Alkali Sacaton: Its Merits for Forage and Cover[1]

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Highlight

Alkali sacaton provides fairly abundant forage, is an effective ground cover, withstands relatively heavy grazing, and may offer possibilities for reseeding. It probably is a more valuable grass than generally realized and merits more attention and research.

Alkali sacaton (*Sporobolus airoides* (Torr.)) may be a more valuable grass than generally realized. On many western ranges it effectively serves a dual purpose of protecting soil and furnishing forage. Because of its growth characteristics, it would seem to merit further consideration and study.

Alkali sacaton is widely distributed in western North America, extending from the Canadian border almost to Mexico City and from South Dakota and the Gulf Coast of Texas to eastern Washington and southern California. Altitudinal range of the species, reported by various authorities, is from near sea level to 8,000 ft.

The species grows under a wide range of precipitation. The cover varies from place to place, depending upon annual precipitation, topography, and soil. On the more favorable sites, when it is not overgrazed, the species may form a uniform cover approaching a sod.

Alkali sacaton apparently was much more prevalent in certain areas in the past than it is today. On the basis of early descriptions, Humphrey (1958) concludes that much of the flood plain area in the main drainages of the desert grassland supported

dense stands of alkali sacaton four to six feet tall. Thornber (1910), an early botanist who saw many of these areas before they had deteriorated, observed alkali sacaton as the dominant species in many of the moist valleys and cienegas of southern Arizona. Examples of these valleys were the Santa Cruz, San Pedro, and San Simon. Storm runoff spread over the floors of these valleys and was retarded by the stands of alkali sacaton. Similar conditions were observed in the early days of the Rio Puerco drainage in New Mexico (Bryan, 1928; Cooperrider and Hendricks, 1937).

Almost no research has been done on alkali sacaton as an individual species. The literature either gives comparisons between it and other species or refers to it as an item in papers considering mainly other vegetation. This report summarizes observations and results of utilization and growth studies on alkali sacaton, largely made in the Rio Puerco drainage of west-central New Mexico.

Studies in New Mexico

In western New Mexico, living plants of alkali sacaton are largely restricted to the alluvial flood plains. This observation conforms with the prevailing opinion that alkali sacaton grows only on plains, along stream bottoms, or in moist, alkaline valleys. In many parts of New Mexico, alkali sacaton is presently found only in such situations (Fig. 1A). A careful reconnaissance indicates, however, the species may not always have been so restricted in its occurrence. Large numbers of dead rootcrowns of alkali sacaton are found on hillsides and mesas in the Rio Puerco drainage (Fig. 1B). According to Dortignac (1960), this finding suggests that at one time the species may have grown throughout the area, regardless of topography, but, for some reason, died out everywhere except in the alluvial flood plains. Similar observations were made by Valentine and Norris (1964), who reported dead or unthrifty alkali sacaton plants capping soil pedestals on a 2 to 5% slope in a creosotebush area about 9 miles north of Tularosa, New Mexico.

Other studies were made on a steep, rocky hillside before and after six years of excluding livestock. Before exclusion, there were only widely scattered plants of alkali sacaton. But after six years' protection from

FIGURE 1A. Good stand of alkali sacaton on alluvial flood plain in western New Mexico.

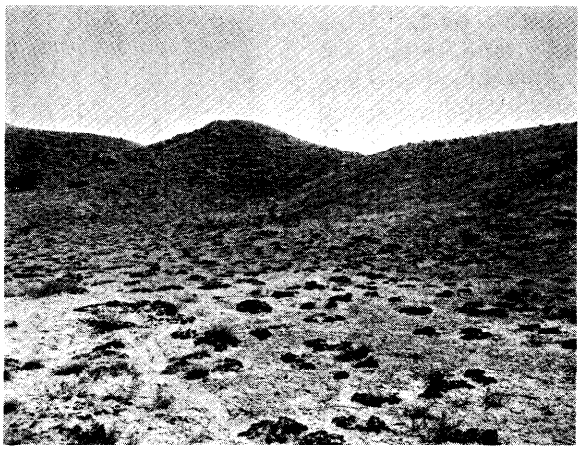

FIGURE 1B. Dead and nearly dead crowns of alkali sacaton on slopes and hills in the same area.

