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Enhancing the competitiveness of other species with leafy spurge

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The Eurasian noxious weed leafy spurge infests millions of hectares in North America. Herbicides are generally not cost-effective on rangelands, and biocontrol agents have limited effectiveness in cool, moist areas. We conducted a field trial and a greenhouse study to assess the effectiveness of interseeding alfalfa (field) and other species (field and greenhouse) into infestations of leafy spurge. We had three pretreatments: disking, mowing, and control at two field sites in northcentral Montana. We interseeded one of three alfalfa cultivars: Ladak, Spreador II, and Pioneer 5364 in late May 1993 across these three pretreatments. Standing crop in August 1994 ranged from 2700-3800 kg/ha⁻¹. More than half of the standing crop at both sites was alfalfa (54-79%). Disking enhanced leafy spurge at one site but not at the other, and was not necessary for alfalfa establishment. In the greenhouse, we grew leafy spurge with one of eight other species (cultivars): sheep fescue, Russian wildrye, crested wheatgrass, intermediate wheatgrass, western wheatgrass, and the same three alfalfa cultivars. Each combination was then treated with the following nutrients: none (control), 50 kg N ha⁻¹, 100 kg N ha⁻¹, 50 kg P ha⁻¹, 50 kg P ha⁻¹, 50 kg N ha⁻¹, 50 kg P ha⁻¹ + 100 kg N ha⁻¹. Leafy spurge shoot biomass was lowest when grown with intermediate wheatgrass, western wheatgrass, and Ladak and Spreador II alfalfa, and highest when grown with sheep fescue. Root biomass of leafy spurge was lowest when grown with intermediate wheatgrass and highest when grown with sheep fescue. Leafy spurge shoot biomass was highest in pots with added P, although root biomass was unaffected by nutrient treatments. The other species had different responses to the nutrient treatments. Overall alfalfa, crested wheatgrass and intermediate wheatgrass appear to have the potential to compete effectively with leafy spurge.