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A Study of the Small Rodents of Black Hawk County, Iowa (1961-1962)¹

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Abstract. Two-hundred and fifty-nine small rodents were collected in Black Hawk County, Iowa, from June 1961 to June 1962. Specimens were taken from 53 locations in the county.

Specimens of the following species were collected: *Spermophilus tridecemlineatus tridecemlineatus*, *Reithrodontomys megalotis dychei*, *Peromyscus maniculatus bairdii*, *Peromyscus leucopus noveboracensis*, *Microtus pennsylvanicus pennsylvanicus*, *Microtus ochrogaster ochrogaster*, and *Mus musculus*.

Perognathus flavescens perniger and *Tamias striatus griseus* were reported to have been obtained by other investigators, but neither was taken during this study period.

The small rodents of Black Hawk County, Iowa, have never been reported on as a group. This study was made from June 1961 to June 1962 to obtain data concerning these small rodents.

THE STUDY AREA

Black Hawk County, Iowa, is located in northeastern central Iowa, in the fourth tier of counties south of Minnesota and in the fourth tier west of the Mississippi River (Longitude: 92° 5'-33'W. Latitude: 42° 18'-38'N).

The area of the county is 565 square miles. It is in the Iowan drift soil area and a major portion of its soils are of glacial origin. Much of the soil is covered with loess deposits and is considered loessial (Stevenson, 1920).

The general topography of the land is gently rolling prairie cut by the valleys of the Cedar and Wapsipicon rivers. Drainage of the area is effected primarily by the Cedar River and its tributaries.

According to Paul Barger (letter, 1962) of the Black Hawk County Extension Office, the utilization of the land is as follows: crops—274,820 acres; pasture—39,700 acres; forest and woods—7,408 acres; farmsteads—10,529 acres; not in farms—30,412 acres.

DEFINITION OF SMALL RODENT

The term small rodent as used herein includes the following members of the order Rodentia as described by Hall and Kelson (1959): Family Sciuridae, genus *Tamias* and *Spermophilus*;

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Family Heteromyidae; Family Cricetidae except genera *Neofiber* and *Ondatra*; Family Muridae except genus *Rattus*; Family Zapodidae.

METHODS AND MATERIALS

Methods of Obtaining Specimens. Any small rodent authentically determined to be from Black Hawk County was accepted as material for this study. Trapping in the field with Sherman live-traps and common household snaptraps baited with a variety of materials was the primary source of specimens.

Traps were set at 55 different sites within the county. The pattern presented by the locations of the sites is more concentrated in the northwest corner of the county. A total of 3,371 trap-nights and 1,270 trap-days were counted during the study.

Traps were set in the greenhouse and other buildings at the State College of Iowa in Cedar Falls and netted numerous specimens. Several individuals brought in specimens obtained from cats and from traps in homes. During the spring months several specimens were caught by hand in the field.

Identification of the Specimens. The specimens were classified according to the description given by Hall and Kelson (1959).

Museums and Individuals Queried. Requests were sent to museums and two individuals for information concerning specimens and records of any small rodents in their collections. The study and museum specimens at the State College of Iowa in Cedar Falls and Iowa State University in Ames were examined.

RESULTS

A total of 259 small rodents were obtained during the course of this investigation. Representatives of seven species were collected. Data on two other species were received.

Results of Trapping in the Field. Small rodents were taken at 48 trapping sites. A total of 255 animals were taken during 3,371 trap-nights and 1,270 trap-days. Of the 255 animals taken, 216 were small rodents and 39 were of other types (35 shrews, 2 frogs, 1 snake, and 1 toad).

The areas yielding the most small rodents were those relatively undisturbed by man and his domesticated animals. Lands put into "soil bank", undisturbed deciduous forest areas, deserted farmsteads, abandoned roads and railroads, marshes, and wildlife conservation areas were the most productive types.

Results of Other Methods of Obtaining Specimens. A total of 43 small rodent specimens were obtained by methods other than trapping in the field. Traps set in the greenhouse and other buildings at the State College of Iowa yielded 24 specimens of *Mus musculus*. One *Mus musculus* was caught alive in a waste-

basket in a home in Cedar Falls. One *Peromyscus leucopus noveboracensis*, one *Microtus pennsylvanicus pennsylvanicus* and one *Spermophilus tridecemlineatus tridecemlineatus* were taken from a pet cat. Fourteen *Microtus p. pennsylvanicus* were caught by hand in the field, one *mophilus t. tridecemlineatus* was killed with a rock on a golf course and one was caught by hand.

Information Received from Museums and Individuals. None of the museums queried had specimens from Black Hawk County.

Mr. Emmett B. Polder of Loras College in Dubuque, Iowa, was contacted by letter concerning studies he had made in north-eastern Iowa. Mr. Polder did some trapping in the Black Hawk County area in 1936. He reported to have a female specimen of *Tamias striatus griseus* from the county in his study collection. During the 1936 study period he reported catching the following small rodents in a continuous trapping sequence near Finchford: *Perognathus*, *Reithrodontomys*, *Peromyscus maniculatus*, *Peromyscus leucopus*, *Microtus pennsylvanicus*, *Microtus ochrogaster*, *Mus musculus*, *vapus*, *Tamias*, *Citellus tridecemlineatus*, and *Citellus franklini*. He also stated he had caught *Microtus ochrogaster* from two locations near Cedar Falls. *Perognathus flavescens perniger* has been previously reported by Polder (1937).

