

NOTES

ANALYSIS OF CHEEK POUCH CONTENTS OF ORD'S KANGAROO RAT (*DIPODOMYS ORDII*).—Ord's kangaroo rat (*Dipodomys ordii*) is widely distributed in western North America. One subspecies, *D. ordii oklahomae*, is confined to the floodplain of the South Canadian River in central Oklahoma. Limited ecological observations concerning habitat and food habits of this taxon have been presented by Trowbridge and Whitaker (J. Mamm., 22:343-345, 1940). The purposes of our study were to determine what food items were gathered by *D. o. oklahomae* and examine seasonal variation in these food items.

From July 1970 through July 1971, 423 kangaroo rats were collected using large Victor rat traps. All collections were from islands of relatively stable sand dunes in the floodplain of the South Canadian River; this habitat consists of a barren substrate with scattered annuals and occasional cottonwoods (*Populus deltoides*) and willows (*Salix* sp.). The kangaroo rats occur in these sandy areas and never were taken on the adjacent clay-like soils. All specimens were collected at nine localities from 7.2 mi. W, 1.8 mi. S Moore, Cleveland Co., eastward to 1.5 mi S, 5.3 mi. W Wanette, Pottawatomie Co. Cheek pouch contents were removed, placed into vials, and labeled. To facilitate seed identification, samples of plants were collected during August and September 1970, and were identified by George Goodman, Bebb Herbarium, Univ. Oklahoma. Seeds from the plants then were compared to those taken from the cheek pouches. Kangaroo rats used in this project are the same individuals as those studied by Reisen and Best (Ann. Entomol. Soc. Amer., 66:599-601, 1973), Best and Schnell (Amer. Midland Nat., 91:257-270, 1974), and Hoditschek and Best (in prep.).

Monthly and total frequencies and percent occurrences of each of the 13 food categories are presented in Table 1. A comparison with previously published data on *D. ordii* food habits (Wood, New Mexico St. Univ., Agric. Exper. Sta. Bull., 555:1-17, 1969; Alcoze and Zimmerman, J. Mamm., 54:900-908, 1973; Flake, J. Mamm., 54:636-647, 1973) revealed two major differences. First, cheek pouches of Oklahoma *D. ordii* never contained animal food. Alcoze and Zimmerman (1973) found that insects and other arthropods were eaten in relatively large amounts in west-central Texas (8.0% of the winter diet and 18.3% of the spring diet). In southern New Mexico, insects made up 10% of the diet of *D. ordii* (Wood, 1969). Flake (1973) found only 4.4% volume of animal matter (almost all arthropods) in stomachs of *D. ordii*. As Wood (1969), Alcoze and Zimmerman (1973), and Flake (1973) examined stomach contents and we examined cheek pouch contents, this difference might be expected—arthropods would have a tendency to escape if placed into the cheek pouches alive. The second major difference between previous studies and ours is in the vegetational composition of the study areas. Most of the plant species in the Texas, New Mexico, and Colorado study areas are not found along the floodplain of the South Canadian River in Oklahoma where our specimens were collected.

Seasonally (except for summer), seeds of *Strophostyles helvola* (wild bean) were the most common item in the cheek pouches of *D. ordii oklahomae* (Table 1). Wild bean was common at all nine of the collecting sites. Trowbridge and Whitaker (1940) found several of these seeds in the pouches of a specimen from Norman, Oklahoma.

Seeds of *Cycloloma atriplicifolium* (winged pigweed) occurred in 15.9% of the kangaroo rat cheek pouches that had contents. Summer and fall samples had the greatest frequencies, and few or no occurrences were recorded for winter and spring, respectively. During the summer, this species replaced *Strophostyles* as the most frequently occurring food item.

Trifolium (clover) was represented in seven of the monthly samples. We did not find clover in pouches of specimens examined from August through December, or from May. In February and April, we found green leaves, but for the other months we recorded only seeds. Clover was one of the most common food items in summer and winter, but was either absent (fall) or in low frequencies (spring) during the other seasons.

Cassia fasciculata (partridge pea) seeds were found in 10.8% of the cheek pouches with contents. This species was present in relatively low frequencies for 9 of the 13 months. Highest seasonal frequencies were during winter (18.2%) and fall (11.8%), although the July 1971 sample represented the highest frequency during the study.

Seeds of several plant species occurred in pouches at low frequencies. *Corispermum hyssopifolium* (bugseed) was present only in the October and January samples, but great enough to account for a 4.1% frequency for the year. For the 4 months in which we recorded *Helianthus* (sunflower)

TABLE 1.—Cheek pouch contents of 423 kangaroo rats (*Dipodomys ordii oklahomae*) from central Oklahoma. Total sample sizes and percent with cheek pouch contents for each month and for the entire study period are in parentheses. Opposite each item the frequency and percent occurrence, respectively, are presented for each month and for the entire study.

