Table 3. Average daily feed consumption and costs per head by treatment

Treatment	Ave. daily rough. consump.	Ave. daily supl. consump	Feed cost
	lb	lb	$
1	16.2	0	.45
2	14.0	2	.44
3	13.9	3.5	.60

Alfalfa-orchardgrass hay, 1st cutting--$50/ton; 2nd cutting--$55/ton; Barley--$90/ton; protein-energy--$139/ton.

PRODUCTION AND CHEMICAL ATTRIBUTES OF *KOCHIA PROSTATA*

C. M. Britton and F. A. Sneva

Investigations of *Kochia prostata*, introduced from Russia, have been in progress at the Squaw Butte Experiment Station since 1971. This species appears to have the potential of becoming a valuable forage plant on western ranges. It is widely distributed throughout the arid and semiarid regions from Russia to the Mediterranean Sea and central Europe. *Kochia* has been described as a long-lived, morphologically variable half shrub having thick roots with numerous branches penetrating deeply into the soil. The Russians report that *Kochia* is exceptionally drought resistant and is valued as a fattening feed for sheep, goats, and camels.

Several important questions require answers before *Kochia* is considered for use on western rangeland. First, how productive is *Kochia* under western rangeland conditions? Second, what are the seasonal variations in nutrient content and third, what oxalate content does the plant contain? The oxalate content is important because this is the substance that makes hologeton poisonous.

EXPERIMENTAL PROCEDURES

Two experimental plantings were established in 1974. On each area 2 subspecies of *Kochia prostata* were seeded. These subspecies will be referred to as the green and gray form. On one area the two forms were seeded in plots with row spacing widths of 6, 12, and 24 inches. Plots were replicated 3 times with 5 rows per plot. The plots were harvested to determine production during September of 1975 and 1976.

On the second area, 4 plots of the green form and 11 plots of the gray form were established in 1974. From September 1975 to September 1976, approximately 7 plants were harvested from each plot on a monthly basis. During this sampling period, plants were 2 years old and contained old and new growth. These plants were analyzed for crude protein and oxalate content.

RESULTS AND DISCUSSION

The green form of *Kochia* produced more total dry matter than the gray form regardless of row width (Table 1). It was slightly more productive when grown in the 6-inch row widths than in the 12-inch row width. Both forms were consistently more productive in the 6- and 12-inch spacings than in the 24-inch rows. The highest production was measured from the 6-inch row width of the green form with 819 pounds per acre which is similar to crested wheatgrass production. The lowest production from the 24-inch row width from the gray form with 364 pounds per acre.

Table 1. Production of the green and gray forms of *Kochia prostata* for different row widths

Row width	Green form	Gray form
inches	lb/ac	lb/ac
6	819	553
12	691	514
24	491	364

Since the number of plants varied greatly within all plots, production per plant was calculated to minimize this source of variation. Both forms yielded more per plant when grown in the 12-inch row spacings (Table 2). The green form, however, yielded about 50% more than the gray form at the 12-inch row width. Yields per plant from the 6- and 24-inch row spacings were similar regardless of form. This indicates that probably the best long term effects would be associated with a row spacing width of 12 inches.

Table 2. Average production of individual plants of the green and gray forms of *Kochia prostata* for different row widths

Row width	Green form	Gray form
inches	g/plant	g/plant
6	21.8	18.8
12	31.3	20.8
24	21.0	18.0

Crude protein content varied throughout the year (Fig. 1). The lowest concentration (5.4%) occurred during October. Two peaks were observed with the first peak in November during seed maturation at 6.6%. The second peak occurred during the period of leaf growth from April to June at approximately 9.5%. The increase observed during August and September of 1976 resulted from new growth initiated by the unusually high precipitation during August 1976. This trend in crude protein content suggests that *Kochia* has the potential of providing good quality forage production early in the spring. Also, since the crude protein content was comparatively high during late summer and fall, *Kochia* might provide protein needed to balance the grazing animals diet when native or seeded grasses are low (2-3%) in protein. Even with the mixture of old and new growth, *Kochia* maintained about 6% crude protein content through the winter months. This is adequate for maintaining animals and would be available because snow melts quickly around the protruding plants.

Oxalate content of *Kochia* plants also changed through the year, Fig. 2. The low point occurred during March at 0.49% while the peak occurred during July at 0.98%. This peak appeared to coincide with the period when plants would be under maximum water stress. These concentrations of oxalate appear to be well below the tolerance limit of grazing animals. They are very low compared to the 20-35% concentrations found in halogeton.

