



Purple loosestrife: M.J. Thomson

Natural Invaders

This information is for gardeners. It is for the young couple who plant flowers along their front walk for enjoyment; it is for the cooks who take pride in growing their own herbs; it is for the amateur naturalists who sit by their garden and admire the activity of the butterflies, birds, and bees that it attracts. It

is intended to alert the reader to the dangers of many common flowers and nursery varieties that threaten to replace our native vegetation. These are the “natural invaders” that may be growing in your own backyard, just waiting for an opportunity to escape and move into neighbouring woodlots and ravines.

Ontario’s wetlands, woodlands, fields and roadsides are bright with green plants and brilliant flowers during the spring and summer months. They charm us with their colour, scent and beauty, sparking our senses and enticing us to plant them in our gardens. But perhaps it would be wise to step back and ask how they got here in the first place, and why we are now trying so hard to get rid of some of them.

Of the roughly 2600 vascular plant species that grow wild in Ontario, some 700 are exotics or aliens, that is, species that are not native to the province. Some, like day lilies are harmless, particularly if they are kept under control in confined gardens. Unfortunately, many others are what we call invasive species, that is species that possess aggressive reproductive qualities that enable them to displace our native, natural plant communities.

The most serious invaders tend to be those that came from far away, with European and Asian species having the most impact. Entire plant communities in fens, bogs and marshes have been engulfed by invasives. Wainfleet Bog for example, has been inundated by European birch, and in many wetlands purple loosestrife has crowded out native vegetation creating a monoculture that provides little food or shelter for wildlife.

And then they came

The story of how different trees, shrubs and herbs found their way into our gardens and natural areas is as diversified as the plants themselves. Many of them migrated to our shores during European settlement, bringing with them the traits that made them so successful in their home countries. Some were brought as ornamentals that reminded early settlers of home. Others were brought for food, forage, pasture crops, pot herbs,

condiments or medicinal or ceremonial purposes. Many came as stowaways in the rigging or ballast of ships. In the early days, vessels sailing light carried tons of earth as ballast, earth which was shovelled overboard upon making port, and which naturally contained the seeds of numerous foreign plants. Many of these plants survived and even thrived in their new environment, becoming naturalized in our landscape. Unfortunately, they left behind the natural controls (usually insects) that kept them in check in their native habitats.



M.J. Thomson

Dame’s rocket takes up space that native species should occupy.

More recently, seeds and fruit have been transported by car grilles, sold in commercial wildflower mixes or intentionally introduced as landscaping material. Without human assistance, most of our exotics would never have reached this continent. Human activities have altered our landscape and consequently have invited invasives to make themselves at home and to spread.

We have cut down forests, ploughed the land, built cities, railways and highways, altered the natural drainage and created such artificial habitats as farms, pastures, lawns and gardens. Many altered landscapes, whether disturbed by natural causes or human-induced activities, are more susceptible to invasion because they will contain fewer established native species that might assist in keeping the aliens in check. While habitats with well-established native species have a better opportunity to suppress the establishment of non-indigenous species, they are



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not immune to invasion. Some aliens can hybridize with native species, suppressing genetic characteristics that are adapted to local conditions. The native red mulberry, for example, is becoming rare in Ontario due to hybridization with the introduced white mulberry.

Norway maple was introduced to Canada more than 200 years ago and is now a problematic invasive.



Helena Rusak

Many people plant exotics such as purple loosestrife and magnolia for the mere beauty of the plant but many of these aliens are also hardy, disease free, have few if any insect pests, and reproduce or propagate easily. Unfortunately, these characteristics also make them serious competitors when released into a new ecosystem or habitat.

However native species get here, movement of their fruit and seeds by water, wind and animals, including humans, are the chief agents for their dispersal. Streams and rivers carry seeds across wide areas and spread them even more broadly during times of flood or heavy rainfall. Many tree species produce fruits that have winged appendages, such as the key fruits of maples, that the wind disperses into the surrounding landscape. The seeds of fleshy fruits are usually able to pass unharmed through the digestive tracts of birds or other animals, and in this way may be deposited far from the parent plant. Other fruits have hooks, barbs, or spines that adhere to the fur of animals or the clothing of humans, who

then transport them to another location. Some species reproduce underground by root runners; others create an accumulated seed bank that may lie dormant for years until the soil is overturned. Walking through a field or lawn and pulling up shoots may stimulate the banked seeds to germinate and start up a vigorous new population, larger in extent than the original.

