ENHANCING LATE SEASON FORAGE QUALITY OF CRESTED WHEATGRASS?

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Crested wheatgrass (Agropyron desertorum), an introduced perennial bunchgrass, is a favorite species for seeding semiarid rangelands. The species is relatively easy to establish, well adapted to semiarid environments, strongly competitive once established, palatable and nutritious during the spring, and withstands heavy spring grazing. The tolerance of heavy spring grazing allows producers to graze crested wheatgrass during the spring and permits delayed grazing on native species that are less tolerant of early grazing.

The primary undesirable characteristic of crested wheatgrass is the production and growth of stiff reproductive shoots that become unpalatable and interfere with subsequent grazing. Hyder and Sneva reported reproductive shoots of crested wheatgrass grow from buds produced the previous year in the leaf axils at underground culm nodes. By May 1, total shoot length was about 1 inch; by mid-May, individual shoots had five leaf blades fully exposed, the first two internodes fully elongated and seed heads about 1 inch long; by June 1, the seedheads emerged from the uppermost leaf sheath; spikelets were in anthesis in late June and early July; and shoot growth usually stopped at or before anthesis.

Hyder and Sneva suggested the desirable characteristics of crested wheatgrass could be used to advantage and the undesirable stemminess could be minimized by grazing. They have shown that adjusting stocking levels to achieve close grazing in late May, while plants are in the boot stage, will reduce formation of reproductive shoots and stimulate vegetative growth with sufficient available soil moisture. However, seldom does one achieve 100 percent control of the growing points (floral primondia) and reproductive shoots, and regrowth after late May is highly unpredictable.

Sneva sought to improve the percentage control of growing points and thus, compared the effects of paraquat (1,1'dimethl-7,4'-bipyridinium ion) applications with grazing. He found paraquat applied in June provided cured herbage for late season grazing and did not cause a yield depression after three years of treatment. He also found paraquat applied on May 20 in 1964, 1965, and 1966 reduced growing points by 50, 87, and 64 percent, respectively, in July and August.

At best, only limited success has been achieved in the research thrust to improve forage quality during the late summer-fall grazing period. Paraquat has not been cleared for curing forage on rangelands, and erratic rainfall does not always allow the desired regrowth after spring grazing.

Mefluidide (N-[2,4-dimethyl-5-[[(trifluoro methyl)sulfonyl]amino]-phenyl]acetamide) is a newcomer to the chemical scene. It is a plant growth regulator from 3M. Spring applications of 0.125-0.375 pounds per acre when plants are 4 to 6 inches tall have improved forage quality of some cool-season grasses. Rob and coworkers in Kentucky found mefluidide prevented seedhead formation in tall fescue (Festuca arundinacea) while simultaneously reducing fiber and increasing soluble carbohydrate and N content in mid-summer. In light of research findings on other cool-season grasses, research was initiated in May 1982 at the Squaw Butte Experiment Station to determine the effects of mefluidide on the forage attributes of crested wheatgrass.

Plots of crested wheatgrass were treated on May 14, 1982, with 0, 0.125, 0.250, and 0.375 pounds per acre of mefluidide. The foliage spray was a water mix applied at the rate of 10 gallons per acre. Forage was harvested to ground level on July 1 and 15, August 1 and 15, September 1 and 15, and October 1 and 15. Forage samples were retained for nitrogen, acid detergent fiber, and IVDMD determinations. Reproductive shoots were counted on August 1 and 15.

Growth conditions were above average on the study areas in 1982. Soil moisture was adequate for growth in early spring. Precipitation totaled 1.98 inches in March, April, and May, 1 inch below average; 2.42 inches in June and July, 1 inch above average; .42 inch in August, .18 inch below average; and 2.74 inches in September and October, 1.3 inches above average.

Forage yields on untreated plots were about 900 pounds per acre in July, and yields on treated plots averaged 700 pounds per acre (Table 1). The depression of yields caused by mefluidide persisted throughout the study.

Table 1. Forage yields (pounds/acre of mefluidide treated crested wheatgrass during July 1 - October 15, 1982 at the Squaw Butte Experiment Station

Date		Mefluidide Rates			
		0	.125	.250	.375
July	1	896	712	584	656
	15	996	900	660	688
August	1	1304	828	804	624
	15	1136	796	676	652
September	1	1140	776	772	704
	15	1184	812	760	704
October	1	896	784	676	676
	15	1112	836	692	616

Decreased yields may have resulted from a supression of reproductive shoot development. Reproductive shoot numbers were decreased 64, 82, and 91 percent by August with mefluidide at 0.125, 0.250, and 0.375 pounds per acre, respectively (Figure 1). The magnitude of yield loss caused by preventing stemminess or reproductive shoot development may not be as large as first assumed. When mature stands of crested wheatgrass are grazed, many of the reproductive shoots are broken by animals and remain on the ground rather than being ingested. Thus, one must realistically reduce the loss in yield by a relatively large waste factor.

