

This brochure has been produced by the Ontario Federation of Anglers and Hunters with the support and cooperation of:

Canadian Wildlife Service

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Ducks Unlimited Canada

Manitoba Purple Loosestrife Project

Minnesota Department of Natural Resources

Ontario Ministry of Natural Resources

U. S. Great Lakes Sea Grant Network

University of Guelph



What You Should Know, What You Can Do

Purple Loosestrife



Purple Loosestrife

THE ARRIVAL

Purple loosestrife (*Lythrum salicaria*), a beautiful but aggressive invader, arrived in eastern North America in the early 1800's. Plants were brought to North America by settlers for their flower gardens, and seeds were present in the ballast holds of European ships that used soil to weigh down the vessels for stability on the ocean. Since it was introduced, purple loosestrife has spread westward and can be found across much of Canada and the United States.

THE PROBLEM

Purple loosestrife is a very hardy perennial which can rapidly degrade wetlands, diminishing their value for wildlife habitat. Wetlands are the most biologically diverse, productive component of our ecosystem. Hundreds of species of plants, birds, mammals, reptiles, insects, fish and amphibians rely on healthy wetland habitat for their survival.

However, when purple loosestrife gets a foothold, the habitat where fish and wildlife feed, seek shelter, reproduce and rear young, quickly becomes choked under a sea of purple flowers. Areas where wild rice grows and is harvested, and where fish spawn, are degraded. An estimated 190,000 hectares of wetlands, marshes, pastures and riparian meadows are affected in North America each year, with an economic impact of millions of dollars.

Purple loosestrife also invades drier sites. Concern is increasing as the plant becomes more common on agricultural land, encroaching on farmers' crops and pasture land.

THE CHALLENGE

Many organizations throughout North America have taken action to control the spread of purple loosestrife. Their response has been characterized by unparalleled cooperation with the result being the most successful biological control program for an invasive species in North America. National wildlife services, state/provincial natural resource and environment agencies, universities, nursery trades associations, and conservation and community organizations have also responded to the purple loosestrife invasion by raising awareness of the threat posed by this invasive plant, how to prevent its spread and methods of control.



Photo courtesy of Matt Vandy

HOW TO IDENTIFY PURPLE LOOSESTRIFE

Flower: Five or six pink-purple petals surrounding small, yellow centers. Each flower spike is made up of many individual flowers which bloom in late June to August.

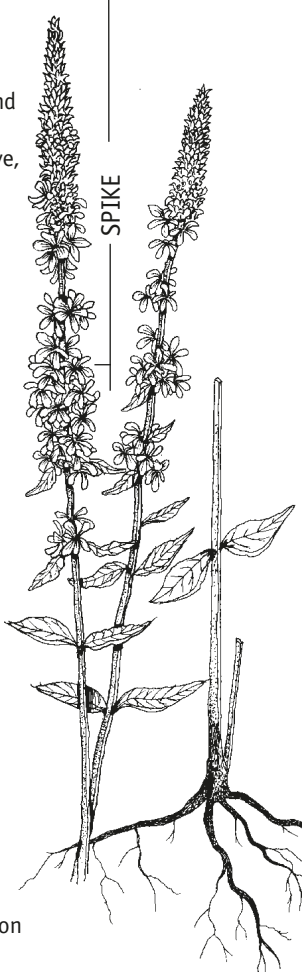
Seed Capsule: Appear as flowers begin to drop off and contain many tiny seeds. Depending on where you live, plants may go to seed as early as late July.

Seed: As tiny as grains of sand, seeds are easily spread by water, wind, wildlife and humans (mature plant can produce up to 2.7 million seeds annually). Germination can occur the following season, but seeds may lay dormant for several years before sprouting.

Leaves: Downy, with smooth edges, arranged opposite in pairs which alternate down the stalk at 90° angles, however, they may appear in groups of three.

Stalk: Square, five- or six-sided, woody, as tall as 2m (6+ ft.) with several stalks on mature plants.

