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Aphthona flea beetle establishment determined by soil composition and root growth pattern

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Abstract:

Aphthona spp. flea beetles have been used since 1992 as a control treatment of leafy spurge in North Dakota. The reduction in leafy spurge where biological control was used ranges from excellent to poor depending on location. The fair to poor location results prompted a study on the effects of soil composition and root growth patterns of leafy spurge on flea beetle population levels.

Forty one, four-year-old, *Aphthona* flea beetle release locations were sampled between 1996 and 1998 for soil composition and root growth pattern. The leafy spurge roots were extracted and measurements from the soil surface to the first laterial roots, and the number of filament roots on laterial and tap roots were recorded. The results were compared to adult flea beetle population levels at each location.

To use *Aphthona* spp. for leafy spurge control appears to require a soil composition that will result in root growth close to the soil surface. A silt loam, silt clay loam, clay loam, or loam soil with a ph of 6.8 - 7.9 and organic matter of 6.0 - 9.28% produced the most adult flea beetles. The fine sand, loam fine sand, or fine sand loam soils with a ph of 6.5 - 7.4 and organic matter of 0.90 -2.8% produced the fewest adult flea beetles. Leafy spurge root systems in soil habitats that do not produce sufficient numbers of filament roots and the laterial roots are more than two inches below the soil surface, will result in low *Aphthona* spp. population levels and little impact on spurge stands.