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FOOD HABITS OF THE PRAIRIE SPOTTED SKUNK IN SOUTHEASTERN IOWA

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The prairie spotted skunk, *Spilogale interrupta* (Rafinesque), is one of the more common mustelids in the state of Iowa. Because of its general distribution and its tendency to live about farm yards, as well as its omnivorous appetite, many queries, and not a few complaints, have been received by responsible agencies concerning the management of this animal. As the value of the prairie spotted skunk as a furbearer has been questionable, it is important that its worth be determined in other ways. An understanding of its relationship to economic species of insects, birds, and mammals is of fundamental importance in the process of formulating and putting into effect wise management practices for the species. For these reasons the following investigation was undertaken as part of an intensive study on the ecology and management of the species.

The area chosen for this investigation lies in the northeast corner of Van Buren County, near the southeast corner of the state (fig. 1). It consists of approximately 17.5 square miles. A diversified terrain was selected to obtain a more comprehensive study of the ecological requirements of the species. The western side of the area contains about seven square miles of rough, eroded woodland pasture largely of oak-hickory formation with several hundred acres cut over and grown up to hickory sprouts. This wooded area is interspersed with farms and clearings on the higher ground. The rougher western portion changes gradually to a flat plateau of about ten square miles almost entirely tiled for drainage and subjected to intensive agriculture. Corn, hogs, sheep, and hay are the principal products of the area. The soil on the eastern portion is the rich black Grundy silt loam characteristic of southern Iowa where erosion has not had its effects.

The investigation covered the period March 18, 1939, to March 1, 1940.

During this time seven months were spent in continuous residence on the area. When not in residence the author made trips at least twice a month with the exception of December, 1939, when only one visit was made.

This paper is based upon the analysis of 834 scats gathered during this period; 699 from within the bounds of the area, 135 from a place less than a mile and a half from its eastern border.

HISTORICAL REVIEW

Very little has been written concerning the food of the spotted skunk. Lantz (1923) says, "The little spotted skunks are remarkably efficient as

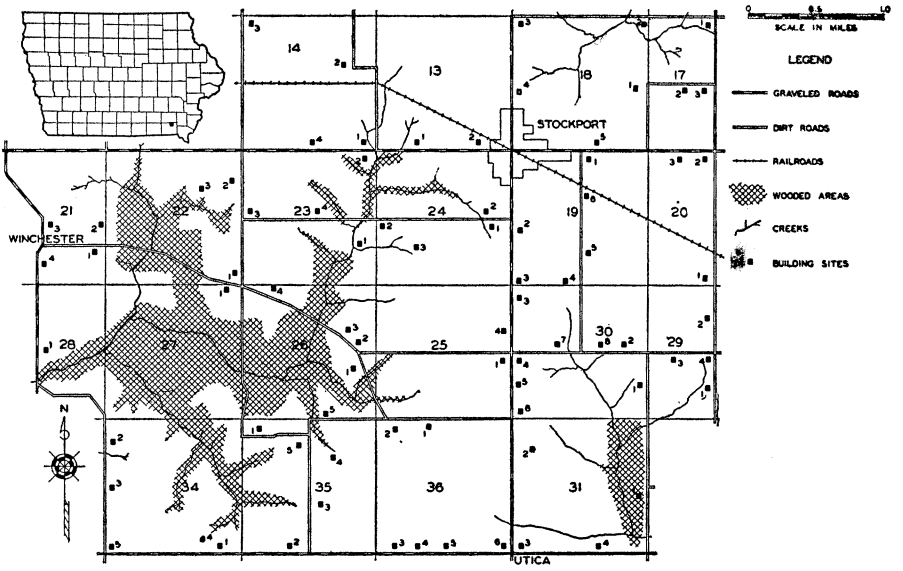

FIG. 1. Map of the area.

destroyers of rats and mice. They are small and nearly like a weasel in shape; they are quick in their movements, and can follow rats and mice into smaller crannies than the ordinary skunk can enter."

Howell (1906) states, "The food of the spotted skunks, judged by the records of 17 stomach examinations made by collectors of the Biological Survey, consists in large measure of insects, chiefly beetles and grasshoppers. These are supplemented by mice and other small mammals, lizards, salamanders, small birds, and crayfish. One stomach contained persimmons and several species of fungus."

Pellet (1913) writes as follows, "On one occasion rats became very troublesome under a big pile of cobs in one of the outbuildings. . . .Not long after, a small skunk took up its abode in the same building and the rats moved out with little delay. . . .They are expert in catching pocket gophers and I have

several times found them in the holes apparently in pursuit of the gopher. In winter they frequently catch rabbits."

