

## Leafy Spurge Control with Tebuthiuron - 1988 Dickinson Experiment Station

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A study that tests the effects of tebuthiuron (Graslan) on leafy spurge (Euphorbia esula) was started in 1983 at the Dickinson Experiment Station. Leafy spurge is a major problem weed in uncultivated rangelands in North Dakota. It greatly reduces herbage production and beef production which causes substantial economic losses. The leafy spurge plant is extremely difficult to control and has numerous mechanisms to survive control attempts.

Tebuthiuron is a herbicide that is primarily intended for use on shrubs in rangeland. The chemical is absorbed by the roots and translocated to the leaves. Photosynthesis is restricted. The leaves senesce prematurely and fall off and a new set of leaves develop. This process continues until the plant depletes its stored carbohydrates. The process may take one to four years before the plant dies completely depending on the species and the environmental conditions. In theory, this appears to be a desirable method to control leafy spurge.

One set of test plots for this study was established in 1983 on 0.1 acres located on the NE<sup>1</sup>/<sub>4</sub>, NE<sup>1</sup>/<sub>4</sub>, SW<sup>1</sup>/<sub>4</sub> Sec. 22, T. 141 N., R. 104 W. on the property of Dale Maus, five miles north of Camels Hump Butte. The 10 x 53 foot plots were arranged in a randomized block design with two replications. The size of the leafy spurge patch was not sufficient for additional treatments or replications. The soil was vebar fine sandy loam. The range site was sandy. The site has a slight slope of about 3% with an east aspect and the south half of the plots has a slight slope of about 5% with a north aspect. The vegetation on the site was predominantly leafy spurge with an understory of Kentucky bluegrass (Poa pratensis) and a few scattered plants of smooth brome grass (Bromus inermis).

A second set of plots was established in 1984 on 0.12 acres located on NE<sup>1</sup>/<sub>4</sub>, SE<sup>1</sup>/<sub>4</sub>, NE<sup>1</sup>/<sub>4</sub> Sec. 4, T. 140 N., R. 103 W. on the property of Cecil Adams, north of Camels Hump Butte in the Knutson Creek drainage. The 30 x 22 foot plots were arranged in a randomized block design with two replications. The soil was Havrelon silt loam. The range site was overflow. The vegetation on the site was predominantly leafy spurge with a few scattered plants of silver sage (Artemisia cana) and western wild rose (Rosa woodsii) and a very sparse understory of Kentucky bluegrass.

The herbicide, tebuthiuron, was furnished by the Elanco Products Company. The chemical was incorporated into solid clay pellets with 20% active ingredients. Three rates of the 20% concentration were used in this trial each year. The three rates were: 1, 2 and 3 pounds of active ingredient per acre. A control of no chemical treatment was included in each replication. The herbicide was broadcast applied with a whirly-bird hand spreader on 12 July 1983 and 4 June 1984. The recommended optimum period to apply herbicides to leafy spurge is from mid-June until seed dispersal during hot, dry weather in July (Lym and Messersmith, 1983).

The data that were collected on the 1983 applied and the 1984 applied treatment plots in 1987 were: above ground herbage production, leafy spurge stem densities and mean weight per leafy spurge stem. The above ground herbage production was sampled by clipping the vegetation to ground level in two  $\frac{1}{4}\text{m}^2$  quadrats for each plot. The herbage was separated into four categories, leafy spurge, grass, forbs, and shrubs. The samples were oven dried at  $80^\circ\text{C}$ . The average herbage production for each category and the total production for each plot were determined. The leafy spurge stem densities were conducted by counting all of the current years leafy spurge stems that were rooted within two  $\frac{1}{4}\text{m}^2$  quadrats per plot. These data were converted to stems per foot square. The mean dry weight per leafy spurge stem data was collected by counting the number of stems clipped during collection of the above ground herbage samples per  $\frac{1}{4}\text{m}^2$  and calculating the mean weight per stem from the leafy spurge herbage production data.

Tebuthiuron does have an effect on leafy spurge. The herbicide causes a reduction in herbage weight, stem density and mean weight per stem of leafy spurge. The data from these two sets of plots do show some encouraging trends on the detrimental effects of tebuthiuron on leafy spurge.

### **Literature Cited**

Lym, Rodney G. and Calvin G. Messersmith. 1983. "Control of Leafy Spurge with Herbicides". North Dakota Farm Research Bimonthly Bulletin Vol. 40(5) : 16-19.

### Leafy Spurge Control by Tebuthiuron Applied in 1983

<b>Location:</b>	NE <sup>1</sup> / <sub>4</sub> , NE <sup>1</sup> / <sub>4</sub> , SW <sup>1</sup> / <sub>4</sub> Sec. 22, T. 141 N., R. 104 W. Property of Dale Maus
<b>Replications:</b>	Two      Randomized Block Design
<b>Study Size:</b>	53' x 80'      0.1 acres
<b>Plot Size:</b>	10' x 53'      0.012 acres
<b>Perimeter Border:</b>	2'
<b>Soil:</b>	Vebar fine sandy loam
<b>Range Site:</b>	Sandy
<b>Herbicide:</b>	Tebuthiuron 20% concentrated pellets
<b>Application Date:</b>	12 July 1983
<b>Treatments:</b>	0 lbs. ai/acre 1 lbs. ai/acre 2 lbs. ai/acre 3 lbs. ai/acre

### Leafy Spurge Control by Tebuthiuron Applied in 1984

<b>Location:</b>	NE <sup>1</sup> / <sub>4</sub> , SE <sup>1</sup> / <sub>4</sub> , NE <sup>1</sup> / <sub>4</sub> Sec. 4, T. 140 N., R. 103 W. Property of Cecil Adams
<b>Replications:</b>	Two      Randomized Block Design
<b>Study Size:</b>	44' x 120'      0.12 acres
<b>Plot Size:</b>	22' x 30'      0.02 acres
<b>Perimeter Border:</b>	2'
<b>Soil:</b>	Havrelon silt loam
<b>Range Site:</b>	Overflow
<b>Herbicide:</b>	Tebuthiuron 20% concentrated pellets
<b>Application Date:</b>	4 June 1984
<b>Treatments:</b>	0 lbs. ai/acre 1 lbs. ai/acre 2 lbs. ai/acre 3 lbs. ai/acre