

Idaho's Statewide Monitoring Guidelines for *Aphthona* sp. and Leafy Spurge:



Overview:

A critical part of successful weed biological control programs is a monitoring process to measure populations of biological control agents and the impact that they are having on the target weed. Monitoring should be conducted on an annual basis for a number of years. The Idaho State Department of Agriculture, in conjunction with the University of Idaho, Nez Perce Biocontrol Center, and federal land management agencies, has developed the monitoring protocol below to enable land managers to take a more active role in monitoring the progress and weed control ability of the

leafy spurge flea beetles, *Aphthona* sp. (AP) in efforts to control leafy spurge, *Euphorbia esula*. This monitoring protocol was designed to be implemented by land managers in a timely manner while providing data which will enable researchers to better quantify the impact of AP on leafy spurge throughout the state.

Leafy Spurge:

Leafy spurge is a deep-rooted, aggressive, persistent perennial that reproduces vegetatively and by seed. Plants have an extensive root system which grows horizontally and is capable of reaching depths up to 20 ft. Stems are thickly clustered and have narrow, alternate leaves which exude a milky latex when damaged. The flowers are small and yellowish-green and are enclosed in showy yellow-green bracts. Seeds are oblong and occur in clusters of three. When the seeds are dry, the capsules shatter and spread the seeds as far as 15 ft from the plant. Leafy spurge is commonly found in grassland and rangeland habitats, but is also capable of invading forests and riparian areas, displacing native vegetation.



Leafy Spurge Flea Beetles (AP):

The *Aphthona* sp. complex consists of six different species, all with a similar biology. The larval stage is the most destructive to leafy spurge. AP larvae feed on fine and lateral leafy spurge roots, impairing the roots and preventing moisture and nutrient uptake. Larval root-feeding provides entry points for disease. AP larvae may be found in infested leafy spurge roots from July to early spring of the following year. AP pupates in the soil near the leafy spurge roots with adult emergence occurring in June, July, and August. Adult AP feeding reduces leafy spurge's ability to make sugars for root reserves. AP are best

suitable for dry sites with a large amount of sun exposure. Recent studies suggest that AP can also be used as a “bio-herbicide” in riparian areas.

Monitoring:

The Statewide Biological Control monitoring protocol is based upon a permanent 20 meter vegetation sampling transect randomly placed in a suitable (at least 1 acre) infestation of leafy spurge and sweep net samples of AP adults. Annual vegetation sampling will allow researchers to characterize the plant community and the abundance and vigor of leafy spurge. Sweep net samples of AP adults will provide researchers with an estimate of AP population levels.

Permanent Site Set-up:

To set up the vegetation monitoring transect, you will need: 1) a 25 x 50 cm Daubenmire frame made from PVC (preferred) or rebar, 2) a 20 m tape measure for the transect and plant height, 3) 10 permanent markers (road whiskers and 16 penny nails – see picture below), 4) a post (stake or piece of rebar) to monument the site (see pictures for examples of field equipment), and 5) 30-45 minutes at the site during the **last week of June**. To set up the transect, place the 20 m tape randomly within the infestation. Mark the beginning of the transect with a post. Place permanent markers every 2 m (for a total of 10 markers) beginning at the 2 m mark and ending with the 20 m mark on the tape measure. Place the Daubenmire frame parallel to the tape on the 50 cm side with the permanent marker in the upper left corner starting at 2 m (see pictures). **Refer to the “sweep” data sheet for how to conduct monitoring.** Repeat the frame placement at 2 m intervals for a total of 10 measurements (one at each permanent marker).