Cheek pouch contents	Jul (31;54.8)	Aug (13;61.5)	Sep (16;81.3)	Oct (21;76.2)	Nov (35;62.3)	Dec (26;38.5)	Jan (23;69.6)	Feb (29;58.6)	Mar (43;65.1)	Apr (37;21.6)	May (38;50.0)	Jun (54;16.7)	Jul (57;21.1)	Total (423;46.1)
Gramineae														
<i>Aristida</i> sp.				2;12.5		1;10.0								3; 1.5
Salicaceae														
<i>Populus deltoides</i>											1; 5.3			1; 0.5
Chenopodiaceae														
<i>Cycloloma atriplicifolium</i>	4;23.5	3;37.5	8;61.5	7;43.8	1; 4.6	1;10.0	2;12.5	1; 5.9					4;33.3	31;15.9
<i>Corispermum hyssopifolium</i>				5;31.3			3;18.8							8; 4.1
Leguminosae														
<i>Cassia fasciculata</i>		1;12.5	2;15.4	2;12.5	2; 9.1	2;20.0	2;12.5	4;23.5	3;10.7				3;25.0	21;10.8
<i>Trifolium</i> sp.	4;23.5						5;31.3	6;35.3	4;14.3	2;25.0		2;22.2	4;33.3	27;14.9
<i>Strophostyles helvola</i>	5;29.4	2;25.0	2;15.4	4;25.0	21;95.5	3;30.0	10;62.5	9;52.9	13;46.4		11;57.9	2;22.2	1; 8.3	83;42.6
Compositae														
<i>Helianthus</i> sp.			1; 7.7	1; 6.3		1;10.0				1;12.5				4; 2.1
Unidentified Seeds	6;35.3	4;50.0	6;46.2	2;12.5	7;31.8	5;50.0	5;31.3	10;58.8	9;32.1	1;12.5	5;26.3	4;44.4	2;16.7	66;33.9
Plant Segments*	1; 5.9		1; 7.7	2;12.5	4;18.2			1; 5.9	9;32.1	2;25.0	4;21.1			24;12.3
Unidentified Leaves	1; 5.9	2;25.0			1; 4.6	3;30.0	2;12.5	1; 5.9	4;14.3	3;37.5	5;26.3	2;22.2		24;12.3
Plant Debris	1; 5.9		1; 7.7	1; 6.3	2; 9.1	2;20.0	5;31.3	3;17.7	8;28.6		3;15.8			26;13.3
Sand			2;15.4											2; 1.0

*10 to 20 mm segments of unidentified stems or roots.

seeds, they were present for only one individual per month. *Aristida* (three-awn) was present twice, and some cotton from a *Populus* (cottonwood) was found in the cheek pouch of an adult female in May.

For the 13-month study period, our category of "unidentified seeds" comprised about one-third of the items from the cheek pouches (Table 1). The relatively high frequency for this category each month and for the year is misleading, because there was a minimum of eight species represented in this grouping. Based upon our plant collections, we feel that these species occurred in very low densities and that each of them represented only a very small part of the diet of these kangaroo rats. Our categories of plant segments, unidentified leaves, and plant debris also contain plant material that we were unable to identify. Undoubtedly, these groupings contain several plant species. Plant debris was present in 9 of 13 months. Highest frequencies were in winter (23.3%) and spring (20.0%). Contents placed in this category generally were fragments of weathered plant material or items that were not appropriate for inclusion in any of the other groups. Plant segments were pieces of stems or roots 10 to 20 mm long. Although they occurred during all seasons, the greatest frequency was in the spring (27.3%). Plant segments taken from the pouch of an individual specimen were approximately the same length. They frequently were packed into the pouches forming neatly arranged bundles. Both green and weathered segments were found, but not in the same individual. In west-central Texas, Alcoze and Zimmerman (1973) found dry unidentified stems to be the most common food of *D. ordii* during winter and less common in spring. In our study, unidentified leaves were most frequent during the spring (21.8%). Usually leaves were green, but pieces of dried, weathered leaves were also placed into this group. Previous investigators (Bradley and Mauer, J. Mamm., 52:497-507, 1971) have indicated that green leaves probably are ingested as they are encountered, and primarily seeds are placed into the cheek pouches.

The only non-plant material found in the cheek pouches was sand, which occurred in pouches of two adult females in September. There were seeds in these pouches, suggesting that the sand may have been placed there accidentally.

The percentage of kangaroo rats with cheek pouch contents ranged from 81.3% in September to 21.1% in July 1971 (Table 1). Seasonally, the fall months had the greatest percentage (70.8%) of kangaroo rats with cheek pouch contents. Winter (55.1%), spring (46.6%), and summer (29.7%) had lesser values. We expect that diets may vary considerably both seasonally and annually depending upon temperature and precipitation, which have a direct influence on which plant species will be available to kangaroo rats.

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