



Science briefs

■ Bison disease still threatens cattle

A dispute as bitter as a Montana winter rages between ranchers and environmentalists over Yellowstone National Park bison and a disease called brucellosis, which can harm cattle. In a National Research Council report, UC Berkeley and Iowa State University researchers have studied the problem and made recommendations.

The report, "Brucellosis in the Greater Yellowstone Area," contains findings from Dale R. McCullough, UC Berkeley wildlife biologist, and Norman Cheville, veterinary pathologist at Iowa State.

Brucella abortus, the bacteria that causes brucellosis, can cause spontaneous abortion in cattle and other animals. It is transmitted primarily through reproductive fluids and nursing.

Last winter was extremely harsh in Yellowstone, and hundreds of bison died of starvation. Record numbers left the park,

searching for forage at lower elevations.

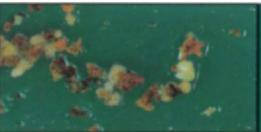
Alarmed that some of the itinerant animals might be infected with brucellosis, Montana livestock officials killed nearly 1,100 of them.

Ranchers worry not just that the disease will be detected in their beef herds, but that it will be detected in their states — which could lead to cattle trading restrictions. California has had brucellosis in the past, but recently regained its brucellosis-free status.

This winter has been mild in Yellowstone. No bison are known to have been shot. But McCullough and Cheville say their fate — and that of the area's elk (another carrier) and cattle — depends on steps taken to manage them all.

"To make the Yellowstone area brucellosis-free," the authors write, "the disease must be eradicated in all three species simultaneously. A lot more research is needed to determine whether and how such an ambitious goal can be met."

The draft report is on the Internet at www2.nas.edu/besthome/bisonelk.htm.



Research update

Bats can pack a punch in pest control

Bats from a single colony can consume millions of insect pests each growing season and may someday play a key role in integrated pest management, if studies in the Sacramento Valley are any indication.

UC research has confirmed that Mexican free-tailed and Yuma myotis bats in the Sacramento Valley prey upon night-flying insects which include serious farm and urban pests — moths, beetles, flies, midges, mosquitoes and plant bugs (see p. 8).

In the growing recognition that bats offer a natural and inexpensive means of pest control, hundreds of growers and homeowners statewide are seeking advice on how to attract these mammals to their property, according to Rachael Long, UC field crops farm advisor in Yolo and Solano counties.

"In the last couple of years in the Sacramento Valley alone, I've advised at least 60 growers on

how to build bat houses." Long says. "There has been a great deal of interest in the ability of bats to control pests on high value crops, such as codling moths which prey on orchards."

Bronwyn Hogan, a graduate student at California State University, Sacramento, and co-investigator with Long, notes "A typical colony of 150 bats will eat several million insects each season, according to research from Texas. And bats may also protect crops from pests by 'chasing' insects away with their echolocation calls."

A number of moths, including cutworms, armyworms and bollworms, are sensitive to bat echolocation up to 120 feet away, and turn away or dive to the ground when exposed to pulsed sounds, she says.

"In spite of their benefit to farms and the environment as whole, bats have been maligned and even today are subject to eradication campaigns. Little effort has been made to protect

their roosting and foraging habitat," says Hogan.

More than half of American bat species are in severe decline or are already listed as endangered, according to Merlin Tuttle, president of Bat Conservation International (BCI). In California, at least 10 of 24 species are designated "of special concern" by California Department of Fish and Game (CDFG), meaning their numbers are in decline and they require special management to preclude further losses.

Most bat eradication efforts are fueled by fear of bats themselves, often based on myths and legends. While bats, like all mammals, can contract rabies, less than a half of 1% of bats actually do, according to BCI. And rabid bats do not become aggressive — unlike cats and dogs. They bite only in self-defense, and pose little threat to people who do not handle them.

If a sick or injured bat is found on the ground, the finder should call a local wildlife care center or the California Bat Conservation Fund, Hogan said. No bat should be moved unless the handler is wearing thick protective gloves.

CDFG biologist Betsy Bolster says that bats, like all nongame mammals in California, are protected from hunting, collection and extermination — unless they cause property damage.

"In cases of property damage, we strongly recommend exclusion rather than extermination," she says. "If you kill bats, it doesn't solve the problem. You still have an accessible shelter that will attract them again.

"Bat exclusion involves using nets, plastic drapes or one-way tunnels which allow bats to leave but not to return." Exclusion should be done before bats begin reproducing and raising their young, an activity which occurs between mid-April and mid-August. Alternatively, since many bats migrate in October, their entry points can be sealed after they depart.

While humans sometimes intentionally destroy bats, other bat declines are the indirect result of human activity. "Some bat declines are the result of land development. Many bat species roost in old, defective trees and feed near water sources. The loss of natural vegetation can have serious consequences for bats," says Dixie Pierson, a wildlife biologist in Berkeley.

Because of the recent, increasing grower interest in the beneficial aspects of having bats as neighbors, it is critical for scientists to learn more about the role of bats in the agricultural ecosystem, says Hogan.

There are few data on the food habits of bats in California. Scientists need to assess the diet



B. Moose Peterson/WRP

and foraging behavior of bats on a local level, because food habits vary with locality, time of year, species of bat, time of feeding and available insect prey.

To begin answering these questions, Long and Hogan plan to investigate the effects of the two species of bats in an agricultural area of the Sacramento Valley.

The researchers will use "bat detectors" to perform acoustic surveys; detectors convert high-frequency bat calls, inaudible to human ears, to lower frequency, audible sounds. They will also tag bats with small glowsticks to gain a visual impression of where bats are foraging and in what manner. The tags, attached with tape or weak non-toxic glue, fall off within a few hours.

Bat feeding activity and insect pest species abundance will be surveyed in row crops, orchards, marshes, open grassland, urban and suburban areas around the roosts. Researchers will determine whether there is a relationship between bat foraging and the timing and density of insects. In other studies, Long and colleagues are studying natural bat roost characteristics to help design bat houses.

For general information about bats, contact BCI in Texas at www.bci@batcon.org or call (512) 327-9721. For more specific information about California bats or to report an injured bat or a colony, contact the California Bat Conservation Fund at forbats@batnet.com or call (415) 456-6598. You may also contact the Wildlife Management Division of California Fish and Game at (916) 654-3806.

-Editor



Merlin D. Tuttle, Bat Conservation International

Top, Long-eared Myotis bats. About 200 bats can pack themselves into one square foot. Bottom, *Macrotis californicus*, a desert bat.