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Spotted Skunk and Weasel Populations Den and Cover Usage by Northeast Iowa

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Abstract. Examination of dens and territories of 118 *Mustela frenata*, 59 *Mustela rixosa*, and 65 *Spilogale interrupta*, in northeast Iowa indicated that tall grass, hay meadow, and brush-bramble-weed growth at field edges were the favorite habitats of the three species. Black willows were attractive to *Spilogale* and *M. frenata*. *M. rixosa* was most tolerant of sparse cover. *Spilogale* and *M. frenata* preferred burrows of Franklin ground squirrels and pocket gophers for primary den sites. *M. rixosa* favored mole runs and *Blarina* burrows for den sites. The present trend to continuous corn, reduced hay acreage, removal of permanent fences, and use of herbicides is reducing much of the cover needed by these small predators and the burrowing mammals associated with them.

The spotted skunk *Spilogale interrupta*, long-tailed weasel *Mustela frenata*, and least weasel *Mustela rixosa* are mammals common to nearly every section of cultivated land in northeastern Iowa. Prior to 1900, according to older farmers and fur buyers, weasels were abundant in prairie meadows, but spotted skunks were uncommon. After 1925 the spotted skunk was commonly seen throughout the area and has continued to maintain a stable population up to the present. Long-tailed weasels have declined in numbers since the writer first began taking field notes on them in 1927. Least weasels were known to trappers and fur buyers before 1900, but these "kit weasels" of the fur trade were not familiar to the writer until 1927 and were not listed as Iowa mammals before Scott listed this species in 1937. These weasels are secretive and their small size make them difficult to detect.

Populations of weasels and spotted skunks are influenced by land use, burrowing mammals, and human alterations of the environment. The environmental complex regulating these populations has been modified greatly in the past decade by changes in cropping and fencing, and by the use of insecticides and herbicides. All of these factors in addition to some of the government agricultural programs may have a strong influence on these mammals, their prey, and the burrowing mammals with which they have commensal dependence. In the light of these changes it was thought that studies covering these mammals in the recent past would be of value to ecologists dealing with rapidly changing environment.

This study began in 1925 when the writer lived on a farm in Grundy County. Data were collected between 1931 and 1940 from Black Hawk, Butler, Fayette, and Story Counties. Field notes were taken from 1940 until 1957 in Linn, Delaware, Dubuque, and Alamakee Counties. The three decades covered by this study were in a period

¹Dyersville, Iowa.

when there was extensive use of permanent fencing, pasture for cattle, and a corn-oat-legume crop rotation with little use of commercial fertilizer.

The slow pace of "horse farming" in the 1920's and 1930's permitted close scrutiny of entire fields during cultivation, haying, and harvest. When shocking grain and picking corn by hand, one came in contact with every square rod of grain land. Repeated treks to remote tracts of permanent pasture to bring in cattle resulted in field contacts with weasels, spotted skunks, and other associated animals. A county bounty on pocket gophers and rewards paid by neighbors for control of ground squirrels took the writer afield at dawn and dusk before and after farm chores. This activity was most productive of encounters with both weasels and skunks. During the fall and winter, light snow facilitated tracking these animals while the writer was afield prospecting for furbearers or trapping and hunting. Much was learned of their range of activity, food habits, primary dens, secondary dens, food caches, latrine preferences, and play activities. In spring and summer a small dog and a pony were valuable aids for field study. The pony did not alarm the mammals and gave the rider a wider view. Use of the dog enabled the writer to find many dens in weedy, grassy, shrubby, and briar-covered areas.

Weasel activity was greatest at sunrise; spotted skunk movements were most often observed at late dusk. The weasels could be seen at a distance as they ran or stood up in hay stubble and bluegrass pasture. As the darkness deepened, spotted skunks were encountered patting their feet in warning, standing on their "hands," and walking on their "hands" with tails held perpendicular, making them appear larger than they actually were. In the darkness they could be located with a flashlight beam directed in the direction of their warning foot "pats." On a few occasions these skunks came out of freshly opened pocket gopher burrows in response to the sound of the writer's feet or those of the pony. Usually these skunks would "hand stand" and then run to one of their dens rather than return to the gopher burrow.

