

# Plants Invasive in Rhode Island

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Africanized ("killer") bees coming across the Texas border, brown tree snakes invading Guam, and zebra mussels infiltrating eastern U.S. waterways--these dramatic biological invasions grab headlines all over the world. Quieter invasions are taking place, however, which may eventually prove to have far greater effects on the world's ecosystems. These are the invasions of exotic plants.

Forty years ago, the weeds we worried about were the herbaceous plants, largely of European origin, that reduced the yields of crops. These were the weeds that grew in pastures and hay fields, among the corn, potatoes, and market garden crops, and which invaded nursery stock, orchards, and home gardens. They were usually removed by mowing or cultivation, since herbicides were expensive and required careful application to protect nearby plants and human health.

Also at this time, as agriculture declined and fields were abandoned, the usual pattern of "old field succession" followed. First came annual weeds, then gradually native perennial plants, and sometimes a stand of native beard grass, *Schizachyrium scoparium*. The first woody plants appeared in about five years. Eventually the area would be covered with native shrubs, the species depending on soil characteristics and the amount of moisture available. Soon short-lived trees would replace the shrubs, and gradually the more permanent trees of the climax forest would become established.

Today, when an area of land is no longer managed, it becomes occupied by masses of invasive ornamental plants instead of natives. In some cases, these invasive plants even move into established meadows and woodlands. In conservation areas and land saved for open space, where native vegetation is supposed to remain undisturbed, conditions are now so serious that a massive eradication campaign is needed.

Interestingly enough, few of the species causing problems in the northeast are recent introductions. Many of them were introduced as medicinal or ornamental plants in colonial times, and the others as ornamentals in the nineteenth century. As long as they remained where they were considered desirable, there were no problems. If they escaped from cultivation, most of the surrounding land was used for agricultural purposes, and any invading plant was promptly removed. As agriculture declined in Rhode Island, however, more and more land was released from management by farmers and trained gardeners. Simultaneously, an increasing human population meant more houses, more roads, more stores....a vast change in the amount of disturbed land, especially disturbed edges. It is probably this combination of increased disturbance and decreased management that has left the state so vulnerable to exotic invasion.

Compounding the problem, in recent decades many exotic ornamentals have been widely recommended as food and shelter for wildlife, and for erosion control, for planting in urban areas, and for use on highways as crash barriers and to reduce headlight glare. In Rhode Island, conditions are



especially bad on both sides of Narragansett Bay, on some of the Bay Islands, at Beavertail State Park, the Trustum Pond National Wildlife Refuge, and along roadsides. The vegetation along Route 4 and some of the side roads near there, and some of the roads on Aquidneck Island, is composed almost entirely of invasive exotic ornamentals. According to a visiting landscape architect who does land restoration work all over the country and lectures on the problems with invasive plants, conditions in Rhode Island are the worst she has seen in her travels.

While people notice a forest defoliated by gypsy moths, or an island stripped bare of vegetation by feral goats, a woodland taken over by exotic plants may look as green and lush as ever. Many exotic invasives are ornamentals chosen for their beauty and ease of growth, making it difficult for people to understand what all the fuss is about. Indeed, the majority of introduced plants are not invasive or even become naturalized. Indeed, most introduced plants need careful cultivation, cannot compete with native species, and often lack the necessary pollinators. About 10% of naturalized plants and animals, however, do have major effects on their adopted ecosystems. Among the plants, kudzu (*Pueraria lobata*), water hyacinth (*Eichhornia crassipes*), Canada thistle (*Cirsium arvense*), and saltcedar (*Tamarix* spp.) are well-known examples in the United States. These four species alone account for millions of dollars spent each year by farmers, ranchers, wildlife agencies, and homeowners, to control the spread of these invasive plants. [6,16]

For an exotic plant species to succeed in its new home, it must be able to outcompete the natives. In general, successful exotic invaders are rapid growers and reach reproductive maturity quickly. They tend to have generalized pollination systems, such as self- or wind-pollination, or are pollinated by a large variety of insects. Most produce an abundance of seeds which are easily dispersed over long distances by wind or water, or in animals' digestive tracts, and in many cases the seeds remain viable for years. Many exotic invasives also are able to sprout from cut stumps or fragments of rhizomes, and can often reach a high density because they lack the herbivores which fed on them in their original locale. Finally, almost all invasions are intensified when habitat is disturbed. [3,6,12,13,24]

