MALE PSEUDOHERMAPHRODITISM IN A POPULATION OF KANGAROO RATS, *DIPODOMYS ORDII*

Bawdon (1965) reported hermaphroditism in an Ord's kangaroo rat (*Dipodomys ordii*) trapped in southeastern Oregon. The specimen possessed a full complement of male and female reproductive structures but histologic examinations of gonadal tissues were not made to verify the presence of gametes. There are no other reports of this abnormality among heteromyid rodents. This paper provides the first histologic examination of pseudohermaphroditism in a population of *D. ordii*.

From 26 September 1981 to 11 September 1982, 100 Sherman live traps were set biweekly on 20 ha of mesquite grassland 8 km SE Portales, Roosevelt Co., New Mexico. Of the rodents collected, 124 were *D. ordii* of which 39 were males, 65 were females, and 20 (16.1%) were presumed to be hermaphrodites based on gross gonadal examination. Testes and proximal and distal portions of both uterine horns of all specimens were prepared for standard histologic examination. Tissues were fixed in Bouin fixative, embedded in paraffin, sectioned at 6 μm stained with Gill's hematoxylin and eosin Y, and mounted in Permount according to Humason (1979).

The reproductive tracts of the pseudohermaphrodites resembled those described by Bawdon (1965). A vaginal opening was present between the penis and the anal opening, and well-developed testes, baculum, and uterine horns were present internally (Fig. 1A). Bawdon (1965) found what appeared to be an ovary attached to one uterine horn. However, there was no evidence that ovaries were present in any of our specimens. Instead, the distal ends of the uterine horns were folded back on themselves.

Histologic examination of upper (Fig. 1B) and lower (Fig. 1C) horn sections revealed that maturing follicles were absent and the lumen was occluded in all specimens. The lumen had undergone an apparent fibrosis near the distal end (Fig. 1B) and the proximal end was filled with loose connective and adipose tissues. Conversely, the testes consisted of many functional

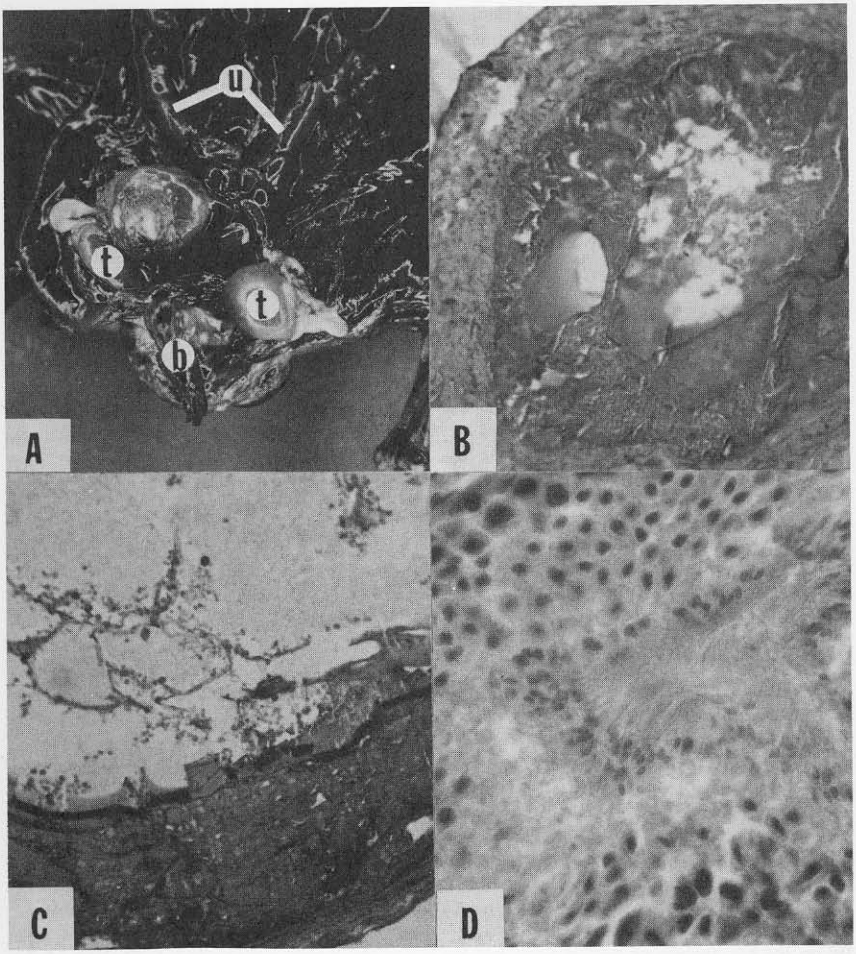

FIG. 1—(A) Pseudohermaphroditic male kangaroo rat with testes (t), baculum (b), and uterine horns (u). Histologic sections of distal (B) and proximal (C) uterine horn and testis (D) indicate male pseudohermaphroditism.

seminiferous tubules, each containing spermatozoa (Fig. 1D). The combined presence of functional testes and accessory male reproductive structures with a rudimentary female reproductive system indicated that 34% (20 of 59) of the non-female individuals were pseudohermaphroditic (Burns, 1980) males.

Age was determined according to criteria of Best and Schnell (1974). The mean weight of normal subadult male (n=15) was 54.5 g whereas the pseudohermaphroditic subadults (n=2) weighed 60.19 g a weight difference of 9.3%. Normal adult males (n=19) averaged 5.24% lighter in weight (65.27 g) than adult (n=18) pseudohermaphrodites (68.88 g). Their weight ranges were 54.4-76.3 g and 59.4-86.4 g, respectively.

When we examined individual captures we found that all adult males captured during October, November, December, and March were pseudohermaphrodites; during January and June, only normal males were taken. The large number of pseudohermaphrodites observed during the late autumn and winter corresponds, in part, to the peak reproductive season of *D. ordii* in the southern Great Plains (Hoditschek and Best, 1983).

To better understand the biologic significance of pseudohermaphroditism in *D. ordii*, additional studies are needed to determine possible advantages or disadvantages associated with

the difference in body weights among dimorphic males, and to elucidate the selective forces that maintain such an abnormality within this population.

We thank Derik de Bruin, Kristy Yerkes, Bryan Nygren and Ron Moore for their help in collecting specimens and Drs. Brian R. Chapman and Thorvald Holmes, Jr. for reviewing the manuscript. We also thank the Llano Estacado Center for Advanced Professional Studies and Research, Eastern New Mexico University, for financial support granted to the senior author.

Literature Cited

Bawdon, E. D. 1965. A hermaphroditic kangaroo rat. J. Mamm. 46:684.

Best, T. L. and G. D. Schnell. 1974. Bacular variation in kangaroo rats (genus *Dipodomys*). Amer. Midl. Nat. 91:257-270.

Burns, G. W. 1980. The science of genetics. Macmillan Publ., New York.

Hoditschek, B. and T. L. Best. 1983. Reproductive biology of Ord's kangaroo rat (*Dipodomys ordii*) in Oklahoma. J. Mamm. 64:121-127.

Humason, G. L. 1979. Animal tissue techniques. W. H. Freeman and Co., San Francisco.

Gary S. Pfaffenberger, *Dept. of Life Sciences and Natural History Museum, Eastern New Mexico Univ., Portales, NM 88130;* Floyd W. Weckerly, *Memphis State Univ., Memphis, TN. 38152,* and Troy L. Best, *Dept. of Biol. and Museum of Southwestern Biol., Univ. of New Mexico, Albuquerque, NM 87131.*