Seasonal Grazing of Crested Wheatgrass by Cattle

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Highlight

Thirty-six pastures of crested wheatgrass were grazed in early spring plus early fall; late spring; all spring; early summer; late summer; early fall; and late fall. Summer and fall treatments included grazing with and without supplement. Yearlings made substantial gains in all seasons except during late fall when they lost weight. They finished the entire grazing period with an average gain of 224 lb. Calves gained 249 lb. Yearlings and calves did as well on crested wheatgrass as on forest range, and supplementation provided no additional gain. Cows on supplement gained 125 lb as compared to 50 lb for non-supplemented cows. In years with no fall regrowth, second grazing of crested wheatgrass without supplement produced daily gains in early fall equal to those for single grazing with supplement.

Due to reductions of permitted livestock on the higher summer ranges, it is important for some owners to obtain new sources of feed supply for the summer months. Crested wheatgrass has been used extensively on lower ranges for spring and fall grazing although it has been considered inferior to other grasses during the summer (Sarvis, 1941; Williams and Post, 1945; Barnes and Nelson, 1950; Cook et al., 1956).

The purpose of this study was: (1) to determine if crested wheatgrass was a dependable source of forage for cattle from April to December; and (2) to determine the merits of feeding a protein supplement to cattle grazing crested wheatgrass during summer and fall, combined with regular spring grazing. The data covers a four-year period from 1961 to 1964.

A preliminary report by Harris et al. (1965) showed that cows responded well to seasonal grazing of crested wheatgrass from April through mid-December when supplemented with 0.34 kg (0.75 lb) of protein supplement daily. Yearlings and calves made good gains throughout the season without supplement.

Literature relative to supplementing cattle on crested wheatgrass was scarce at the outset of this experiment; however, Wallace et al. (1963) have since reported work done with yearling cattle. The yearlings were supplemented with barley, cottonseed meal, and salt, alone and in various combinations, while grazing crested wheatgrass on a two-year study. Both energy and protein supplementation resulted in significant gains over the two-year period, while salt in combination with cottonseed meal showed less response than cottonseed meal alone.

Experimental Area and Procedure

The Benmore experimental area is located in southeastern Tooele County within a belt commonly considered as spring–fall range in the Intermountain region. The elevation is approximately 5,800 ft (1,768 m), and the average annual precipitation is about 12 inches (30 cm). Soils are mainly clay loams, generally with small amounts of gravel in some locations. This area, now under the jurisdiction of the Forest Service, was marginal dry farm land purchased in 1934 by the federal government. Thirty-two hundred acres were set aside as an experimental area from which pastures were fenced and seeded to grass. Water was piped to each pasture in the late 1930's.

The grass stands are now approximately 25 years old. At present, crested wheatgrass, including both fairway wheatgrass (*Agropyron cristatum*) and the so-called "standard" crested wheatgrass (*A. desertorum*), make up about 95% of the forage, with minor amounts of western wheatgrass (*A. smithii*), bulbous bluegrass (*Poa bulbosa*), cheatgrass (*Bromus tectorum*), squirreltail grass (*Sitanion histrix*), and several forbs. Big sagebrush (*Artemisia tridentata*) and rubber rabbitbrush (*Chrysothamnus nauseousus*) are present in varying amounts but were seldom eaten by cattle in the experimental pastures.

For the experiment, 36 pastures were divided into 3 blocks (replicates) of 12 pastures per block for grazing at different seasons as shown in Fig. 1. Treatments were: early spring plus early fall; late spring; all spring; early summer; late summer; early fall; and late fall. All of the summer and fall treatments included grazing with supplement and grazing without supplement.

All pastures were 50 acres each, except the ones grazed all spring and late spring; these pastures were 100 acres in size. Two yearlings and about 10 cow-and-calf pairs were allotted at random to each of the 50-acre pastures, while the 100-acre pastures received about twice the number of animals in keeping with predetermined stocking rates. Animals were shifted to new pastures at the beginning of each season, excepting that the three pastures grazed in early spring were also grazed in early fall. Cattle in the "all spring" treatment were shifted to the mountain range (National Forest) during the summer.

Utilization of the grasses was 60 to 70%. Animals were weighed individually after an overnight shrink in the corral before being placed in, or taken out of, a pasture. Cattle of Hereford breeding were provided by the Vernon Cattlemen's Association.