The reduction in reproductive shoot numbers definitely improved forage quality. Crude protein content was consistently lowest in untreated forage throughout the study (Figure 2). Percent crude protein in untreated samples was less than 5.8 percent, required by a dry pregnant cow on all sampling dates. Protein contents of treated plots decreased below 5.8 percent in early August. As expected, protein content decreased in all plants as the season progressed. September rains, however, increased soil moisture allowing plants to regrow. Although regrowth was slight, forage quality was increased.

The applications of mefluidide reduced reproductive shoot development and increased forage quality of crested wheatgrass during a year with above average growing conditions. The availability of higher quality forage in early August might allow producers to defer use of crested wheatgrass pastures to later in the season and provide more flexibility in grazing management. The reduced stemminess could effectively reduce spot grazing of mature plants and thus reduce the problem of wolf plants. Forage yields, however, were decreased and we do not know how long-term, year-to-year treatment will affect plant vigor.

Research comparing mefluidide rates will be repeated in 1983. New research will also be initiated to evaluate long-term plant response to mefluidide treatment and to evaluate the yield response to mefluidide x nitrogen fertilization treatments.

Mefluidide was used experimentally in this study. At the time of writing, mefludide was not cleared for use in treating forage. Until mefluidide is registered for this use, it should not be employed.