Typical vegetative cover on farms studied in the Cedar Falls, New Hartford, Finchford, Dike areas, and at Randalia, Earlville, Ames, and Marion was 20 percent oats, 20 percent legumes and timothy, 10 percent bluegrass pasture, 21 percent *Andropogon* and *Spartina* prairie, weedy fence row, black willow, and brush-bramble-weed ditch and gully waste areas, 25 percent corn and 4 percent buildings and groves. Habitat in the Lansing area consisted of roughly 50 percent limestone and sandstone bluffs and hills forested with oak-hickory and maple-linden growth. Small fields were located in valleys and larger fields of grains and legumes covered the ridge tops. The area east and south of Dyersville had a wide variety of habitats—silt hills, limestone outcrops, sandy flood plains, and deep gullies. Burr oak, poplar, and brush

covered the rock outcrops and brush and brambles bordered the gul-
lies; 66 percent of the land was under cultivation and the fence rows
were grazed clean by cattle. *Spartina* and *Andropogon* prairies were
found along two railroad right-of-ways east of Dyersville.

Primary dens of 65 *Spilogale*, 118 *M. frenata* and 59 *M. rixosa* were
located. Such dens were occupied more than twice as often as other
neighboring secondary dens and were generally near the center of the
animal's range of activity. All three species utilized a wide variety of
shelters for temporary refuge. The three species commonly visited and
used some of the same secondary den sites. *M. frenata* frequently had
as many as five or six food cache dens within a radius of 20 rods from
the primary den. *Spilogale* did not appear to store food, but frequently
pilfered weasel caches, and at times these skunks moved to dens at the
outer limits of their territories for mousing expeditions of four to six
days' duration. *M. rixosa* did store food items at primary den sites,
but the writer did not find conclusive evidence of secondary den caches.
Both *Spilogale* and *M. frenata* showed a strong preference for Franklin
ground squirrel and pocket gopher burrows as den sites. *M. rixosa*
favored mole and short-tailed shrew burrows. A summary of primary
and secondary den sites is listed for the three species in Table 1.

Table 1
The Number of Primary and Secondary Dens Used by *Spilogale*,
Mustela frenata and *Mustela rixosa*

Kind of Burrow or Other Site	<i>Spilogale</i>		<i>M. frenata</i>		<i>M. rixosa</i>	
	Prim.	Sec.	Prim.	Sec.	Prim.	Sec.
Franklin ground squirrel	32	99	67	83	3	13
Striped ground squirrel			5	51	4	18
Pocket gopher	22	88	32	89		11
Chipmunk			1	4	1	3
Woodchuck	1	31		38		
Badger	1	8				
Muskrat	1	17		11		
Mole			13	37	21	49
Norway rat	1	15		13		
Striped skunk		8		2		
Hole in a tree		6		18		
Hollow log		14		7		3
Culvert	1	27		22	2	11
Farm buildings	3	16		14	1	4
Straw or hay stack		22		10	1	11
Boulder heap	1	41		68	7	27
Drain tile	1	33		30	1	9
Junk pile		36		41	3	17
Wood pile		25		19	1	12
Corn shock		18		11		2
Limestone fissure	1	46		18		6
Short-tailed shrew					12	32
Total	65	550	118	686	59	238

Spilogale and *M. frenata* favored similar vegetative cover. Both species selected tall grasses and forbs as a center of activity. *M. rixosa* occupied a wide range of habitat varying from sand dunes, plowed ground, and stubble to rank growth of *Spartina*. Close-cropped bluegrass pasture had the least appeal for all three species. Throughout the year *Andropogon*, *Spartina*, legume hayland, legume pasture, and weed-grass-shrub-bramble cover was used extensively by all three species. From late May until early August, *M. frenata* and *Spilogale* were active in oat fields. *M. frenata* entered the edges of cultivated cornfields in May and June to feed on earth worms after rains, but they did not take up residence in cornfields until early August when the corn was tasseled and the ground was covered with weeds and grasses. *Spilogale* entered cornfields during cultivation in search of grubs; from August until late November both this skunk and *M. frenata* moved into these fields and took dens in grassed waterways and fence rows. *Spilogale* spent much time feeding on crickets that were laying eggs in the cracked soil of the cornfields during September. When corn was shocked and left standing late in winter, concentrations of *Microtus* in the shocks attracted *Spilogale* and *M. frenata*, which used them as temporary den sites.