During summer and fall, half of the yearlings and lactating cows received in portable mangers the equivalent of 0.34 kg/day of a protein supplement on Monday, Wednesday, and Friday. The other half received no supplement. The supplement had the following percentage composition:

Soybean meal, solvent extracted, 44% protein	88.2%
Calcium phosphate, dibasic	10.8%
Trace mineral salt	1.0%

Each 0.34 kg of supplement supplied 75% of the daily requirement of phosphorus.

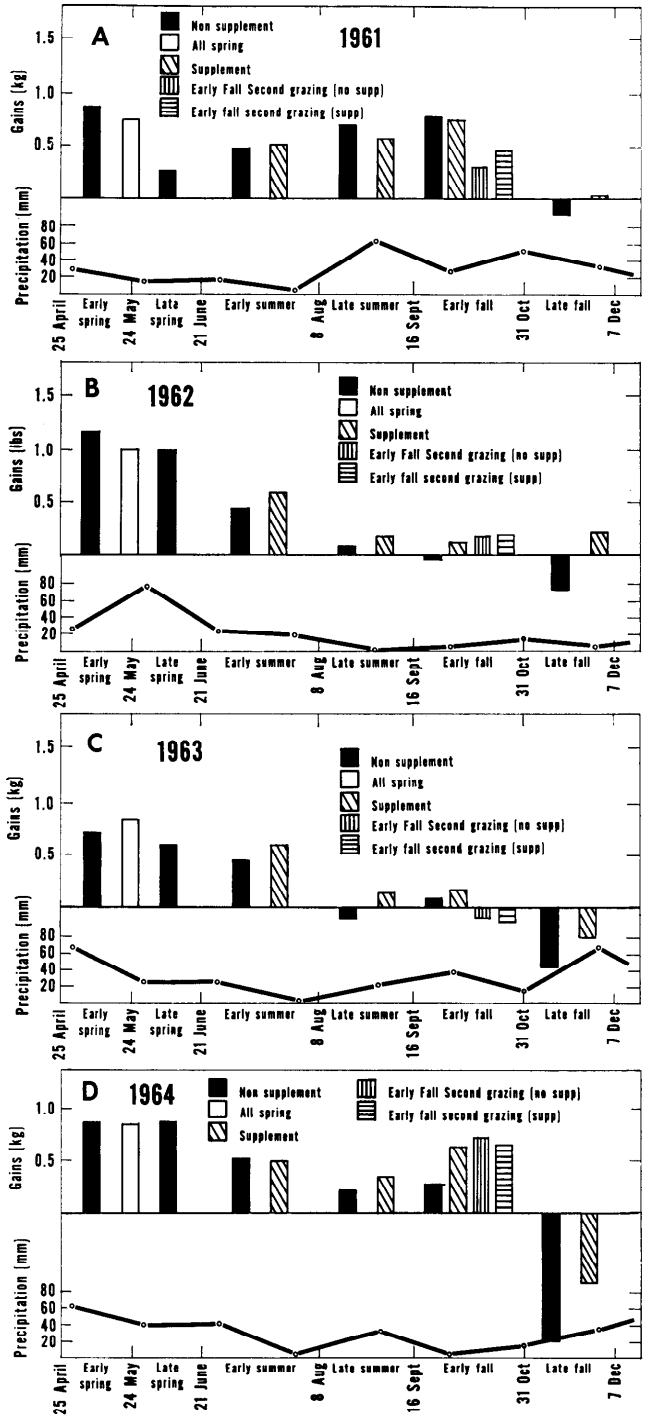

FIG. 1. Average daily gains for three classes of cattle grazing crested wheatgrass at various seasons of the year for four years (A) 1961 (B) 1962 (C) 1963 (D) 1964 and precipitation data for the same period.

All animals received rock salt during the spring periods, while during the summer and fall periods they received crushed salt in one side of a self feeder and one part trace mineral salt and one part calcium phosphate, dibasic, in the other half of the feeder.