Selko (1937) investigated 59 scats of the spotted skunk gathered in September, October, and November of 1936 in central and northwestern Iowa. He found insects and mammals sharing first place in importance. They appeared in 26 per cent of the feces. Mammal remains ranked second among the classes of food, appearing in 47 per cent of the feces but exceeded in volume by insects. Bird remains appeared in 16 scats or 27 per cent of the total. Vegetable matter appeared 16 times. Grass leaves, wheat kernels, horsenettle berries, oats, acorns, apple seeds, and two kernels of corn made up the list of items.

THE INVESTIGATION

Method of Procedure.—Scats were gathered at most of the locations used by the skunks at least every two or three weeks, depending somewhat upon the accessibility of the locality and the success in finding scats. During the time of residence on the area many places were visited regularly twice a week, but no place was visited oftener than every other day.

The feces of the spotted skunk are generally distinguishable by one feature or another. There were few striped skunks on the area and when there was any question as to species the scats were discarded. Size, form, contents, location, and odor all help to determine the species concerned (pl. 1-a). No single criterion was always an infallible indication of the species. One scat—unquestionably spotted skunk—found in the attic of a schoolhouse measured $\frac{11}{16}$ of an inch in diameter and $1\frac{1}{2}$ inches long. The scat contained insect remains and would have been questionable if found in the field. Most spotted skunk scats measure $\frac{1}{2}$ inch or less in diameter.

Spotted skunks appear to be much less inclined to making so-called "latrines" than are the striped skunks and as a rule they defecate promiscuously—often in their runways and in such inaccessible places as under buildings, in woodpiles or postpiles, and in strawpiles. As this study was primarily one of food habits every effort was made to avoid altering the natural situations of the animals or the forces shaping their environment. This often prevented obtaining inaccessible scats.

To facilitate a more accurate determination of the age of scats that were not strictly fresh, about two dozen fresh scats from a captive spotted skunk, which contained the remains of typical food items, as well as some scats that were found in the field, were exposed to the weather during May and June and checked daily. It was found that a scat retained its natural moisture about two days, and that the odor remained with a scat one to two weeks, depending on the contents. After two weeks there was no certain way to determine the age by the condition of the scat when picked up. It was found that scats well protected from the weather retained their odor longer and their shape almost

indefinitely. On the other hand, those that were exposed to rains, tramping of livestock, and other destructive factors deteriorated rapidly. A daily record of the weather was invaluable in estimating the age of scats in many instances (pl. 1-d).

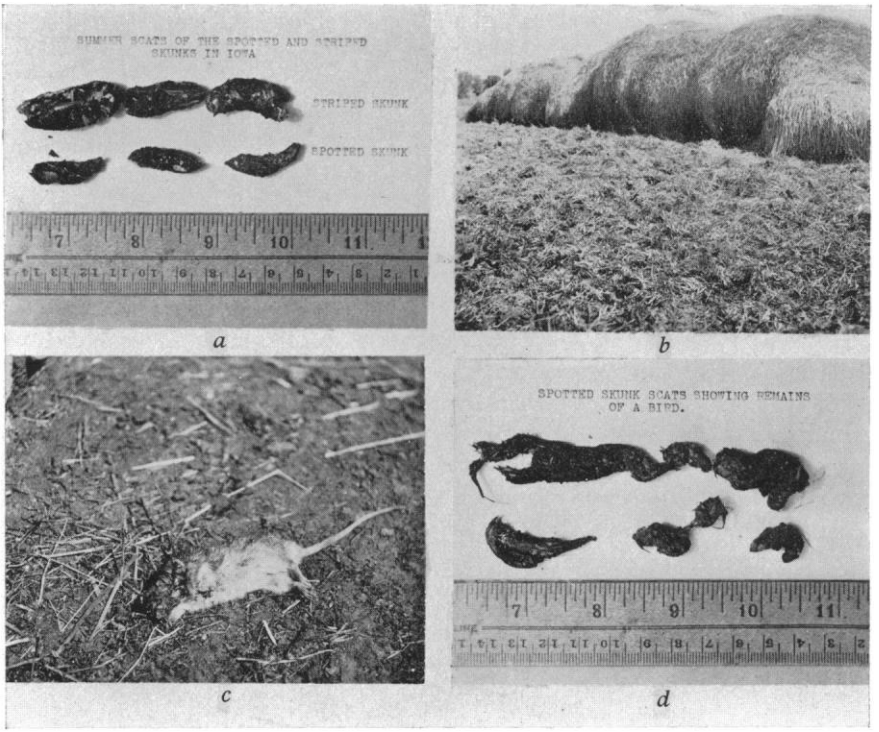

PLATE 1

(a) Spotted skunk scats compared with striped skunk scats.

(b) The thorough uprooting of a rotting strawpile by the spotted skunks in search of the larvae of the scarab, *Osmoderma eremicola*. This is evidence of several nights' work. July 12, 1939.

