

## A Summer Concentration of the Indiana Bat, *Myotis sodalis*, in Wayne County, Indiana

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### Abstract

On 3 August 1971, a group of about 50 bats flew from a dead elm tree (*Ulmus americana*) as it was bulldozed over. Eight were captured and identified as Indiana bats, *Myotis sodalis* (two adult females, four immature females, and two immature males, now in the collection of the Joseph Moore Museum). This represents the first record of a maternity colony of this species. During intensive mist-netting along a stream 500 meters south of the elm in the summer of 1972 and 1973, 193 bats were captured. A high percentage of these (16.3%) were *Myotis sodalis*. This led us to believe the colony had returned to the immediate vicinity of the elm tree. However, we were unsuccessful in locating a specific colony site.

### Introduction

In past summers the Indiana bat, *Myotis sodalis*, has been collected by shooting (5), it has been found under bridges (6), individuals have been found with little brown bats, *Myotis lucifugus*, in maternity colonies (Cope, unpub. data) and mist-netted in Missouri (3) and Ohio (Koestner, unpub. data). Summer-male colonies of this species are known to occur in caves where winter populations of *Myotis sodalis* have been found (4). Little, however, is known concerning the summer activity of this species (1). Winter populations of the Indiana bat declined rapidly in the past decade (2; and Cope, unpub. data). The Bureau of Sport Fisheries and Wildlife (1966) and International Union for Conservation of Nature and Natural Resources (1968) have placed the Indiana bat on the rare and endangered species list.

On 3 August 1971, Mark Wright bulldozed a dead elm (*Ulmus americana*) tree in a hedgerow near the Nolands Fork River, north of Webster, Wayne County, Indiana. He captured 8 of an estimated 50 bats which flew out from under the loose bark of this tree as it was pushed over. These bats, two adult females, two immature males and four immature females, were taken to the Joseph Moore Museum on the Earlham College campus where they were identified as *Myotis sodalis* and entered in the Museum collection, M3278, M3279, M3280, M3304, M3305, M3380, M3381, and M3382. These bats represent the first reported maternity colony of *Myotis sodalis*.

### Materials and Methods

Personnel of the Joseph Moore Museum mist-netted over Nolands Fork River about 500 m south of the site where the maternity colony was destroyed, from 6 July 1972 through 5 October 1972 and from 13 June 1973 to 6 October 1973. This totaled 58 net nights in 1972 and 112 net nights in 1973. All bats were captured in 9 or 12-m mist-nets placed at right angles to the river, between pipe or conduit supports.

One 9 m high netting station was established by placing four 9-m mist-nets on top of each other enclosing the area just below the canopy of a large Sycamore (*Platanus occidentalis*) which had branches drooping over the river. The 12-m nets were moveable and placed at different netting sites along the river and adjacent hedgerows. Captured bats were banded with Fish and Wildlife Service bands, weighed, sexed, aged, checked for reproductive condition and released within 15 min of capture time in the summer of 1973, but held until the end of netting time before release in the 1972 operation.

Observations were made on crepuscular and nocturnal activity of bats in the vicinity of the netting sites. This was aided by as many as seven persons spread out along the river bank within radio or voice contact with each other. An ultrasonic sound detector (bat detector) was used to monitor bat activity after it became too dark for visual observation.

### Results

A total of 193 bats were captured and banded during the summer of 1972 and 1973: 106 (56%) were big brown bats, *Eptesicus fuscus*; 31 (16%) were Indiana bats, *Myotis sodalis*; 28 (15%) were red bats, *Lasiurus borealis*; 15 (8%) were little brown bats, *Myotis lucifugus*; 8 (3%) were hoary bats, *Lasiurus cinerius*; 3 (1%) were Keen's bats, *Myotis keenii*; and 2 (1%) were silver-haired bats, *Lasionycterus noctivagans*. An extensive search of each building within a 2.5 km radius of the netting site was conducted, and four maternity colonies of *Eptesicus fuscus* with an estimated total population of 140 were recorded. No *Myotis sodalis* were found.

Of the 31 *Myotis sodalis* captured, 25 (81%) were adult females, two (7%) were adult males, three (10%) were immature males, and one (3%) was an immature female. All 25 adult females gave evidence of reproduction. One captured 24 June 1973 was gravid, near full-term, weighing 9.7 g. Fifteen captured between the dates of 15 June and 12 June 1973 were lactating, weighing on the average 7.5 g (9.4 to 6.7 g). The 5 captured after 13 July 1973 had enlarged nipples and worn hair around the nipples indicating recent nursing. At least some of the young were independent of the mother shortly after this time as the first immature was netted on 18 July 1973.

In the summer of 1973, crepuscular flight patterns were routinely studied. *Myotis*, probably *sodalis* because they were five times more abundant (according to banding data) than *Myotis lucifugus*, had established a flight pattern along a hedgerow parallel to the river. These flights were very direct, taking as little as 20 sec to fly 300 m. These bats when monitored with a bat detector produced sounds which indicated direct flight rather than the rapid, irregular, clicking notes associated with feeding behavior. When the bats reached the site where the 9 m high net was located they turned and fed near it, sometimes being caught, but mostly flying around or over the net. From these data it seemed that the flight patterns were originating from somewhere in the hedgerow. Monitoring 40 to 50 m northeast of the starting point

of the hedgerow at dusk with the bat detector, revealed no bat activity. In the summer of 1973 we noted this flight pattern of *Myotis* up to 15 July. (After this date the flight pattern became inconsistent and we were unable to predict where the bats would feed.) Perhaps when the young became independent the flight pattern and habits of the bats changed.

### Discussion

*Myotis sodalis* is uncommon in samples of bats netted over streams in Indiana and Ohio. Cope (unpub. data) netted in six Indiana counties on 24 netting nights but failed to capture a single *Myotis sodalis* in 141 bats captured. Koestner (unpubl. data) netted for 21 nights in nine southwest Ohio counties capturing 201 bats of which only two (1%) were *Myotis sodalis*. Since 16% of our bats were *Myotis sodalis* and because of the special flight patterns observed in the summer of 1973, we have concluded that our nets were within the home range of a *Myotis sodalis* colony.

*Myotis sodalis* have a strong homing instinct to their hibernacula (4). As high as 80% of banded *Myotis sodalis* return the following year to the same cave where banded (Cope, unpub. data). It seems likely therefore that *Myotis sodalis* displaced from the elm tree in 1971 homed back to the same general locality in subsequent years.

*Myotis sodalis* apparently developed a consistent flight pattern while the young were unable to fly, but as soon as the young became independent, the flight pattern and feeding habits changed. Efforts to locate the maternity colony of this group of *Myotis sodalis* were unsuccessful.

Efforts to locate *Myotis sodalis* maternity colonies will be aided by a grant supported by the Department of Interior through a contract to the World Wildlife Fund in the summer of 1974.

### Acknowledgements

We wish to thank the following persons for help with the field work: Gregg Godsey, Janet and Steve Hinshaw, Fritz Drexler, Hadley Jenner, Marcia Starns, Bret Whitney, Mr. Clayton Clark, the landowner, and the Joseph Moore Museum, Earlham College, for a special research grant.

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