Bulls were admitted to the pastures at the beginning of the late spring period. At the end of this period, part of the cattle were moved to the mountainous summer range

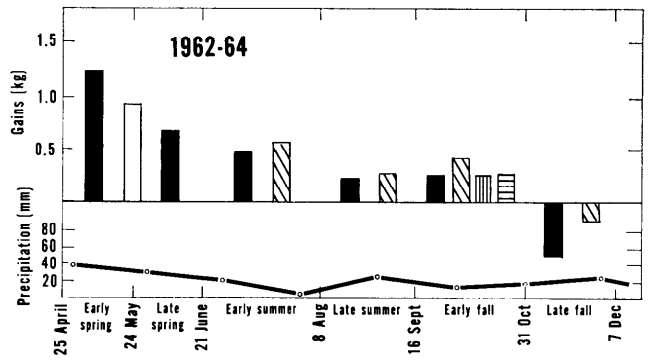

FIG. 2. Average daily gains for three classes of cattle grazing crested wheatgrass at various seasons of the year for four years (1962–64) and precipitation data for the same period.

(forest) south of the pastures. These cattle were rounded up and weighed at the beginning of the early fall period to provide data for comparison of pasture gains with gains made on the higher summer range.

Results

Average yearly daily gains per period and precipitation data for the corresponding periods are shown in Fig. 1. Animal gains varied as a function of available green forage, this in turn being affected by the precipitation, except during late fall which was beyond the growing season. Variations during the grazing seasons for the four years were large enough to warrant discussion by year.

Daily gains in summer and fall averaged highest during 1961, probably for two reasons. Late spring gains were low because of reduced growth of grass, so fairly high subsequent gains were possible. A total of 3.31 inches (8.4 cm) of rain fell during August, resulting in considerable late summer and fall green regrowth of grass. Secondly, the animals were removed from the late-fall treatment on November 23, due to heavy snows. Since the cattle generally lost weight during late fall, weight losses were minimized by this comparatively early removal.

During 1962, gains were relatively high in the spring periods. Little rain fell during the remainder of the grazing season and no fall regrowth occurred. With less green forage available, the effects of protein supplement were more pronounced, especially during the late fall when the cattle receiving supplements continued to gain at a rate of 0.21 kg/day while animals not supplemented lost weight.

Gains for 1963 were basically the same as for the previous year, although spring gains were slightly lower. The effects of supplement were more pronounced early in the season due to the dryness of the year. There was enough moisture during September to produce some regrowth, which resulted in a slight increase in gains for early fall over the previous year. A heavy fog blanketed the area for about a month during the late fall period of 1963

