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Chemical composition of leafy spurge and alfalfa at four growth stages

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Leafy spurge (*Euphorbia esula*) is a long-lived perennial weed estimated to infest over 1 million ha in the northern Great Plains (1). Leafy spurge primarily infests pasture and rangeland where it severely decreases herbaceous production and livestock carrying capacity (2). Annual losses in forage and livestock production in North Dakota are estimated at \$8.6 million (3).

Efforts to control the rapid spread of leafy spurge have proven to be either too expensive or ineffective. Herbicides can provide partial control of the plant but effective treatment costs are prohibitive for use on wide spread infestations. Biological control methods using insects or pathogens have long-range potential but much research still needs to be conducted before these agents can be efficiently utilized.

A more traditional approach to leafy spurge control has been the grazing of sheep or goats in infested areas. Numerous ranchers are using this method and report various degrees of effectiveness (4). However, there is disagreement concerning the effect of leafy spurge on grazing animals and the forage value of leafy spurge. The objectives of this study were to: a) examine the chemical composition of leafy spurge at four phenological growth stages and four locations in North Dakota, and b) compare leafy spurge to alfalfa (*Medicago sativa*), harvested at similar growth states and locations.

Leafy spurge and alfalfa samples were collected in 1990 near Dickinson, Minot, Valley City and Fargo at vegetative (May 15), flowering (June 15), mature (July 15) and regrowth (September 1) phenological states. Samples were dried, ground and analyzed for % crude protein (CP), % acid detergent fiber (ADF), % in vitro dry matter digestibility (IVDMD) and % phosphorus (P).

Chemical composition of leafy spurge and alfalfa were averaged by vegetative and mature growth stages across the four collection locations. Percentage CP, IVDMD and P decreased in both leafy spurge and alfalfa with advancing maturity. Percentage CP and IVDMD tended to be greater in alfalfa regardless of vegetative stage when compared to leafy spurge. However, P percentage was consistently higher in leafy spurge. Nutrient requirements for lactating 150 lb ewes are 10.7% CP, 59% TDN (similar to IVDMD), and 0.23% P. Nutrient requirements for lactating 100 lb angora goats are 12.4% CP, 66% TDN, and 0.22% P. Both plant species exceed these requirement levels even at maturity.

Table 1. Chemical Composition of Leafy Spurge and Alfalfa.

Species	Growth Stage	% Crude Protein	% Acid detergent fiber	% In vitro dry matter digestibility	% Phosphorus
Leafy spurge	Vegetative	27.3	17.9	80	0.53
	Mature	19.5	28.5	66	0.39
Alfalfa	Vegetative	32.8	18.1	84	0.44
	Mature	25.6	25.3	74	0.32

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