

## A CONCENTRATION OF LEMMING MICE (*SYNAPTOMYS COOPERI*) IN CENTRAL ILLINOIS

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Lemming mice (*Synaptomys cooperi*) have long been regarded as rare in Illinois. Cory, in his report on the mammals of the state, says "So few specimens have been taken in Illinois that we know very little as to its habits in the state." (1912, 236). Even in 1941, Necker and Hatfield, in their account of the "Mammals of Illinois," list only 5 localities for the State from which specimens had been taken. Koestner (1941) and Goodnight and Koestner (1942) in studies of populations of mammals in central Illinois have emphasized the scarcity of individuals of the lemming mouse.

In the fall and winter of 1946-1947, our own investigations in central Illinois indicated that lemming mice were abundant at this time in their restricted habitat. They were caught at five previously unreported localities and were abundant at two of these places. Our most intensive investigation was undertaken along the Sangamon River, 5 miles west and 2½ miles south of Monticello, Piatt County, in the Allerton Park of the University of Illinois. Here there were several hundred, estimated at 650, acres of ungrazed, uncut blue-grass adjacent to the forest, with the latter extending down to the river's edge. Lemming mice were the dominant small mammal trapped in the Allerton Park during the fall and winter in this blue-grass habitat.

Near the middle of November 1946, the number of *Synaptomys* was 35 per acre. This was more than twice the number of all the other mammals caught in the acre trapped. In February 1947, the population per acre was 20, and in March, 22 per acre (table 1) judging from our catch.

At first it was surmised that the large number of lemming mice at the fall period represented a peak in a cycle. Trapping was purposely extended through the winter in anticipation of a possible sharp decline in numbers of individuals. No such sharp decline occurred. The decline by some 40 percent from November to February was probably the result of "normal" predation without replacement by young. Females caught in February were without embryos, but on April 7 and 8 all the females caught were pregnant, as determined by the presence of a vaginal plug or embryos. Since reproduction did not extend through the winter, it might be inferred that this population of lemming mice had not reached the peak of its cycle of abundance, because information concerning other microtine rodents, such as *Microtus pennsylvanicus*, indicates that during the final year in a cycle, young are produced throughout the winter as well as the other seasons.

The three areas chosen in the Allerton Park for sampling the population and determining numbers of

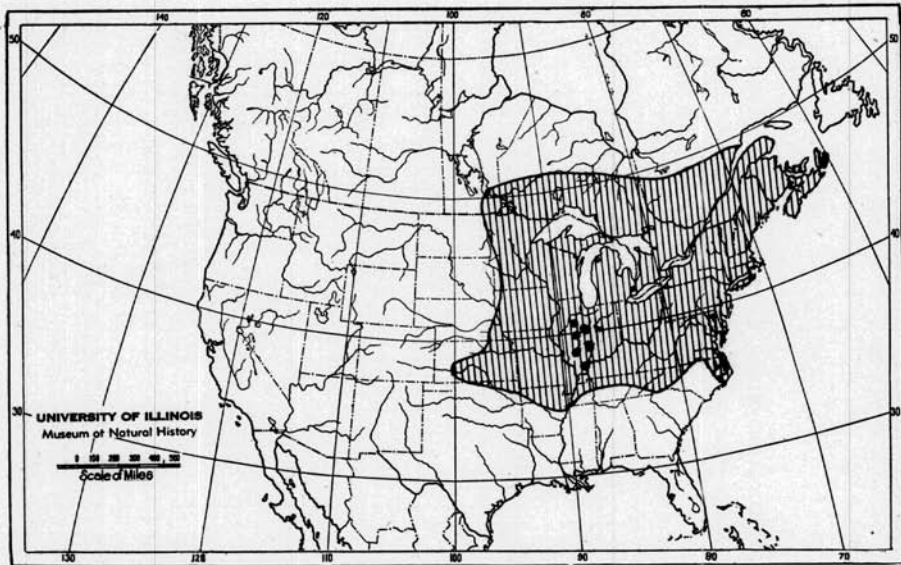


FIG. 1.—Map showing the distribution of the lemming mouse, *Synaptomys cooperi*, in North America, with localities from which specimens have been recorded in Illinois indicated by solid circles.

