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Integration of herbicides with grazing for leafy spurge control

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An experiment to evaluate herbicide treatment with grazing to improve long-term leafy spurge control compared to either control method alone was established in May 1992 on the Sheyenne National Grasslands and the Gilbert C. Grafton South State Military Reservation. The six treatments included: a) grazing alone, b) picloram plus 2,4-D at 0.5 plus 1 lb/A fall applied, c) grazing in spring followed by picloram plus 1,4-D at 0.5 plus 1 lb/A fall applied, d) picloram plus 2,4-D at 0.25 plus 1 lb/A spring applied, e) picloram plus 2,4-D at 0.25 plus 1 lb/A spring applied followed by grazing of all regrowth, and f) an untreated control. Leafy spurge was rotationally grazed at the Sheyenne National Grasslands but grazed season-long at Camp Grafton South.

The fencing necessary to prevent or delay grazing was established in May 1992 and leafy spurge density evaluated. The herbicides were applied in June or September in 1992 and 1993 for the spring-and fall-applied treatments, respectively. Leafy spurge root material for carbohydrate and protein content analyses was harvested in October 1992 and 1993.

Grazing combined with fall-applied herbicide treatment reduced leafy spurge density more than grazing alone. Also, season-long grazing as used on Camp Grafton South, either alone or combined with herbicides, reduced leafy spurge more than rotational grazing used on the Sheyenne National Grasslands. The best treatments averaged over both locations was picloram plus 2,4-D applied in the fall alone or proceeded by spring grazing. These treatments reduced the stem density from an average of 16 stems/0.25m^2 in 1992 to 0.3 stem/0.25m^2 or 99% control in 1994.

Grazing alone reduced leafy spurge 74% at Camp Grafton South but had no effect the Sheyenne National Grasslands. The difference in control is likely due to the type of grazing management. Continuous season-long grazing prevents the plant from restoring root nutrients because they are need to restore topgrowth. However, rotational grazing apparently encourages bud growth from the roots after the first grazing cycle and without immediate regrazing, sustains a stem density similar to the untreated control.

Picloram plus 2,4-D spring-applied proved 96% control at Camp Grafton South, but only 62% control at the Sheyenne Grasslands after two treatments. The average control

with picloram plus 2,4-D at 0.25+1 lb/A for many experiments in North Dakota is 65% after two treatments. A spring-applied herbicide treatment followed by fall grazing increased leafy spurge density at Camp Grafton South slightly compared to the herbicides applied alone. At the Sheyenne National Grasslands the stem density increased from an average of 10 to 16 stems/0.25 m^2 when spring applied herbicides were followed by fall grazing compared to the herbicides used alone. The reason for the increase in leafy spurge density when leafy spurge is grazed following a herbicide treatment is not known.

The effect of grazing and herbicide treatments alone or in combination on leafy spurge root nutrient content was minimal after 2 years. All treatments reduced the root protein content at Camp Grafton South compared to the untreated control. The sucrose concentration in leafy spurge roots was similar regardless of treatment. However, the starch concentration declined by 60% in the grazed only and spring grazing followed by picloram plus 2,4-D fall-applied treatments compared to the control.

The sucrose and starch concentration in leafy spurge roots at the Sheyenne National Grasslands in 1993 after two growing seasons was similar regardless of treatment. However, the protein content was reduced by 67% in the grazed only treatment compared to the control even though stem density was high in the grazed plots. No other treatment affect root protein content at the Sheyenne National Grasslands after 2 years.