

# Food Habits of the Plains Pocket Gopher on Western Nebraska Rangeland

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## Abstract

Plains pocket gophers (*Geomys bursarius*) were trapped during 10 months (June and July excluded) of 1974, 1975, and 1976 to determine their food habits. Using a microscopic technique, twenty species of grasses, forbs, and rushes were identified in the stomach contents of 141 pocket gophers. Of the total diet, forbs comprised 9.9%, grasses 44.9%, and rushes 14.8%. Root and leaf-stem materials were found to make up 30.9% and 38.7% of the diet, respectively. Winter food constituents were difficult to identify with 30.4% of the total diet being unidentified material. Gophers exhibited diet selectivity; major species in the vegetation were not necessarily major species in the diet.

Little is known about the food habits of the plains pocket gopher (*Geomys bursarius*). Foster (1977) reported that plains pocket gophers had a significant impact on forage production on western Nebraska rangeland, decreasing production by approximately 46%. Myers and Vaughan (1964) reported that plains pocket gophers in eastern Colorado fed preferentially on forbs. In their study area, 88% of the vegetation was grasses, but these grasses comprised only 66% of the gophers' yearly diet.

Food habits of the northern pocket gopher (*Thomomys talpoides*) have been studied thoroughly (Keith et al. 1959; Ward and Keith 1962; Vaughan 1967). Data published by these authors as compared to data published by Myers and

Vaughan (1964) indicated that forbs comprised a much larger portion of the northern pocket gopher diet (67%–93%) than of the plains pocket gopher diet (30%). This study was designed to determine plant species and plant parts (roots or leaves and stems) eaten by plains pocket gophers in western Nebraska.

## Methods and Materials

The study area was located 35 kilometers (22 miles) south and 11 kilometers (7 miles) east of Chadron, Nebraska. The climate is semiarid with a 30-year mean annual precipitation of 399 mm, with 69% occurring during the 130-day growing season (U.S. Dep. of Commerce 1973). Soils vary from fine sand to silty clay. Species comprising vegetation on the research area were primarily deep-rooted rhizomatous grasses such as prairie sandreed (*Calamovilfa longifolia*), sand bluestem (*Andropogon hallii*), western wheatgrass (*Agropyron smithii*), and sandhill muhly (*Muhlenbergia pungens*). Additional perennial grasses present were needleandthread (*Stipa comata*), Indian ricegrass (*Oryzopsis hymenoides*), and sand dropseed (*Sporobolus cryptandrus*).

Gophers were trapped during all months of 1974, 1975, and 1976 except June and July. Personnel were not available for trapping during June and July. The specimens were frozen and stomachs were removed later. Stomach contents of 141 pocket gophers, 57 males and 84 females, were examined to determine their food habits.

Vegetation data were compiled (Foster 1977) during the 3 years of trapping. Gophers generally were trapped away from vegetation sampling sites. However, 16 gophers were trapped on one of Foster's specific vegetation sampling sites so that plants eaten could be compared with plant species composition (South Sand Canyon study site).

A representative plant collection was made on the study area during August, 1976. Tissues of each plant species were finely ground and mounted on microscopic slides. These slides served as reference material for comparison with stomach content slides which were prepared using a modification of techniques described by Dusi (1949), Hansen (1976), Keith et al. (1959), and Williams (1962).

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Two microscopic slides were prepared from each stomach, and 10 fields were observed on each slide. Relative amounts of food items in a stomach were estimated by counting the number of fields in which each item occurred out of 20 fields. Each field was randomly selected and observed at 100 × magnification. Percentage of total composition was calculated for each species as well as the percentage of root and leaf-stem material eaten. Total and monthly percentages describing the diet of pocket gophers were based on the mean percent plant composition of the stomach contents.

## Results and Discussion

Twenty species of grasses, forbs, and rushes were identified in the stomach contents of pocket gophers (Table 1). Four species made up 50.0% of the total diet. Needleandthread occurred in 81.0% of the stomachs and comprised 27.5% of the yearly diet. Common scouring-rush (*Equisetum hyemale*) was the second most important species in the diet. It was found in 28.2% (occurrence) of the stomachs and comprised 14.8% (composition) of the diet. Prairie junegrass (*Koeleria cristata*) and Kentucky bluegrass (*Poa pratensis*) were found in 12.9% and 10.3% of the stomachs, respectively. No other species was found in nor comprised more than 10% of the diet.

The percentage of needleandthread in the diet of gophers in this study was similar to that of the same species of gopher in

Colorado (Myers and Vaughan 1964). In their study, the yearly diet consisted of 22% needleandthread. Myers and Vaughan (1964) reported diets containing 14% western wheatgrass, 12% blue grama (*Bouteloua gracilis*), and 9% spreading pricklypear (*Opuntia humifusa*). In our study, western wheatgrass and blue grama were minor items in the gopher's diet, each making up less than 1%, while spreading pricklypear was not present.

