buildings, varying color or design only, but all at the same height and receiving the same amount of sun. You may also place identical

Pair-Mounting Technique

A Galvanized sheet metal roof with 1-5" overhang (longest in hottest climates)
B 3/4" space between houses
C 1" x 4" x 42" for large houses
  1" x 4" x 30" for small houses
D 1" x 4" x 12" for large houses
  1" x 4" x 9" for small houses
E 4" x 4" post

This new pair-mounting technique appears in the recently published 1995 revision of the Bat House Builder's Handbook, which was edited to incorporate many of the findings reported in past issues of this newsletter.

By mounting two houses back to back with a space between, you will create a single larger house that provides a much greater temperature range. The space between the houses forms an extra roosting chamber, vented from top to bottom.

If you expand the rear vent slots to 3/4-inches wide, bats can move freely between the houses or into the cooler central chamber. Adding a tin roof over both houses will complete the central chamber enclosure. Rough wood or screening on the backs of the houses will make a better gripping surface.

Test your paired houses on poles in east/west versus north/south orientations to the sun, especially in the South where overheating is a greater possibility.

The new Bat House Builder's Handbook can be ordered from our toll-free number: 1-800-538-BATS.
houses on opposite sides of a building at the same height or in locations where they receive more or less sun. Or, to test the potential effect of mounting substrate, locate identical houses to receive similar amounts of sun on trees, poles, or buildings.

Observations from the North
In the Spring 1994 issue of the Bat House Researcher we reported that occupied black bat houses from the northern U.S. (north of the 38th parallel) received an average of six hours of daily sun, while successful dark brown houses averaged nine. This suggested that dark houses exposed to too much sun can overheat, which agrees with this season’s findings. In the 1994 season, just 3 out of 20 black houses (15%) that received 9-13 hours of sun were occupied, compared to 7 out of 13 (53%) that received 8-9 hours and 11 out of 23 (48%) that received 5-8 hours.

In contrast, 4 out of 12 houses (33%) that were dark brown and received 9-12 hours of sun were occupied, as well as 30% of those exposed to between 5-9 hours. Since these data cover the northern half of the United States as well as Canada, some allowance must be made for temperature differences within that relatively wide range of latitude. These samples are small, and more testing is required, especially in the coolest climates, before reaching final conclusions. Nevertheless, for all but the coolest climates, medium to dark brown seems likely to be the color of preference for houses exposed to more than nine hours of full sun.

Black may be advisable only in the coolest climates or where houses receiving eight hours or less of sun require greater heating. When in doubt, you can test pairs that include light to medium brown against dark brown, or try turning pairs on poles to face north and south so that one is always partially shaded. Most of the houses reported in 1994 were not vented or did not have both front and rear vents. Addition of vents should alleviate overheating, but to what extent remains to be tested. If you believe overheating might be a problem with your unoccupied houses, it’s never too late to drill ventilation holes or to paint them a more appropriate color, though some may still require relocation.

Surprisingly, 17 out of 78 light brown bat houses (22%) used in the northern half of the U.S. were occupied, three by nursery colonies. However, consistent with current knowledge, 76% of these houses received 5-12 hours of daily sun, most more than 8 hours. The four houses in this sample that received little or no sun were all hung on moderately dark buildings that appear to have been radiating heat to the boxes.

Observations from the South
In the South, 25 out of 66 bat houses (38%) that were left a natural wood color—mostly light brown—were occupied. Twelve out of 20 houses (60%) that received 9-12 hours of sun attracted bats. However, 7 of 13 such houses (54%) were successful in complete shade. Given these results, it is quite surprising that only 6 out of 33 houses (18%) that received 2-8 hours of daily sun were successful. One possible explanation is that different southern species have different preferences, and this is supported by reports that only small Myotis and evening bats (Nycticeius humeralis) have been seen in the shaded houses. In Central Texas, Sunny Sanders moved a shaded bat house that had been unoccupied for five years to a position receiving morning sun, and approximately 300 Mexican free-tails (Tadarida brasiliensis) moved in within weeks. Similarly, Amanda Lollar in northern Texas found that her few failures in accommodating free-tails all involved white bat houses that were receiving just one to five hours of sun, while her light brown and darker houses with more sun (that were also mounted on brick buildings) were consistently occupied. Nevertheless, at Carol and Baxter Adams’ home in southern Texas, hundreds of free-tails have chosen to live in two completely shaded bat houses. Perhaps these bats are simply desperate. Amanda, Baxter, and Carol will provide choices to test this and other possibilities this year. We clearly have more to learn.

Challenges Ahead
Despite the exciting progress being made, it is clear that we cannot fully understand bat needs without many years of careful experimentation and comparisons from a wide variety of locations. Our original 1992 research centered primarily on results from the northeastern U.S. and strongly emphasized little and big brown bat (Myotis lucifugus and Epitesicus fuscus) preferences. Now that we have ex-
expanded into 49 states and are dealing with many more species and climatic conditions, we need large sample sizes for each species, spread over broad areas and multiple seasons.

Species' preferences often differ, and, even within a single species, many variables affect choice. Successfully attracting bats should be viewed only as the first step, the opportunity to begin testing preferences, one variable at a time. Whether or not a house is occupied cannot stand as the sole determinant of the merit of that house's design. In some cases bats will occupy a house because they are desperate for roosts in that particular area, not because the design or treatment is ideal. Meanwhile, good houses may go unoccupied in an area where bats are abundant because ideal natural roosts are already available. And in places where few bats remain, it may simply take a long time to find houses. It is increasingly obvious that some seemingly apparent failures later become successes.

