LATE SUMMER ACTIVITY OF SMALL-FOOTED, LONG-EARED AND BIG BROWN BATS IN DINOSAUR PARK, ALBERTA.

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Small-footed bats (*Myotis leibii subulatus*) occur widely in the badlands and arid river valleys of southern Alberta and probably Saskatchewan.[4] Little is known of the life history of the species there or elsewhere.[1] Therefore the capture of a number of small-footed bats in Dinosaur Park, Alberta, with long-eared bats (*Myotis evotis*) and big brown bats (*Eptesicus fuscus*) is of some interest. On 20 August 1979 we captured bats at an abandoned garage at the old Stevesville Ferry site in the north end of the park; the garage is used by bats only during the night. We captured two adult female and one adult male small-footed bats as well as a little brown bat (*Myotis lucifugus*) and a big brown bat. Similar use of buildings by small-footed bats as night roosts has been noted in Colorado and is common behavior elsewhere among other bat species.

On 21 August 1979 we found a little brown bat in the awnings of the warden's cabin at the park headquarters and another in a small cavern in the badlands. That night we captured 22 small-footed, 4 long-eared and 2 big brown bats in a mist net placed at the entrance to another cavern. Many more small-footed bats were present but, as others have observed,[1] they appeared to detect the net and turn away. Small-footed bats are extremely slow flyers which likely allows them time to avoid the net at close quarters.

Most bats of the bat family (Vespertilionidae) present in Alberta and Saskatchewan have similar reproductive cycles. In the northern hemisphere most mating takes place in September, though this occurs to a varying extent later as well. The females store the sperm over the winter; ovulation and fertilization occur in the spring. Testes are largest in late July and early August, most sperm production occurring in the latter month. During August the sperm is stored in the epididymides which enlarge. Sperm production has ceased by the time of breeding and the testes are smaller. In the mountains of Alberta, and possibly other northern and colder regions, the timing of these events may be somewhat compressed compared to areas of more moderate climate where bat reproduction has been examined in detail.[5]

Reproductive organs of the bats collected for the Provincial Museum of Alberta were examined to determine the breeding condition. Table 1 shows some measurements of reproductive organs of male small-footed bats captured 21 August in

Table 1. TESTES AND EPIDIDYMIDES MEASUREMENTS[a] OF ADULT AND JUVENILE MALE SMALL-FOOTED BATS FROM DINOSAUR PARK, ALBERTA, 21 AUGUST 1979.

Age group	*Testis diameter*	*Cauda epididymidis diameter*	*Cauda epididymidis length*	*No. bats*
Adult	2.0±0.5, 1.8-2.5	2.0±0.1, 1.7-2.5	3.7±0.9, 1.8-6.0	5
Juvenile	1.5±0.3, 1.1-1.9	1.5±0.2, 1.0-2.0	2.0±0.6, 1.4-3.0	16