Control

There are five main control methods for removing invasive exotics: chemical herbicides, physical removal, biological agents, prescribed burning, and ecological or integrated pest management.

In recent years, the use of herbicides has become a matter of environmental concern, and it is therefore not the first control method recommended. It can, however, be quite successful when applied to cut stumps to eliminate shoot and root sprouting. Physical control methods are labour-intensive and not always effective, as stem and root fragments of some species are capable of re-infesting a controlled area or spreading into a new one. Prescribed burning is usually practised on open areas such as prairies, alvars and savannahs, where the invasion of small trees and shrubs threaten these open habitats. For obvious reasons, it is normally recommended that only well-trained professionals undertake such activities.

Biological control methods involve the release of living organisms into populations of an invasive species. The decision to use such a method should be made only after careful examination, as it is not unknown for the control agent to find native species more to its liking than its intended target and itself become invasive. Ecological and integrated pest management involves combining any or all of the above methods with preventative measures.

Before removing an exotic, one should also consider how to restrict its growth and restrain its reproduction to keep it in check. Some of the more effective strategies include reducing the amount of site disturbance and re-establishing natural conditions in the area. This requires patience — restoring an area to its natural condition is a lengthy process and should usually be accompanied by re-establishing native species that can compete with the invaders on the site.

Current trends in landscaping have led to a variety of new garden types



How does your garden grow?

In addition to the traditional flower beds and vegetable plots, many people are now planting water gardens, ornamental grasses and wildlife gardens. For years, many people have taken for granted that if a plant was purchased at a garden centre it was suitable for planting in their gardens. In most cases, they were right. Unfortunately, some of our cultivated species have escaped our garden beds and have invaded nearby woodlots and meadows — dame's rocket and periwinkle are examples. This is becoming especially troublesome with the introduction of new hybrids which are bred for hardiness, reproduction, pest resistance and landscaping appeal. Within each of the garden types popular today are a number of "natural invaders" that should be considered carefully before planting, or ideally not be planted at all.

Ornamentals

The variation of size, form and colour of plants is endlessly surprising and beautiful, inspiring us to add them to our gardens. However, some of the species that we choose to plant for beautification purposes tend to pose more problems than they provide pleasure.



J. Scott Peterson, USDA, NRCS, www.forestryimages.org

Russian olive is commonly found beside roads and in other disturbed areas.

The **Norway maple** (*Acer platanoides*) was introduced from Europe for use in urban landscaping in 1778. In the early 1800s, it escaped from planted areas into open woods and floodplains in southern Ontario and is now a problematic invasive species in small Toronto ravines. Norway maple is able to colonize and

dominate almost any forest habitat, shading out many native species. Any garden or lawn in the vicinity of Norway maples will be bombarded by the fruit keys of these trees. Efforts should be made to rake up these keys either in the early spring or fall. The alternative is an endless succession of small maple seedlings. When considering a new shade tree for the front lawn, choose a hardy native species such as basswood, sugar maple or white ash instead.

European birch (*Betula pendula*), a native of Northern Europe, invades bogs and other natural areas. In Ontario, it is dramatically changing bog habitats by displacing native species. The natural vegetation of some Southwestern Ontario bogs are slowly being replaced by monocultures of European birch, with a resulting loss in biological diversity.

Dame's rocket (*Hesperis matronalis*), a beautiful plant that flowers prolifically in June, now dominates many southern Ontario floodplains and has become common in moist forests and meadows. Its base of broad leaves takes up space that native species should occupy. It is still a common plant used in wildflower mixes marketed as "meadow-in-a-can."

An aquatic plant familiar to most is **purple loosestrife** (*Lythrum solitaria*). This aggressive invader was probably transported in ship ballast, on imported sheep, or in livestock feed nearly 200 years ago. It has since been spread intentionally by humans for herbal use, as an ornamental and in wildflower seed mixtures. The reproductive capacity of purple loosestrife is extremely high. With each plant producing up to 2.7 million seeds per year, it can quickly develop a large seed bank and its seeds are able to live for several years under varying and extreme environmental conditions. It is normally spread by water, wind and in mud attached to animals but can also spread vegetatively by adventitious shoots and roots from clipped, tramped or buried stems. The values of wetlands are lost as this invader chokes out significant species, rare or otherwise, which may be food plants for the fauna using the wetland. Purple loosestrife could thus have a major impact on populations of waterfowl, muskrats, frogs, turtles and toads. It has also caused agricultural problems by clogging irrigation systems and degrading wetland pastures and wild hay meadows.



