

**FOOD HABITS OF BADGERS IN EASTERN SOUTH DAKOTA<sup>1</sup>**

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**INTRODUCTION**

The South Dakota Department of Game, Fish and Parks initiated a fox-pheasant study in 1964 to determine relationships of red foxes (*Vulpes fulva*) to populations of ring-necked pheasants (*Phasianus colchicus*) and other prey. Two years later, the study was expanded to include the badger (*Taxidea taxus*), a common predator found in eastern South Dakota. Predator control as well as prey censuses for that study provided data for a badger food habits study.

The badger has increased in numbers throughout most of its range in the midwest in recent years. Moseley (1) believed that the draining and clearing of land, low fur prices and the increase of thirteen-lined ground squirrels (*Citellus tridecemlineatus*) and other prey was important in the increase of badgers in northwestern Ohio. The badger has adjusted to land-use changes that have occurred in eastern South Dakota since pioneer times, and it is frequently observed living in close proximity to human dwellings in intensively cultivated farmlands.

**DESCRIPTION OF THE STUDY AREA**

The study area was located in east-central South Dakota (Sanborn, Miner, Davison and Hansen Counties) in the James River Lowland, which is lower than the Coteau des Prairies (Prairie Hills) on the east and the Coteau du Missouri (Missouri Hills) on the west. Elevations range from 1,300 to 1,400 feet above sea level. Annual precipitation is 20-22 inches and mean annual temperature is 46-48 degrees F (4).

Soils are dark, grayish-brown and black loams and clay loams developed from calcareous loam till. The area varies from well to moderately well-drained on a gently undulating to nearly level glacial plain (4). Agriculture is devoted primarily to corn, small grains, pasture and hay.

<sup>1</sup>Federal Aid to Wildlife Restoration Project W-75-R in South Dakota through the South Dakota Cooperative Wildlife Research Unit (South Dakota Department of Game, Fish and Parks, Bureau of Sport Fisheries and Wildlife, South Dakota State University, and Wildlife Management Institute, cooperating.)

The food habits of badgers have been studied in Iowa by Errington (2) and by Snead and Hendrickson (3), but no quantitative food habit studies have been done in South Dakota. The present study was initiated in 1966 to determine the food habits of the badger.

## MATERIALS AND METHODS

Personnel of the South Dakota Department of Game, Fish and Parks conducted censuses of pheasant (roadside counts), rabbits (spotlight counts), and small mammal populations (snap-trap surveys) on the study area during 1967 to estimate the relative abundance of species which are preyed upon by badgers (5). A roadside census for ground squirrels was made in May, 1968 (6).

Badgers were trapped by Kenneth Johnson, state trapper assigned to control and census mammals on the study area. Digestive tracts were removed, put in cloth bags, labeled and preserved in 10 percent formalin. Hair, feathers and finer food items were separated from teeth, bones and other heavier items by flotation in water. Stomach contents, after being dried were measured volumetrically by water displacement in graduated cylinders. Contents less than 0.1 ml were recorded as a trace.

Frequency of occurrence was ascertained by dividing the number of stomachs or colons containing a food item by the total number of stomachs or colons which contained food. Percent volume of stomach contents was ascertained by dividing the volume of an item in all stomachs by total volume of stomach contents. Data were tabulated according to the three seasons of badger activity: spring (March - May), summer (June - August), and fall (September - November).

## RESULTS AND DISCUSSION

Counts showed that thirteen-lined ground squirrels were more plentiful (1.1/mile) than Richardson ground squirrels (0.01/mile). Fewer cottontails (0.25/mile) were observed than jackrabbits (4.07/mile) which may be due to habitat preference, observability and/or mobility of jackrabbits. Deer-mice were the most common, small mammal which was snap-trapped, and meadow voles were the second most plentiful.

From March to November 1967, the digestive tracts of 143 badgers taken on the study areas were saved to examine for food habits. Of the 143 digestive tracts, 62 stomachs and 115 colons contained food items.