(c) Rat killed in a horse barn manger at Stockport by a spotted skunk, but not eaten. Notice the mutilation of the head and neck. April 7, 1939.

(d) Typical scats of the spotted skunk after eating a bird.

Each scat found was placed in a separate paper sack, plainly marked with the time and place of acquisition and its probable date of deposition.

No scats were used in this study that could possibly be over one month old. Many scats were discarded because of indefinite age such as those found in haybarn runways when the hay was removed in early spring. The scats were analysed dry. The identifications were made by comparison with a large collection of known foods from the area and by comparison with the collec-

tion of insects, seeds, mammals, and birds kept at the laboratory for that purpose.

Quite a wide variation exists between the number of scats gathered during the winter months and the other three seasons; hence, it was decided to consider the food habits data by seasons. The seasons were arbitrarily divided into units of three months each: (1) winter period—December, January, and February, (2) spring period—March, April, and May, (3) summer period —June, July, and August, and (4) fall period—September, October, and November.

Winter foods.—Mammals were the most important winter food; 90.44 per cent of all the scats contained the remains of one or more species in this group. Mearns cottontail rabbits (*Sylvilagus floridanus mearnsii*) were the most important single item. Their remains occurred in 38 of 75 scats (50.54 per cent). They also represented 54.26 per cent of all mammals. There was a heavy population of cottontails on the area during 1938 and 1939. In the winter of 1939–40 when these scats were gathered, cottontails were so numerous that they did extensive damage to shrubs and fruit trees. Large numbers were shot by farmers all over the area as a protective measure. Most of these rabbits were left where they fell and with little spoilage during the cold weather they were almost continually available as carrion to the spotted skunks and other scavengers (pl. 2-d).

Meadow mice (*Microtus pennsylvanicus*, and *M. ochrogaster*) were the next in importance. This genus appeared in 18.62 per cent of all scats and represented 19.92 per cent of all mammals appearing during this period (pl. 2-b).

Norway rats (*Rattus norvegicus*) were third in importance among the mammals. They were found in 9.31 per cent of the scats during this period and made up 10 per cent of the mammalian occurrences. The spotted skunks' predation on rats in winter about farm buildings was very noticeable. It was observed at several places on the area that a heavy population of rats during the summer and fall completely disappeared, or nearly so, during the winter months when a spotted skunk was in residence. Whether the skunks killed more than they drove away is a question, but, nevertheless, they appeared to exercise a controlling influence on the rats.

Other mammals appearing in 5 per cent or less of the scats were: white-footed mice (*Peromyscus* sp.); prairie harvest mice (*Reithrodontomys megalotis dychei*), and house mice (*Mus musculus*). Mice of undetermined species appeared in 3.99 per cent of the scats.

The next important group of items was plant material in which corn (*Zea mays*) took a dominant position. It exceeded all other single items except cottontail. It appeared 19 times (25.27 per cent) and represented 70.3 per cent of all vegetable matter. Many spotted skunks lived about buildings, frequently under and in corn cribs, and while taking their regular toll on the rat and mouse population they also utilized the corn. They apparently ate

PLATE 2

(a) Cottontail carrion partly eaten by the spotted skunk. This rabbit was entirely eaten the next night. March 28, 1939.

(b) A typical winter sight. The scat (lower right) was pried up from the depression melted under it in the snow so that it would show in the photograph. Meadow mice were caught by spotted skunks in such places as this.

(c) An illustration of the digging at the roots of greater ragweeds for insects on the Stockport area. Fresh scats were picked up within two feet of these two plants. June 14, 1939.

(d) A few of the cottontails shot by farmers during February of 1940 on the area. Notice the rabbit damage to the shrubbery. Cottontails such as these were available to scavangers, including the spotted skunk, during most of the winter.

it many times in preference to other foods. Two or three of the animals deposited scats consisting almost entirely of corn in the traps when they were caught for tagging purposes.

Insects appeared in 14.63 per cent of the scats gathered during this period. This is significant in view of the fact that few appeared to be available. Dearborn (1932) says that the striped skunks in Michigan continue to find insects as long as the ground remains uncovered with snow. This observation seems to apply equally as well to the spotted skunks for traces of Hemiptera, Coleoptera, Orthoptera, and Lepidoptera appear from one to four times each in the scats (see table 1 and figs. 2 and 3).

Birds consistently appeared in the scats. Bird remains were in 5.32 per cent of the winter scats. Pigeon (*Columba livia*) appeared twice, domestic chicken 3 times, and an unidentified small bird once. The chicken in this case was known to be carrion. All three scats containing chicken were from the same skunk during one week in January (figs. 2 and 3).

