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## Assessing biological control agents for area-wide control of leafy spurge with foci in Montana and South Dakota

MATTHEW S. PARKER<sup>1</sup> and JACK L. BUTLER<sup>1</sup>

<sup>1</sup>Matthew S. Parker and Jack L. Butler, Department of Biology, Central Missouri State University, Warrensburg, MO 64093.

### Abstract:

The objective of this study is to document micro-scale distribution, density, dynamics and trends of leafy spurge populations in response to flea beetle control within the Montana and South Dakota study areas. Ninety-three permanently located sample sites were established during the 1998 field season within the Mill Iron (Montana) and South Fork of the Moreau River (South Dakota) study areas. The selected sites represent the wide range of topographic, soil, vegetation, and landform situations typical of the region. Approximately 6,000 beetles (3,000 *Aphthona lacertosa* and 3,000 *A. nigriscutis*) were released in June 1998 at each of the 62 permanently located release sites. Beetle abundance was estimated using insect sweeps conducted in 1999 and 2000. Foliar cover of leafy spurge was estimated in 1998, 1999, and 2000 using a digital analysis system. Species composition and foliar cover of the extant vegetation was estimated on each sample site during the 1998 and 2000 field seasons. Beetle numbers increased dramatically between 1999 and 2000, and did not appear to demonstrate any particular affinity for site differences in slope and aspect in either South Dakota or Montana. Concomitantly with the increases in insect abundance, foliar cover of leafy spurge decreased an average of 76% and 77% in South Dakota and Montana, respectively, from 1998 to 2000. The native vegetation increased in frequency and abundance in response to the decrease in leafy spurge. Grass foliar cover at the Montana site increased 42% while species richness increased 27% in the two years following flea beetle release.