Mammals were the most important food for badgers throughout the year (Table 1). Mice were an important staple during spring, comprising 44.1 percent by volume of stomach contents and occurring in 75.0 percent of the stomachs and in 75.6 percent of the colons. Occurrence and volume of mice in the badger diet were lowest during the summer months, but increased again in the fall. Although the fall sample was small and October and November were not represented well, it appears that badgers relied heavily on mice during the fall as well as the spring.

Table 1. Badger food habits shown as frequency of occurrence for stomach and colon contents and percent volume for stomach contents.

Food Item	Spring			Summer			Fall		
	Stomach (20)*		Colon (41)	Stomach (29)		Colon (52)	Stomach (13)		Colon (22)
	Freq.**	Vol.***	Freq.	Freq.	Vol.	Freq.	Freq.	Vol.	Freq.
MAMMALS	90.0	88.1	92.7	79.3	87.9	80.8	69.2	41.6	81.8
Mice	75.0	44.1	75.6	20.7	6.6	38.5	38.5	12.6	68.2
Ground squirrels	25.0	25.2	17.1	62.1	63.5	53.9	23.1	22.8	18.2
Cottontail	15.0	16.5	9.8	10.3	17.8	1.9			
Whitetail -									
Jackrabbit	10.0	2.3	4.9			1.9		7.7	6.0
Pocket Gopher			2.4						
Unident. Mammal	10.0	Tr.		3.4	Tr.	3.9			
BIRDS	15.0	2.2	12.1	20.7	5.2	15.4			
EGGS	15.0	Tr.	22.0	34.5	2.1	30.8			
INSECTS	15.0	Tr.	31.7	51.7	2.6	57.7	38.5	Tr.	63.6
PLANTS	85.0	9.7	90.2	79.3	2.0	75.0	76.9	31.4	81.8
			100.0		100.0				100.0

\* Number of badger stomachs or colons examined which contained food.

\*\* Percent frequency of occurrence

\*\*\* Percent volume

Deer mice and meadow voles were the most common mice in the badger diet. They were also the most common mice trapped. Other species of mice were trapped less frequently and were found to be of minor importance in the diet.

Thirteen-lined ground squirrels were an important food item by volume during all three seasons. They were most frequently eaten during the summer months when they were most active and plentiful. Rabbits, which ranked third in importance, were eaten more frequently during the spring and summer months when young rabbits were available.

The remains of game birds were found only during the spring; those of adult pheasants were found in the digestive tracts of only three badgers. Non-game birds included chickens and various ground-nesting passerine birds such as meadow larks, horned larks and longspurs. Unidentified bird remains usually consisted of a few feathers. Most birds are probably taken when the opportunity occurs while the badger is seeking other prey (2).

Occurrence of eggs was as high as 34.5 percent in the stomach and 30.8 percent in the colon during the summer. It isn't possible to determine the number of eggs eaten since little of the shell is normally consumed.

Toads (*Bufo cognatus*) occurred in 46.2 percent of the stomachs and fragments of various insects were present in trace amounts throughout the year. May beetles (*Phyllophaga* sp.), both adults and white grubs, were considered the most important insect in the diet. A colon collected in September contained 199 of the grubs.

Grasses, usually dry and in trace amounts, were eaten during all seasons. They were probably ingested incidentally with other foods. Weed seeds were probably in the digestive tracts of the small mammals and birds eaten; however, one stomach taken in the spring was gorged with seeds of annual sunflower (*Helianthus annuus*). During the fall, 31.2 percent of the volume of 13 stomachs was corn and small grains. It appeared that badgers consumed more of this plant material when animal foods were not as easily obtained.

#### CONCLUSIONS

Ground squirrels, mice and rabbits were found to be important foods in the badger diet. There was an inverse relationship in the amount of ground squirrels and mice eaten. Mice were eaten more frequently during the spring and fall while ground squirrels were eaten in greater quantity during the summer. Rabbits occurred in the diet most frequently during the spring and summer months when road-kills and young were more plentiful. Birds and eggs were represented in the diet only during the breeding and nesting season. Insects were frequently eaten during all seasons but usually only in small amounts.

The above findings are similar to those found by Errington (2) and by Snead and Hendrickson (3) in Iowa. Results strongly suggest that the badger, like most predators, is an opportunist and eats what is available.

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