Reprinted with permission from: 1994 Leafy Spurge Symposium, Bozeman, MT. July 26-29, 1994. p. 1.

Sponsored by: Great Plains Agricultural Council, Montana Noxious Weed Trust Fund, and United States Department of Agriculture-Agricultural Research Service.

Response of leafy spurge to defoliation and competition

SAUD L. AL-ROWAILY, NEIL E. WEST, and JOHN W. WALKER

Al-Rowaily and West are with the Department of Range Science, Utah State University, Logan, UT 84322-5230. Walker works at the USDA-ARS, US Sheep Experiment Station, Dubois, ID 83423.

Leafy spurge (*Euphorbia esula* L.) is an aggressive introduced perennial weed invading nonirrigated pasture and rangeland habitats. The objective of the study was to examine the overall impact of simulated herbivory on leafy spurge production. The interaction between herbivore damage and interaspecific competition under a combination of intensity, frequency and timing of defoliation were also studied over a three-year period. The study was conducted on a leafy spurge-infested rangeland in Clark County, located on the upper Snake River Plains of southeastern Idaho. The defoliation regime consisted of three intensities 0% (control), 40%, and 80% removal of the aboveground standing crop. Defoliation was applied on $1m^2$ plots at different phenological stages (vegetative stage, flowering stage, and seed stage) and either to leafy spurge only or to both leafy spurge and associated vegetation to determine leafy spurge competitive ability. Aboveground biomass of leafy spurge and associated vegetation, and leafy spurge stem numbers and average heights were measured. Undefoliated biomass was determined using leafy spurge stem numbers and average height via multiple regression. Leafy spurge biomass production was significantly lower ($p<0.001$) on all the defoliated plots compared to the control. The highest reduction was observed when the plots were defoliated at higher intensity (80% compared to 40%) and three times during the growing season, especially under high intensity (80%). In addition, leafy spurge biomass obtained from plots where only spurge was defoliated was significantly lower ($p<0.001$) compared to the plots where both leafy spurge and associated vegetation were defoliated at both intensities. This study indicates that the most effective management strategy to reduce leafy spurge biomass would be one that uses multiple grazing and heavy utilization. The competitive disadvantage placed upon leafy spurge by defoliation can be further enhanced if the herbivore selectively grazes leafy spurge and avoids associated vegetation.