

Purple Loosestrife Biocontrol How to Rear and Release Loosestrife Beetles

Staff Contact: Wendy Crowell, Aquatic Invasive Species Management Consultant, wendy.crowell@state.mn.us

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Objective

This guide is for DNR staff and partners (for example, local governments, lake associations, garden clubs, etc.) who want to help with the statewide purple loosestrife (PLS) biological control effort by rearing and releasing purple loosestrife beetles.



**** Important! Before you start, contact your local [Invasive Species Specialist](#) for a list of potential beetle collection sites, and to get the necessary permits.**

Purple Loosestrife (*Lythrum salicaria*, *Lythrum virgatum*)

Purple loosestrife is a perennial wetland plant that is non-native to Minnesota and is classified as a [Prohibited Invasive Species](#). It contains a flower spike of pink-purple flowers that bloom in late June to August. Purple loosestrife aggressively invades wetland areas, displaces native plants, and disrupts habitat for native animals. It can also encroach on drier lands such as agricultural fields.

Biological Control

Biological control is the best method to manage medium to large areas of purple loosestrife. There are two species of leaf-eating beetles that are well-established biological control agents in Minnesota, the golden loosestrife beetle (*Galerucella pusilla*) and the black-margined loosestrife beetle (*Galerucella californiensis*), shown in the photo on the right. See the DNR [purple loosestrife biological control webpage](#) for more information.

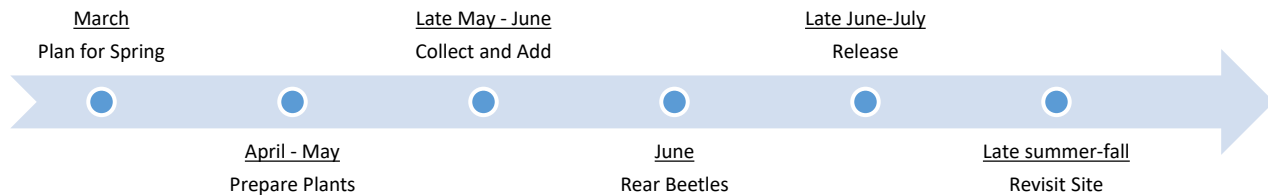


Galerucella beetles on a purple loosestrife plant, inset *Galerucella californiensis*.

Rearing and releasing beetles

Rearing and releasing PLS beetles requires more time and effort than collecting and moving them but requires a much smaller initial beetle source. To collect and move beetles you need a source population where hundreds of beetles can be collected. Initial collection of 50 to 100 beetles is recommended and can produce 1000's of beetles for release. Below are the monthly steps to successfully rear beetles and release them in areas of densely observed purple loosestrife.

Note: the exact timing of these steps will depend on the weather in your area.



March: Planning for Spring

1. Contact your local Invasive species specialist to identify possible collection and release locations, and to obtain the permits you need to transport and possess purple loosestrife.
2. Collect the needed equipment and secure a location for rearing. See photo on the right.
3. Equipment:
 - a. Wading pool (s)
 - b. Netting, sewn into tubes [**the DNR has netting material we can provide for free**]
 - c. Shovel for digging up loosestrife roots
 - d. Clippers to cut off dead stems from previous years
 - e. Pots and potting soil to plant the loosestrife roots
 - f. Waders (may be needed, depending on the sites you'll be working in)
 - g. Some way to attach the nets to the pots to prevent beetle escape (duct tape or elastic cords are two possible ways).



Example of small backyard beetle rearing setup.

April to May: Preparing the loosestrife plants for the beetles

1. Purple loosestrife roots are large and woody. Dig up one for each pot you plan to use. A large shovel is recommended because of the size of the roots. Keep any new growing shoots attached to the root but cut off any dead stems to make the roots easier to work with
2. Spray root mass with water to minimize predators and remove other plants that might be growing between the roots
3. Put sand in the bottom of each pot followed by good potting soil (leave room for root mass)
4. Plant one root mass in each pot and pack soil around roots
5. Place pots in a wading pool. Fill pool with enough water so the bottom of each pot is submerged at least two inches. If the pool sides are higher than the soil level, drill a few holes near the top of the pool to allow water to naturally remain at the right level in case of rain.
6. Once the plants start growing, cover them with nets. If you use a tube of netting fabric, tie the top of the tube in a knot to make it easier to add and remove adult beetles. Tie the tops of the net to a support to allow the plant to continue growing and to give the beetles room to move. Possible methods of keeping nets up are a cord that runs above rows of pots where the nets can be attached, or stakes in the pots to hold up the net.
7. Take care of the plants and wait for them to grow. Regularly check the pools to make sure there is water. If the plants are not growing well after two weeks add a bit of fertilizer.
8. When the plants are about a foot and a half tall, they are ready to have beetles added.
9. Document where you collected purple loosestrife plants using the DNR [web survey](#).

Late May to June: Collecting and adding the beetles

1. Either the black-margined loosestrife beetle or the golden loosestrife beetle can be collected.
2. The best time of year to collect beetles is in the spring as beetles emerge from the soil. This usually occurs around late May when plants are about one to three feet tall.
3. Beetles are collected on wetlands that have purple loosestrife plants and populations of *Galerucella* beetles established. Various public wetlands in the metro area have purple loosestrife stands where beetles may be collected. However, beetle abundance at any one site can vary from year to year. Please be sure that any site you go to collect is safe to access and that it is either on public land or you have permission from the landowner be on the site.



