

## Idaho's Statewide Monitoring Guidelines for *Aceria malherbae* and Field Bindweed:

### **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 which enables land managers to take a more active role in monitoring populations and the weed control ability of the field bindweed gall mite, *Aceria malherbae* (ACMA) in efforts to control field



bindweed, *Convolvulus arvensis*. 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 ACMA on field bindweed throughout the state .

### **Field Bindweed:**

Field bindweed is a creeping perennial vine native to Eurasia. It can grow from 0.3 to 2 m in length and often forms dense infestations consisting of one or more clones. Leaves are

round to arrow-shaped 2.5 to 5.7 cm long and alternate along a prostrate stem.

Flowering occurs in the mid-summer, when white to pale pink, funnel-shaped flowers develop and continues into early fall. Flowers are typically 1.9-2.5 cm in diameter and are subtended by small bracts. Seed pods are pointed and approximately 5 mm long. Each pod contains four rough, pear-shaped seeds which can remain viable in the soil for up to 10 years and as long as 50 years under the right conditions. Field bindweed is thought to have been introduced into North America as a contaminant in crop seed as early as 1739. Plants tolerate a wide range of environmental conditions and elevations – from cultivated fields to waste areas. This invasive is present in all 48 contiguous states and Hawaii.



### **Field bindweed gall mite (ACMA):**

ACMA is a gall-forming Eriophyid mite which stunts, reduces plant density, and reduces flowering in field bindweed. Galls are typically found on the leaves or stem buds. The stems form compact clusters of stunted leaves when they are attacked. When the leaves are attacked, they fold or twist upward along the midrib where the mite feeding occurs. These agents are present year-round producing multiple generations per year. The two nymphal stages resemble the adults

but lack external genitalia. The adults are microscopic and worm-like with an annulate body with two pairs of legs on the combined head and thorax. The soft-bodied adults are increasingly available from established field sites. Galls can be handpicked and stored for several weeks if refrigerated. Wrapping infested stems around bindweed plants or transferring individual galls to the tip of the stem are the best methods to conduct new releases.

**Monitoring:**

SIMP is based upon a permanent 20 meter vegetation sampling transect randomly placed in a suitable (at least 1 acre) infestation of field bindweed and timed counts of ACMA galls. Annual vegetation sampling will allow researchers to characterize the plant community and the abundance and vigor of field bindweed. Visual counts of ACMA galls will provide researchers with an estimate of ACMA 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 meter 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 2m (see pictures).

Repeat the frame placement at 2m intervals for a total of 10 measurements (one at each permanent marker).