Prior to 1945, large black willows were common along fence rows and ditches on open prairie farms. These trees had a strong attraction for *M. frenata* and *Spilogale* and other mammals. Willows were used in winter when much of the cover adjoining them had been plowed, harvested, or closely grazed. During November and December, 1929, the writer collected three *Spilogale*, nine *M. frenata*, two mink and two opossums from a hole in a punk crotch of one of these trees which grew in a fence row between a *Spartina* meadow and a cornfield in Grundy County. This willow was close to the center of a section of land from which 18 *M. frenata*, 12 *Spilogale*, five mink, and 12 opossums had been taken. This one tree in the center of a 20-rod row of old willows was included in the overlapping territories of half of the weasels and one-fourth of the spotted skunks residing in this section. Weasels, mink, and spotted skunks were found living at heights of from 5 to 15 feet in woodpecker and knot holes in black willows. These trees provided escape from dogs and foxes and were a source of prey animals such as small birds and *Peromyscus*.

Bluegrass pastures were used by *M. frenata* when the grass was tall in late May, June, and early July. At this time they were active in search of young thirteen-lined ground squirrels and resided in the burrows of these ground squirrels. *Spilogale* scats were found in cow paths in bluegrass pastures in July and August where they were probably feeding on grasshoppers laying eggs in the dry sod. *M. rixosa* was occasionally found living in mole runs in bluegrass throughout the year. Grazed bluegrass was the least used cover of all permanent cover types by either weasels or spotted skunks.

Farm windbreaks of silver maple or burr oak were frequently visited by *Spilogale* and to a lesser extent by *M. frenata*. These groves served as a stopover for skunks and weasels visiting farm buildings in search of mice and rats. Wood piles, junk piles, and hollow trees in the windbreaks were used as temporary den sites and usually harbored prey species.

The extensive oak-hickory and maple-linden forest tracts at Lansing and Dubuque supported lower winter populations of *Mustela* and *Spilogale* than were found on prairie farms. In forested tracts, both species of *Mustela* concentrated most of their activity in the brush-weed-bramble cover at the edges of the woods and in cutover brush; *Spilogale* ranged at random throughout the woods without special cover preference. In the mixed forest and field habitat of Dubuque and Allamakee Counties, the winter *Spilogale* population averaged eight per section, in contrast to an average of 12 per section on open prairie land. The *M. frenata* winter population varied from six to 18 per section in the prairie counties and ranged between two to five per section in the forested counties.

Fall-plowed land had few winter resident skunks or weasels. A single *Spilogale* primary den and five *M. frenata* primary dens were found in plowed ground. All the *M. frenata* were small females capable of pursuing *Microtus*, *Blarina*, and *Peromyscus* through the small spaces under the legume sod. *M. rixosa* tracks were common in both legume sod and oat stubble plowing. Their primary dens were concealed from view under furrows, but the range of their tracks indicated that most of them stayed within 10 to 25 acres of plowed ground without moving out to other cover.

Since 1957, when these observations were concluded, many changes have taken place. Farms are being enlarged, fences are being removed or replaced by temporary electric fence, pastures and hay crops are being reduced, most *Spartina* meadows have been drained, willows and large windbreak groves are disappearing, gullies are being filled, and the trend is toward continuous corn or a corn-soybean rotation. All of this results in destruction of cover and den sites. New herbicides destroy many weedy cover plants in fields and fence rows and the wide use of insecticides may have ecological consequences not yet suspected. On the credit side, land diverted from crop production to a conservation reserve provides areas where the weasels, ground squirrels, pocket gophers, and other creatures associated with dense vegetation can maintain a survival nucleus. It is the writer's opinion that studies of these small creatures should be continued to determine the effects of new farming methods upon them.

Literature Cited

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