Spring foods.—Mammals were the most important spring food taken. Mammal remains appeared in 86.35 per cent of the scats. Field mice came into prominence in this season. Meadow mice were the most important and appeared in 36.66 per cent of the scats. They represented 34.96 per cent of all mammalian occurrences. White-footed mice appeared in 20.3 per cent of the scats and represented 19.36 per cent of the mammalian occurrences. These mice became more accessible during the spring months when the snow was off the ground. Other foods being relatively more difficult to procure, the spotted skunks probably range farther afield during this season in search of food.

Mearns cottontail was still an important item in the diet. Cottontails appeared in 17.87 per cent of the scats and represented 17.05 per cent of the mammalian occurrences. These scats were gathered in 1939 after a heavy population of rabbits had wintered over. During the spring months many adult cottontails succumbed to natural causes and dead ones could be found in almost every weed patch or brush pile. Since other foods were more abundant then than in the winter, fewer rabbits were utilized than might otherwise have been the case. The rabbits appearing in the scats were probably all carrion. No evidence was found of predation on adult cottontails by the spotted skunks (pl. 2-a).

Other mammals appearing in the feces during this period and the per cent of scats containing them are as follows: House mouse, 6.36; Norway rat, 6.06; harvest mouse, 1.81; and little short-tailed shrew (*Cryptotis parva*), 3.33. Unidentified mice appeared in 11.81 per cent of the scats. The spotted skunks continued to prey upon rats during this period but when other foods, which were probably more palatable, were available they only killed the rats and did not make a practice of eating them (pl. 1-c).

The next important group of items was the arthropods; 47.57 per cent of the scats contained their remains. Arthropods were represented in a few more than one half of the number of scats containing mammal remains. Insects and insect larvae appeared in 37.87 per cent of the scats. Most prominent

TABLE 1.—*Food of the spotted skunk in Iowa*

FOOD ITEMS	WINTER—75 SCATS			SPRING—330 SCATS			SUMMER—254 SCATS			FALL—185 SCATS		
	Appearances		Per cent of total scats appeared in	Appearances		Per cent of total scats appeared in	Appearances		Per cent of total scats appeared in	Appearances		Per cent of total scats appeared in
	No.	Per cent		No.	Per cent		No.	Per cent		No.	Per cent	
Mammals												
Microtus spp.	14	19.92	18.62	121	34.96	36.66	20	20.00	7.86	47	34.02	26.50
Peromyscus spp.	4	5.71	5.32	67	19.36	20.30	11	11.00	4.32	6	4.34	3.38
Reithrodontomys megalotis dychei	1	1.42	1.33	6	1.73	1.81						
Mus musculus	3	4.28	3.99	21	6.06	6.36	4	4.00	1.57	6	11.58	3.38
Unidentified mice	3	4.28	3.99	39	11.27	11.81	38	38.00	19.93	41	29.68	23.12
Rattus norvegicus	7	9.99	9.31	20	5.78	6.06				5	3.62	2.82
Sylvilagus floridanus mearnsii	38	54.26	50.54	59	17.05	17.87	27	27.00	10.61	22	15.92	12.40
Cryptotis parva				11	3.17	3.33						
Ovis aries				2	.57	.60				1	.72	.56
		100.00			100.00			100.00			100.00	
Birds												
Columba livia	2	33.20	2.66	4	19.04	1.21	3	11.40	1.17			
Gallus gallus	3	49.80	3.99	3	14.28	.90	3	11.40	1.17			
Colaptes auratus				1	4.76	.30						
Gallus gallus eggs				1	4.76	.30				1	14.28	.56
Unidentified small birds' eggs				3	14.28	.90	5	19.00	1.96			
Sturnella magna eggs							1	3.80	.39			
Colinus virginianus eggs							1	3.80	.39	1	14.28	.56
Sturnella magna							5	19.00	1.96			
Turdus migratorius							2	7.60	.78			
Zenaidura macroura							1	3.80	.39			
Unidentified small birds	1	16.60	1.33	9	43.84	2.72	5	19.00	1.96	5	71.40	2.82
		100.00			100.00			100.00			100.00	

