

EVALUATION OF BIOLOGICAL AGENTS ON LEAFY SPURGE
(*Euphorbia esula* L.) AND THE SOIL SEEDBANK COMPOSITION
IN THE LITTLE MISSOURI NATIONAL GRASSLAND

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ABSTRACT

Cline, Dean Arthur; M.S.; Department of Animal and Range Sciences; College of Agriculture, Food Systems, and Natural Resources; North Dakota State University; December 2002. Evaluation of Biological Agents on Leafy Spurge (*Euphorbia esula* L.) and the Soil Seedbank Composition in the Little Missouri National Grassland. Major Professor: Dr. Donald R. Kirby.

The objectives of this research were to (1) determine seedbank composition, which may play a role in future site revegetation during leafy spurge control efforts, and (2) evaluate leafy spurge (*Euphorbia esula* L.) control using flea beetles (*Aphthona* spp.). Two range sites, silty and overflow, and four leafy spurge per site, (1) control, no leafy spurge, (2) light, (3) moderate, and (4) heavy, infestations of leafy spurge, were evaluated in 1999 for soil seedbank composition. Seedlings were classified in one of seven categories: leafy spurge, *Poa* spp. (bluegrass), high seral grass, high seral forb, low seral grass, low seral forb, and 'other' species. Most abundant species germinating were leafy spurge, *Poa* spp., prairie junegrass (*Koeleria pyramidata* (Lam.), little bluestem (*Schizachyrium scoparium* (Michx.) Nash-Gould, green needlegrass (*Stipa viridula* Trin.), fringed sagewort (*Artemisia frigida* Willd.), drummond false pennyroyal (*Hedeoma drummondii* Benth.), common dandelion (*Taraxacum officinale* Weber), and common mullein (*Verbascum thapsus* L.). Uninfested sites had a lower ($P < 0.05$) percentage of leafy spurge seedlings germinating than light, moderate, and heavy infestations of leafy spurge for both silty and overflow range sites. Establishment of *Aphthona* spp. reduced ($P < 0.05$) the foliar cover of leafy spurge on the release sites. Non-release sites also showed a reduction ($P < 0.05$) in foliar cover in 2000 due to insect invasion of these sites. Two years after insect releases, 77% of all sites had areas of control 400 m² or larger.