In many instances, tradition may be an important factor in success. It is clear that a well-made bat house, located near a site where a colony has been excluded, has a high probability of success. In general, bat houses located where many bats are already present have the highest probability of quickly attracting bats. It also appears that once bats become accustomed to living in bat houses at a particular location, occupancy of similar nearby houses becomes nearly automatic, as has been demonstrated by Tony Koch in Oregon. We have yet to discover whether this acceptance is due to imprinting, i.e., because bats may establish an instinctive link to a particular kind of roost when young, or because the new houses tend to be similar to ones that already have proven appropriate to the area. Available evidence suggests that imprinting is an important part of the equation.

Finally, we cannot rule out the possibility that new wood or paint odors may result in an ideal house being rejected until it has been in place for a season. The odors of some paints or kinds of wood may take longer to dissipate than others, a possibility not yet tested.

Solar Heating Critical in Minnesota

Jack Davis has been testing houses for the past two seasons in a very cool area of northern Minnesota. Last year we suggested he move several houses to nearby locations with more sun. He moved four unoccupied black houses, and all of them became occupied in 1994. His best success was with a house that was moved from deep shade to a utility pole where it received maximum sun for eight to ten hours. It was immediately occupied by 12 little brown bats, gradually increasing to 22, and was used as a nursery site. Two other houses were moved to locations with increased, but not full sun, and they attracted small bachelor colonies. Another was left in place, but nearby branches casting shade on the house were removed to provide more, but not maximum sun. It too attracted a small bachelor colony.

Most of Jack's current houses are caulked and painted black, but are made from one-inch thick pine and are mounted in areas where numerous trees prevent exposure to ideal amounts of sun. Since his warmest houses remain the most successful, he will try equipping a couple of houses with gutter or heating cables next season. These cables are used in northern climates to prevent rain gutters and water pipes from freezing. By inserting this material into one of the crevices that will be closed to bats in each house, he hopes to maintain the adjacent crevice temperature of around 80°. If possible, he will use thermostat-controlled material, enabling him to experiment with bat preferences by artificially raising or lowering roost temperatures.

Eastern Michigan Experiment in Progress

John Ragan of Troy, Michigan, put up a Model 3 multi-chamber bat house in May of 1991 and a Model 4 beginner's bat house in May of 1992. Both were made of rough white cedar and were left unpainted. They each attracted a few bachelor bats within two to three months, and the colonies grew substantially in 1993. In 1994, John discovered pink babies inside one of the houses while the adults were out feeding. At last report, looking in from the bottoms, he counted 30 adults in the multi-chamber house and 15 in the other. John's houses receive full sun for most of the morning and probably
also receive radiant heat from the moderately dark side of the building to which they are attached. In May 1994, John built a pair of small nursery houses, painted them black, and mounted them back to back on poles facing east and west within 50 feet of the original two houses. One bat had moved in by August. For the 1995 season, he will also test a black house beside the original pair on the shed.

Modified Beginner's Houses Succeed in Idaho

Bill and Jenni Blair of Cascade, Idaho, built four beginner's bat houses from 3/4-inch plywood, following the Bat House Builder's Handbook plans, but with two alterations: they added Reflectex insulation in both front and back, and they made two houses without vents. The insulation was used on the inside, lined only with fiberglass window screening. All houses were painted dark brown and mounted in pairs, one vented and one unventilated per pair.

The Blairs put up their houses in March, and by June what appeared to be little and big brown bats had moved in, at least 32 and 22 bats each in the unvented houses, compared to 18 and 10 for the vented houses. Since the comparisons turned out not to be identical (one pair was at slightly unequal height, and the other pair received differing amounts of sun), the Blairs will make further tests in the coming season. They also intend to test the bats' preferences for house size by providing large nursery houses, one on the building and a pair on poles nearby.

The Blairs live near a large lake in an area where typical daytime high temperatures in July and August are between 75° and 85°, rarely exceeding 90°. Extensive logging of the surrounding conifer forests may have depleted natural roosts; bats have lived in the Blairs' cabin walls for generations. But this year, noise in the walls was substantially reduced after bats were seen occupying the bat houses.

Awards for Outstanding Contributions

The North American Bat House Research Project is awarding Life Member status to five individuals who have made special contributions to our knowledge of bat houses. Lisa Williams and Cal Butchkoski of the Pennsylvania Game Commission were the first to demonstrate the value of ventilation slots to prevent bat houses from overheating on hot days. They also were among the first to demonstrate the feasibility of providing alternate bat house roosts for little and big brown bats excluded from buildings. Amanda Lollar of Mineral Wells, Texas, has greatly increased our understanding of Mexican free-tailed bat preferences in bat houses, with approximately 10,000 bats in her houses. Jack Davis of the U.S. Forest Service diligently carried out experiments on 26 bat houses to test the effects of solar heating in northern Minnesota. By changing the color and solar exposure of unoccupied houses until they were occupied, he has made considerable progress in demonstrating what bats need in this exceptionally cool climate. Tony Koch of Oregon was the first to document the importance of dark color and sun for northwestern bat houses and was also the first to demonstrate that bat houses could be used to help control insect pests on organic farms. Each of these Research Associates will receive a plaque honoring their effort and dedication.

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