

A Preliminary Report on Bat Banding in Indiana

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The marking of bats with bands was initiated by Dr. Arthur A. Allen, of Cornell University, in 1916. Banding was conducted by several persons from this time, so that by the end of 1951 there were 33 active banders operating in the United States and Canada (1). Norman C. Negus, Ohio State University, was the first to band in Indiana and tagged 286 bats in Big Wyandotte Cave, Crawford County, in 1946. The authors obtained permits in the fall of 1951 and to date have banded over 6,000 bats.

Bands are supplied by the United States Fish and Wildlife Service and are small, aluminum bands identical to those used on birds. Each bears a number made up of two parts, that is, a series designation and a group of 5 or 6 additional digits, such as 21-90407 or ⁵⁴561238. Records are kept by the Section of Distribution of Birds and Mammals, U. S. Fish and Wildlife Service, under the supervision of Dr. John W. Aldrich. Bands are applied to the forearm of one wing of the bat in such a manner that they are free to slide along the radius and not pinch the skin.

Dr. Donald R. Griffin (2) gives as the major objectives of bat banding the determination of whether bats have a homing instinct, whether the same individuals utilize the identical summer and/or winter roost each year, and to trace the movements of individuals. Other objectives include determining the life span, sex ratios, phases of life history, physiology of hibernation, and parasites. Our banding in Indiana has been primarily concerned with movements, sex ratios, and the annual return of bats to identical roosts. Incidental to these aims have been the determining of bat populations, distribution, species composition, breeding range, and additional general knowledge regarding our native species. We are particularly interested in tracing the movements of *Myotis sodalis*, the Indiana bat, since its summer home is unknown. It was first described to science in 1928 from specimens taken in Big Wyandotte Cave, but has a wide distribution throughout the eastern United States.

Banding operations the past three winters have been greatly aided by the cooperation of many Earlham College students and a few other interested persons. Their invaluable assistance is greatly appreciated.

Methods

Most of our banding has been done in winter, when bats are congregated in caves and are easily captured in large numbers. Twenty-three caves throughout the limestone area of south-central Indiana have been visited. There are literally hundreds of caves of various sizes, however, which we have been unable to visit.

An attempt is made to capture every individual in the cave, but the nature of most caves makes this impossible. Several people usually comprise the banding team and after a few trips become very proficient, enabling us to band several hundred individuals in a relatively short time.

It is important that the bats are not held too long in the gathering cages, since their metabolic rate (usually very low during hibernation) accelerates rapidly and they utilize a considerable portion of their reserve energy, once they are fully awake. Excessive periods of action during their interrupted winter state of torpidity may cause them to use too much of this reserve. If this long active period is followed by many weeks of cold weather, many may starve before insect food again becomes available.

Efforts have also been made to locate colonies outside of caves at all seasons and we have banded in seven of these. Summer roosts are more difficult to locate and usually result in fewer animals to band, therefore our sample to date is quite small.

All bats captured are counted, identified, sexed, and given a cursory examination for external parasites, pelage coloration, and abnormalities. Some have been weighed and measured for special studies. In summer colonies, the animals are aged by an examination of the finger joints of the wings. Bats taken from the caves in winter cannot be aged accurately.

Findings

Field work carried out to date has supplied us with considerable information, although our banding program is a long-term project. We have attempted to sample caves believed to harbor the greatest number of bats, but have been greatly disappointed in the small populations found. Our work has paved the way for more intensive investigations and has pointed up the areas where additional data are sorely needed. We should like to present some of the significant findings at this time.

Populations:

Judging from earlier accounts, we expected to find Big Wyandotte Cave fairly swarming with bats. Visits on March 7, 1953, and March 20, 1954, however, have shown that this cave contains not more than 10,000. This is the largest concentration we have located, although other caves harbor from a few to 5,000. Almost every cave visited in winter has contained a few bats.

Species Composition:

Twelve species of bats are known from Indiana, but by far the greatest number of wintering individuals are the various species of *Myotis*. We have found seven species in the caves during our studies. In addition, we have picked up the skulls of *Lasiurus borealis* (red bat) and *Lasiurus cinereus* (hoary bat) in a cave at Spring Mill State Park. *Myotis grisescens* (gray myotis) and *Corynorhinus macrotis* (big-eared bat) are also known from Indiana caves. Only the one remaining species, *Nycticeius humeralis* (evening bat) has not been found in our caves. A summary of 6,160 bats banded prior to July 25, 1954, is as follows: *Myotis lucifugus* (little brown bat), 3,756; *Myotis sodalis*, 1,400; *Myotis austroriparius* (Mississippi myotis), 29; *Myotis keenii* (long-eared myotis), 17; *Pipistrellus subflavus* (eastern pipistrel), 534; *Eptesicus fuscus* (big brown bat), 411; *Lasionycteris noctivagans* (silver-haired bat), 2; *Lasiurus borealis*, 11.

Discussion and Future Plans

Further banding may be a helpful aid in determining the summer range of the Indiana bat. We hope to band as many of this species as we can find. Over the years we hope to determine if bat populations are really decreasing steadily, as seems evident in some caves at this time. It is doubtful if we can formulate the cause of any decline, but annual, detailed data from individual caves are necessary as a starting point.

In order to obtain a larger sample of the bat populations in our caves, we hope to work closely with the various speleological clubs over the state. We shall supply these organizations, and other interested persons or groups, with mimeographed information on the identification of our most common bats. When available, specimens will be given to these clubs as further aids in identification.

Additional knowledge of summer colonies is needed, since we have little means of determining the species composition or populations of summering species. We hope that persons knowing about bat colonies will contact us, for such congregations are usually located by chance. Studies concerning the life histories of various species can be initiated when colonies become available for research.

In addition to our banding, we propose to compile data concerning the range, population, and seasonal dispersion of all species of bats in Indiana. Some information on food habits may also be obtained. This material will be published at a later date. Locality records and/or specimens of all bats captured would be greatly appreciated. These may be easily preserved, entire, in 80 per cent alcohol, or they may be made into study skins, with skulls separate. A questionnaire sent to all colleges and universities in the state revealed that very few bat specimens are in their museums, notable exceptions being Earlham College and Purdue University.

Our combined study collections contain some 232 specimens. These will form the basis for any detailed morphological studies. We are actively adding material, as further collecting is carried out. The northern half of the state is poorly represented, thus material from there would be valuable to us. Specimens have been of considerable aid in banding work in that they have made it easier to distinguish between similar species.

In conclusion, we urge anyone knowing of a banded bat to report the band number to us promptly. If it is possible to obtain the bat, in case it is dead or injured, this would be desirable. In reading the band number on a live animal, be sure that all of the digits on the band are noted. Sometimes it is difficult to read a band that has grown into the flesh of the wing, but this seldom happens. If the band can be read in its entirety, it is best then to release the bat, unless it is obviously unable to survive. Bands may also be reported to the U. S. Fish and Wildlife Service, Washington 25, D. C.

Literature Cited

1. MOHR, CHARLES E. 1952. A survey of bat banding in North America, 1932-1951. *The American Cavern Bull.* 14.
2. GRIFFIN, DONALD R. 1936. Bat Banding. *Journal of Mammalogy*, 15(3) : 202-207.