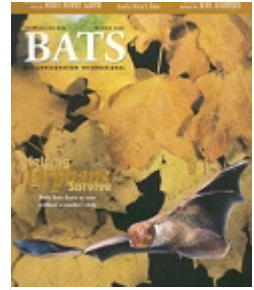


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Helping Orphans Survive

Baby Bats Can Learn to Fly, Hunt, and Hide on Their Own

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The first flights were tentative at best - brief, wobbly affairs that hardly veered from a straight path. Twists and turns apparently were more than the baby bats, untutored by mothers, could handle; so was maintaining a consistent altitude. And they landed, very un-batlike, heads up on the sides of their cage. Within days, however, the eight orphaned bats were racing confidently around the perimeter of their enclosure and landing, after little flying somersaults, upside down on the cage ceiling - just as red bats should.

In fact, these bats, orphaned soon after birth, single-handedly acquired the secrets of their kind (*Lasiurus borealis*). Without the help of their mothers, they learned to fly and land, to fire up their sonar and hunt the insects that wild red bats prefer, and to avoid at least one predator of bats. Much of what it takes to be a successful red bat - or at least the biological foundation on which the bats' behavior develops - apparently is hard-wired into the genes of the species.

On the other hand, without a mother's support, the eight red bats in this study almost certainly would not have survived long enough in nature to learn what they needed to know.

Can baby bats learn to catch insects when raised in captivity without parents? The question is of considerable interest to wildlife rehabilitators, who often raise orphaned bats. Can such bats be released into the wild with a reasonable chance of survival? Or must human rehabilitators work in loco parentis and try to fill the mother's role as teacher?

Little is known about young, insectivorous bats as they make the transition from a diet of mother's milk to flying insects. Some researchers suggest that young bats need time, during which they are still nursed by their mothers, to develop the skills needed for successful flight and foraging. Other research indicates they may learn those skills by spending time hunting insects with their mothers. Red bat pups in captivity typically begin flying at about 21 days of age, but, at least in the wild, mother's milk is available to bat pups for about 38 days - and most pups are probably learning to fly and feed on insects before then.

In Central Texas, Barbara French, a wildlife rehabilitator and Conservation Officer for Bat Conservation International, often receives orphaned or injured red bats, members of a solitary, tree-roosting species that ranges from Central America to Canada. Pregnant females typically give birth to two to four pups. The pups weigh 1.75 grams (about six-hundredths of an ounce) each and do not open their eyes until they are 10 to 11 days old.

To determine whether baby red bats can, on their own and in captivity, become successful insectivores, French built an outdoor flight cage about 56 by 21 feet (17 by 6.4 meters) and 12 feet (3.6 meters) high and covered it with netting. Foliage and a variety of roosts were hung from the ceiling. Eight red bat orphans - seven males and one female - were hand-raised from infancy and placed inside the cage when they were old enough to eat

insects, at an estimated three to six weeks of age.

When first delivered to the rehabilitator, the pups were fed fortified milk and baby food (veal and bananas), supplemented with a vitamin paste, four times a day. Viscera from mealworm larvae and eventually whole mealworms were added to their diet as soon as the young bats would accept them. After they went into the flight cage, hand feedings were reduced to two a day (at about 7:30 a.m. and 7:30 p.m.).

The young bats began flying almost immediately after being released in the cage. Within days, they were circling around the enclosure and, soon after, they were racing around the poles that run down the center of the cage.

It was at this point that the young bats seemed to notice the insects swarming around the incandescent and black lights hung from the ceiling. At first, the bats repeatedly flew into and straight out of the swarms. Within a week or two, however, most began darting about and turning sharply within the swarms, as though pursuing insects.

The bats initially were found with sunken abdomens at their morning hand-feedings - a sign that they weren't having much luck catching insects. Within a few weeks, however, bulging bellies were common in the mornings, and insect remnants were found in their feces. One orphan sported a distended abdomen just six days after he began flying, while three late bloomers showed no indication of self-feeding for 42 to 43 days.

Twice a week, we used a bat detector to monitor echolocation calls during evening flights. Clearly defined feeding buzzes, the rapid-fire calls that signal a bat's final attack on an insect, were detected after two weeks in the flight cage, although at least one bat was clearly capturing insects several days earlier. The first evidence of flying insects in feces was found after 28 days. All the bats were feeding on insects by the time they reached adult weights of 10 to 12 grams (0.35 to 0.42 ounces).

Since all eight bats had learned on their own to catch and eat flying insects, the questions became: What are they eating? Do the bats feed on whatever insects are most common, or are they selective in their menus? To find the answers, we used a funnel trap to collect insects from inside the cage and collected bat droppings from plastic tarps beneath the bats' roosting areas. Comparing insect species from the trap and the droppings showed that the bats were indeed selective in their choice of prey and generally chose those insects favored by wild red bats.

The orphans fed mainly on moths, a common food of red bats in the wild. They also occasionally gorged on midges - a type of swarming fly that may be rather easy prey for young bats still learning to feed. They largely ignored most other insect species identified from the traps.

One evening, French watched in surprise as all of the young bats suddenly flew into roosts at the same time. A moment later, the shadow of a great horned owl passed overhead. The bats not only sensed the presence of this potent predator, but responded appropriately by hiding in foliage. This behavior almost certainly is innate, since no experienced bats were available to teach it.

Evidence suggests red bat pups in the wild continue nursing while learning to fly and capture insects. But red bat mothers lactate for only about 38 days after giving birth, so the young apparently must feed on their own after that. Our orphan bats, however, needed an

estimated 50 to 82 days after birth to learn to forage for insects. The much longer time before self-feeding was most likely due to the absence of their mothers.

Although it appears that insect-hunting with echolocation is innate, a mother's presence probably speeds up acquisition of these essential skills. A baby bat would be unlikely to survive this learning period in the wild without its mother's assistance. Our experience suggests, however, that providing protection and supplemental feedings in captivity may give young bats enough time to hone the skills needed for survival.

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