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BULLETIN OF THE UNIVERSITY OF NEBRASKA STATE MUSEUM

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in Nebraska

By
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CONTRIBUTION OF THE DIVISION OF ZOOLOGY

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The Goss Lemming Mouse, *Synaptomys cooperi gossii* (Coues), in Nebraska

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IN the course of studies on the cestode parasites of microtine rodents by one of the authors (Hansen), specimens of mice were sent to the United State National Museum where they were identified by Dr. David H. Johnson. Two of these microtines proved to be *Synaptomys cooperi gossii* (Coues). These specimens of *Synaptomys* (U.S.N.M. Nos. 282343 and 282344), collected at Lincoln, Lancaster County, Nebraska, on September 16, 1946 (male) and November 20, 1946 (female), respectively, are the first ones to be identified from Nebraska.

Examination of the mice in the collections of the University of Nebraska State Museum has revealed a skin and skull of *Synaptomys cooperi gossii* (No. 268, Collection of State Entomologist). This specimen was collected on Stephens Creek, near Lincoln, Nebraska, on March 14, 1914, by Myron H. Swenk and L. M. Gates. The tag on this specimen bears no determination, the identity of the mouse apparently having gone unrecognized until now.

Among the specimens of microtines in the collections of the Department of Zoology of the University of Nebraska is the skin of a mouse, taken by Watson E. Beed in the Niobrara Game Preserve, near Valentine, Cherry County, Nebraska, on June 9, 1934, of which the short tail (22 mm.), the six plantar

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tubercles, the configuration of the nail of the first digit of the front foot, and the general character of the pelage distinguish it as one of *Synaptomys*. There is, unfortunately, no skull with the skin. Under these circumstances, this specimen must be referred to *cooperi gossii*. Beed (1936), in his report on the mammals collected or seen by him in his studies near Valentine, does not record the occurrence of *Synaptomys* in any of the communities described by him.

Howell (1927, p. 18), in his revision of the American lemming mice, defines the range of *S. c. gossii* as "the west-central Mississippi Valley country, mostly in the Upper Austral Zone, from northeastern Arkansas and southern Illinois into Iowa and extreme southeastern South Dakota." Howell's inclusion of southeastern South Dakota is based upon the statement of Hahn (1909, p. 522) that he (Hahn) had taken lemming mice, which he called *gossii*, on the Missouri River in that region.

In addition to the localities given by Howell (*loc. cit.*, pp. 10 and 19), Van Hyning (1913, p. 311) recorded a specimen of *S. c. gossii*, taken by T. Surber at Fairport, Muscatine County, Iowa, and Stoner (1918, p. 108) reported a specimen from Logan, Harrison County, Iowa. Scott (1937, p. 77) states that "there is a record of this mouse for Dickinson County, Iowa, by Stevens (1922, p. 56)." Examination of Stephens' report shows his statement to read ". . . very few specimens have been taken in Iowa and none in Dickinson County." Necker and Hatfield (1941, p. 54) report specimens of *S. c. gossii* from Seymour and Urbana in Champaign County and Flat Rock in Crawford County, Illinois.

Hibbard (1943, p. 8) writing on the occurrence of *S. c. gossii* in Kansas, says that the subspecies is "known only from Anderson, Douglas, Stafford, and Woodson Counties." Previous to this statement by Hibbard, specimens of this lemming mouse had been reported from Manhattan in Riley County, and from Topeka, presumably from within Shawnee County, Kansas (Linsdale, 1927, p. 51); from Leavenworth in Leavenworth County, Kansas (Howell, *loc. cit.*, p. 19 and Linsdale, 1927, p. 51), and from Atchinson and Jackson Counties, Kansas (Burt, 1928, p. 213).

The map in Fig. 1 shows the distribution and localities of record of *S. c. gossii* as presented by Howell (*loc. cit.*, p. 10),

with the additional localities noted above, including the records for Nebraska here reported.