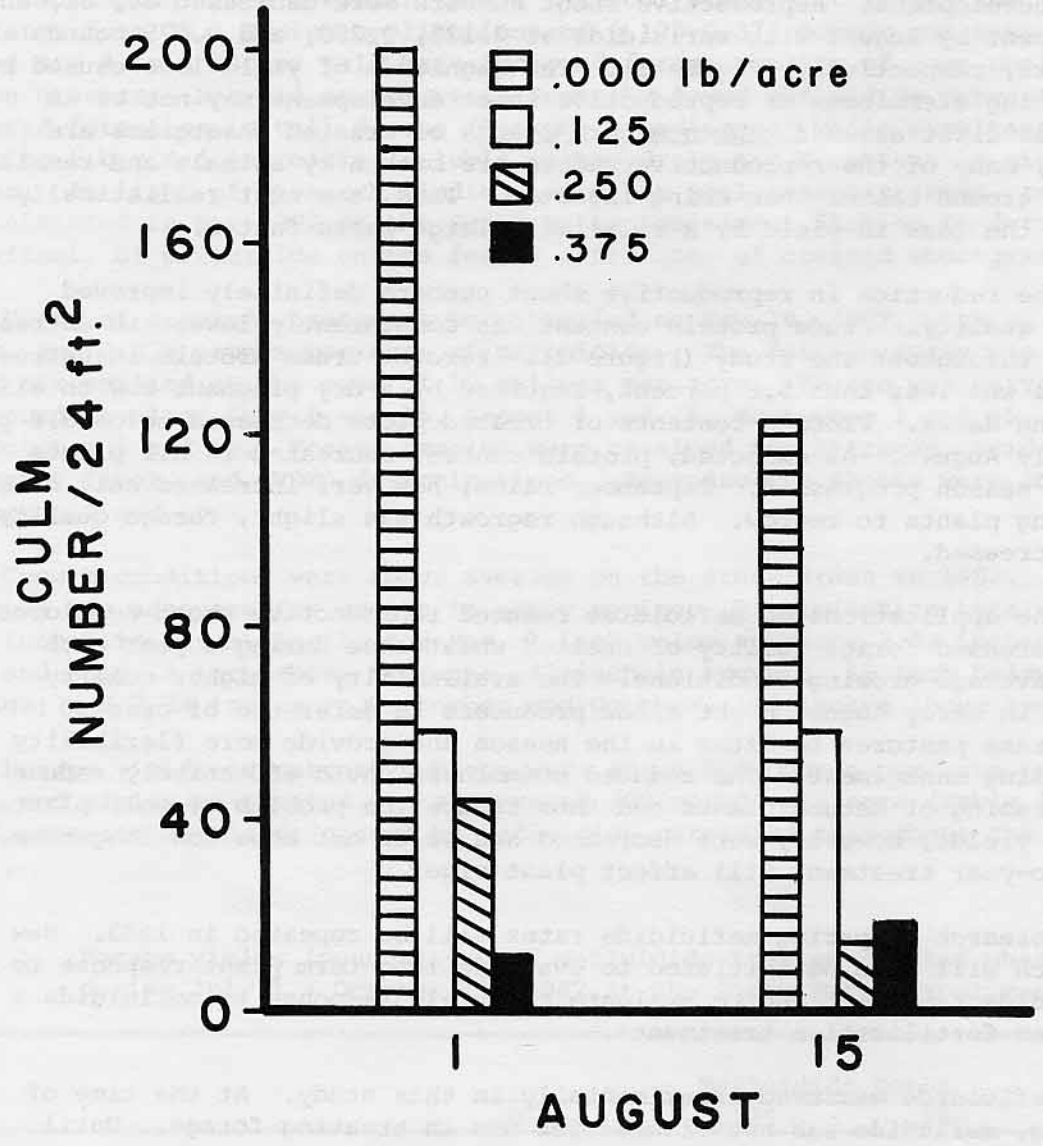

Figure 1. Reproductive shoot (culm) numbers of untreated crested wheatgrass plants and those treated with three rates of mefluidide during 1982 at the Squaw Butte Experiment Station.

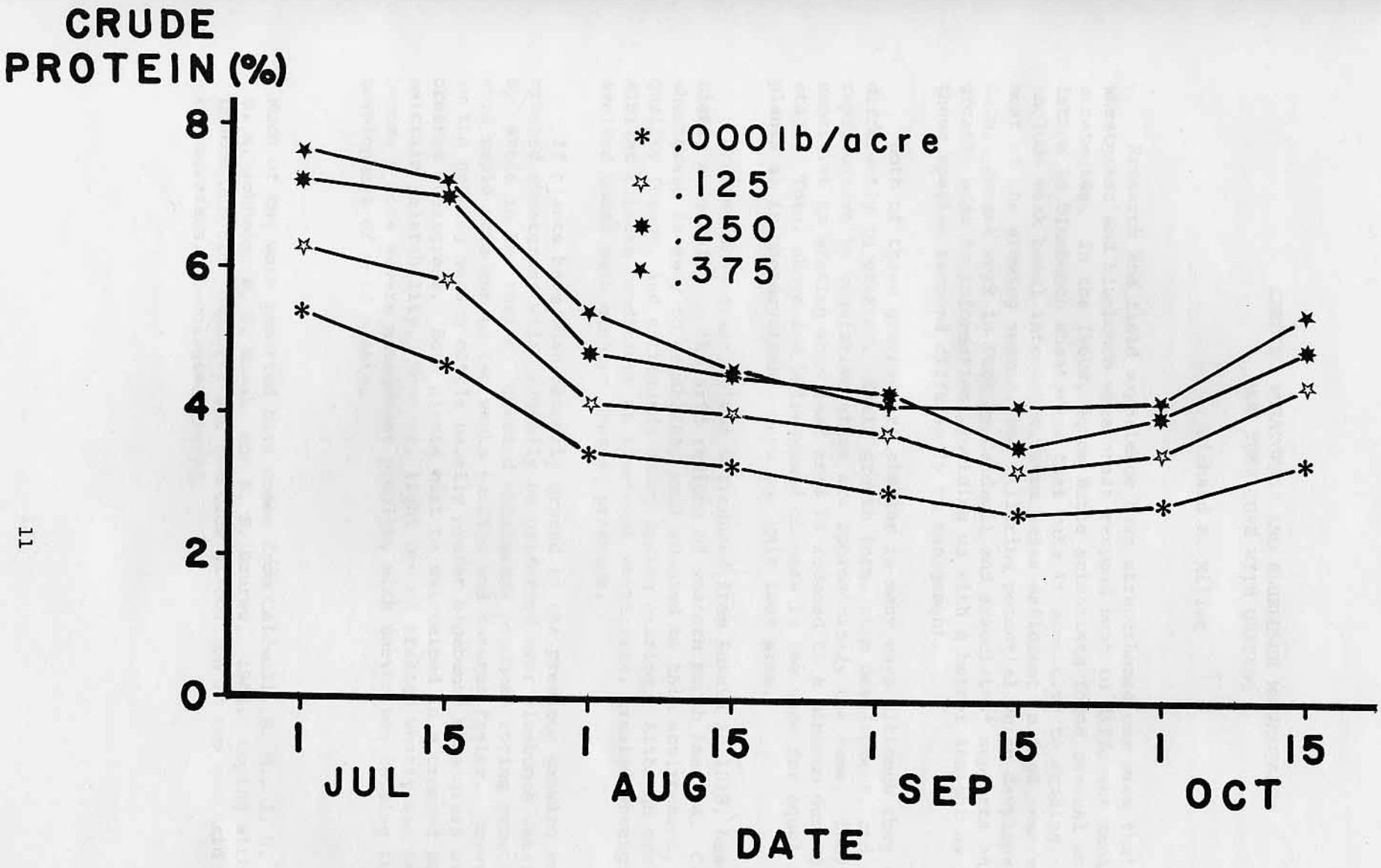

Figure 2. Percent crude protein of untreated crested wheatgrass plants and those treated with three rates of mefluidide during 1982 at the Squaw Butte Experiment Station.