Plant Material												
Zea mays	19	70.30	25.27	20	51.20	6.06	2	2.98	.78	29	31.61	16.35
Avena sativa	3	11.10	3.99	8	20.48	2.42	2	2.98	.78	1	1.09	.56
Vitis spp.	1	3.70	1.33				3	4.47	1.17	20	21.80	11.28
Setaria spp.	2	7.40	2.66	1	2.56	.30				3	3.27	1.69
Grass	2	7.40	2.66	9	23.04	2.72	7	10.43	2.75	7	7.63	3.94
Abutilon spp.				1	2.56	.30						
Morus rubra							47	70.03	18.47	1	1.09	.56
Solanum nigrum							1	1.49	.39			
Physalis spp.							1	1.49	.39	24	26.16	13.35
Ambrosia spp.							1	1.49	.39			
Ribes spp.							1	1.49	.39			
Prunus serotina							1	1.49	.39	2	2.18	1.12
Malus spp.										1	1.09	.56
Unidentified seed							1	1.49	.39	2	2.18	1.12
					100.00			100.00			100.00	
Arthropods												
Millipeds												
Parajulus spp.	1		1.33	85		25.75	8		3.14	24		13.53
Insects												
Locustidae	4	33.32	5.32	15	8.61	4.54	16	2.73	6.28	102	39.16	57.52
Gryllidae							88	15.04	34.58	14	5.37	7.89
Coreidae	2	16.66	2.66	3	1.72	.90	4	.68	1.57	9	3.45	5.07
Pentatomidae										1	.38	.56
Hemiptera (other than above)	2	16.66	2.66	1	.57	.30						
Cicindelidae							9	1.53	3.53	3	1.15	1.69
Scarites spp.				14	8.03	4.20	57	9.74	22.40	3	1.15	1.69
Harpalus spp.				17	9.75	5.15	118	20.17	46.37	21	8.06	11.84
Calosoma spp.				1	.57	.30	5	.85	1.96			
Chlaenius spp.							2	.34	.78			
Evarthus spp.							4	.68	1.57			
Carabidae (other than above)				28	16.07	8.48	41	7.01	16.11	26	8.96	14.66
Macrobasis spp.				1	.57	.30						
Silpha spp.				4	2.29	1.21	2	.34	.78			
Necrophorus spp.				9	5.16	2.72	6	1.02	2.35	2	.76	1.12

TABLE 1.—*Concluded*

FOOD ITEMS	WINTER—75 SCATS			SPRING—330 SCATS			SUMMER—254 SCATS			FALL—185 SCATS		
	Appearances		Per cent of total scats appeared in	Appearances		Per cent of total scats appeared in	Appearances		Per cent of total scats appeared in	Appearances		Per cent of total scats appeared in
	No.	Per cent		No.	Per cent		No.	Per cent		No.	Per cent	
Arthropods, insects—*Concluded*												
Pelidnota spp.							3	.51	1.17			
Canthon spp.							3	.51	1.17			
Euphoria spp.							1	.17	.39			
Osmoderma eremicola larvae							4	.68	1.57			
Phyllophaga and *Ligyrus* spp.				34	19.51	10.30	82	14.02	32.22	28	10.75	15.79
Phyllophaga larvae							1	.17	.39	1	.38	.56
Aphodius spp.										10	3.84	5.64
Scarabaeidae (other than above)				2	1.14	.60	5	.85	1.96			
Meloidae							2	.34	.78			
Lucanus dama							1	.17	.39			
Tenebrionidae							1	.17	.39			
Chrysomelidae							2	.34	.78			
Curculionidae							1	.17	.39	3	1.15	1.69
Elateridae				1	.57	.30				1	.38	.56
Coccinellidae										1	.38	.56
Ptinidae				1	.57	.30						
Coleoptera (other than above)	1	8.33	1.33	11	6.31	3.33						
Formicidae							6	1.02	2.35	3	1.15	1.69
Vespidae				1	.57	.30	1	.17	.39			
Polistes spp.							2	.34	.78			
Sphecidae							1	.17	.39			
Diptera										1	.38	.56
Lepidoptera larvae							25	4.27	9.82	4	1.53	2.25
Lepidoptera (other than above)	1	8.33	1.33									
Unidentified insect parts	2	16.66	2.66	31	17.79	9.39	81	13.85	31.83	28	10.75	15.79
		100.00			100.00			100.00			100.00	

were various species of carabids which represented 34.42 per cent of the total insects eaten. Next in importance were the various species of May beetles