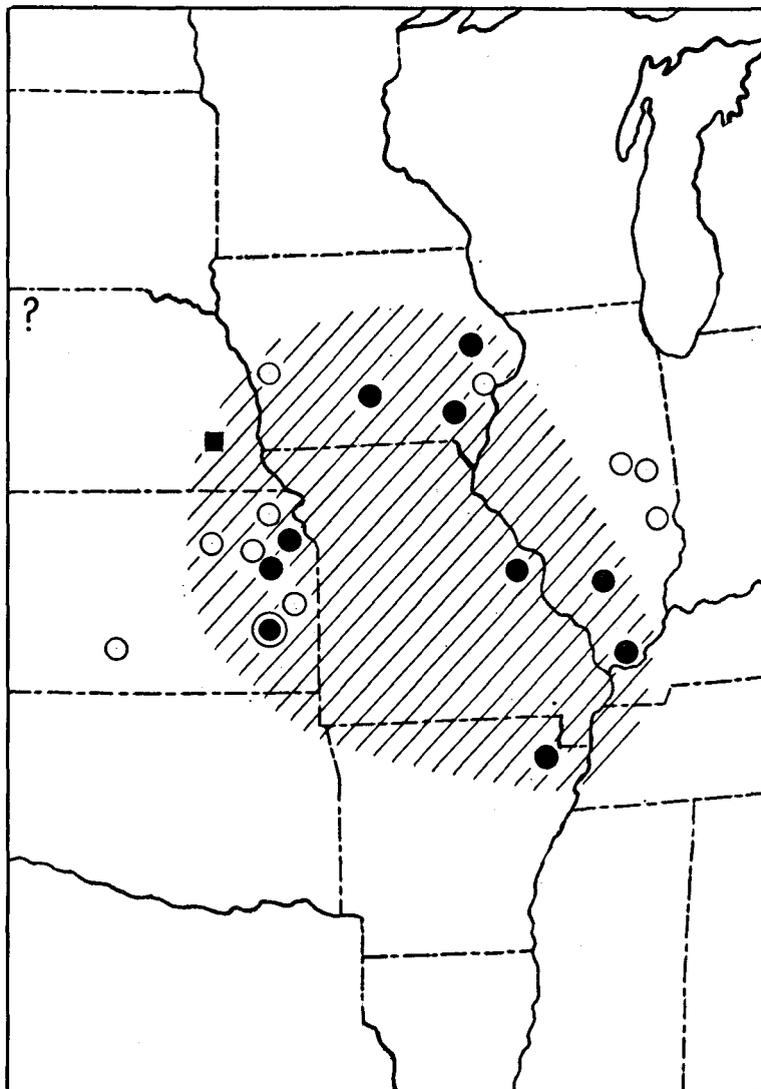


FIG. 1.—Distribution of *Synaptomys cooperi gossii*. Solid dots indicate specimen records, the encircled dot the type locality, as given by Howell (1927); the shaded area shows the distribution as projected by that author. Open circles indicate localities of record given by other authors. The solid square represents the Lincoln, Nebraska, record of occurrence, the question mark the tentative Valentine, Nebraska, record.

The Lincoln, Lancaster County, Nebraska specimens were taken within the range of *gossii* as projected by Howell (*loc. cit.*, p. 10). The Valentine, Cherry County, Nebraska record here reported tentatively, extends the possible range of this mouse about 180 miles to the west of "extreme southeastern South Dakota," and about 200 miles northwest of the range as mapped by Howell. (Fig. 1)

From September 9, 1946 to May 14, 1947, inclusive, a total of 22 Goss lemming mice have been captured in live traps in the vicinity of Lincoln, Nebraska. Measurements of some of these specimens, together with measurements of specimens taken in Kansas as reported by Howell (*loc. cit.*, p. 18), and Linsdale (*loc. cit.*, p. 53), are given in Table 1.

A male lemming mouse, captured November 29, 1946, was placed in a wire mesh cage measuring 31 inches on each side, where he exhibited what seemed to be an extremely nervous temperament, a characteristic previously reported by Burt (*loc. cit.*, p. 215). The lemming repeatedly climbed the side of the cage and upon reaching the top would appear to let himself fall to the bottom. On the morning of November 30 he was found dead; his skull showed a fracture of the zygomatic arch. Another specimen, captured January 23, 1947, was kept in captivity in a cage measuring 20 x 20 x 13 inches. Until found dead on March 10, 1947, he was fed on oatmeal, lettuce, and wheat-germ diet.

Synaptomys is apparently active all winter in southeastern Nebraska. Some specimens were taken at freezing temperatures; the minimum temperatures on November 29, 1946 and January 23, 1947 were 27 and 28 degrees Fahrenheit,* respectively. Burt (*loc. cit.*, p. 214) observed that the Goss lemming mouse in Kansas was active at temperatures as low as 4 degrees below zero Fahrenheit.

