LITERATURE CITED


Received: 9 January 1999 Accepted: 20 February 2000

OBSERVATIONS ON REPRODUCTION IN THREE SPECIES OF BATS – The purpose of our note is to report observations that we made concerning reproduction of the northern myotis (Myotis septentrionalis), evening bat (Nycticeius humeralis), and silver-haired bat (Lasionycteris noctivagans) in Kansas. With the exception of the big brown bat (Eptesicus fuscus) (Kunz 1974), and the cave myotis (Myotis velifer) (Kunz 1973), information about reproduction of bats in Kansas is limited.

We conducted statewide surveys of bats in Kansas from 1994 through 1996 (described by Sparks and Choate 1996, 2000). We recorded the reproductive condition of all bats handled. When we captured several animals in the same reproductive condition, we usually kept only one voucher specimen (all of which are housed in the Sternberg Museum of Natural History, MHP). We obtained additional information on reproduction from specimen labels in research collections (identified below).

Previous authors (Jones et al. 1967, Bee et al. 1981, Jones et al. 1985) regarded the silver-haired bat as a migrant that does not reproduce in Kansas. We captured a female silver-haired bat on 10 May 1995 as it flew over Bow Creek, 7.5 mi N and 0.25 mi W of Stockton, Rooks County. When we examined the bat in the lab, we noted that it contained two small fetuses (one in each horn of the uterus), each with a crown-rump length of 4 mm. This bat caused us to question the assumption that silver-haired bats do not reproduce in Kansas, and we netted throughout the drainage of Bow Creek until October in an unsuccessful attempt to catch additional silver-haired bats. We then re-examined the seven museum specimens of female silver-haired bats previously collected in Kansas during May, but none had been pregnant. We concluded that the silver-haired bat indeed is a migrant that does not bear young in Kansas, but that some females already contain small fetuses during migration over the state.

Historically the assumption was that the northern myotis migrates across Kansas and, in a few instances, hibernates in Kansas, but leaves the state to bear young (Jones et al. 1967, Choate and Fleharty 1975). However, we now know that the northern myotis is one of the most common bats in Kansas throughout the year (Sparks and Choate 2000). In summer of 1995, we captured five northern myotis that showed evidence of reproduction. On 3 July, we netted a female over a tributary of Paradise Creek 0.5 mi S and 1 mi E of Natoma, Osborne County, with a near-term fetus (crown-rump length, 16 mm) in the left horn of its uterus. On 15 July, we netted two lactating females along Bow Creek 13.5 mi N and 3.5 mi E of Bogue, Graham County. On 29 July, we netted a juvenile female along Paradise Creek in the town of Paradise, Russell County. At the same site, we captured a solitad juvenile male from a night roost. These specimens document that the northern myotis reproduces in Kansas.

Published information about reproduction in the northern myotis (summarized in Haysen et al. 1993) indicates that the timing of reproduction varies but that there is a tendency for reproductive events to occur earlier in the south. We suspect that reproductive milestones in Kansas typically are reached earlier than in Iowa, South Dakota, and New York, later than in Oklahoma, and at approximately the same time
as in Missouri and Indiana. Thus, we suspect that the pregnant female netted in Osceola County on 3 July 1995 was a late pregnancy.

Before our study, only one volant juvenile, two pregnant, and four lactating evening bats had been reported in Kansas. These were a female containing two fetuses (with crown-rump length of 5 mm) when caught in Douglas County on 25 May (Jones et al. 1967) and a female containing two fetuses (crown-rump length, 12 mm) when obtained in Ford County on 4 June (Birney and Rising 1968). Four lactating females were collected on 30 June in Barber County, and a volant juvenile was shot on 10 July in Comanche County (Kunz et al. 1980).

In 1994 through 1996, we captured 31 evening bats that provided information about the reproductive biology of this species in Kansas. To show the pattern revealed by these bats, we listed the captures beyond in chronological order without regard to year. On 11 May 1996, we captured three adult females at a locality 11 mi N and 1 mi W of Lincoln, Lincoln County. Each bat was pregnant with two fetuses (crown-rump lengths of 4, 9, and 12 mm). On 10 June 1995, we captured a female at a place 7 mi N, 4 mi E of Glade, in Phillips County, that was pregnant with three fetuses (crown-rump length, 11 mm). On 13 June 1994, we captured a lactating female 0.25 mi N, 0.25 mi W of Jamestown, Cloud County. On 3 July 1995, we captured two lactating females 0.5 mi S, 1 mi E of Natoma, Osborne County. On 5 July 1996, we captured two lactating females on the Kirwan National Wildlife Refuge (5.75 mi S, 6.25 mi E of Glade), Phillips County. On 8 July 1995, we captured seven lactating females and a volant juvenile male at a locality 7 mi N, 4 mi E of Glade, Phillips County. On 12 July 1994, we captured one volant juvenile female as it flew along Strong Creek on the Council Grove Wildlife Area in Morris County. On 29 July 1995, we captured a newly post-lactating adult female in Paradise, Russell County. On 12 August 1995, we captured five juvenile females and four juvenile males (each with descended testes) at a locality 7.25 mi N, 6.25 mi W of Stockton, Rooks County. On 26 August 1995, we captured a post-lactating adult female at a locality 1 mi N, 0.67 mi W of Concordia, Cloud County.

In Missouri and Iowa, near the Kansas border, the natural history of the evening bat has been studied in greater detail (Watkins 1970, Watkins and Shump 1981). The earliest documentation that evening bats had returned was on 19 April, and maternity colonies were formed between 6 and 15 May. All arriving bats were pregnant. Most births occurred during mid-June, although one female was pregnant on 8 July. Young were flying within the roost by 6 July but did not exit the roost until 11 July. Evening bats were not found after 12 October. Our observations in Kansas correspond closely to the results of these studies.

Partial funding for our research was provided by a contract (6326) with the Kansas Department of Wildlife and Parks. The Department of Biological Sciences and the Sternberg Museum of Natural History at Fort Hays State University provided additional funding. Permission to examine specimens in collections was granted by R. J. Timm (University of Kansas Natural History Museum), E. J. Finck, and D. W. Moores (Schmidt Museum of Natural History at Emporia State University). The following persons permitted access to property under their management: P. Briney, J. Clark, S. Gager, Kansas Department of Wildlife and Parks, S. Maupin, R. Muir, H. Tien, and an anonymous landowner. The following persons provided assistance in the field: S. M. Bergman, D. Bradley, P. A. Briney, C. Carr, M. Charles, M. David, G. C. Doll, B. E. Dorf, R. S. DeBaca, F. A. Duffey, H. F. Foutz, S. R. Hoover, V. L. Jackson, C. K. Ranneyer, D. Lantow, G. S. Mills, N. E. Mandlek, N. Stroly, D. Toll, E. W. Valdez, S. K. Wetter, and K. M. Wolfe. Four anonymous reviewers improved an earlier draft of our manuscript.--Dale W. Sparks, Jerry R. Choate, and Robert J. Winne, Department of Life Sciences, Indiana State University, Terre Haute, IN 47809 (DWS); and Sternberg Museum of Natural History and Department of Biological Studies, Fort Hays State University, Hays, KS 67601 (JRC, RJW).

LITERATURE CITED


Received: 24 August 1999 \hspace{1cm} Accepted: 30 June 2000