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## Opportunistic Feeding by Coyotes

### Abstract

Opportunistic feeding by coyotes (*Canis latrans*) was evaluated relating the diet of three coyotes during one year with regard to prey availability. Diet closely matched prey availability, supporting the description of the coyote as a highly flexible, opportunistic predator.

### Introduction

Opportunistic predators select prey primarily on the basis of availability. The coyote is commonly regarded as an opportunistic predator; however, little is known about the relationship between the diet of individual coyotes and prey availability. Published studies of coyote diets were based on large or undetermined numbers of coyotes (Henderson, 1930; Murie, 1940; Sperry, 1941; Ferrel *et al.*, 1953; Korschgen, 1957), and hence reveal little about prey selection by individual coyotes. Furthermore, few authors related diets of coyotes to prey availability to show that coyotes do in fact eat whatever is available. Such studies related abundance of a single prey item to occurrence in coyote diets on an annual or seasonal basis (Fichter *et al.*, 1955; Tiemeier, 1955; Gier, 1957; Korschgen, 1957; Nellis and Keith, 1976; Johnson and Hansen, 1979). Availability of a diversity of prey species was not related to occurrence in coyote diets in a program of frequent, regular sample collection.

In this study, we related the diet of three coyotes during one year to availability of prey species; we evaluated prey selection by the smallest sample of coyotes possible. Opportunism would be indicated by a close relationship between diet and prey availability.

### Methods

The 275 ha study area was located 9 km south of Sisters, Deschutes County, Oregon, on Klah Klahnee Wildlife Sanctuary and adjacent parts of Deschutes National Forest. Elevation was about 1100 m. Dominant vegetation was a ponderosa pine (*Pinus ponderosa*)-juniper (*Juniperus occidentalis*) forest. The shrub understory consisted of *Chrysothamnus nauseosus*, *C. viscidiflorus*, *Purshia tridentata*, *Arctostaphylos patula*,

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*Ceanothus cordulatus*, *Ribes cereum*, and *Artemisia tridentata*. About 40 ha were irrigated for pasture and alfalfa.

Three coyotes regularly foraged within the study area: an adult male, an adult female, and a yearling. During 700 hr of systematic observation in the study area, primarily from a 10 m tower, we regularly saw these three coyotes throughout the study. Other coyotes seldom used the area.

On 1 April 1976 we removed all coyote scats from 12 km of dirt roads located within and on the perimeter of the study area. On the first and fifteenth day of each month thereafter for one year, all coyote scats found on the 12 km route were collected. Each scat was washed in detergent soap and air dried. Contents were separated, and prey items were identified by comparison with a reference collection from the area. Percentage of scats in which prey items occurred was calculated on a monthly basis.

Heavy snowfall precluded scat collection on 1 December and 1 January. Scats deposited during each of these periods were included in two double collections, one from 16 November to 15 December, and the other from 16 December to 15 January. To obtain bimonthly estimates of coyote diets during this period, the number of scats in each double collection was halved, and each half was assigned the diet composition of the entire double collection.

Prey availability was determined by regular visual surveys of the study area within every bimonthly collection period. Surveys were conducted on foot and from a 10 m tower. We noted presence or absence of prey species and recorded events that appeared to cause noticeable changes in availability of certain prey species to coyotes.

#### Results and Discussion

A total of 308 scats was collected and analyzed. Coyotes used the study area consistently; more than one-half of the bimonthly samples contained 11 to 13 scats, and scats often were deposited regularly at certain points along the collection route.

Rabbits (primarily *Sylvilagus nuttalli*) and chipmunks (*Eutamias* spp.) were active throughout the year and appeared in coyote scats in all months (Fig. 1). Gophers (*Thomomys talpoides*) also were available all year and were eaten by coyotes during eight months.

Birds were always present and were recorded in scats throughout the year. In summer 1976, Brewer's Blackbirds (*Euphagus cyanocephalus*) were abundant ground nesters in the irrigated fields. The young of blackbirds and other ground nesting birds fledged primarily during July, which coincided with a high percentage of birds in coyote scats. Young of other species such as swallows (Hirundinidae) and bluebirds (*Sialia* spp.) fledged at this time and probably became more vulnerable to predation by coyotes.

Microtine rodents were present all year and were eaten by coyotes every month, except during winter. A peak in frequency of occurrence in scats during late summer paralleled the alfalfa harvest, which began in late July and continued until mid-October. The hay was mowed, raked, and baled; these activities increased the availability of microtines to coyotes by disturbing cover used by voles and by killing or injuring voles. Coyotes frequently were observed following the mower and catching or scavenging voles, or successfully hunting for them along newly raked windrows of hay.

Insects were always present in the study area and appeared in coyote scats during 10 months. Infrequent occurrence in scats during winter corresponded to the season

