

Table 2. Number of forbs on the Claypan range site for the summers of 1961 and 1962.

Species	Per Sq. Foot		Per Acre	
	1961	1962	1961	1962
	(Number)			
Western ragweed	3.20	10.71	139,392	466,528
Heath aster	0.46	1.60	20,038	69,696
Dotted gayfeather	1.72	3.33	74,052	145,055
Western yarrow	0.62	0.55	26,136	23,958
Annual broomweed	0.44	0.93	19,166	40,511
Others	0.24	0.64	12,197	27,878
Total	6.68	17.76	290,981	773,626

Table 3. Forage production and percent forage on the Claypan range site for the summers of 1961 and 1962.

Species	Dry Weight		Forage	
	1961	1962	1961	1962
	—(lb/A)—		(Percent)	
Blue grama	721	627	33.5	34.3
Buffalograss	203	67	9.4	3.7
Forbs	699	676	32.5	37.1
Others	529	454	24.6	24.9
Total	2152	1824	—	—

The average foliage height of blue grama exceeded that of buffalograss throughout the summer months, and the numerous slender fruiting culms reached heights varying from 29.0 cm in July, 1961, to 53.0 in August, 1962. On buffalograss the fruiting culms varied from 19.5 cm in July, 1961, to 23.8 cm in August, 1962. The leaves of blue grama ranged in length from 12.9 to 17.3 cm and from 1.7 to 2.0 mm in width. The number of leaves produced by these two species was generally the same.

Tall dropseed was the tallest growing grass species, reaching a maximum height of 89.5 cm and an average height of 70.7 cm. The leaves of this species were longer and wider than those of any other grass, but the number of leaves per plant was generally the same as in the others. The growth measurements of windmillgrass were generally the same as those of buffalograss, the only significant difference being that its leaves were about twice as wide.

Western ragweed grew to a height of at least 10 inches by June, and in mid-August when the last measurements for vigor were taken, it had at least doubled in height. The number of leaves per plant for this species ranged from 14 in June to 86 in August of both years.

Dotted gayfeather grew to a height of around 14 inches by June of both years, and in mid-August this species had reached a maximum height of 24 inches. The number of leaves per plant for this species ranged from 100 in June to 160 in August.

Heath aster increased in height from 12 inches in June to 20 inches in mid-August, and the number of leaves per plant for this species ranged from near 400 in June to around 1200 in August. There was no significant difference in the length and width of the leaves of the different species as they increased in height.

Summary and Conclusions

Vegetative composition, basal density, forage production, and plant vigor were determined on a claypan range site in northern Osage County, Oklahoma, during the summer months of June, July, and August of 1961 and 1962.

Eleven grass species were recorded in sampling the site, with blue grama and buffalograss predominating. The presence of these short grasses was due to a dense, compacted layer of clay, located from 5 to 16 inches below the soil surface, sharply restricting the growth of tall grasses.

Western ragweed, dotted gayfeather, and heath aster, respectively, were the most abundant forbs. These species not only contributed a high percentage of the total herbage production, but also grew to a height which overshadowed and tended to obscure the grasses.

Yields of 1800 to 2200 pounds of dry matter per acre per season were produced on the site. Blue grama and buffalograss were the main forage producers, but the forbs also produced a very significant amount.

Leaf growth measurements showed that height of leaf growth was one of the most consistent indicators of plant vigor. Leaf width and number of leaves, however, were shown not to be correlated with vigor.

Water content of the soils apparently played no significant role in this study since there appeared to be practically no moisture stress during either summer.

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Range Management by Correspondence

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Correspondence courses of some kind are offered by colleges and universities in every western state. These are accepted everywhere, officially, for full credit at high school and college levels, but usually not for graduate credit. Even though three excellent articles have appeared recently in the *Journal of Range Management* discussing problems in education, no mention is made of correspondence courses (Heady, 1961; Box, 1964; Hervey, 1964).

At this time courses in range management may be taken by correspondence at only two institutions, as far as is known to this writer—Utah State University and the University of Wyoming. However, all the courses basic to range management, Botany, Zoology, Physics, Mathematics, English, and Chemistry may be taken at a beginning level at a large choice of colleges and uni-

versities. In addition, courses in allied subjects may be found, e.g., Feeds and Feeding or Soil Physics (University of Arizona), Forage Crops or Land Economics (University of Idaho), Plant Identification (University of Nebraska) Conservation of Natural Resources (University of Oregon), and Forestry (University of Wyoming).

Who takes correspondence courses in range management? During the past three years records have been kept on 50 students (3 women, 47 men), each of whom received at least three hours of college credit for correspondence work in range management at the University of Wyoming. The following is a cross-section, then, of the persons for whom this service filled a need.

Place of Residence—The 50 were from Wyoming (11), Idaho (7), California (5), various armed forces addresses (5), Nevada (4), Arizona, Colorado, Iowa, Kansas, Minnesota, Montana, Ohio, Oklahoma, Oregon,

Utah (1 each), and foreign countries (8).

Age—The youngest was 18 and the oldest 48. However, of the 50, 35 were in their twenties, 27 of these from 21 to 26. Obviously this is the age when a need for these courses is felt.

Reasons for Taking—(1) To increase profession competency, (2) to qualify for graduate work in range management, (3) for certification purposes in secondary education, (4) to qualify for civil service, (5) needed for college graduation, (6) out of general interest in subject area, and (7) planning to buy a ranch.

Occupations of Those Taking the Course—(1) Soil conservationist, (2) county agent, (3) student, (4) farm hand, (5) Game and Fish, game winter-range-unit manager, (6) map compiler and photo interpreter, U. S. Army, (7) surveyor's aide, (8) range technician, (9) none, (10) mechanic, U. S. Air Force, (11)

farmer, (12) range aide, (13) sheep shearer, (14) engineering aide, (15) ranch hand, and (16) lab technician.

Favorite Subjects—Biology, including Botany, Zoology, and Agriculture, especially forestry and range management.

Subjects Liked Least—Mathematics, English, History, and Chemistry.

With the campus continuing to be a crowded and expensive place to live, not always meeting all educational needs, it may be expected that correspondence courses in range management will more and more fill a need.

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