Perennial Rootstock: Extensive on mature plants and can send out 30 to 50 shoots, creating a dense web which chokes out other plant life.



Swamp Loosestrife: Individual flowers ring the stem above leaf pairs. They do not form a flower spike like purple loosestrife.



Fireweed: The conical flower spike is 10-13 cm (4-5 inches) wide at the base. Stem is round and leaves alternate.



Blue Vervain: Small purple flowers ring the stem; edges of leaves are toothed.



Winged Loosestrife: Leaves alternate with small stems attached to main stem.

Photo courtesy of M.J. Oldham

Guidelines For Control

DON'T BE FOOLED BY THESE LOOK-A-LIKES



		Size Of Infested Area			
		Isolated plants	Small less than 1 acre (0.1 - 0.5 hectares)	Medium up to 4 acres (0.5 - 2 hectares)	Large more than 4 acres (more than 2 hectares)
Density Of Infested Area	Low Density 1 to 50 plants (1 - 25% of the area)		 	 	
	Medium Density 50 to 1,000 (25 - 75% of the area)	 	 	 	
	High Density more than 1,000 (75 to 100% of the area)		 	 	

Key To Chart Symbols

Digging & Hand Pulling Pulling by hand is easiest when plants are young (up to two years) or when in sand. Older plants have larger roots that can be eased out with a garden fork. Remove as much of the root system as possible, because broken roots may sprout new plants. Purple loosestrife can be cut or pulled without a permit. It is important to dispose of the plants away from the water.



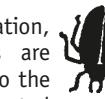
Cutting Removing flowering spikes before going to seed will prevent more plants in future years --remember each mature plant can produce over 2 million seeds per year. Also, carefully remove last year's dry seed heads, as they may still contain seeds. Finally, cut the stems at ground level to inhibit growth and put all plant material in the garbage. Purple loosestrife can be cut or pulled without a permit.

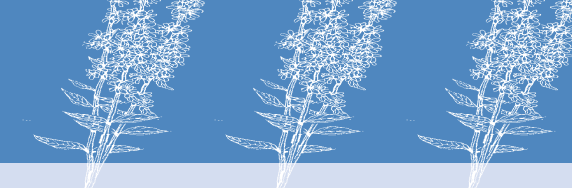


Chemical Control Small populations of purple loosestrife can be controlled by applying an approved herbicide to individual plants by selective hand spraying. Glyphosate or Triclopyr based herbicides, that are labelled for aquatic use, are recommended. A MN DNR permit is required to spray purple loosestrife in public waters and protected wetlands. There is no fee for this permit. Contact the DNR to obtain permit information.



Biological Control In areas of severe purple loosestrife infestation, manual and chemical control efforts are ineffective and may in fact contribute to the problem. However, the use of specially selected insects that feed on purple loosestrife is a highly effective method for long-term control in these higher density areas. Leaf-eating beetles (*Galerucella* spp.) are available for control of purple loosestrife. Contact the MN DNR for information on how to obtain beetles. Biological control is discussed in more detail in a following section.





Guidelines For Control

Biological Control

Biological Control

Biological Control

Is Purple Loosestrife Growing In Your Garden?

Alternative Plantings For Purple Loosestrife

■ **The best time to control** purple loosestrife is in late June, July and early August, when it is in flower, plants are easily recognized, and before it goes to seed. Once flower petals start to drop from the bottom of the spike, the plant begins to produce seed. Control activities can continue during this time, but require greater care so seeds are not shaken from the plant. At sites where plants have gone to seed, remove all of the flowering spikes first by bending them over a plastic bag and cutting them off into the bag. Further cutting of stems or pulling can now take place without fear of spreading the tiny seeds.

■ **Proper disposal** of plant material is important. Put all plant pieces in plastic bags (vegetation rots quickly in plastic) and take the bags to a sanitary landfill site. Be sure the landfill site doesn't require bags to be broken open for composting. Composting is not advised, as purple loosestrife seeds may not be destroyed and the thick, woody stem and roots take a long time to decompose.