Even though it was a major species in the vegetation (Foster 1977), prairie sandreed comprised only 0.3% of the gopher diet. Common scouring-rush and prairie junegrass were present only in trace amounts on the research area, even though the two species comprised 20.2% of the diet.

Seasonal trends of the two major species eaten were noted. Needleandthread made up a major portion of the diet in summer and fall, and common scouring-rush was eaten mainly during winter and spring. The major species in the diet varied during the 10 months studied during each of the 3 years. Either needleandthread or common scouring-rush was the major species in the diet, except during May. Prairie junegrass was the major food item in May, when it made up 40.3% of the diet. Prairie junegrass was eaten only from February through May.

Forbs were a more important component of the diet during the growing season than during other parts of the year (Fig. 1). Only a small amount of forb material was eaten during the winter months although a large portion of the unidentified material may have been forb roots.

Table 1. Frequency of occurrence and composition of food items in the diet of plains pocket gophers.

Plants	% occurrence	% composition
<b>Grasses</b>		
<i>Agropyron smithii</i>	7.3	.5
<i>Bouteloua gracilis</i>	1.1	.1
<i>Bromus</i> sp.	3.3	.3
<i>Buchloe dactyloides</i>	7.7	1.3
<i>Calamovilfa longifolia</i>	2.1	.3
<i>Koeleria cristata</i>	12.9	5.4
<i>Poa pratensis</i>	10.3	2.3
<i>Sorghastrum nutans</i>	.7	.1
<i>Stipa comata</i>	81.0	27.5
<i>Stipa</i> or <i>Sporobolus</i>	35.9	7.1
Grass roots	64.5	9.2
Grass leaf and stem	97.9	35.7
All grasses	97.9	44.9
<b>Forbs</b>		
<i>Ambrosia psilostachya</i>	6.3	1.4
<i>Astragalus</i> sp.	.7	.6
<i>Cirsium</i> sp.	2.1	1.3
<i>Croton texensis</i>	.7	.3
<i>Eriogonum annuum</i>	1.4	.3
<i>Melilotus</i> sp.	4.6	3.6
<i>Opuntia fragilis</i>	5.6	1.7
<i>Opuntia macrorrhiza</i>	1.5	.9
<i>Psoralea tenuiflora</i>	.7	.5
Forb roots	19.1	7.7
Forb leaf and stem	14.9	2.2
All forbs	19.9	9.9
<b>Rush</b>		
<i>Equisetum hyemale</i>	28.2	14.8
Rush roots	24.8	14.0
Rush leaf and stem	9.9	0.8
<b>Totals</b>		
Roots of all plants	79.4	30.9
Leaf and stem of all plants	97.2	38.7
Unidentified plant material	70.9	30.4

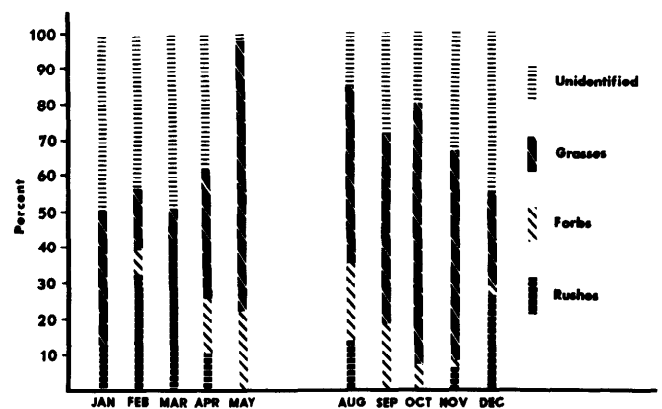


Fig. 1. Percent of grass, forb, and rush in the monthly diet of plains pocket gophers.

The ten grass species made up a larger part of the diet than the nine forbs or one rush. The rush, common scouring-rush, made up 14.8% of the yearly diet, while all forbs comprised only 9.9% of the diet. Common scouring-rush made up only a trace of the vegetation, while forbs comprised a much larger portion (30%). No shrub or animal matter was detected in stomachs examined.

Root and aboveground materials were nearly equal in the gopher's diet, comprising 30.9% and 38.7%, respectively (Table 1). A total of 30.4% of the stomach contents could not be identified. Special difficulties were encountered in identification of stomach contents of gophers collected from November through March. Common scouring-rush roots were easier to identify than grass or forb roots. They made up nearly equal portions of the yearly diet (14% common scouring-rush, 16.9% grass and forbs). Grass leaf and stem parts were eaten more often than leaf and stem parts of forbs and the rush.