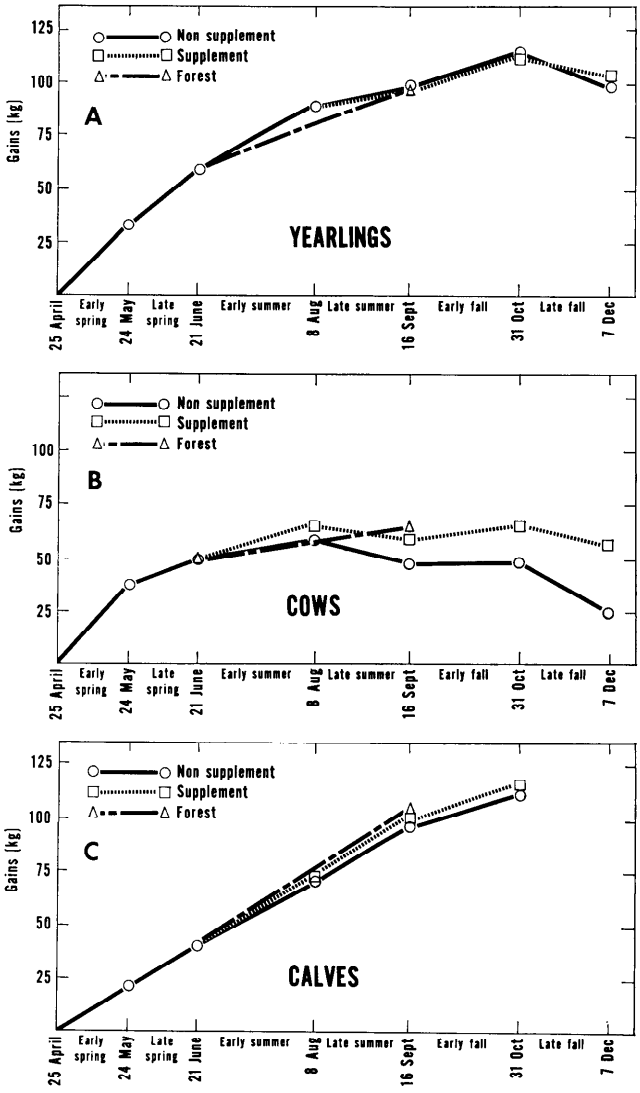

FIG. 3. Cumulative average gain (kg/animal) for three classes of cattle grazing crested wheatgrass at various seasons of the year for (A) yearlings, (B) cows, and (C) calves. Some animals on crested wheatgrass received supplement; others did not. Part of these animals were compared for the summer season with cattle on the National Forest.

reducing the daytime temperatures considerably. This may be one reason for the increased weight loss during that period.

Fairly high gains for the spring periods were made during 1964. Even though summer moisture was not sufficient to produce regrowth, possibly enough total growth was made during spring to sustain the substantial gain during summer and early fall. During late fall of 1964, cold weather and above-normal amounts of snow covering the feed caused the extreme loss in weight for that period.

Pastures that were grazed twice (early spring and again in early fall) provided slight additional gains upon second grazing in 1962 and 1964 compared to pastures grazed only in early fall. In these two

FIG. 4. Cattle in good condition on September 30 have grazed on crested wheatgrass since April 20. They received protein supplement during summer and fall. (Yearling in right foreground—cows and calves beyond.)

years, early fall gains for second grazing without supplement equaled or exceeded gains for single grazing with supplement. These years were dry wherein no summer or fall regrowth was produced. On the other hand, during the years of late summer and fall regrowth (1961 and 1963) early fall gains were higher for single grazing than for second grazing. The four-year average of gains made by the three classes of cattle during second grazing showed no significant response to supplementation (Fig. 2).

Cumulative gain (average per animal over a 4-year period) is shown in Fig. 3. The weight profile for each of the three classes of animals is portrayed over all grazing seasons. In addition, weights of the cattle grazing the forest area are compared to weights of animals on crested wheatgrass with and without supplement.

Yearlings and calves showed no significant differences among supplemented, non-supplemented, or forest-grazed animals. The cows tended to push yearlings away from the manger, which may account for the fact that yearlings did not respond to the supplement. The calves gained at a consistent rate through all seasons, making an average gain of 113 kg (249 lb) by the time they were sold near the end of early fall. The yearlings finished the entire grazing period with an average gain of 102 kg (224 lb) after losing slightly during late fall.

Cows made a significant response ($P < .05$) to supplement, finishing the entire season with an overall weight gain of 57 kg (125 lb) compared to 23 kg (50 lb) gain for non-supplemented cows. Summer gains made by cows receiving supplement on crested wheatgrass were essentially the same as those made by cows on the mountain range. These animals were in good condition until storms and cold weather hit in November (Fig. 4).

Gain per acre averaged highest for late spring

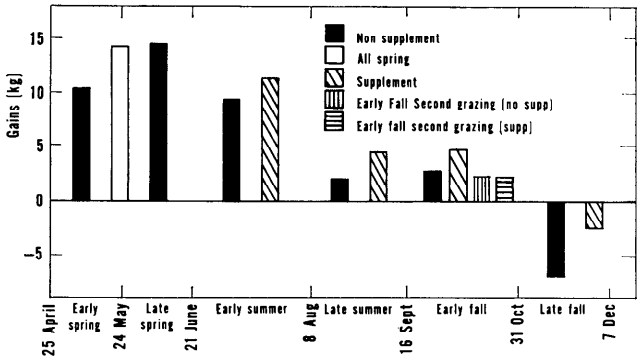

FIG. 5. Total gain per acre for the cattle grazing crested wheatgrass at various seasons of the year.