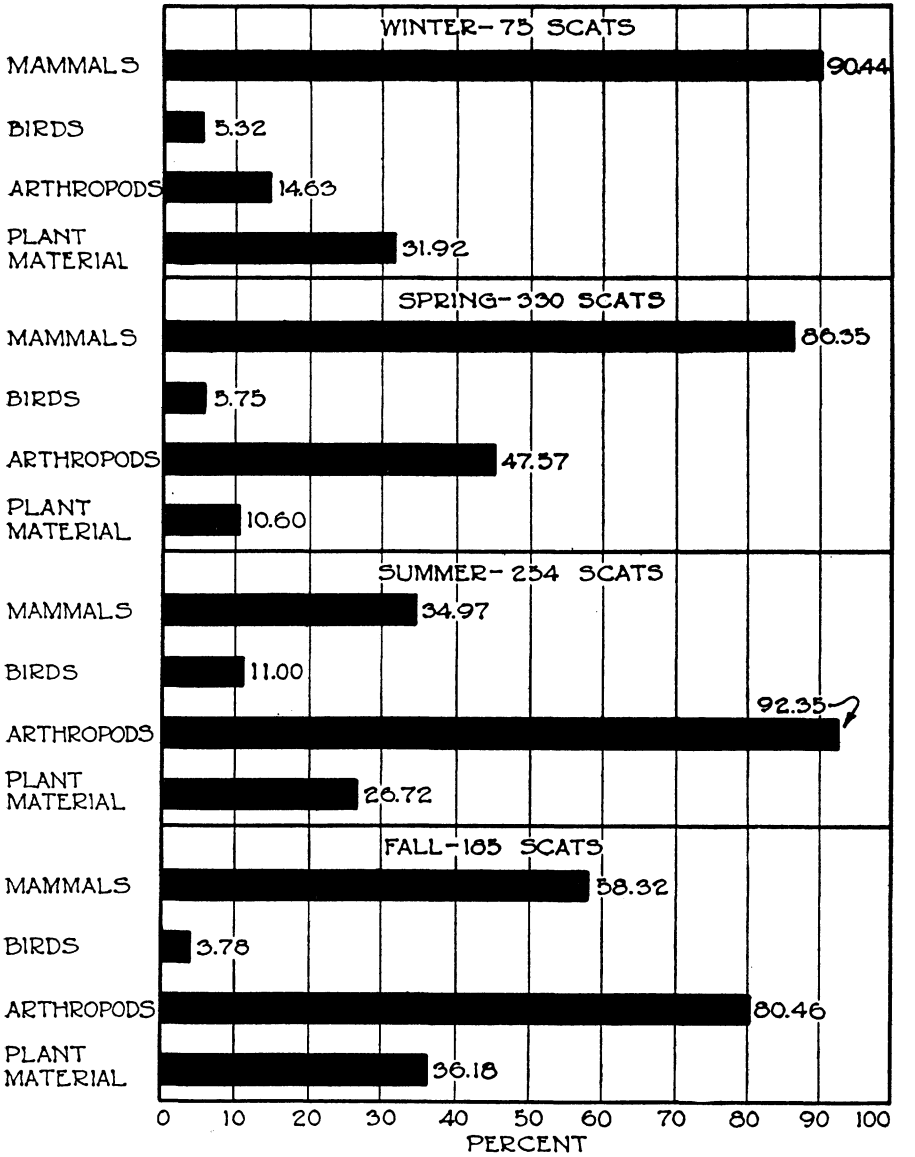

FIG. 2. Spotted skunk food. Percentage of scats in which various items appeared.

(*Phyllophaga* spp.) which appeared in 10.3 per cent of the scats and represented 19.51 per cent of all the insects present.

Millipeds (*Parajulus* spp.) appeared in 25.75 per cent of the scats. They were abundant about strawpiles and weedy fence rows during this period and the skunks seemed to relish them. Occasionally, a scat appeared that contained nothing but milliped remains. The greatest number appearing in any