The lack of natural enemies in North America has contributed to the proliferation of purple loosestrife. Several European insects that attack it exclusively are being tested as a possible long-term biological control. Physical control, such as hand pulling and shearing, may be successful in areas of limited infestation but is unrealistic in most cases. It is possible in areas with individual plants, clusters of up to 100 plants, and younger plants (one to two years old), but pulling is required on a continuous basis to eliminate the new plants being established from the seed bank. Any pulled plants should be bagged and ultimately burned.

Species to avoid

- European highbush cranberry (*Viburnum opulus*)
- European mountain ash (*Sorbus aucuparia*)
- privet (*Ligustrum vulgare*)
- white mulberry (*Morus alba*)
- horse chestnut (*Aesculus hippocastanum*)
- oriental bittersweet (*Celastrus orbiculatus*)
- silver poplar (*Populus alba*)
- black locust (*Robinia pseudo-acacia*)
- Scots pine (*Pinus sylvestris*)
- Siberian elm (*Ulmus pumila*)
- Himalayan balsam (*Impatiens glandulifera*)
- European and Japanese barberry (*Berberis vulgaris* and *B. thunbergii*)
- European birch (*Betula pendula*)
- Russian olive (*Elaeagnus angustifolia*)
- Japanese knotweed (*Polygonum cuspidatum*)
- multiflora rose (*Rosa multiflora*)
- silver dollar (*Lunaria annua*)
- creeping bellflower (*Campanulaceae glomerata*)

Ground Covers

In just about every backyard, there's an area where nothing grows, either as a result of poor soil conditions or inadequate light.

Increasingly, many people are replacing lawns with ground covers that require little maintenance and survive in poor growing conditions. Two popular ground covers are periwinkle (*Vinca minor*) and goutweed (*Aegopodium podagraria*). These plants are fine provided they are contained, but they should not be introduced into or adjacent to natural habitats.

Glossy buckthorn (*Rhamnus frangula*) and common buckthorn (*Rhamnus cathartica*) were first recorded in Ontario prior to 1913. These plants were introduced as ornamental shrubs, mainly for hedges. Once established, they shade and crowd out native shrubs. Common buckthorn invades prairies and woodlands, while glossy buckthorn is mostly found in wetland communities. All exotic buckthorns produce seeds and fruits which are eaten and spread by birds.

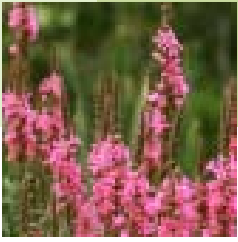
Alternatives

- basswood (*Tilia americana*)
- sugar maple (*Acer saccharum*)
- white ash (*Fraxinus americana*)
- red mulberry (*Morus rubra*)
- white pine (*Pinus strobus*)
- honey locust (*Gleditsia triacanthos*)
- trembling aspen (*Populus tremuloides*)
- trumpet creeper (*Campsis radicans*)

Periwinkle is such a problem in Michigan dune forests that it has been banned for use in some lakeside communities.



Periwinkle is a problem in natural habitats where it has escaped gardens.



Species to avoid (unless they are well-contained)

- sweet woodruff (*Asperula odorata*)
- crown vetch (*Coronilla varia*)
- lily of the valley (*Convallaria majalis*)
- moneywort (*Lysirnachia nununularia*)
- English ivy (*Hedera helix*)
- bugleweed (*Ajuga reptans*)

Alternatives

- native ferns
- herb Robert (*Geranium robertianum*)
- Virginia creeper (*Parthenocissus inserta* or *P. quinquefolia*)
- bearberry (*Arctostaphylos uva-ursi*)
- wild strawberry (*Fragaria virginiana* and *F. vesca*)

Wildlife Gardens

Many people today are choosing to landscape their yards to attract wildlife, and exotics are sometimes introduced into these designs. At best, however exotics have no more appeal or value for wildlife than well chosen native plants would have; at worst some of them have minimal value. Furthermore, some exotic species replace the more beneficial species that are important to our native fauna.