individuals were circular in shape. With such a shape, the perimeter is reduced and as a consequence there may be a reduction, at least theoretically, in the number of indrifting, "non-native" animals. Lemming mice are also probably more sedentary than some other kinds of small mammals and do less drifting, or shifting of home areas, when alterations in population densities occur. An acre was trapped for three days in November (10th to 12th) by D. G. Allison and R. M. Wetzel. The 130 snap-traps caught animals indicated in table 1. A half-acre, with 165 snap-traps, and five-eighths of an acre, with 97 snap-traps, were studied and trapped on February 23 and 24 and April 7 and 8, respectively. All three areas were in the grassland at the forest's edge. A few small trees were interspersed among the blue-

grass. Here in the Allerton Park, lemming mice were closely associated with habitats that are predominantly, if not exclusively, of blue-grass, and are found in places where the blue-grass has not been cut or grazed for some time. The tall, uncropped blue-grass falls over providing cover and possibly protection to the surface runways, and the grass also provides a source of food. In areas in the Park where hay has been removed in the past few years, little or no sign of *Synaptomys* is evident. Wherever the lemming mice are numerous, their runways are littered with greenish fecal pellets, and in many places there is such a concentration of excreta as to form a solid mat on the floor of the runway. The presence of green fecal pellets however is not necessarily indicative of *Synaptomys* alone for the droppings

TABLE 1.—NUMBERS OF SMALL MAMMALS IN THE GRASSLAND ALONG THE SANGAMON RIVER, CENTRAL ILLINOIS, 1946-47

	Population per acre			Actual catch						Population per 650 acres			
	Nov.	Feb.	April	November (1 acre)			February (1/2 acre)		April (5/8 acre)		Nov.	Feb.	April
				10th	11th	12th	23rd	24th	7th	8th			
Lemming Mouse ( <i>Synaptomys cooperi</i> ) .....	35	20	22	8	13	14	7	3	9	5	22,750	13,000	14,300
Meadow Mouse ( <i>Microtus ochrogaster</i> ) .....	10	24	14	7	1	2	5	7	8	1	6,500	15,600	9,100
White-footed Mouse ( <i>Peromyscus leucopus</i> ) .....	6	6	0	2	2	2	2	1	0	0	3,900	3,900	.....
Least Shrew ( <i>Cryptotis parva</i> ) .....	0	4	0	0	0	0	1	1	0	0	.....	2,600	.....
Total .....	51	54	36								33,150	35,100	23,400

of the yellow-bellied meadow mouse, *Microtus ochrogaster*, occupying the same habitat, and probably the same runways, may be equally bright green. When these meadow mice are feeding solely on blue-grass, their fecal material is as green as that of *Synaptomys*.

Approximately 650 acres of grassland in the Allerton Park are suitable for occupancy by lemming mice. Superficial examination of many parts of this grassland indicates that these mice are just as abundant throughout the 650 acres as they were in the three plots that were trapped. If such an assumption is correct, one can estimate the total population of lemming mice in the Allerton Park to be 22,750 in November 1946 and 13,000 and 14,300 in February and April 1947 respectively. In spite of this concentration of lemming mice, they probably do little or no damage to the natural cover. The amount of blue-grass that they crop off has little effect upon the total cover as far as we could note. On the contrary the dry grass carried below ground adds im-

portant humus to the soil. After a heavy rain at the Allerton Park there was no free water on the surface of the ground for the excess water had been stored in underground runways. As a result of this the ground was so saturated with water that when one stepped on it the ground vibrated or quaked. The underground burrows hasten the penetration of surface water, retard run-off, and serve to retain excess water. These lemming mice are most likely beneficial, rather than detrimental, on the ungrazed, uncut grassland they occupy in at least some parts of Illinois.

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