

Idaho's Statewide Monitoring Guidelines for *Urophora cardui* and Canada Thistle:



Overview:

A critical part of successful weed biological control programs is a monitoring process to measure populations of the 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 Standard Impact Monitoring Protocol (SIMP) below to enable land managers to take a more active role in monitoring the progress and weed control ability of the Canada thistle stem gall fly, *Urophora cardui* (URCA) in efforts to control Canada thistle, *Cirsium arvense*. 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 URCA on Canada thistle throughout the state.

Canada thistle:

Canada thistle is an aggressive, colony-forming perennial weed that reproduces by seed and deep, extensive horizontal roots. Flowering occurs from June through August. The flowers are urn-shaped, purple (sometimes white), and male and female flowers occur on separate plants with heads ranging from $\frac{1}{2}$ to $\frac{3}{4}$ inch in diameter. Fruits are about $\frac{1}{8}$ inch long and brownish with a tuft of hairs at the top. Stems are typically 1 to 4 feet tall with alternate, oblong or lance-shaped leaves divided into spiny-tipped irregular lobes. Canada thistle is a native of southeastern Eurasia and was introduced to Canada as a contaminant of crop seed in the 18th century. It can commonly be found in gardens, flower beds, pastures, cultivated fields, rangelands, forests, and along river banks, ditches and roadsides. Canada thistle can tolerate a wide range of environmental conditions, but requires good light intensity for optimal growth. It is highly competitive with crops and, in heavy concentrations, effectively prevents grazing. A number of accidentally introduced insects attack Canada thistle. However, only two insects are approved for release; *Urophora cardui*, and *Ceutorhynchus litura*.



Canada thistle stem gall fly (URCA):

URCA is a biological control agent that attacks Canada thistle stems and forms a gall which acts as a metabolic sink. This metabolic sink decreases the nutrients supply available to the plant thereby reducing plant vigor and competitive ability. Adult flies emerge from galls in late spring to early summer, mate, and females deposit one to 30

eggs in Canada thistle's vegetative shoots. Fly larvae initiate gall development by tunneling into the plant stem. Larvae grow slowly while the gall is developing and attain 98% of their body weight as the gall matures. Multiple larvae (3 to 10) can be found within large galls. Pupation occurs within the gall in early spring. Galls resemble a small green crabapple generally in the middle of the stem (see picture on 1st page) and can vary in size, but they are generally marble to walnut-sized. The fly does best in semi-shaded, moist, disturbed areas with scattered Canada thistle plants.

Monitoring:

SIMP is based upon a permanent 20 meter vegetation sampling transect randomly placed in a suitable (at least 1 acre) infestation of Canada Thistle and timed counts of URCA galls. Annual vegetation sampling will allow researchers to characterize the plant community and the abundance and vigor of Canada thistle. Visual counts of URCA galls will provide researchers with an estimate of URCA 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 **first week of August**. 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 data collection 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).

