

The Hoary Bat in Indiana

RUSSELL E. MUMFORD, Purdue University

Abstract

The hoary bat (*Lasiurus cinereus*) has been recorded from 34 counties in Indiana. All but one record of occurrence fall between April 12 and October 5; one specimen was taken January 31. The species probably breeds throughout the state. Most young are evidently born in June. Adult males appear to make up an extremely small percentage of the Indiana population.

First reported from Indiana in 1844 by Plummer (11) the hoary bat (*Lasiurus cinereus*) was long considered rare in the state. Lyon (4) knew of extant specimens from only Monroe and St. Joseph Counties, although other authors had published records (either without specimens or specimens since lost) from other localities. For a century after Plummer caught a hoary bat in a building in Wayne County, little was learned about this showy species in Indiana. Some Purdue University students became interested in bats in the late 1940's and in the spring of 1948 shot eight *Lasiurus cinereus* at West Lafayette (12). James B. Cope and I initiated a bat banding program in Indiana in 1951 and have been assisted by Earlham College students and others to the present. Nixon A. Wilson began banding later. Norman C. Negus did the first bat banding in Indiana, but worked with non-lasiurine species. John O. Whitaker, Jr., working in cooperation with the State Board of Health, has added numerous records through the identification of bats submitted to the Board for rabies tests.

Distribution and Seasonal Occurrence. The hoary bat probably occurs throughout Indiana and specimens are now in museums from 25 counties (7, 13, and hitherto unpublished records). Reliable sight records of lost or discarded specimens are at hand from 9 additional counties.

Findley and Jones (1) summarized the seasonal distribution of the hoary bat throughout its contiguous range, but their data for Indiana are incomplete. It seems worthwhile, therefore, to summarize Indiana records in more detail herein (Table 1). Except for the specimen (J. O. Whitaker 4003) taken January 31, 1967, at Terre Haute, Vigo County (14), all records for which dates of collection are known fall between April 12 and October 5. Most of the reports are for the months of May to August, probably the period when hoary bats are most abundant in Indiana. The single January record suggests that a few may winter. It is generally felt that over the northern part of the range of the hoary bat (which includes Indiana) the species migrates southward in the fall. Banding to date has failed to confirm such movement, but sightings and other circumstantial evidence indicate that migration does occur. The hoary bat is hardy and wide-ranging, capable of long flights. Its tolerance to northern winters requires investigation.

Population data are not available, thus the seasonal abundance of this species in Indiana is unknown. On the evening of May 29, 1948, I

TABLE 1. *Number of Records of Lasiurus cinereus in Indiana by County, by Month.*

County	Jan.	Apr.	May	June	July	Aug.	Sept.	Oct.	Month Un- known
Blackford					1				
Clay				5	2				
Franklin									1
Gibson								1	
Grant						1			
Harrison			1						
Howard					1				
Jackson					1				
Jefferson									1
Jennings			1						
Johnson				1					
Knox									1
LaGrange				2					
Lake				5					
Lawrence									3
Madison							1		
Marion			1	1	1				
Marshall						1			
Miami				2					
Monroe			1		1				
Montgomery					1				
Morgan					1				
Newton						1			
Parke					1				
Pike				2					
Pulaski						2			
St. Joseph					2				1

TABLE 1 (Continued)

County	Jan.	Apr.	May	June	July	Aug.	Sept.	Oct.	Month Un- known
Tippecanoe			5	4	1	4			
Vanderburgh		1		2	3	2	1		
Vermillion						1			
Vigo	1		1						
Wayne		2	2	5	7				1
Wells									1
White									1
Totals	1	3	12	29	23	12	2	1	10

shot two of at least three hoary bats feeding together along the border of a pastured woodlot near West Lafayette. Thomas W. Hoekstra and J. Scott Grundy shot five hoary bats at dusk on June 27, 1962, as the bats flew over a small pond near Munster (Lake County). Hoekstra told me that he and Grundy stopped shooting at the numerous bats when the five collected all proved to be *Lasiurus cinereus*; all bats seen that evening appeared to be this species. James B. Cope and his students netted and banded three hoary bats the night of July 12, 1962, near Richmond (Wayne County). More field work is necessary before the true status of this bat can be determined.

Habitat. *Lasiurus cinereus* is thought to be essentially a tree-inhabiting bat, roosting by day among the foliage. Such known roosting sites in Indiana include a pasture, residential areas, a wooded lake shore, a wooded campus, and an open area of mixed woodland, brush, and old fields. One individual was taken in a building; another was found clinging to the side of a building. There are a few records of skulls and other remains of hoary bats from Indiana caves (2, 6), but neither a live nor an intact animal has been discovered in caverns in this state. We would like to know at what season and under what conditions this bat enters caves. Most Indiana specimens have been shot or netted about woodlot borders, along small streams through pasture or cropland, or over ponds (mostly in non-wooded areas). The eight females taken at West Lafayette in 1948 were shot around the borders of a pastured, deciduous woodlot surrounded on three sides by pasture and on the fourth by a cultivated field. Other species of bats shot at this location include *Eptesicus fuscus*, *Myotis sodalis*, *Pipistrellus subflavus*, *Lasionycteris noctivagans*, *Lasiurus borealis*, and *Nycticeius humeralis*. Judging from the frequency with which hoary bats are submitted to the State Board of Health for examination, residential areas may be utilized to a considerable extent.

