

Coyote Food Habits in Mississippi and Alabama¹

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Abstract: Food habits of coyotes (*Canis latrans*) from the upper coastal plain province of Alabama and Mississippi were determined from scats ($N = 211$) and stomachs ($N = 100$) collected from December 1980 through April 1984. Frequency of occurrence of major food items found in scats and stomachs for all seasons were rodents (43.1%), fruit (38.6%), rabbits (34.7%), insects (29.9%), white-tailed deer (28.0%), and birds (22.5%). Seasonally, rabbits and rodents occurred most frequently in spring; rodents, insects, and birds in summer; fruit, primarily persimmons, in fall; and deer and rodents in winter. Peak deer occurrences in summer coincide with the fawning periods in both states.

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Coyotes are opportunistic predators (Bekoff 1977, Van Vuren and Thompson 1982) whose food habits vary by season and locale (Sperry 1941, Fichter et al. 1955, Meinzer et al. 1975, Niebauer and Rongstad 1975). Coyote food habits were studied in Louisiana (Wilson 1967, Michaelson 1975, Hall 1979), Arkansas (Gipson 1974), and Tennessee (Smith and Kennedy 1983). However, differences in the results among these studies (Gipson 1974, Michaelson 1975, Hall 1979) or small sample sizes (Wilson 1967, Smith and

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Kennedy 1983) limit their application to other southeastern states. The purpose of this paper is to present results of analyses of coyote scats and stomachs collected primarily from the upper coastal plain province in Mississippi and Alabama.

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Methods

Coyote carcasses were obtained through county extension agents, fur buyers, and state wildlife conservation agencies. Stomachs were removed from carcasses and processed according to methods described by Korschgen (1980); contents were dried and food items identified after gross examination by comparisons with reference material. Hair was identified using Spiers (1973) and Moore et al. (1974). Seeds were identified according to Martin and Barkley (1961). The identity of reptile remains was confirmed by R. G. Altig (Department of Biological Sciences, Mississippi State University). Food items were recorded by frequency of occurrence. Plant debris, human refuse, and coyote hair were assumed to have been consumed incidentally or through grooming and were considered non-food items.

Recently-deposited coyote scats were collected primarily from roads on Noxubee National Wildlife Refuge in the Interior Flatwoods Region of Mississippi and from the Blackbelt Prairie Region in Lowndes County, Mississippi, and Sumter County, Alabama. Coyote scats were identified by odor, size, and tracks if present. In addition to the scats collected in the field, feces were removed from the colon of necropsied coyotes if the stomachs were empty. Initially, scats were machine washed in 0.35-mm mesh nylon bags following methods described by Johnson and Hansen (1979); but when hair was lost through the mesh, the method was abandoned and those scats discarded. Subsequently, scats were hand-washed in the nylon bags without hair loss, dried, and the food items identified by the method used for stomach contents.

Results

One hundred stomachs and 211 scats collected from December 1980 to April 1984 were analyzed. Ten of these scats were collected from coyote car-

Table 1. Percent occurrence of coyote food items determined from 211 scats and 100 stomachs collected in Mississippi and Alabama, December 1980–April 1984.

Food item	% occurrence	
	Scats	Stomachs
MAMMAL	(91.5)	(94.0)
Rodent	46.0	36.0
Cotton rat (<i>Sigmodon hispidus</i>)	29.9	21.0
Mice—other and unknown ^a	18.0	23.0
Squirrel (<i>Sciurus</i>)	2.8	6.0
Beaver (<i>Castor canadensis</i>)	0.9	0.0
Rabbit (<i>Sylvilagus</i>)	35.1	34.0
Deer (<i>Odocoileus virginianus</i>)	27.0	30.0
Livestock	4.3	24.0
Cow	3.8	19.0
Hog	0.5	5.0
Raccoon (<i>Procyon lotor</i>)	1.4	1.0
Striped skunk (<i>Mephitis mephitis</i>)	0.9	1.0
Shrew—unknown (Soricidae)	0.9	0.0
Opossum (<i>Didelphis virginiana</i>)	0.0	2.0
Unknown	5.2	7.0
FRUIT	(47.9)	(19.0)
Persimmons (<i>Diospyros virginiana</i>)	37.4	0.9
Blackberry (<i>Rubus</i>)	5.7	0.0
Corn	1.9	2.0
Watermelon	0.5	2.0
Acorn (<i>Quercus</i>)	0.5	6.0
Other and unknown ^b	5.2	7.0
INVERTEBRATE	(30.3)	(29.0)
Grasshopper (Orthoptera)	16.1	13.0
Beetle (Coleoptera)	13.7	12.0
Maggot (Diptera)	0.0	7.0
Insect—other and unknown ^c	8.1	7.0
Crayfish (<i>Procambarus</i>)	1.4	2.0
BIRD	(21.3)	(25.0)
Chicken	3.3	4.0
Passerine (Passeriformes)	3.3	12.0
Quail (<i>Colinus virginianus</i>)	0.5	1.0
Dove (<i>Zenaida macroura</i>)	0.5	0.0
Woodpecker (Picidae)	0.5	0.0
Unknown	8.5	9.0
Egg	7.1	2.0
REPTILE	(7.1)	(4.0)
Egg	4.3	0.0
MISCELLANEOUS	(16.6)	(24.0)
Green grass	10.9	11.0
Seed—other and unknown	2.4	7.0
Fish—unknown	0.5	0.0
Bone—unknown	0.5	6.0
Egg—unknown	0.5	0.0
Animal—unknown	0.5	0.0
Matter—unknown	1.4	1.0