■ **Be aware** that your clothes and equipment may transport the small seeds to new areas. Thoroughly brush off your clothes and equipment before leaving the site.

■ **Keep site disturbance to a minimum.** Wetlands provide habitat for many native song birds, waterfowl, mammals, amphibians, and fish which depend on native wetland vegetation. Wetlands are also home to many rare and delicate plants. Take care not to trample or damage native vegetation when controlling purple loosestrife.



WHY BIOLOGICAL CONTROL?

When a plant is introduced to an area outside of its native range, it usually leaves behind the natural enemies that control its population. The purpose of biological control (biocontrol) is to reunite a plant with its natural enemies. Complete eradication is unlikely; the goal of biocontrol is to reduce numbers of the target plant to reduce its ability to displace native vegetation.

Obviously, extreme caution must be taken when introducing one organism to control another. Prior to any introduction of a biological control agent, intensive testing is conducted to ensure that a safe and effective agent is selected.



Beetle damage to loosestrife plant photo courtesy of MN DNR
Beetle larvae photo courtesy of Jim Corrigan

SELECTION AND SCREENING PROCEDURES

Before approval is granted to release biological control agents in Canada or the U.S., years of testing are required to determine that they will only affect the target species.

Testing is usually done in Europe by the International Institute of Biological Control in collaboration with Canadian and U.S. scientists. This enables controlled laboratory testing and natural field testing to be conducted in the insects' native home, to avoid the risk of a foreign species escaping.

Once testing is completed, a report is written for submission to a Canadian Advisory Committee and a U.S. Technical Advisory Group. If both the Canadian and U.S. representatives are satisfied that the benefits outweigh the risks, they recommend the release of biological control agents.

Once approved for release in Canada or the U.S., insects must pass through national quarantine facilities to ensure that they are the correct species and are free of disease and parasites.

FINDING BIOLOGICAL CONTROLS

In the mid-1980's, biologists began to conduct a search for biological control agents for purple loosestrife. Of the more than 100 insects that feed on purple loosestrife in Europe, several species were thought to have had excellent potential. Testing began in Europe and was completed in North America between 1987 and 1991. Included in the tests were "feeding trials" which exposed the insects to approximately 50 species of plants including wetland species native to North America, and important commercial and agricultural species.

Five species of beetles received approval for release in North America, first from the United States government, and then from the Canadian government in 1992. *Galerucella pusilla* and *G. californiensis* are leaf-eating beetles which seriously affect growth and seed production. *Hylobius transversovittatus* is a root-boring weevil whose larvae feed on the root tissue, destroying the plant's nutrient source for leaf development, which in turn leads to the complete destruction of mature plants. Finally, two flower-eating beetles, *Nanophyes brevis* and *N. marmoratus*, reduce seed production of purple loosestrife.

RELEASE AND MONITORING PROTOCOL

Since the initial importation to North America, four of the control agents have been released in Canada and the United States. As of 2006, *G. pusilla*, and *G. californiensis* have been released in 9 Canadian provinces and at least 33 U.S. states. *H. transversovittatus* and *N. marmoratus* have also been released on a limited basis in the United States and Canada. The other flower-eating beetle has yet to be released in North America.

At the time of insect release, site characteristics including habitat and soil type, size of infestation and water levels are recorded. Follow-up visits to the site occur later in that season, and in subsequent years, so that survival and establishment of the beetles can be assessed and their impact on the plant population evaluated.



Galerucella species photo courtesy of David J. Voegtlin

THE IMPACT OF BIOLOGICAL CONTROL ON PURPLE LOOSESTRIFE

The biological control program for purple loosestrife has proven to be one of the most successful examples of control of an invasive species in North America. Since 1992, releases of both species of *Galerucella* beetle have effectively reduced the density of purple loosestrife by reducing shoot growth, preventing or delaying flowering and reducing seed production. At many release sites, reductions of purple loosestrife have occurred by more than 80%. The beetles will also disperse, flying to new purple loosestrife stands as its food supply dwindles.