The museum of the State College of Iowa in Cedar Falls contains four specimens mounted for display. Of these specimens, two are labeled *Citellus tridecemlineatus*, one is labeled *Peromyscus maniculatus* and one is labeled *Tamias striatus*. The location of the catch of these specimens is not indicated on the labels.

The rodent collection of Dr. Martin L. Grant, Professor of Biology, State College of Iowa in Cedar Falls, was examined and found to contain four specimens from the country. These specimens (with field number assigned to them by Grant) were identified as *Microtus p. pennsylvanicus* (#13731), *Peromyscus maniculatus bairdii* (#8654), and *Reithrodontomys megalotis dychei* (two specimens, #11833 and #13729).

DISCUSSION OF SPECIES COLLECTED

Spermophilus tridecemlineatus tridecemlineatus (Mitchill). Three specimens were taken; none in traps. Specimens were observed on numerous occasions during drives to and from trap-sites from early spring until late fall.

Reithrodontomys megalotis dychei (J. A. Allen). Eight specimens were taken. The catches were made in November 1961 and June 1962. Seven of the eight specimens were taken from grass areas along railroads.

Peromyscus maniculatus bairdii (Hoy and Kennicott). All 49 specimens of this species were taken with traps in the field. Measurements taken from 48 of these specimens indicate some differences in the mean measurements of the males and females (Table 1).

Table 1. Measurements of *Peromyscus maniculatus bairdii*.

	Adult males (10 specimens)					Weight
	Total Length	Tail Length	Foot Length	Ear Length		
Maximum	154 mm	60 mm	19 mm	17 mm		21.5 gm
Minimum	135	49	17	14		18.4
Mean	143.5	56.6	18.4	15.9		19.8
	Adult females (14 specimens)					Weight
	Total Length	Tail Length	Foot Length	Ear Length		
Maximum	153 mm	62 mm	19 mm	16 mm		28.5 gm
Minimum	119	44	17	14		12.9
Mean	142.3	56.4	18	14.6		20.8
	Subadult males (17 specimens)					Weight
	Total Length	Tail Length	Foot Length	Ear Length		
Maximum	140 mm	59 mm	18.5 mm	15 mm		19.3 gm
Minimum	112	44	17	14		8.5
Mean	131.2	52.9	17.7	14.6		14.7
	Subadult females (5 specimens)					Weight
	Total Length	Tail Length	Foot Length	Ear Length		
Maximum	132 mm	50 mm	18 mm	15 mm		18.7 gm
Minimum	113	44	17	13		10.5
Mean	125.6	48.4	17.6	13.8		15.2

The tail constituted an average of 39.5 per cent of the total length in the adults and 39.9 per cent in the subadults. Adult males had a greater range in this percentage (35.2-42.2) than adult females (36.1-41.1), but the averages were nearly the same (adult males—39.4, adult females—39.5).

All but one of the 13 females taken during the months of March, April, May, and June were pregnant, and the mammary of that one were lactating. The average number of embryos found was 5.8 (range 8-4).

This rodent was found in several types of short-grass habitats. Broadleaf plants and isolated small trees were part of the habitat occupied by three specimens, but the major plant growth was short grass.

Peromyscus leucopus noveboracensis (Fischer). One hundred and fifteen specimens were taken from 23 different areas in Black Hawk County. Measurements were taken from all the specimens.

The tail constituted an average of 43.9 per cent of the total length in all adults. This percentage was slightly greater in the

Table 2. Measurements of *Peromyscus leucopus noveboracensis*.

Adult males (51 specimens)					
	Total Length	Tail Length	Foot Length	Ear Length	Weight
Maximum	187 mm	84 mm	23 mm	18 mm	36.0 gm
Minimum	148	60	15	15	16.1
Mean	162.5	70.9	21	17	23.0
Adult females (30 specimens)					
	Total Length	Tail Length	Foot Length	Ear Length	Weight
Maximum	190 mm	87 mm	23 mm	22 mm	40.1 gm
Minimum	140	57	16	13	17.2
Mean	172.4	76.7	20.9	17.1	25.8
Subadult males (29 specimens)					
	Total Length	Tail Length	Foot Length	Ear Length	Weight
Maximum	154 mm	70 mm	22 mm	18.5 mm	18.7 gm
Minimum	124	54	15	12	8
Mean	138.9	61.5	19.9	15.3	14.5

females (44.3, range 39.6-45.9) than in the males (43.6, range 39.8-48.1).

The habitat usually had trees or brush associated with it. The only treeless habitat in which this rodent was found was a fence row between a cornfield and a hayfield.