[a]mm — Mean ± S.D., Range

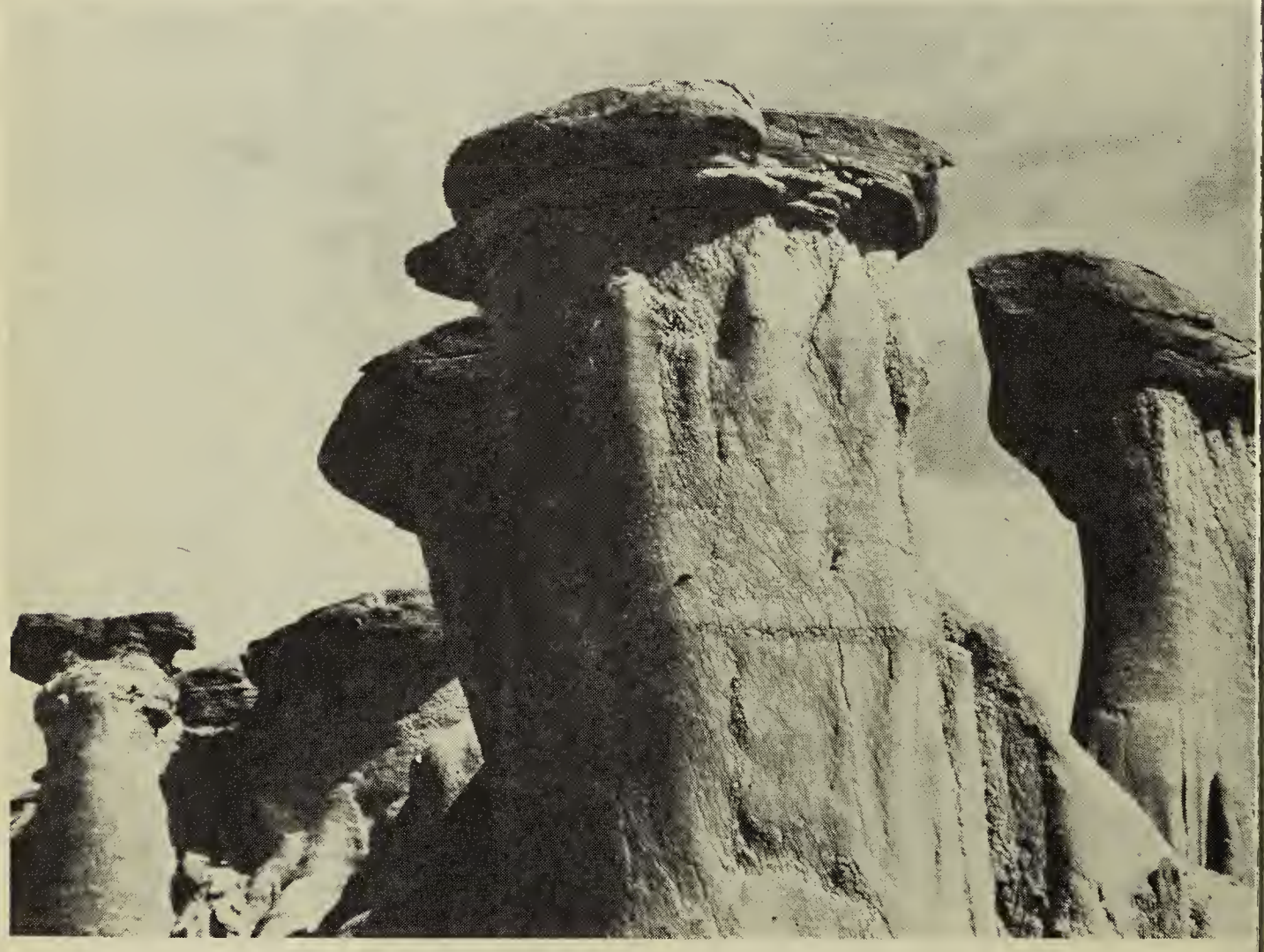
Dinosaur Park. Only one adult male appeared to be in breeding condition; his testes (1.8 mm) were the smallest of the adult males and no sperm were found in them; the cauda epididymides were the largest (5.3 and 6.0 mm) of the males. He was, as well, the heaviest (7.1 g) of the small-footed bats captured. The other adult males had not reached breeding condition. Active sperm manufacture was still occurring in the testes and, if size of the epididymides is a reliable indication, they had stored considerably less sperm than the largest male. Juvenile male testes were smaller than those of adults, the smaller bats generally having the smallest testes. No evidence of sperm was detected among the juvenile males. Weights of juvenile males averaged considerably less than adult males (Table 2).

Visual examination of the nipples and reproductive tracts of female small-footed bats showed three of the five adults to have suckled young. Those three, and one of the adults which had not suckled young, had enlarged right uterine horns; the remaining adult and the four juveniles examined had smaller, nearly symmetric uteri. The larger asymmetric uteri probably indicated that those bats had been pregnant with a single fetus. Sperm could not be found in the tracts of the females, however, that was not unexpected as only one male appeared to be in breeding condition.

Table 2. WEIGHTS[a] OF SMALL-FOOTED BATS CAPTURED 21 AUGUST 1979 IN DINOSAUR PARK.

	Adult		Juvenile	
	Male	*Female*	*Male*	*Female*
Weight	6.0±0.9, 4.9-7.1(5)	5.8±0.3, 5.3-6.1(5)	4.5±0.3, 3.9-4.9(8)	4.8±0.2, 4.9-5.1(4)

[a]g — Mean ± S.D., Range (number of bats)



Dinosaur Provincial Park, Alberta. *Wayne Lynch*

Fall reproductive activity of male small-footed bats may be like that of little brown bat males at Cadomin Cave.[5] There, little brown bat juvenile males are not reproductively active; they weigh considerably less than adult males, which are even heavier than many adult females (which are larger bats) at the beginning of the breeding season. Fall breeding in that species evidently involves considerable weight loss as adult male little brown bats enter hibernation weighing considerably less than earlier in the fall. Juveniles continue to gain weight. That the juvenile small-footed bats we collected were not reproductively active and that the heaviest bat was the only male in breeding condition suggests a parallel situation with that described for those little brown bats; however, this can not be definitely determined on the basis of a single collection. Long-legged bat (*Myotis volans*) adult and juvenile males at Cadomin Cave gain weight through the fall and both ages are reproductively active.[5] We have also found that among a small sample of big brown bat juvenile males collected in fall, the heavier individuals are coming into, or are in, breeding condition while the lighter ones do not appear likely to breed. Thus all or some of the juvenile male small-footed bats could breed in their first year, although they would necessarily come into breeding condition later than the adults as none we collected showed evidence of advanced production of sperm.

We have captured small-footed bats throughout the summer in southern Alberta and the species undoubtedly gives birth in Dinosaur Park as they do in similar habitat in South Dakota.[7] They may also hibernate there as small-footed bats are noted to be extremely cold tolerant during hibernation[1] and the species hibernates in south-central Montana.[6] It is likely that some of the cracks in the park badlands go in beyond the frost line and may provide suitable hibernacula.

We would like to thank Jim Bahr and Karen Cosby for showing us the location of the cave in Dinosaur Park and first noting the bats there. The warden and park naturalists of Dinosaur Park assisted our efforts and Provincial Parks and Recreation issued permits to collect in the park.

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