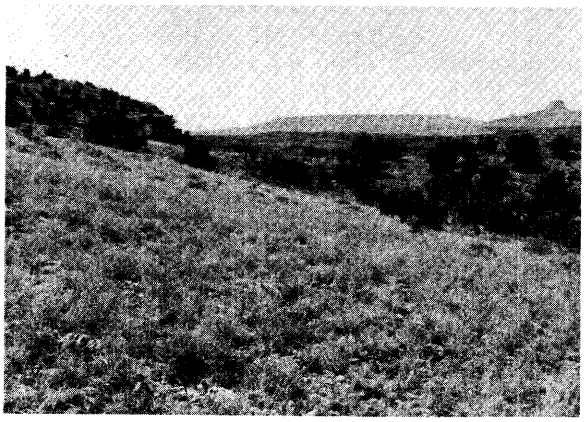

FIGURE 2A. Relatively dense stand of alkali sacaton on steep, rocky hillside.

FIGURE 2B. Individual clump of alkali sacaton seven feet in diameter.

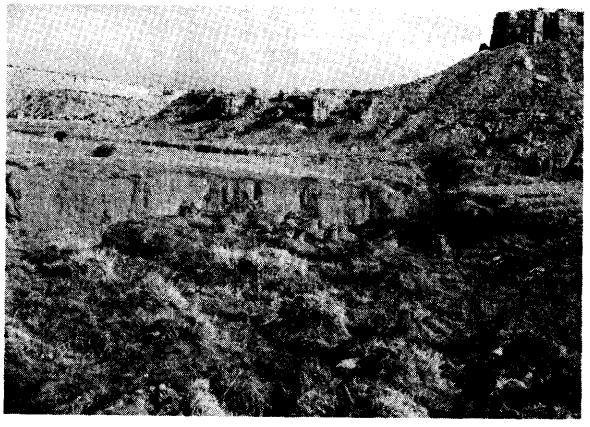

FIGURE 3A. Head cutting slowed by plants of alkali sacaton.

FIGURE 3B. Drainage with good cover of alkali sacaton; cutting action by runoff waters is negligible.

grazing, the area supported a relatively dense stand (Fig. 2A). The species probably has been overgrazed in many areas, for it now survives only under the better conditions found in alluvial flood plains. Under excessive grazing, perhaps the only plants able to produce sufficient seed to perpetuate the grass stand were those growing under ideal habitat conditions, such as the more moist valley floors. On the hillsides and mesa tops, where moisture conditions were less favorable, stands may have died out not only because of insufficient seed, but also because new plants failed to become established under heavy grazing.

Alkali sacaton generally is regarded as a relatively non-preferred species that is grazed only in the spring or early summer when the forage is young and tender. According to Judd (1962), the foliage becomes tough, coarse, and unpalatable as the season advances and does not mature into a nutritious winter feed. In the studies on the Rio Puerco, however, alkali sacaton was the preferred species regardless of the season of use. Galleta *(Hilaria jamesii* (Torr.) Benth.) and blue grama *(Bouteloua gracilis* (H.B.K.) Lag.), the two principal associated species, were utilized only after alkali sacaton became scarce. Cattle in poor condition that grazed on stands of mature alkali sacaton during the winter season, gained weight and ate even the coarsest plants to within a few inches of the rootcrown.