Morrow's (*Lonicera mortowii*) and **Tartarian honeysuckle** (*Lonicera tatarica*) are shrubs that escaped from gardens. Introduced as garden ornamentals, these honeysuckles were planted as wildlife shrubs by government agencies and have spread to colonize open woods, fields and shorelines. Being among the most aggressive aliens in central and eastern Ontario, they are thought to damage areas where they proliferate by displacing native understory species and ground flora, affecting biological diversity and restricting forest tree regeneration.

Nevertheless, no organized control measures have been taken in Ontario to eradicate these species. The most effective local control strategy with many shrubs is to cut them off near ground level and apply the herbicide glyphosate to the freshly cut stems ensuring that surrounding vegetation is not affected.

The **Japanese honeysuckle** (*Lonicera japonica*), similar to Tartarian and just spreading into extreme southwestern Ontario, has invaded thousands of square kilometres of wooded country from southern New England to Florida.

Oriental bittersweet (*Celastrus orbiculatus*) is an incipient concern in Ontario because it hasn't been under cultivation here for very long. We can thus still hope to avoid the problem faced by the New England states, where it is taking over many natural areas.



Patrick Breen, Oregon State University, www.forestryimages.org

Tartarian honeysuckle escaped from gardens and is now one of the most aggressive aliens in central and eastern Ontario.

Species to avoid

- European highbush cranberry (*Viburnum opulus*)
- European mountain ash (*Pyrus aucuparia*)
- autumn olive (*Elaeagnus umbellata*)
- wayfaring-tree (*Viburnum lantana*)

Alternatives

- American highbush cranberry (*Viburnum opulus* var. *americana*)
- mountain ash (*Sorbus americana*)
- pin cherry (*Prunus pensylvanica*)
- serviceberry (*Amelanchier* spp.)



Tall Grasses

Landscaping with grasses is a new trend in gardening. Grasses are tall and graceful and retain their elegance throughout the year. They can be cut and dried for flower arranging and can be highly attractive to wildlife (especially birds and butterflies). Many new varieties of exotic ornamental grasses have recently been introduced to the landscape trade. As beautiful as they are, **pampas grass** (*Miscanthus sp.*) and **reed canary grass** (*Phalaris arundinacea*) are two “natural invaders.”

Although a genotype of reed canary grass is native, most landscaping grasses have been introduced as forage crops from Eurasia and threaten the existence of our native species. The vigorous growth of reed canary grass reduces the available moisture and nutrients to adjacent plant species and the shade it creates can reduce available light, limiting the growth and survival of young tree seedlings.



Kenneth M. Gale, www.forestryimages.org

Pampas grass is just one of many ornamental grasses now invading Ontario’s natural landscapes.

Alternatives

- big bluestem (*Andropogon getardii*)
- little bluestem (*Schizachyrium scoparium*)
- bottle-brush grass (*Hystrix patnia*)
- switchgrass (*Panicum virgatum*)

Water Gardens

The presence of water is vital to wildlife, primarily for drinking and bathing. For some amphibians, it is essential for completing their life cycle. As well, many of the plants that grow in or near water produce beautiful foliage and flowers and it is for this reason that many people choose to grow aquatic plant species.

Flowering rush (*Butomus umbellatus*), a native of Europe and Asia, is occasionally found inland as a discard from gardens. It has become a nuisance along the St. Lawrence River and has expanded its range into southwestern Ontario.

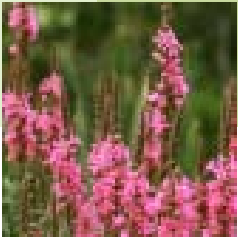
European frog-bit (*Hydrocharis morsusraeae*), also a natural invader, has severely overrun some Lake Ontario marshes.

Eurasian water milfoil (*Myriophyllum spicatum*), native to Eurasia and Africa, is an extremely aggressive species in lakes, ponds and slow-moving streams, in part because of its ability to grow rooted in water more than six metres deep (fresh or saline) and under ice. Although this plant is sometimes eaten by ducks, it holds no true wildlife value and poses more problems than benefits.



Phragmites is an exotic tall grass that thrives in wet areas.