The beetles will never completely eradicate purple loosestrife populations, but will enable the reestablishment of native plants within our wetland habitats. It is estimated that in the long term, (over the next 10 to 20 years) purple loosestrife will be significantly reduced across the North American landscape.

It is important that we continue to work together to control the spread of purple loosestrife to new areas by using the control guidelines previously outlined and by removing any plants in your garden.



Before & after photos courtesy of MN DNR

Purple loosestrife (*Lythrum salicaria*, *L. virgatum* and any combination thereof) is listed as a noxious weed and a prohibited invasive species in Minnesota. It is illegal to possess, plant, transport, or sell loosestrife in Minnesota.

Garden varieties of loosestrife, which were once thought to be sterile, can cross-pollinate with wild purple loosestrife to produce viable seed. Gardeners can help protect our environment by not planting purple loosestrife or the following cultivars:

- *Atropurpureum*
- Columbia Pink
- Firecandle
- Floralie
- Gypsy Blood
- Lady Sackville
- Morden Pink
- Pink Spires
- Purple Spires
- Rose Gleam
- *Roseum superbum*
- Rosy Glow
- The Rocket
- Brightness
- Dropmore Purple
- Flashfire
- Florarose
- Happy
- Morden Gleam
- Morden Rose
- Purple Dwarf
- Robert
- Rose Queen
- Rosy Gem
- The Beacon
- *Tomentosum*



If you currently have purple loosestrife or a cultivar growing in your garden, please remove it (roots and all).

The following plants are examples of some ornamental and native species available at garden centers and nurseries that have similar characteristics but pose no threat to our natural environment.

Common Name	Botanical Name	Native	Bloom Colour	Bloom Period	Moisture Required	Light	Height
Blazing star	<i>Liatris spp.</i>	y	pink, purple, white	July-August	well-drained soil	sun	60-120cm (2'-4')
Blue Iris/Blue Flag	<i>Iris versicolor</i>	y	Blue	June-July	wet	sun	60-90cm (2'-3')
Blue vervain	<i>Verbena hastata</i>	y	blue-purple	July-September	medium to wet	sun	90-150cm (3'-5')
Cardinal Flower	<i>Lobelia cardinalis</i>	y	deep red	July	medium to wet	sun/shade	60-120cm (2'-4')
Culver's Root	<i>Veronicastrum virginicum</i>	y	white	August	medium to wet	sun/shade	90-180cm (3'-6')
Delphinium	<i>Delphinium spp.</i>	no	blue, purple, pink	July-August	medium	sun	30-180cm (1'-6')
Astilbe - False Spirea	<i>Astilbe x arendsii</i>	no	pink, purple, crimson	June-July	medium	part shade	30-120cm (1'-4')
Great Blue lobelia	<i>Lobelia siphilitica</i>	y	blue	August-September	medium to wet	part shade	60-90cm (2'-3')
Joe-Pye Weed	<i>Eupatorium maculatum</i>	y	pink	July-September	medium to wet	sun	90-180cm (3'-6')
Lupine, Wild/Sundial	<i>Lupinus perennis</i>	y	purple	May-June	well-drained soil	full/part sun	60-90cm (2'-3')
Swamp Milkweed	<i>Asclepias incarnata</i>	y	pink, rose-purple	July-August	wet	sun	90-150cm (3'-5')
Turtlehead	<i>Chelone glabra</i>	y	white, rose-pink	July-September	medium to wet	sun	60-90cm (2'-3')

For more information

If you would like more information about purple loosestrife, the problems it causes, regulations to prevent its spread, or methods and permits for its control contact:

Minnesota Department of Natural Resources
1-888-646-6367 (statewide) / (651) 259-5100 (metro area)
www.dnr.state.mn.us/invasives/index.html