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## Effects of prescribed burning and herbicide treatments on leafy spurge (*Euphorbia esula*)

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### Abstract:

A 3-year experiment to evaluate herbicide treatments with prescribed burning to improve long-term leafy spurge (*Euphorbia esula* L.) control compared to herbicide alone was established on the Gilbert C. Grafton South Military Reservation in North Dakota. Six treatments were evaluated including an untreated control, prescribing fall burning with no herbicide, spring applied picloram (4-amino-3,5,6-trichloro-2-pyridinecarboxylic acid) plus 2,4-D [(2,4-dichlorophenoxy) acetic acid] applied at 0.28 plus 1.1 kg ha<sup>-1</sup> (normal) and unburned, spring applied picloram plus 2,4-D applied at 0.56 plus 1.1 kg ha<sup>-1</sup> (heavy) and unburned, spring applied picloram plus 2,4-D applied at 0.28 plus 1.1 kg ha<sup>-1</sup> following a fall burn, and spring applied picloram plus 2,4-D applied at 0.56 plus 1.1 kg ha<sup>-1</sup> following a fall burn. A prescribed burn was conducted on the predetermined treatment plots in mid October of 1994 with herbicides applied in 1995 and 1996. Study objective was to evaluate burned and unburned treatments in conjunction with differing rates of herbicide on leafy spurge control. All herbicide treatments, regardless of burning, reduced ( $P < 0.05$ ) the density of leafy spurge compared to the control. No differences ( $P > 0.05$ ) were noted between the burned and unburned plots after 12 months and 24 months on any treatment. Burning alone did not affect leafy spurge stem densities as new spring growth grew uniformly and with vigorous sprouting occurring following the fall prescribed burn. Leafy spurge stems were reduced ( $P < 0.05$ ) 69% and 95% on the normal and heavy herbicide rates of picloram plus 2,4-D on the burn treatment, respectively, compared to the control after 12 months of herbicide treatment. After 24 months of herbicide treatment on the burn plot, leafy spurge stems were reduced to 88% on the normal herbicide rate of picloram plus 2,4-D which was a reduction ( $P < 0.05$ ) of 19% compared to 12 months following treatment. No change ( $P > 0.05$ ) in leafy spurge stems was noted on the heavy rate of picloram plus 2,4-D between the 12 months and 24 months herbicide application on the burned treatments. Leafy spurge stems were reduced

( $P < 0.05$ ) 62% and 82% on the normal and heavy herbicide rates of picloram plus 2,4-D on the unburned treatments, respectively, compared to the control after 12 months of herbicide application. No change ( $P > 0.05$ ) in leafy spurge stems was noted on either the normal or heavy rates of picloram plus 2,4-D between the 12 months and 24 months following herbicide application on the unburned treatments. A fall prescribed burning program alone did not affect leafy spurge stem densities or improve herbicide control when compared to unburned treatments. However, fall prescribed burning did enhance leafy spurge control using picloram plus 2,4-D applied at 0.28 plus 1.1 kg ha<sup>-1</sup> under a 2-year spraying program compared to unburned treatment results.