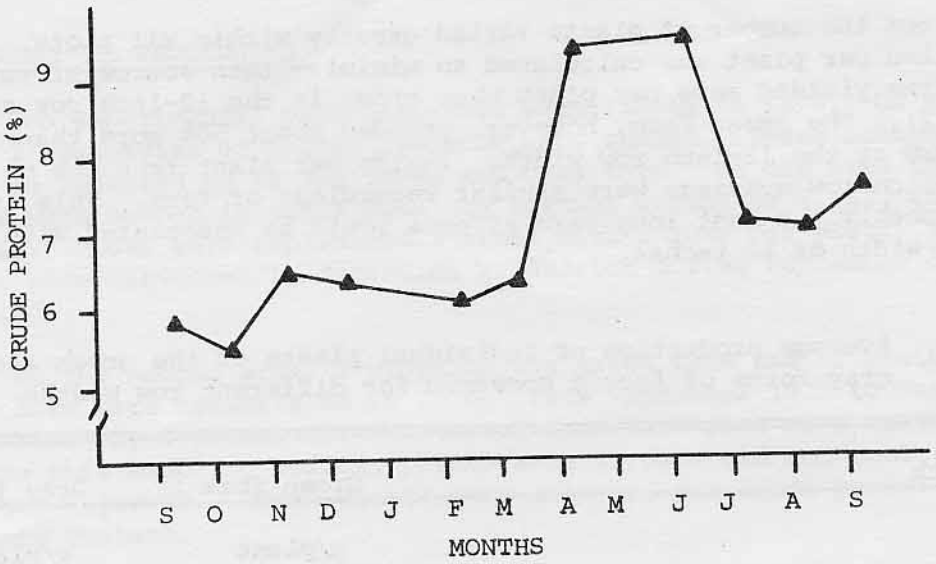

Figure 1. Average change in crude protein content for combined sample of the green and gray forms of *Kochia prostata*.

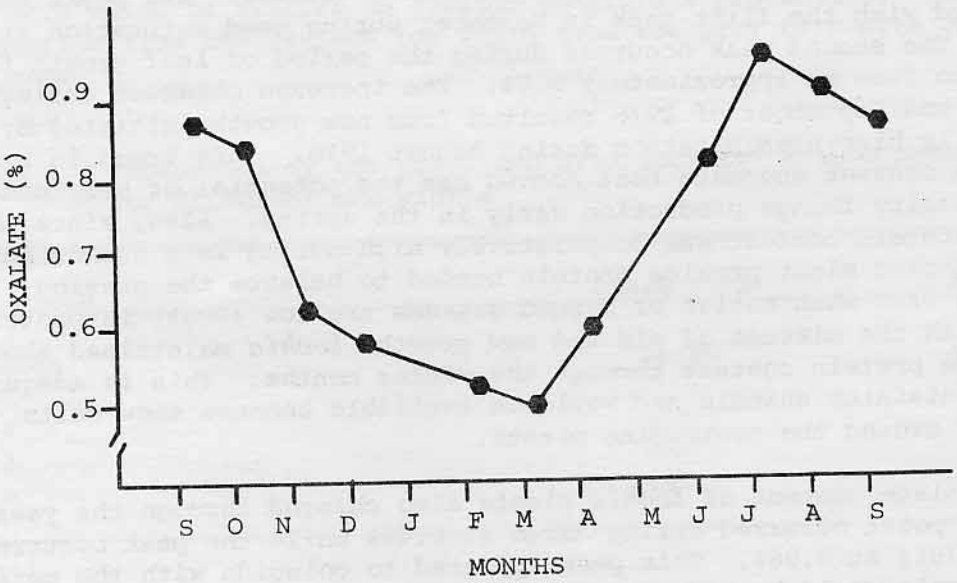

Figure 2. Average change in oxalate content for combined sample of the green and gray forms of *Kochia prostata*.

FUTURE WORK

The above mentioned measurements will be continued for at least another year. New studies will include an evaluation of *Kochia* tolerance to 2,4-D and burning at different dates. Work will be done on seed characteristics and seeding methods. A 2 acre area has been seeded for testing cattle preference and utilization. The effects of height of clipping will be evaluated in terms of sustained production.

THE EFFECTS OF NUTRITION LEVEL ON THE PERFORMANCE OF WINTERING COWS

R. L. Phillips, M. Vavra and R. J. Raleigh

Wintering cows is one of the most costly phases of beef cattle production. The cost of hay continues to increase as does the cost of energy and labor to harvest and feed this hay. One way to reduce wintering costs would be to feed less hay, but not to the point of reducing the reproductive performance of the cow. Spring-calving cows entering the winter period in good condition can lose some weight without affecting reproductive performance and calf viability.

This study is designed to evaluate the effect of nutrition level on pre-calving and post-calving weight change, days to first post-partum estrus, conception rate, calf birth weight and weaning weight.

EXPERIMENTAL PROCEDURE

This study has been conducted for two winters (1975-76 and 1976-77). The first year's data is complete and the second year's data will be completed in the fall of 1977.

1975-76 TRIAL: Sixty head of pregnant Hereford cows, ranging in age from four to ten years, were allotted by age and weight into three groups of twenty cows each. The treatments were high, medium and low levels of hay which were to approximate 120%, 100% and 80% of the NRC nutrient requirements, respectively, for maintenance of a 1100 pound cow. Cows were group-fed first-cutting alfalfa-grass hay (13% CP) from October 22, 1975 to January 28, 1976. The trial terminated several weeks prior to the calving season. Cows had access to a salt-dicalciumphosphate mixture and fresh water at all times. Initial, 28-day period, and final weights were taken after an overnight shrink off feed and water.