Breeding. The first breeding record for Indiana appears to be that of McAtee (5), who reported a female with two young at Bloomington (Monroe County) on July 12, 1905. Hahn (3) mentions this same report, but states that the specimens (now lost) were taken "in June." Additional breeding data have accumulated slowly, but the presence of hoary bats in most parts of Indiana in summer suggests that the species breeds throughout the state. On July 18, 1952, I shot a subadult female (U. S. National Museum 296436) in Jackson County (8). This bat flew weakly and evidently had been reared locally. A female (R. E. Mumford 2361) and two attached young were captured June 15, 1960, at Lafayette. Another female (Joseph Moore Museum 2009) and two attached young were taken in Wayne County on June 14, 1963. Single, non-flying young (JMM 2667, 2686) were taken in Wayne County on June 30 and July 6, 1966. Emery Jenkins found two young (REM 3996, 3997) at Brazil (Clay County) on June 12, 1964. An adult female (JOW 2613) captured at Terre Haute on May 28, 1964, gave birth to two young the same day (13). It is possible that the latter record represents a premature birth occasioned by the confinement of the female, for none of the eight gravid females taken at West Lafayette between May 19 and June 8, 1948, had given birth. An immature (JOW 4836) taken in Vanderburgh County on June 18, 1968, was probably not yet able to fly (forearm length 46 mm) and no doubt constitutes a local breeding record.

Lasiurus cinereus normally produces two young per litter; nine gravid females and three females with attached young from Indiana each had this number. In contrast, the smaller red bat (*Lasiurus borealis*) usually produces three, and sometimes four, young per litter. Parturition in hoary bats in Indiana probably occurs mostly in late May and the first half of June. The largest embryos examined, both from a female taken June 1 in Tippecanoe County, each had a forearm length of 16.5 mm. Two young, born to a confined female in Vigo County on May 28, had forearm lengths of 15 and 17 mm. At birth, young probably have forearms measuring from 16 to 20 mm (9, 10). Single flying young taken July 18 (Jackson County) and July 19 (Howard County) each had forearm lengths of 53 mm.

From available data, adult male hoary bats are quite rare in Indiana, especially from April through June. One (JOW 4946) was captured in Jennings County on May 31, 1968. For the April to June period there are records of 40 adult females (for a few sight observations the sex is not known). Likewise, most July and August records for adults are of females. Some of the males taken in July and August are of questionable age, but most are clearly young of the year.

Literature Cited

1. FINDLEY, JAMES S., and CLYDE JONES. 1964. Seasonal distribution of the hoary bat. *J. Mammalogy*, **45**:461-470.
2. HAHN, WALTER L. 1907. The mammalian remains of the Donaldson Cave. *Proc. Indiana Acad. Sci.* **15**:142-144.
3. ————. 1909. The mammals of Indiana. 33rd Ann. Report Ind. Dept. Geol. Nat. Resources. pp. 419-654.

4. LYON, MARCUS W., JR. 1936. Mammals of Indiana. Amer. Midl. Natur. **17**:1-384.
5. MCATEE, WALDO L. 1907. A list of the mammals, reptiles and batrachians of Monroe County, Indiana. Proc. Indiana Acad. Sci. **20**:1-16.
6. MUMFORD, RUSSELL E. 1953. Hoary bat skull in an Indiana cave. J. Mammalogy **34**:121.
7. MUMFORD, RUSSELL E., and JAMES B. COPE. 1964. Distribution and status of the chiroptera of Indiana. Amer. Midl. Natur. **72**:473-489.
8. MUMFORD, RUSSELL E., and CHARLES O. HANDLEY, JR. 1956. Notes on the mammals of Jackson County, Indiana. J. Mammalogy **37**:407-412.
9. MUNYER, EDWARD A. 1967. A parturition date for the hoary bat, *Lasiurus c. cinereus*, in Illinois and notes on the newborn young. Trans. Ill. Acad. Sci. **60**:95-97.
10. NERO, ROBERT W. 1958. Hoary bat parturition date. The Blue Jay **16**:130-131.
11. PLUMMER, JOHN T. 1844. Scraps in natural history (Quadrupeds). Amer. J. Sci. Arts **46**:236-249.
12. PROVOST, ERNEST E., and CHARLES M. KIRKPATRICK. 1952. Observations on the hoary bat in Indiana and Illinois. J. Mammalogy **33**:110-113.
13. WHITAKER, JOHN O., JR. 1967. Habitat and erproduction of some of the small mammals of Vigo County, Indiana, with a list of mammals known to occur there. Occ. Pap. Adams Center Ecol. Studies, No. 16:24 pp.
14. ————. 1967. Hoary bat apparently hibernating in Indiana. J. Mammalogy **48**:663.