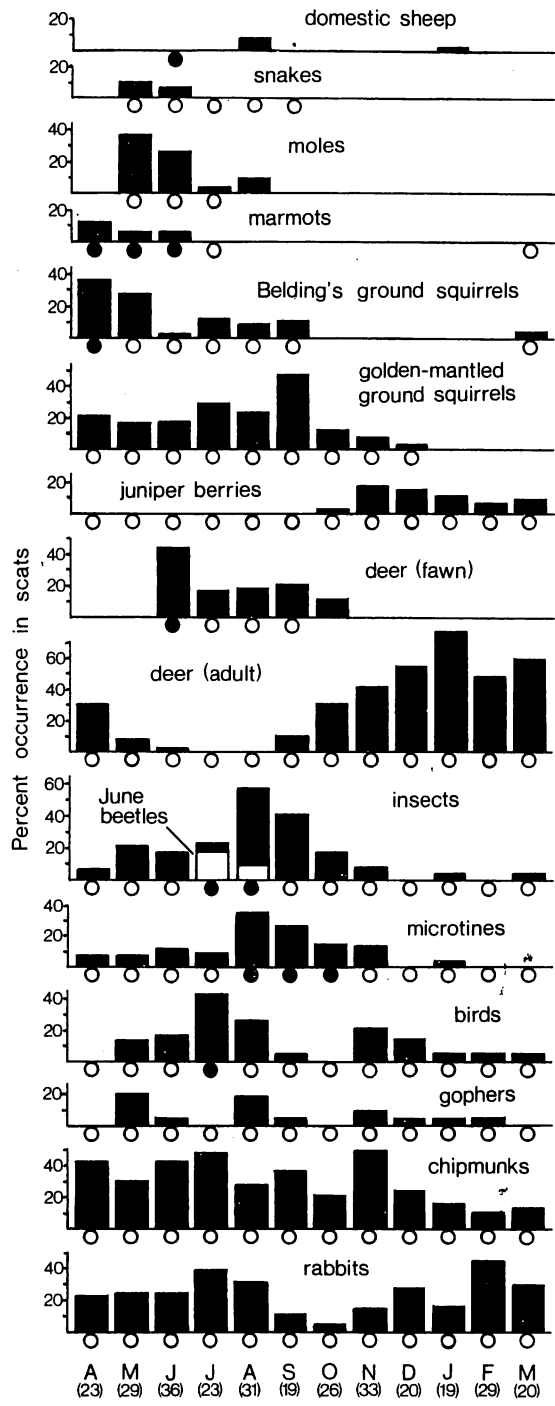


Figure 1. Percent occurrence of food items in coyote scats, at monthly intervals from April 1976 through March 1977, near Sisters, Oregon. Circles indicate those months when a prey species was present in the study area. Solid circles denote increased prey availability. The number of scats collected per month is shown in parentheses.

when insects were least active. June beetles (*Phyllophaga* spp.) appeared in large numbers on 18 July and were first recorded in scats in the next collection, on 1 August. Within three weeks the number of June beetles in the area declined abruptly, which coincided with their disappearance from coyote scats.

Adult mule deer (*Odocoileus hemionus*) were observed almost daily and were recorded in scats in every month except July and August. The abrupt increase in frequency of deer in scats during October coincided with the deer hunting season in Deschutes County; coyotes probably scavenged the remains of deer left by hunters. Adult deer were absent in coyote scats from 15 June to 1 September, when alternate prey species were most abundant and deer presumably were in good condition. Healthy deer are difficult to capture (Murie, 1940; Stebler, 1951; Ozoga and Harger, 1966).

Parturition of mule deer fawns occurred primarily during June (Paul Bonn, Oregon Department of Fish and Wildlife, pers. comm.) and coincided with the first appearance of fawns in coyote scats. Fawns were recorded in 44 percent of scats collected in June; Salwasser (1974) found high mortality in mule deer fawns during or shortly after parturition. Fawns appeared in seven of nine scat collections from 1 June to 15 October. Fawns began shedding their silky hair, which was important in identification of scats, during September (P. Bonn, pers. comm.), and we could not differentiate between fawns and adults after early October.

Juniper berries were available all year, but appeared in scats from 15 October to 1 April. Murie (1951) reported frequent winter use of juniper berries by coyotes in Arizona.

Golden-mantled ground squirrels (*Spermophilus lateralis*) first appeared from hibernation in early April but were not recorded in scats until the end of April, probably because the squirrels were relatively inactive shortly after emergence from hibernation. Golden-mantled ground squirrels were identified in 13 of 15 scat collections from late April until the onset of hibernation in late November and early December. Belding's ground squirrels (*S. beldingi*) emerged from hibernation in early March and were active until September; this period paralleled the occurrence of Belding's ground squirrels in coyote scats. The peak in occurrence of Belding's ground squirrels in scats in April coincided with the dispersal of yearling males of this species, which typically occurs soon after emergence from hibernation (Sherman, 1976).

Yellow-bellied marmots (*Marmota flaviventris*) emerged from hibernation in early March and were present through July. Thompson (1979) found that marmots in the study area were generally not vulnerable to coyote predation. However, marmot social structure changed in 1976, and from late April until the onset of hibernation many individuals dispersed from the colony. This period coincided with the occurrence of marmots in scats.

The coast mole (*Scapanus orarius*) was active almost exclusively below ground; although we found evidence of mole activity, we did not observe individuals during the study. Giger (1965) reported that juvenile coast moles in Tillamook County, Oregon, dispersed on the ground surface from May through July and were vulnerable to predation at that time; their occurrence in scats in this study paralleled their presumed above-ground presence.

Garter snakes (*Thamnophis sirtalis*), the only snakes in the area, were first observed on 15 May and were seen frequently thereafter through the summer. The initial

appearance in the study area matched the first occurrence in coyote scats in the 15 May collection. Snakes were found in scats in the next three collections but were absent in all other collections, despite the continued presence of snakes in the study area.

A herd of 2400 domestic sheep was in and adjacent to the study area during the last week of June, yet sheep did not appear in scats during June or July. Sheep were found in three scats, in August and January. The absence of sheep in coyote scats possibly was due to the active herding by a man and two dogs, the availability of many alternative prey species, or a lack of previous experience with sheep. This herd was the first to pass near the area in over eight years.

The occurrence of prey items in the diet of three coyotes closely paralleled the presence of these prey in the study area. The coyotes ate most prey species whenever the prey were present and responded immediately to a newly available prey item by including it in their diet. The results of this study provide evidence that the coyote is a highly flexible, opportunistic predator. These attributes account, in part, for the continued success of the coyote as a species.

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