DNR Invasive Species Specialist Keegan Lund collecting beetles from a walking trail through a loosestrife area.

- Beetles can be collected using a simple collection bottle made from a used pop bottle and some duct tape (see photo below). Collect the beetles by holding the bottle under the insects and knocking them into the bottle. Before you knock them in add sprigs of purple loosestrife to maintain the beetles during transport and to help keep them from escaping the bottle.

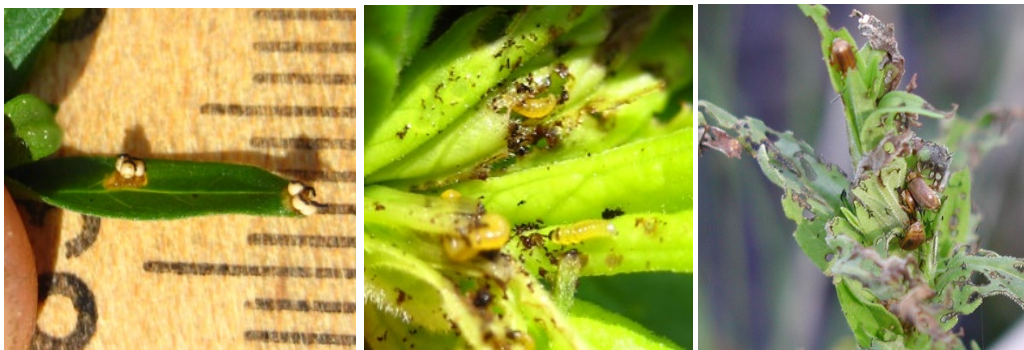


Make a collection bottle from 20 oz. plastic bottle and tape. Put a few sprigs of the purple loosestrife plant in the bottle for the beetles to hold onto. Up to 300 beetles can be kept in each container if the insects are going to be released within 24 hours. **Do not include flowers, seedheads or roots of purple loosestrife in collection bottles. It is illegal to move propagating parts.**

- Document where you collected the beetles using the DNR [web survey](#).
- Add about 10 beetles to each potted plant (those beetles will mate and lay eggs on the plant).
Collection Tips: *Beetles tend to prefer sunny spots rather than shady. Look for damaged (leaf-eaten) plants; if the beetles are not obvious there, check nearby healthy plants. Beetles tend to feed an area hard and then move on to adjacent areas, so move around while searching. During warm, dry days beetles typically congregate near the tops of the plants on the leaves. On cool, damp days they may be tucked deep into the leaves and can only be detected by peeling leaves back.*

June: Rearing the beetles

- Keep the pool(s) filled with water.
- Make sure the beetles don't eat all of the plants. If the plant is small you may have to add extra loosestrife stems and leaves to keep the beetles alive.
- Be on the lookout for beetle egg masses, and beetle larvae, and damage to plants.
- Once the plants are almost all eaten and there are many larvae or new adults in the nets it is time to release the beetles.



Loosestrife beetle eggs (left), larvae (middle), and adults on a beetle damaged plant (right).

Late June to July: Releasing the beetles and larvae

1. Confirm a good location for release with your local Invasive Species Specialist. The release area should have an abundance purple loosestrife population, with little to no evidence of beetle activity.
2. Transport the pots with their nets still attached. Avoid long transport times when it is hot outside if you cannot keep them inside a temperature-controlled vehicle.
3. Place the pots in an area with 50 or more plants. If one area has hundreds of plants, you can cluster the pots in groups of two to four.
4. If the loosestrife dominated wetland spans several acres choose more than one spot to locate the pots.
5. Once a pot is in place carefully remove the net and shake out any beetles that remain. After the net is off nestle the potted plants up near the wild plants to make it easy for the larvae to get from one plant to another. This is best achieved by intertwining wild and potted PLS stems.
6. Mark the location where you left the release pots with flagging, and take a photo with your phone, so the area can be revisited later to see how well the beetles are doing.
7. Make sure all purple loosestrife fragments used during transport are dumped with the beetles on a loosestrife site or thrown away in the trash.

Late summer and fall: Revisiting the site

1. Relocate the site where you left the pots to see how much damage the beetles have done, and if there is any evidence of them spreading away from the release area. Adult beetles make round holes in the leaves while larvae cause “window-pane” like damage to the leaf and stem surface (see photos below).
2. Document the release using the DNR [web survey](#).
3. Take photos of the site.
4. Retrieve the release pots.
5. Revisit site next season.



(Left) PLS plant with typical holes in leaves from adult beetle feeding
(Right) *Galerucella* species larvae and “window-paning” leaf damage.

Additional Resources

EddMaps website has information about the species and detailed information about its location throughout the country, including Minnesota specific information.

Purple Loosestrife <https://www.eddmaps.org/species/subject.cfm?sub=3047>

Minnesota DNR website has information about the species in Minnesota

Purple Loosestrife <https://www.dnr.state.mn.us/invasives/aquaticplants/purpleloosestrife/index.html>

Wisconsin DNR website has information about the species and training materials describing how to rear and release purple loosestrife biocontrol beetles.

Purple Loosestrife Biocontrol and You <https://dnr.wisconsin.gov/topic/Invasives/loosestrife.html>