Microtus pennsylvanicus pennsylvanicus (Ord).Thirty-three specimens, including 31 adults, were taken from 20 areas in the county. Eleven of the specimens were caught by hand and several were observed on numerous occasions in the field. The mean measurements of the females were greater than those of the males (Table III).

The type of habitat occupied by this rodent included short grass, rocky weedy areas, short to middle prairie, short-grass pastures, marshy stream beds, marshes with short to middle grasses and sedges, and corn-stubble fields. No specimens were taken from wooded areas that did not have considerable under-cover.

Table 3. Measurements of *Microtus pennsylvanicus pennsylvanicus*.

Adult males (17 specimens)					
	Total Length	Tail Length	Foot Length	Ear Length	Weight
Maximum	162 mm	46 mm	20 mm	14 mm	27.6 gm
Minimum	126	30	17	11	18.0
Mean	140.7	36.4	19.5	12.6	27.3
Adult females (14 specimens)					
	Total Length	Tail Length	Foot Length	Ear Length	Weight
Maximum	158 mm	51 mm	22 mm	14 mm	52.2 gm
Minimum	127	26	18	11	22.6
Mean	143.8	37.5	19.7	13.1	30.7

Skull remains of this subspecies were found in pellets of a barred owl on several occasions and in unidentified pellets on two occasions.

Microtus ochrogaster ochrogaster (Wagner). The one specimen of this subspecies was taken from the Falls Access area north-west of Cedar Falls. It was taken on 27 October from a small marsh area at the end of a permanent pond.

The measurements were: total 140 mm, tail 29 mm, hind foot 16 mm, ear 14 mm, weight 39 gm.

Mus musculus (Linnaeus). The 59 specimens were taken from 13 different sites. Measurements of these specimens are summarized in Table IV.

Table 4. Measurements of *Mus musculus*.

	Adult males (27 specimens)				
	Total Length	Tail Length	Foot Length	Ear Length	Weight
Maximum	183 mm	92 mm	19 mm	17 mm	25.9 gm
Minimum	152	69	16	13	10.1
Mean	162.3	79.6	18.3	15.1	15.9
	Adult females (24 specimens)				
	Total Length	Tail Length	Foot Length	Ear Length	Weight
Maximum	190 mm	94 mm	19 mm	17 mm	31.0 gm
Minimum	144	66	17	13	11.3
Mean	164.9	79.2	18.1	15.1	17.9

This mouse was found in a greater variety of habitats than any of the other rodents taken. It was caught in and around buildings, in short-to middle-height grasses along roads and railroads, in marshy areas, in pastures, and in forest areas.

DEPOSITION OF SPECIMENS

Study skins and skulls representing each of the seven species obtained in this study were placed in the permanent collection of the museum of the State College of Iowa. One skull representing each of four different species (*Peromyscus leucopus noveboracensis*, *Peromyscus maniculatus bairdii*, *Microtus pennsylvanicus pennsylvanicus*, and *Mus musculus*) was sent to each of the following museums: The American Museum of Natural History, New York, N. Y.; Museum of Vertebrate Zoology, University of California at Berkeley; Museum of Comparative Zoology, Harvard College, Cambridge, Massachusetts; Museum of Zoology, Iowa State University at Ames; Museum of Zoology, State University of Iowa at Iowa City; Museum of Zoology, University of Kansas at Lawrence; Museum of Zoology, University of Michigan at Ann Arbor; Museum of Zoology, University of Minnesota at Minneapolis; Museum of Zoology, University of Missouri at Columbia; Museum of Zoology, University

of Nebraska at Lincoln; Smithsonian Institution, United States National Museum, Washington, D. C.; Museum of Zoology, University of Wisconsin at Madison; Museum of Zoology, Coe College, Cedar Rapids, Iowa.

The remainder of the specimens remain in the author's collection.

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Observations on the Morphology and Life History of *Oswaldocruzia* sp. in Frogs¹

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Abstract. A series of experiments were instituted in order to clarify the life history of *Oswaldocruzia* sp., a nematode of frogs. Suitable hosts were collected and examined for the nematode. Artificial infection of laboratory reared frog tadpoles and young frogs by use of incubated juvenile stages of the parasite was undertaken with negative results. Several reasons are suggested to explain failure of infection attempts. The likelihood that juvenile *Oswaldocruzia* used experimentally were not infective stages of the parasite is suggested. Morphological characters of the worms support this idea. The possibility that tadpoles and young frogs are refractory to infection, and involvement of an intermediate is discussed.

Morphology of adult and juvenile *Oswaldocruzia* is outlined, and comparisons to recorded descriptions are made.

The nematode, *Oswaldocruzia* Travasos, 1917, an intestinal parasite of amphibians, is frequently found in frogs of Emmet and Cheboygan counties, Michigan. Little information is available concerning the life history of nematodes of this genus save that concerning *O. filiformis* (Maupas and Seurat, 1913), a European species.

During the summer of 1962 adult *Oswaldocruzia* were obtained from frogs collected in the vicinity of Douglas Lake, Michigan, and attempts were made to clarify the life history of these parasites. Morphological studies of both adult and juvenile *Oswaldocruzia* were also carried out.

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