Withstands Heavy Winter Grazing. — Alkali sacaton apparently can withstand relatively heavy winter grazing without declining in productivity. An 8-year study in New Mexico showed no decline in production on alluvial areas where utilization during the 6-month winter period (Nov. 1 to May 1) averaged 63%. The trend, in fact, was toward increased production, as shown by these figures for two 4-year periods:

Period of study	Annual inches precipitation	Yield air-dry lb/acre
1955-1958	9.25	94.0
1959-1962	9.43	154.2

Yield of the alkali sacaton averaged nearly two-thirds higher during the second four-year period, although precipitation was only a small fraction higher. This substantial increase in herbage production may be attributed largely to the cumulative effects of several years of summer rest, plus better control of livestock. Grazing was yearlong prior to 1955.

Individual plants of alkali sacaton generally are large and produce an abundance of forage. Though they average less, plants commonly are 5 to 9 feet in diameter on better sites in areas receiving only 10 inches of annual precipitation (Fig. 2B). An experimental pasture in west-central New Mexico, with a loop-method ground cover index of 3.1% alkali sacaton and 12.6% galleta, produced 206 lb/acre of air-dry sacaton herbage but only 184 lb of galleta.

An Effective Ground Cover.— The growth characteristics of alkali sacaton appear to make it an effective ground cover. Because of an extensive fibrous root system, it is a good soil binder (U.S. Forest Service, 1937). It also withstands a great deal of soil deposition. Hubbell and Gardner (1950) found in experiments in northwestern New Mexico that deposition of 9 inches of heavy-textured sediment in two years only moderately damaged alkali sacaton; it survived under as much as 23 inches of sediment deposit, although its basal area was reduced by deposit to any depth. This grass showed greater percentage survival under heavier sediment treatments then either blue grama or galleta.

Observations indicate alkali sacaton may retard the advance of head cuts (Fig. 3A). In October 1963, a rain of approximately 1.75 inches in the Rio Puerco drainage seriously eroded many areas. The areas with a good cover of alkali sacaton, however, eroded little or not at all; instead they trapped large quantities of sediment (Fig. 3B, 4).

Because of special seed characteristics, alkali sacaton may offer possibilities as a seeding species. Jackson (1928) found that the seed coats of alkali sacaton were more permeable than

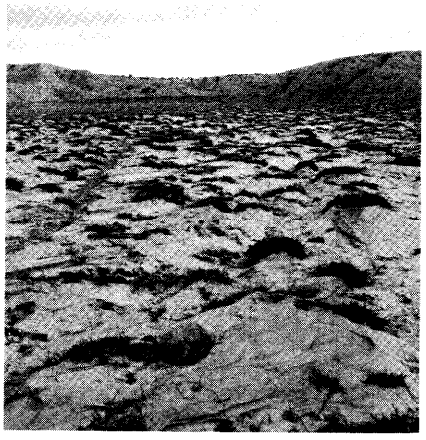

FIGURE 4. Sediment trapped on 8% slope by heavily grazed plants of alkali sacaton.

the seed coats of the other four Southwestern species of *Sporobolus* tested, and that alkali sacaton was the only species which did not require pricking or scarifying the seed coats to give satisfactory germination. The seeds usually do not require stratification, absorb water readily, and germinate promptly at alternating temperatures from 68 to 95 F. (Toole, 1941). According to Campbell (1931), the seeds remain viable for several years. Bridges (1942) recommended seeding alkali sacaton on clay flats wherever moisture is increased by mechanical structures.

Conclusions

Alkali sacaton is a relatively good forage grass that also has characteristics important for ground cover. It provides a fairly abundant amount of forage throughout the year. Although usually found only in alluvial flood plains, observations show it once grew on the hillsides. In west-central New Mexico, cattle preferred alkali sacaton to blue grama or galleta. Its persistence in areas where it is the preferred species shows it withstands fairly heavy grazing. Alkali sacaton appears to be an effective ground cover, because it is a good soil binder, traps sediment, and withstands heavy deposits of sediment. It may offer possibilities as a seeding species. Because of these characteristics and its western-wide distribution, alkali sacaton probably is a more valuable grass than generally realized. It certainly is a grass species that merits more attention and research.

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