^a Includes *Mus*, *Peromyscus*, *Reithrodontomys*, *Oryzomys*, and *Microtus*.

^b Includes *Vitis*, *Prunus*, *Passiflora*, and *Nyssa*.

^c Includes Saturniidae cocoon.

casses. Ninety-six percent of the sample was collected from the upper coastal plain province of Mississippi and Alabama, with additional samples from 3 other physiographic provinces. Sample sizes by season were as follows (stomachs in parentheses): March–May, 29 (7); June–August, 61 (6); September–November, 103 (22); December–February, 17 (59); collection date unknown, 1 (6).

Mammals, ranging in size from cattle to shrews (Soricidae), were the most frequently occurring food item (Table 1). The most common mammal in both stomach and scats was rabbit (*Sylvilagus* spp.), although, collectively, rodents occurred in higher frequencies and were the most common food item. The seasonal occurrence of rabbits and rodents was highest during spring and fall (Fig. 1).

White-tailed deer (*Odocoileus virginianus*) remains occurred in all seasons, but were greatest in summer and winter. In summer, 56% of the deer occurrences were positively identified as fawn; and an additional 18% were believed to be fawn. One stomach collected in the winter contained deer remains and a rifle bullet. Deer appeared in 30% of the stomachs and 27% of the scats.

Other mammals occurred infrequently, with the exception of livestock (cattle and hog), which occurred in 24% of the stomachs and 4.3% of the scats. Livestock occurrences were highest in winter and spring.

Fruit ranked second in importance to mammals in scats but occurred less frequently in stomachs than did other food items. Persimmons (*Diospyros virginiana*) were the most common fruit. In fall, persimmons occurred in 67% of the stomachs and scats. Blackberries (*Rubus* spp.) occurred in 5.7% of the scats but were not recorded in the stomachs.

Invertebrates, primarily grasshoppers and beetles, occurred frequently in both stomachs and scats. Insects were seasonally most important in summer and fall. Maggots occurred in 7% of the stomachs. Crayfish remains were the main component of 1 scat.

Birds, mainly chickens and passerines, occurred in 21% of the scats and 25% of the stomachs. Quail (*Colinus virginianus*) was identified in 1 stomach and 1 scat. Mourning dove (*Zenaida macroura*) occurred in a scat collected in September. Bird eggs were found in 18% of the summer scats. Seasonal occurrence of birds was the highest in summer.

Reptile remains included snake, turtle, and lizard. Reptile eggs (primarily turtle) were identified in 4.3% of the scats. Green grass was the most common miscellaneous food item and fish remains occurred in 1 scat collected in the fall.

Discussion

The merits of stomach versus scat content analysis in documenting coyote food habits were discussed by Gier (1968). Although the 2 sample types are distinctly different, Korschgen (1957) and Fichter et al. (1955) reported the

