

## Applying biological control methods for weed management

Biological control agents are organisms (e.g. insects, nematodes or fungi) that can be used to manage large weed populations. Typically these organisms are natural enemies of the target species in their native continent and are introduced to their new range following testing to ensure they do not harm non-target plants. Biocontrol agents have been approved and released for several weed species in Montana. Following is a description of how to apply biocontrol as part of a weed management program.

**Before you start:** Make sure biocontrol methods will help meet the goals of your integrated weed management plan. For example, it is more appropriate in large infestations of a single weed species (Fig. 1) compared to a small patch of a new invader. Also be sure that your site will fit the ecological needs of the biocontrol agent so it has a better chance of establishing, and that the site will be relatively undisturbed for several years following agent release.

**Obtaining insects:** Biocontrol insects can be purchased through private businesses, and sometimes acquired through your county weed district. Many areas have local insect collection events; ask your weed coordinator if there are any planned in your county or nearby counties. If you do have access to a good population of biocontrol insects you can collect them yourself using a sweep net or aspirator, or even by hand-picking. If you collect your own, make sure to place them in a well-ventilated container (Fig. 2), and to chill them immediately using a refrigerator or cooler. Release insects as soon as possible following collection or purchase.



Figure 2. A cardboard container is ideal for storing insects.

**Releasing insects:** It is critical to do all you can to improve insect survival. For example, you will notice that cold insects move very slowly. If your insects are refrigerated, let them warm up for several minutes before release so they can disperse to a safe location. Along these same lines, avoid releasing them near an ant hill, during periods of cold temperatures, or just before nightfall. Make sure to sprinkle them onto the target weed in a small area so they easily locate each other to reproduce. Finally, make sure not to walk through or step on your biocontrol insects as you leave the site.

**Monitoring:** Monitoring release sites helps reveal whether insects have established, what effect they are having on the weed population, and if the insect population is large enough to redistribute to new locations. Start the monitoring process on the same day insects are released. Take a photo of the site, including enough clear landmarks so the photo is repeatable, and record a location on a GPS or draw a detailed map. In subsequent years, take a photo from the same location at approximately the same date to determine what effects the insects have on the weed population. Many insect populations can be sampled using a sweep net when they are in the adult stage (Fig. 3). Before doing so, it is important to learn when insects emerge during the growing season, and during what time of day they are most active. For example, *Cyphocleonus achates* root boring knapweed weevils are in the adult stage in late summer, and are found on knapweed foliage during hot, sunny weather. Accordingly, sweep net sampling of these insects would be most effective during these times.

**Long term management:** Avoid excessive disturbance of release sites, such as heavy grazing or tillage, for five to ten years to allow insects to establish. Herbicides can be integrated into management of biocontrol sites by spraying the perimeter of large weed patches and any satellite patches that occur. If monitoring reveals that insect populations are thriving, collection and redistribution of insects to a new area is a great idea.

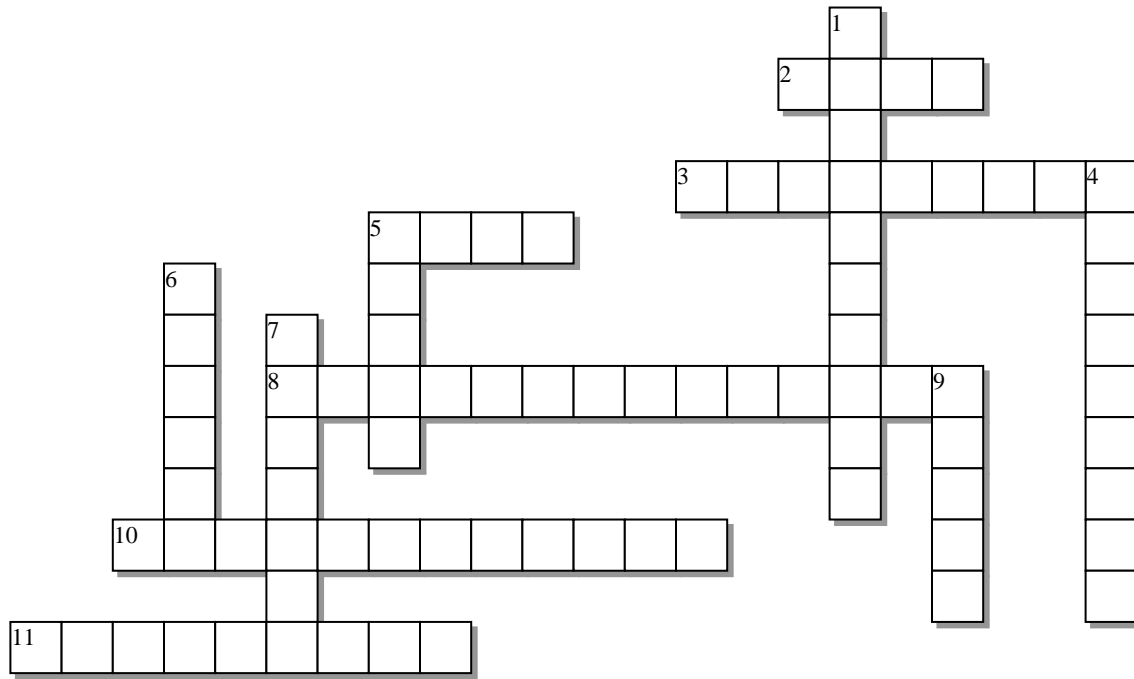


Figure 1. This patch of leafy spurge is a candidate for biocontrol because of its size and density.



Figure 3. Sweep nets can be used to assess insect populations.

**Weed Post Puzzle: Test your knowledge of applying biological control**



**Across:**

- 2 - Insects move more slowly when they're \_\_\_\_\_
- 3 - Insects can be collected with a sweep net, by hand-picking or using this
- 5 - Before using a weed control method, make sure it fits your weed management \_\_\_\_\_
- 8 - Biocontrol uses a plant's \_\_\_\_\_ as a management tool
- 10 - If insects are thriving at one biocontrol release site, it is a good idea to collect some and do this
- 11 - Avoid major disturbances at release sites for 5 to 10 years to allow insects to \_\_\_\_\_

**Down:**

- 1 - This activity helps managers assess what effect biocontrol is having on the weed population
- 4 - Rather than spreading insects thinly across a large area, sprinkle more densely in a relatively small area so they can find each other and do this (some romantic music please)
- 5 - On the same day biocontrol insects are released, record the location and take a \_\_\_\_\_
- 6 - Before sampling adult insects with a sweep net, determine what time of day they are most \_\_\_\_\_
- 7 - Never release biocontrol insects on an \_\_\_\_\_ (would you want to be released on one of these?).
- 9 - Generally, biocontrol is not a great choice for managing weed patches that are \_\_\_\_\_

Solutions are posted to the MSU Extension Invasive Rangeland Weed website:  
<http://www.msuextension.org/invasiveplantsMangold/extensionsub.html>