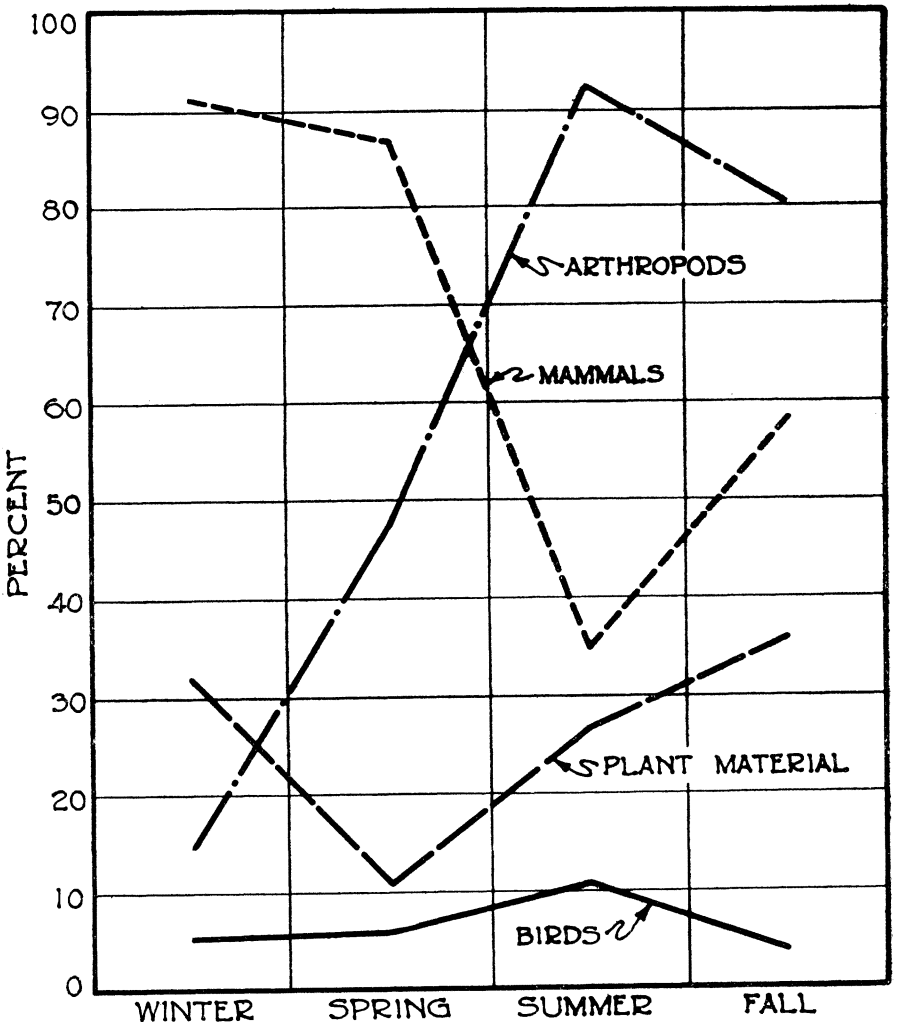

FIG. 3. Percentage of scats in which various items of food appeared by seasons.

one scat was ten. Usually a scat containing millipeds also contained considerable soil ingested with the food.

Plant material appeared in 10.60 per cent of the scats. Corn again was most important, representing 51.20 per cent of the vegetable matter. Oats (*Avena sativa*) and grass represented 20.48 and 23.04 per cent respectively. Grass was probably ingested accidentally many times but the large amount

appearing would indicate that the animal, like the domestic cat, may at times purposefully eat grass. Oats, however, were sometimes taken intentionally for one scat in March contained 9 cc of them. Oats may be used as a "stuffing food" at times.

Birds and birds' eggs represent the smallest percentage in appearances (3.81 per cent of the total). Feathers of small birds appeared 9 times or in 2.72 per cent of the scats. Pigeon appeared 4 times, flicker (*Colaptes* sp.) once, and domestic chicken 3 times. Small birds' eggs appeared 3 times, and hens' eggs once (figs. 2 and 3).

Summer foods.—Arthropods were the most important summer food as 92.35 per cent of the scats gathered during this period contained them. Millipeds appeared only 8 times. The other arthropods were insects. Here again the carabid beetles led, with the genera *Harpalus* and *Scarites* particularly numerous. *Harpalus* appeared in 46.37 per cent of the scats and represented 20.17 per cent of all insects; *Scarites* appeared in 22.40 per cent of the scats and represented 9.74 per cent of all insects. May beetles and larvae were second in appearances with 32.61 per cent of the scats containing them. A large number of these beetles, especially May beetles, were dug up at the roots of greater ragweeds (*Ambrosia trifida*) during June. The spotted skunks dug a shallow hole about two inches deep following the tap root. In one night they would systematically go to almost every plant, in a patch of 200 or 300 plants, and dig at the roots for these insects. They seldom captured all of them under a weed for when these same weeds were pulled up the next morning other beetles could be obtained. This type of activity was not observed during July and August but it appeared again in the fall (pl. 2-c).

For several days during early July spotted skunks on the area dug up a great many larvae of the scarab, (*Osmoderma eremicola*) a large white grub found in rotting strawpiles at that time. Their industry in pursuit of this grub was demonstrated several places where a thousand square feet or more of surface would be stirred up to a depth of about three inches as though a man had done it with a fork (pl. 1-b). At one place on the area it was found that striped skunks (*Mephitis mephitis avia*) had been just as assiduous in the search for these grubs as had spotted skunks.

Mammals were found in 34.97 per cent of the summer scats. The various species of mice made up 73 per cent of all mammal remains. Meadow mice led again, representing 20 per cent of all mice taken. Norway rats did not appear during this season. Several observations were made of spotted skunks living apparently amicably side by side with Norway rats during this period; frequently under the same buildings and woodpiles.

Plant material appeared in 26.72 per cent of the scats with mulberries (*Morus rubra*) appearing in 18.47 per cent of the scats and representing 70.03 per cent of all plant material. Mulberries were particularly abundant during June. Large numbers of ripe berries fell to the ground under the trees that were numerous and well distributed over the area.

The number of birds appearing during this period was significant yet made up but a small percentage of the total food. Birds and birds' eggs were found in 11 per cent of the summer scats. In June one scat contained the breast feathers and egg shell of a meadowlark (*Sturnella magna*). Meadowlark feathers appeared 5 times and represented 19 per cent of the total birds. Bobwhite (*Colinus virginianus*) eggs appeared once. Other birds taken were: barn pigeon, 3; chicken, 3; robin (*Turdus migratorius*), 2; mourning dove (*Zenaidura macroura*), 1; unidentified birds, 5; unidentified small birds' eggs, 5 (figs. 2 and 3).