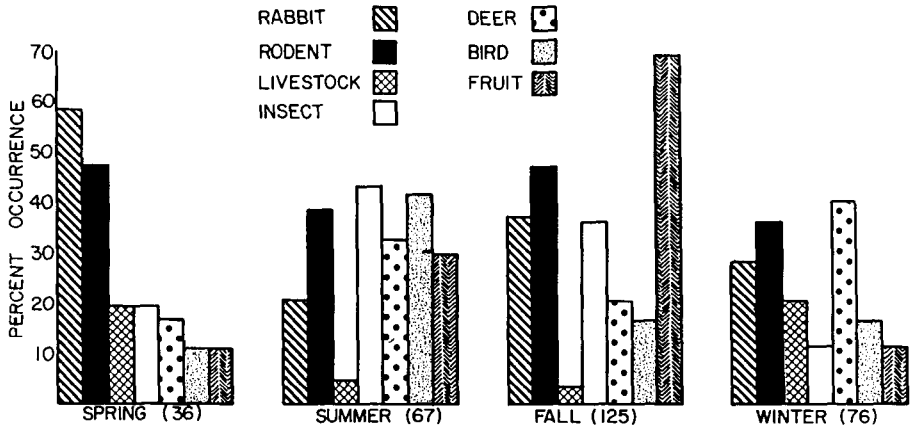


Figure 1. Seasonal percent occurrence of major coyote food items in Mississippi and Alabama as determined from 211 scats and 100 stomachs. Spring = March–May; Summer = June–August; Fall = September–November; Winter = December–February. Sample size is in parentheses.

techniques gave comparable results. In this study, stomach and scat data were treated separately in Table 1, but were combined in Figure 1 after chi-square tests showed the proportion of these food items in the 2 sample types differed significantly only for fruit and livestock ($P < 0.05$).

The importance of rodents and rabbits in the coyote's diet in Mississippi and Alabama was similar to the majority of coyote food habit studies in western states (Pederson and Tuckfield 1983). Rodents and rabbits were less important food items for coyotes in Arkansas (Gipson 1974) than in the present study or in Louisiana (Wilson 1967, Michaelson 1975, Hall 1979). Poultry was the most important coyote food in Arkansas, occurring in 34% of the stomachs (Gipson 1974). In the samples in this study, chicken occurred in only 3.5% of the stomachs and scats. Most of these samples were collected from areas not having commercial poultry producers and the associated poultry carrion available to the coyotes examined in Arkansas. Gipson (1978) related the poultry industry and availability of poultry carrion with coyote increases in the Southeast, but this relationship was not supported in Louisiana (Wilson 1967, Michaelson 1975, Hall 1979) nor in this study.

The seasonal importance of persimmon in Mississippi and Alabama was greater than reported by Wilson (1967), Gipson (1974), Michaelson (1975), and Hall (1979). Gipson (1974) discussed the coyote's adaptability in exploiting persimmons, a food not available in their original range. Blackberry occurrences in this study were similar to those reported by Hall (1979). The annual importance of fruit in Mississippi and Alabama was consistent with that reported for Arkansas coyotes (Gipson 1974).

Deer occurrence (28%) was greater than reported from adjacent states where it ranged from 3.0% (Michaelson 1975) to 16.1% (Hall 1979). Most occurrences in the late fall and winter were believed to represent carrion feeding. During the summer months, white-tailed deer occurrences (mainly fawn) in scats were 4.5% in June ($N = 23$), 33.3% in July ($N = 18$), and 71.4% in August ($N = 21$). In September ($N = 35$), deer occurrences fell to 17.1%. The heaviest occurrence coincided with the peak fawning period in both states (Lueth 1967, Jacobson et al. 1979) and seemed consistent with opportunistic predatory behavior of coyotes in seeking vulnerable fawns (Gardner et al. 1976). High levels of coyote predation on fawns were documented in Texas (Cook et al. 1971) and Oklahoma (Gardner et al. 1976). Hall (1979) found high occurrences of fawn remains in coyote stomachs and scats collected during the fawning period in Louisiana. Current coyote population levels are a new phenomenon in the Gulf Coastal Plain ecosystem, and additional work will be needed to determine their impact on deer.

Cow and hog in the diet occurred primarily in winter and spring and may have been carrion. Coyote predation on cattle typically involves calves less than 8 weeks old (U.S. Department of the Interior, Fish and Wildlife Service 1978). It was not possible to determine whether the 2 calf occurrences in the samples in this study represented carrion feeding or predation.

The food habits of coyotes in Mississippi and Alabama will continue to arouse concern over the actual and presumed effects the species is having on game, domestic animals, and farm crops such as watermelon. The majority of food items found in this study do not suggest conflict with human interests; however, wildlife biologists should be aware of potential impacts coyotes can have on fawn survival in areas where other factors hold deer densities at low levels. Evaluating the economic impact of coyotes in Mississippi, Alabama, and other southeastern states will require studies directed at specific problems.

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