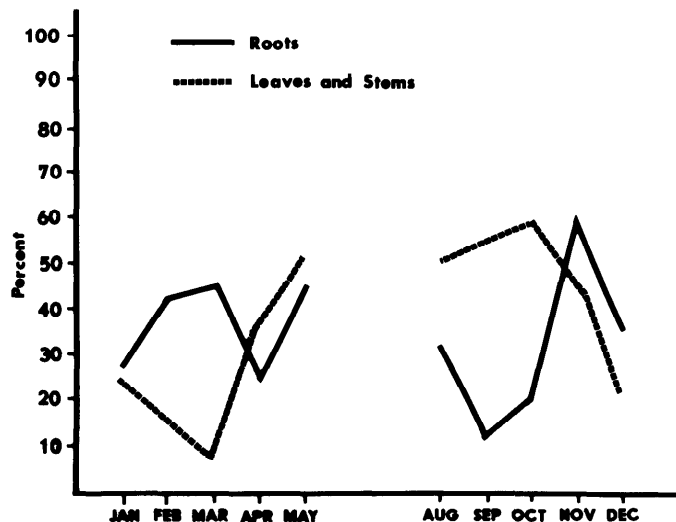


Fig. 2. Percent of root material and leaf and stem material in the monthly diet of plains pocket gophers.

Root material occurred in more stomachs than leaf and stem material during the late fall and winter (Fig. 2). Beginning in April, leaf and stem material became more important to gophers than root material. This trend probably resulted from changes in the availability of green herbage.

The sex ratio (40% males, 60% females) of trapped gophers was similar to that reported by Vaughan (1962). Percent composition of the two major plant species in the diet appeared to vary little between sexes. Frequency of occurrence of the two major species in the diet was also very similar for both sexes.

#### South Sand Canyon Study Site

Data indicate that gophers may influence the vegetative composition on rangeland. Species eaten by gophers tend to decrease while species apparently unpalatable to gophers increase in basal cover. Reductions in vegetation may not be due entirely to gophers because cattle were grazing this area. Prairie sandreed comprised 5.2% of the vegetation in an infested portion of a sands range site study area, while 25.4% of the basal cover of the vegetation in the uninfested portion was prairie sandreed. Blue grama showed a similar trend, comprising 7.0% of the basal cover in the infested portion and 16.1% of the vegetation in the uninfested portion of the rangeland. Prairie sandreed and blue grama each made up less than 1% of the diet possibly due to the scarcity of these species in this site infested by gophers.

Stomach contents of gophers trapped in this area consisted

of 62.0% needleandthread, which was found in all 16 gopher stomachs analyzed from the study area on the sands range site. Needleandthread leaf and stem material comprised 52.5% of the total diet while roots constituted only 9.8%. In gopher infested areas, needleandthread comprised 25.8% of the basal cover in 1976 and made up 31.0% of the basal cover of an adjacent area that was not infested by gophers (Foster 1977).

#### Management Implications

In the present study, plains pocket gophers live in a habitat that is dominated by grasses. Of the identified plants, grasses made up 44.9% while forbs comprised only 9.9% and one species of rush 14.8% of the diet. Myers and Vaughan (1964) reported that grass made up 88% of the vegetation in their study area. The diet of plains pocket gophers in their study consisted of 77% grass.

Some species eaten by gophers are of poor forage value to livestock. Western ragweed (*Ambrosia psilostachya*), thistles (*Cirsium* sp.), and species of cactus are undesirable range plants that comprised 5.3% of the diet. Other food items of plains pocket gophers are range plants of good forage value. Buffalograss (*Buchloe dactyloides*), prairie junegrass, Kentucky bluegrass, and needleandthread are major range grasses that comprised 36.5% of the diet. Plains pocket gophers decrease forage availability of some desirable grasses on rangeland by their feeding habits.

#### Literature Cited

- Dusi, J.L. 1949. Methods for the determination of food habits by plant micro-techniques and histology and their application to cottontail rabbit food habits. *J. Wildlife Manage.* 13:295-298.
- Foster, M.A. 1977. Impact of the plains pocket gopher (*Geomys bursarius*) on rangeland. MS Thesis. Univ. of Wyoming, Laramie. 91 p.
- Hensen, R.M. 1976. Foods of free-roaming horses in southern New Mexico. *J. Range Manage.* 29:347.
- Keith, J.O., R.M. Hansen, and A.L. Ward. 1959. Effect of 2,4-D on abundance and foods of pocket gophers. *J. Wildlife Manage.* 23: 137-145.
- Myers, G.T., and T.A. Vaughan. 1964. Food habits of the plains pocket gopher in eastern Colorado. *J. Mammal.* 45:588-598.
- U.S. Department of Commerce. 1973. Monthly normals of temperature, precipitation, and heating and cooling degree days, 1941-1970. *Climatology of the U.S.*, No. 81. Washington, D.C. 13 p.
- Vaughan, T.A. 1962. Reproduction in the plains pocket gopher in Colorado. *J. Mammal.* 43:1-13.
- Vaughan, T.A. 1967. Food habits of the northern pocket gopher on short-grass prairie. *Amer. Midland Natur.* 77:176-189.
- Ward, A.L. 1960. Mountain pocket gopher food habits in Colorado. *J. Wildlife Manage.* 24:89-92.
- Ward, A.L., and J.O. Keith. 1962. Feeding habits of pocket gophers in mountain grasslands, Black Mesa, Colorado. *Ecology* 43:744-749.
- Williams, O. 1962. A technique for studying microtine food habits. *J. Mammal.* 43:365-368.