BATS, ARTIFICIAL ROOSTS, AND MOSQUITO CONTROL

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Bats are primary predators of vast numbers of insects that fly at night, and some species consume large numbers of mosquitoes. However, mosquito control is a complex problem that rarely can be solved by a single approach, be it bat houses or pesticides.

A variety of options should be considered, though existing chemical pesticides typically cause more long-term problems than they solve. Chemical poisons kill natural mosquito predators more effectively than mosquitoes. Over time, predators such as fish, insects, and bats, die out while mosquitoes develop resistance, multiplying in ever larger numbers in a losing battle often referred to as "the pesticide treadmill."

Individuals of some bat species can capture from 500 to 1,000 mosquitoes in a single hour[1, 2] and large colonies can consume tremendous quantities. For example, a Florida colony of 30,000 southeastern bats consumes 50 tons of insects annually, including over 15 tons of mosquitoes,[3] and from 77.4% to 84.6% of little brown bats living in the northern U.S. and Canada eat mosquitoes.[4, 5] Because mosquitoes do not take evasive action, and are exceptionally easy to capture, bats may prefer them over larger prey.[6,7] Nursing mothers eat up to their body weight in insects nightly,[8] and often can be attracted to live in bat houses.[9]

However, despite the numbers of mosquitoes that bats eat, simple provision of additional roosts should not be promoted as more than one step in the right direction toward solving mosquito problems. In some cases bat houses may help and in others, they may not. Bats are just one of several groups of animals that naturally prey on mosquitoes. Their relative importance appears to vary from none to high in different locations. In some areas, such as in the far northern tundra or in the Florida Keys, habitats are relatively simple and cannot support more than a few bats or other insectivorous animals, largely precluding natural control. In other locations human activities have converted once diverse biological communities into much simpler farm and yard conditions. Such simple habitats may produce huge hatches of mosquitoes and other insect pests on an occasional basis, while providing insufficient other insect species (such as harmless mayflies) to feed insectivorous animals between hatches of pests. As a result, once-abundant predators that help keep nature in balance are lost. Additional roosts alone may not bring them back.

Although no single approach to mosquito control is appropriate for all locations, encouraging natural predators should be an important element in long-term planning wherever possible. Anything that can be done to encourage predation from aquatic insects, fish, or bats may be important in reducing mosquito numbers.

In some areas, bats may never have been significant predators of mosquitoes, while in others they may have been important. Certainly, in areas like Chautauqua, New York, where bats apparently still play an essential role, all possible precautions should be taken to ensure their continued presence. And where bats are known to have declined, their recovery should be encouraged. Providing additional bat roosts is just one aspect of bat conservation, and saving bats is just one aspect of enhancing natural control of mosquitoes.

It is impossible in most cases, either chemically or naturally, to completely eliminate mosquitoes, though

their numbers can be substantially reduced, and in the long run, this is best done by non-chemical means. Putting up bat houses may help in places where bats can be attracted, but even successful bat houses do not always attract a species that feeds on mosquitoes.

Bat houses are most likely to succeed where bats are already known to use old buildings, barns, or bridges. Such roosting habitat typically is being replaced by structures that are unsuitable for bats, forcing them to find new roosts or die. Participants in the North American Bat House Research Project have attracted thousands of bats to new locations using bat houses, but success is not certain in all locations. In some areas, simply using bat-friendly bridge designs can attract tens or hundreds of thousands of bats. In other places, loss of hibernation caves hundreds of miles away may preclude further use of an area by bat species that feed on mosquitoes. Other species that eat primarily beetles or moths, but do not require caves for hibernation, may still be abundant, with little impact on mosquitoes.

All American bats are beneficial, though their diets vary considerably. While mosquitoes may bother us most directly, many beetles, moths, and other insects consumed by bats are important pests of yards and gardens. Building bat houses may help in many ways, though not necessarily in mosquito control. Plans for most types of artificial roosts are available from Bat Conservation International (BCI), including structures capable of housing from dozens to thousands of bats. Please note that most ready-made bat houses now marketed have nothing to do with BCI and often do not meet minimum standards for success (even though sellers often mention BCI in promotional materials). We do provide a list of other vendors that are BCI-approved (www.batcon.org).

Many kinds of bats have their own unique preferences. Several widespread species will occupy vertical roosting crevices that are three-fourths to one inch wide and about 16 inches deep, though most prefer crevices that are 24 inches deep. Each vertical crevice should end in a horizontal ceiling. Houses are now available that will hold several thousand bats each, though most shelter from 50 to 200.

In cool climates houses need to be painted dark brown or black and receive 7-12 hours of daily sun, while those in hot climates should receive 5-10 hours of daily sun (depending on climate), and be painted medium or light brown, vented, and covered with a tin roof. The latter helps protect from mid-day heat, especially when the roof overhangs the sides. All houses should be painted and sealed tightly with caulk. Only bottoms should be open, except for vents. Locations on buildings or poles 15 to 20 feet above ground are best, preferably near water. In cool climates, bat houses on buildings are the most successful. All inner wood should be at least slightly rough. Many are occupied within 6-12 months, but others require two or more years for bats to move in. For further advice or detailed bat house plans, please call or write to Bat Conservation International, P. O. Box 162603, Austin, TX 78716; phone, 512-327-9721; email, www.batcon.org.

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