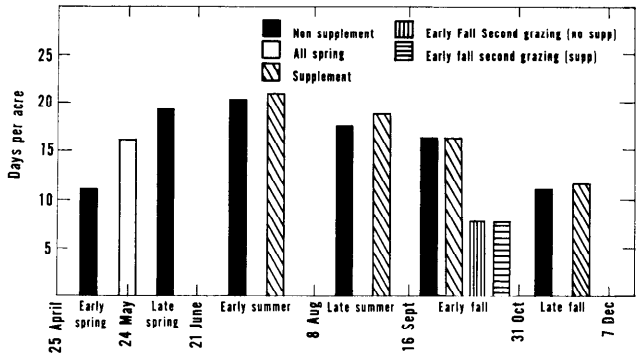

FIG. 6. Animal days per acre for three classes of cattle grazing crested wheatgrass at various seasons of the year.

and all spring grazing (Fig. 5). This corresponds to the period of maximum green forage. Substantial gains were also made during early summer. Excluding second grazing, average gains were slightly over 4.5 kg (9.92 lb)/acre during late summer and early fall for cattle receiving supplement, while cattle without supplement gained only about half this amount; these differences were significant ($P < .05$). Considering that cold, stormy weather contributes to high weight losses in late fall, it would probably be well to terminate grazing on crested wheatgrass ahead of late fall storms. This would depend upon past management patterns. Cattle at Benmore wanted to "go home" when heavy snowstorms occurred in November. Heavy snowstorms caused early termination of grazing in certain years. Otherwise it was Dec. 15.

Fig. 6 portrays the average stocking rates for the various seasons. In pastures where the grazing capacity was not reduced by big sagebrush, the stocking level in early spring averaged about 5 acres/cow month, not considering calves. At this rate, cows with suckling calves ate the grass about as fast as it grew. Again in early fall the stocking level on pastures that had been grazed previously in early spring averaged about 5 acres/cow month. Thus, the total grazing capacity of these pastures was about 2.5 acres/cow month which was about equal to that of pastures in the other treatments. The only difference was that half the capacity was taken in early spring and the other half in early fall, rather than in one period.

As the grass matured, cows became more selective of the areas grazed and the parts of plants they desired to graze. In the spring, utilization of grass in small swales and depressions averaged about 5% heavier than on small ridges and flat areas. Utilization continued equally heavy in the swales in all seasons, but it became lighter on ridges and flats as the seasons progressed. By late fall, utilization of grass in swales and depressions was about 15% heavier than that on the ridges and flats.

In summer and fall, grass around rabbitbrush plants was utilized heavily, like that in swales and depressions. Since rabbitbrush was not detrimental to grass yields under conditions existing at Benmore (Frischknecht, 1963), it appeared that the presence of rabbitbrush enhanced the crested wheatgrass for late summer and fall grazing. In late summer and fall, cows ate mainly seedheads on the dry grass on ridges and flats. The nutritive quality of seedheads was undoubtedly superior to that of the dry stems.

Summary and Conclusions

Thirty-six pastures of crested wheatgrass were divided into 3 blocks (replications) of 12 pastures each. The treatments were: early spring plus early fall; late spring; all spring; early summer; late summer; early fall; and late fall. All of the summer and fall treatments included grazing with supplement and grazing without supplement. Cow and calf pairs and yearlings were randomly allotted to the pastures. The supplemented cattle received the equivalent of 0.34 kg of protein supplement daily in three feedings per week. Salt and calcium phosphate, dibasic one part, and salt one part were also supplied free choice. During the summer, part of the cattle were moved to the adjacent mountain range (elevation 1,981 to 2,438 m) for comparisons of gains on the higher native range and those on crested wheatgrass.

Yearlings made substantial gains in all seasons except during late fall when they lost weight slightly. They finished the entire grazing period with an average gain of 102 kg. Calves gained at a constant rate, finishing in October with an average gain of 113 kg. It may be concluded that yearlings and calves did as well on crested wheatgrass as on the forest range, and supplementation provided no additional gain. Cows showed the only significant response to the supplement of the three classes, making an average gain of 57 kg, as compared to about 23 kg for non-supplemented cows. Cows on the higher range made comparable gains to cows receiving supplement on crested wheatgrass.

In years when there was no fall regrowth, second grazing of crested wheatgrass without supplement produced daily gains in early fall equal to those for single grazing with supplement. In years of fall regrowth, early fall gains were higher for single grazing than second grazing. Except for second grazing, gain per acre in summer and fall was significantly higher ($P < .05$) in pastures where supplement was fed than where it was not fed.

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