Jill M. Swearingen, USDI National Park Service, www.forestryimages.org



Species to avoid

- yellow flag (*Iris pseudocorus*)
- phragmites (*Phragmites conimunis*)

Alternatives

- blue flag (*Iris versicolor*)
- arrowhead (*Sagittaria latifolia*)
- pickerel weed (*Pontederia cordata*)
- water parsnip (*Heracleum lanatum*)
- cardinal flower (*Lobelia cardinalis*)

Herb Gardens

More and more gardeners are expanding their vegetable plots to also include homegrown herbs, rather than buying them from a grocery store.

Mints are garden herbs well-known for their ability to spread and should be well contained. Another potentially invasive herb is **common tansy** (*Tanacetum vulgare*) introduced from Europe at an early date and cultivated by the colonists for bitters and as a kind of tea. The leaves are highly aromatic and provide an oil that has been used in medicines and as a condiment. It is found along fencerows, borders of fields, roadsides and waste places. Other herbs that can become invasive are thyme and marjoram. It is advisable to harvest stalks and leaves of herbs in mid-June before the plants flower, and if the re-growth starts to flower it should be pinched off before it goes to seed.

Inadvertent Introductions

Although many of our exotic invaders have been introduced to North America intentionally, some have come with no purpose at all.

Garlic mustard (*Alliaria petiolata*) seems to be such a species (although it may have been introduced for medicinal uses and as a green vegetable). This European plant is named for the garlic fragrance produced when it is crushed. It was first recognized as a problem species in Ontario in the late 1970s and has since become a major threat to woodlands in the southwestern Ontario counties of Middlesex and Elgin, and in large cities including Toronto, Waterloo, Hamilton and Ottawa. It is especially troublesome in shaded habitats such as forested riverbanks, moist woodlots and roadsides where it can grow to the exclusion of native species. Like many other invasive aliens, garlic mustard is adapted to disturbance and both natural and human disturbances assist in its rapid invasion.

Garlic mustard spreads mainly through seeds which are carried to new habitats by humans, animals and water. Each plant produces an average of 350 seeds which germinate from two to six years later. Garlic mustard thrives on nitrogen and as a result it has benefited from acid rain, particularly in upland forests. Eliminating the spread of garlic mustard may be impossible, but it can be slowed by cutting and removing the flowerstalk at ground level prior to seed production and applying glyphosate in early spring or late fall, when most native plants are dormant. Fire may also work. Early detection is critical since successful removal of well-established colonies is unlikely without considerable cost. A single plant is capable of populating a site.

Other inadvertent introductions

- dog-strangling vine (*Cynanchum spp.*)
- spotted knapweed (*Centaurea maculosa*)
- white bedstraw (*Galium mollugo*)
- coltsfoot (*Tussilago farfara*)



Leslie J. Mehrhoff, University of Connecticut, www.forestryimages.org

Once established, garlic mustard is extremely difficult and expensive to remove



What you can do

Despite evidence that exotics are threatening our natural areas, they are still being tested for wildlife plantings, landscaping purposes, wood and fiber production, soil conservation practices and forage improvement. At the same time, we are spending tremendous amounts to protect and preserve significant habitats that are increasingly vulnerable to infestation by alien invaders. The continued fragmentation of our southern Ontario landscape by suburbs, country estate housing and transportation corridors serves to give these natural invaders an added advantage.

Awareness of the problems caused by invasive alien plants is the first step in preventing their continued use. When choosing plants for your garden, determine whether they are native or exotic. Learn what native species can be used in place of exotics — there is almost always an alternative. Ask your nursery what native plants they have available and use them instead. If you still decide to choose an exotic, make sure it is a non-invasive species such as peony, petunia, forsythia and butterfly bush.



Cindy Roche, www.forestryimages.org

Spotted knapweed (left) and Japanese honeysuckle (below) were unintentionally introduced into Ontario.



Chuck Barger, The University of Georgia, www.forestryimages.org

*Written by Kim Gavine
Layout by Heather Webb*

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ONTARIO NATURE - FEDERATION OF ONTARIO NATURALISTS

355 Lesmill Road, Toronto, Ontario M3B 2W8

Tel: (416) 444-8419 Toll free: 1-800-440-2366

Fax: (416) 444-9866 Email: info@ontarionature.org