On May 1, 1947, two pregnant Goss lemming mice were captured. One of them contained four embryos; the smallest embryo measured 5.0 mm., the largest measured 10.0 mm. in length. All four of the embryos were in the right uterine horn. The other female contained six embryos; the smallest embryo measured 15.0 mm., the largest 20.0 mm. Four embryos were

* Temperatures supplied by Prof. Irving H. Blake, Department of Zoology, University of Nebraska.

in the right uterine horn, two were in the left. On May 10, 1947, a female was captured which contained four embryos; the smallest embryo measured 19.0 mm., the largest 20.0 mm. The right uterine horn contained three embryos, the left horn one.

Several specimens of *Synaptomys* were taken in swinging-door traps set directly in the runway; others were taken in snap-door traps set beside the runway. An oatmeal-peanut butter mixture was used as bait. Catches in the latter set indicate this lemming will seek out an acceptable bait. Swanson *et. al.* (1945) state that the bog lemming mouse, *Synaptomys cooperi cooperi* Baird, was difficult to trap unless the traps were placed directly in its runways and that this mouse merely blundered into the trap. We have captured *S. c. gossii* and *Microtus ochrogaster* Wagner in the same runway; the mutual use of a runway by these two species was likewise observed by Burt (*loc. cit.*, p. 213).

Three of the 22 specimens secured at Lincoln in the winter of 1946-47 were taken on a south slope near the top of a hill above the valley of Salt Creek and about two miles north of the city in a fenced area where bluegrass (*Poa pratensis*) is the dominant species, forming a dense sod. Big bluestem (*Andropogon furcatus*) and switch grass (*Panicum virgatum*) are prominent in the habitat. Prairie cordgrass or slough grass (*Spartina pectinata*) and tall dropseed (*Sporobolus asper*) are also present. Ironweed (*Vernonia* sp.), sunflower (*Helianthus* sp.) thistle (*Cirsium* sp.), and vervain (*Verbena* sp.) constitute the few herbs present. Wild rose (*Rosa* sp.) occurs scattered among the grasses and heavy thickets of sumac (*Rhus* sp.) are present. Scattered ash (*Fraxinus* sp.), catalpa (*Catalpa* sp.), and mulberry (*Morus* sp.) trees are in the immediate vicinity. A cornfield occurs nearby. One specimen was taken on the north slope of the same hill at a distance of about 200 yards in much the same vegetational complex, except for the proximity here of a thicket of wild plum (*Prunus* sp.) and a semi-wooded ravine. An occupied dwelling stands on the top of the hill about midway between these two collecting sites. This area has in the past been grazed by domestic livestock, but has been protected and unmowed for 6 years.

A surface runway at the first site was examined on February 15, 1947, by laying aside the heavy cover of dead bluegrass and big bluestem. No attempt was made to follow runways below the surface of the ground or to find nest cavities. The bases of blue grass leaves on the floor of and at the edge of the runways showed where cuttings of green food had been made. The green feces, mentioned by Burt (*loc. cit.*, p. 215) as typical of *Synaptomys*, was found in the runs as well as in the live-traps.

Notes on the tag accompanying the specimen taken at Lincoln by Swenk and Gates in March, 1914, indicate that it was "caught in mouse trap set in runway in grass at edge of thicket," and that oatmeal was used for bait.

Near the second collecting site described above and on the south side of an east-to-west ravine (Fig. 2) the other 18 Goss lemming mice have been taken. Due to the relatively steep north slope at this site, exposure to insolation and prevailing



FIG. 2.—Habitat of *Synaptomys cooperi gossii*. The grassy area between the low trees in the background and the sumac in the foreground is the site at which most of the Nebraska specimens have been taken.

summer winds is less than in the other sites; soil moisture values are undoubtedly higher. Field crops are produced annually on either side of the ravine; there has been no known grazing within recent years. Blue grass, though present, is here subordinate to the tall grasses. Sunflower, sour dock (*Rumex* sp.), and *Aster* sp. are represented by a few individuals. A small patch of sage (*Artemisia gnaphalodes*), scattered wild roses and rather open stands of sumac complete the vegetational complex within which these 18 mice were collected. Small elm and ash trees border this site on 2 sides, gooseberry bushes (*Ribes* sp.) and wild strawberries (*Fragaria* sp.) occur close by. This appears to constitute the most successful habitat for *Synaptomys cooperi gossii* yet encountered in the vicinity of Lincoln, Nebraska, and the mouse is here in considerable abundance.

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