

# Altruism Absent in Mom Bats

In the early 1960s, vertebrate ecologist Richard B. Davis and his colleagues ventured into a limestone cave in south central Texas to observe the teeming nurseries of the 4 million Mexican free-tailed bats that roost there every spring. "The walls of the cave," says Davis today, "were a solid mass of writhing protoplasm." It is no wonder then that the researchers watching the hungry horde thought they saw female bats nursing pups at random.

"Indiscriminate nursing is really what I thought was happening after my first field season too," says zoologist Gary McCracken of the University of Tennessee in Knoxville. "There are so many bats and the babies are so aggressive that it really does appear to be random." When McCracken recently applied genetic tests to the nursing pairs in the Davis cave, however, he found that this was not the case. Female bats selectively choose to nurse along kinship lines, he reports in the March 9 SCIENCE. The recognition of close ties has also recently been noted in the feeding habits of vampire bats.

The original observation that mothers act as an indiscriminating dairy herd has been cited frequently over the last 20 years in scientific and popular literature as an example of what sociobiologists call group selection — animals behaving for the good of the group rather than for themselves or their offspring.

McCracken says he decided to do the recent study because this kind of altruism is no longer thought to be a pervasive force against selfish or kin-oriented behavior. Moreover, reports of random nursing in groups of other mammals have been very rare. One other bat species with a large maternity colony is reputed to nurse indiscriminately, but genetic studies have not been done.

"These bats have always been an anomaly," says David S. Wilson, an evolutionary biologist at the University of Michigan in East Lansing. McCracken's paper, he says, safely discounts the hypothesis of group selection in this case.

While Davis's group 20 years ago was limited to tagging and visual observations



Photos: Gary McCracken



*There are 2 to 4 baby bats per 10 square centimeters in the crowded creches.*

of the bats' movement, McCracken used a genetic test called allozyme electrophoresis to determine the relationship between nursing pup-female pairs. The technique, which shows genetic variations in protein structures, enabled him to determine which of the 167 pairs plucked from the walls had different genotypes. According to genetic theory, if nursing were random, in this case 43 pairs with dissimilar genotypes would be found. McCracken found only 7 such pairs. All in all, he estimates that 17 percent of the mother bats were nursing pups that were not their own. The researcher could not tell if these bats were nursing a particular pup or if they chose at random.

McCracken believes that this nonparental nursing is due to the enormous size of the maternity colonies that make it impossible for a female to always find her own pup. Females may deposit their pups in large creches and tolerate the cost of occasionally nursing another pup, he says,

because they receive other benefits, such as warmth from the group.

The idea that bats may non-altruistically invest something emerges in another recent study conducted by Gerald Wilkinson, a behavioral ecologist at the University of California at San Diego (UCSD). Wilkinson found that female vampire bats will regurgitate blood to feed a starving adult female who begs for food, but only if that bat is a relative or a known "friend" (frequently observed as a companion) that might return the favor some other time. Wilkinson's findings will be published in an upcoming NATURE.

As for his nursing study, McCracken says, "Now that we have shown that they can find their babies most of the time, the most intriguing question is how?" How does a female find its own young in that incredibly huge mass of babies? Davis likens this task to being dropped in the middle of a parade with more than a million people and being asked to find one particular person.

During the next year, McCracken plans to do in-cave and captive experiments to explore how bats may find their young by scent, vocal signatures and recall

of where they deposited them (although research suggests pups appear to move around a lot). "It's pretty amazing that they can do this," he says. "They're not disembodied spirits."

Wilson says that one thing that makes McCracken's work so important is his use of the electrophoresis test. "That's very ingenious," he says. "This whole idea of determining the parent-offspring relatedness from electrophoresis is relatively new."

In addition to the test, McCracken's success seems to stem from his tenacity. "He's the only one who had the patience to go into these filthy, obnoxious caves," says Jack Bradbury, a behavioral ecologist at UCSD. "Some of the other people working there have been hospitalized because of what the ammonia fumes do to their lungs." Adds Wilson: "How would you like to go into a cave with a million bats and 3 feet of guano beneath your feet?"

—S. Weisburd