Fall foods.—Arthropods dominated; they appeared in 80.46 per cent of the scats. Millipeds were numerous, occurring in 13.53 per cent of the scats; however, the bulk of this group, 47.51 per cent, was insects. The most important insects were members of the family Locustidae; *Melanoplus femur rubrum* and *M. differentialis* were the two most common species taken. Members of this family appeared in 57.52 per cent of the scats during this period, and represented 39.16 per cent of all insects taken. May beetles were of next importance, constituting 10.75 per cent of all insects. The various species of carabids were important; members of the genus *Harpalus* were found in 8.06 per cent of all scats containing insects.

Mammals came into prominence again. They were found in 58.32 per cent of the scats. Meadow mice were most important, representing 34.02 per cent of the mammals taken. Norway rats again began to show up; they accounted for 3.62 per cent of the mammals. Cottontail rabbits were again frequently found in the scats, representing 15.92 per cent. Vegetable matter, especially fruit, was common in the early fall diet. Later in the fall much corn was taken and consequently it outranked the individual fruits in appearances, for 31.61 per cent of the vegetable matter appearing was corn. Ground cherries (*Physalis* sp.) represented 26.16 per cent and grapes (*Vitis* sp.) 21.80 per cent of vegetable frequencies. To procure the grapes it was apparently necessary for one of the skunks to climb up a brace post in a fence corner and take them off the vine. A few mulberries were still available in the early fall and were utilized. Wild black cherries (*Prunus serotina*) were numerous on the area but little used by the skunks. They appeared only twice in the feces.

Fewer birds were taken in this period as compared with the other three seasons. Only 3.78 per cent of the scats contained bird remains. Unidentified small birds appeared 5 times, chicken eggs once, and bobwhite eggs once. The bobwhite egg may have been left over from the nesting season (figs. 2 and 3).

SUMMARY

1. The research into the food habits of the spotted skunk covered a 12 months period, March 18, 1939, to March 1, 1940. The investigation was confined to an area of 17.5 square miles in southeastern Iowa.

2. Seven months were spent in continuous residence in the field. During the other 5 months trips were made to the area twice a month for the purpose of gathering scats (with the exception of December when only one trip was made). The collection totaled 834 scats.

3. The scats were grouped arbitrarily into seasonal periods: winter, spring, summer, and fall.

4. Winter foods were largely of mammal origin. Cottontail rabbit appeared most frequently. It was found in 54.26 per cent of 75 winter scats. Corn was an important item during this season, appearing in 25.75 per cent of the scats.

5. Spring food was predominantly mammals. Native field mice were most common and appeared in approximately 80 per cent of 330 spring scats. Insects also appeared frequently and were found in 47.57 per cent of the scats during this period.

6. Summer food was predominantly insects; they were found in 92.35 per cent of 254 scats. Mammals appeared in only 34.97 per cent of the scats. Plant material (mostly fruit) appeared in 26.72 per cent of the scats, while birds and birds' eggs were found in 11 per cent. Birds were eaten more frequently during this period than at any other time.

7. Fall food, like summer food, was predominantly insects; 80.46 per cent of 185 scats contained them. Mammals were also important in this season, appearing in 58.32 per cent of the scats. Fruits such as grapes, mulberries and ground cherries appeared in 36.18 per cent, while birds were found in only 3.78 per cent. Fewer birds appeared during this period than at any other time.

8. The spotted skunk is an omnivorous animal. During this investigation insects seemed to be the preferred food with members of the families Carabidae and Scarabaeidae being taken most frequently. Small mammals were a regular and important item in the diet. Norway rats were eaten freely when other food was difficult to obtain. Cottontail carrion and chicken carrion were taken freely during the winter when they were available. Birds appeared infrequently in the diet, probably because they are more or less unavailable, although they were readily utilized when possible. Grain, such as corn, was eaten frequently when other foods were more difficult to procure. Fruits were taken readily when available.

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TRAPPERS AND FUR ANIMALS OF THE ORIGINAL DELTA REGION OF MISSISSIPPI

BY LEE E. YEAGER

In a former paper (Yeager, 1938), I presented an account of the otters of the Delta region of Mississippi, based mainly on records secured from old Delta hunters and trappers. Recently I had the opportunity to add to these records and, in addition, to secure or verify information on other Delta fur animals. This material has been checked until I have satisfied myself of its reliability and is presented below.

For the greater part of this account I am indebted to T. E. Cockrell of Indianola and J. J. Cockrell and W. S. Cockrell of Itta Bena, all of Mississippi. All are members of my immediate family whose experience with Delta mammals covers the period from 1860 to date, of which nearly 50 winters were spent in Delta hunting and trapping camps. My own experience includes 26 years of residence and since 1933 seven years of fairly close association. Perhaps a score of others, mostly old-time trappers and woodsmen, have contributed to the general information given here.