The concern over these species goes far beyond damage to crops, waterways, and rangelands. Where invaders are successful, the result is usually a decrease in species diversity. Exotic species may alter virtually every aspect of an ecosystem's functioning, from nutrient cycling and

water balance to soil formation, solar insulation, and ecological succession. Even those species which do not become invasive can serve as reservoirs for insects and diseases which affect native species (remember the chestnut blight and Dutch elm disease?). [3]

In Florida, the punk tree (*Melaleuca quinquenervia*) was introduced in the early 1900's to soak up water from the Everglades; today, in those marshes with dense *Melaleuca* stands, species diversity has fallen by 60 to 80%. More than 50 plant species are now endangered in Australia because they are being overwhelmed by introduced species; in Hawaii, introduced species outnumber the native plants three-to-one. [2,7,19]

Scientists estimate that an average of 12 species of animals--insects and other invertebrates, birds, mammals, etc.--rely on each plant species which grows outside of the tropics (within the tropics, at least 30 animal species are estimated to rely on each plant species). When a native plant is crowded out of an area by exotic invasives, the numerous organisms that utilized that species are also affected. It is important to remember that the native animals of an area have evolved simultaneously with native plant species. The short-sighted approach of using exotic species for wildlife food ultimately may result in a loss of native wildlife. "There is nothing more insidious as an agent of extinction than exotic species," states George Rabb of the World Conservation Union [6].

The problem of invasive exotics is global, leading some scientists to express alarm over what they are calling "the homogenization of the world." It is, however, a problem each individual can deal with locally. Here are some suggestions:

#### **Educate yourself:**

- Learn to recognize the invasives in your area and how to control them.
- Learn how to use native plants in your landscape.
- When travelling abroad, avoid the temptation to bring home plants illegally (without proper quarantine & inspection procedures).

#### **Educate others:**

- Encourage the use of native species for landscaping, attracting wildlife, and highway plantings.
- Speak with nursery dealers, the Department of Transportation's landscape architects, U. S. Soil Conservation Service agents, and similar groups about the importance of avoiding invasive exotics, and suggest native species which can be used in place of exotics.

--Urge federal lawmakers to toughen laws dealing with the introduction of exotic species, and especially to require that exotic species be proven to be benign before introduction.

--Support research to find satisfactory methods for controlling invasive plants.

In Rhode Island, autumn olive, multiflora rose, Japanese barberry, oriental bittersweet, Japanese knotweed, winged euonymus/burning bush, and tartarian and Morrow honeysuckle are among the most serious invasives. Their spread into our finest natural areas is of particular concern. These species, and several others which are known invasives or considered potential trouble-makers, are discussed below.

**Autumn Olive**, *Elaeagnus umbellata* Thunb. Introduced from Japan in 1836, this shrub has a succulent edible fruit and has been widely recommended as a wildlife plant. Autumn Olive spreads most rapidly on open soil and has a high light requirement, but can spread into woodland edges. It is vigorous enough to become established in dense sod and is well enough adapted to brackish conditions to replace Phragmites along the Escape Road in Galilee. Sometimes autumn olive is confused with Russian olive, *E. angustifolia* L., a similar species which causes problems in other areas but not in Rhode Island, because the fruit seldom ripens here. Some states have classified this species as a noxious weed and forbid its sale and planting. At present the only control measure is to pull it out by the roots. [4]

**Japanese Knotweed**, *Polygonum cuspidatum* Sieb. & Zucc. Introduced from Japan as an ornamental in the late 1800's, this species is a very aggressive weed which forms dense stands. Its shoots have been known to penetrate asphalt. It requires full sun, and does not grow well in shade. It can be controlled with herbicides, which should be applied in July for two successive years; a third follow-up may be necessary on particularly vigorous stands. (With all herbicides, be sure to follow the manufacturer's recommendations for their use, and to protect adjacent plant species--as well as people and pets--from the spray) [5].

A similar species, Giant Knotweed (*P. sachalinense* F. Schmidt ex Maxim.), was introduced from eastern Asia before 1896. This species may occasionally be invasive, but where it grows near Japanese Knotweed it is usually crowded out.

**Multiflora Rose**, *Rosa multiflora* Thunb. ex Murr. This rose was introduced from Japan in 1866, primarily for use as a rootstock for grafted cultivated roses. Its invasive properties were not revealed until it was widely distributed as food and shelter for wildlife, as "living fences" for livestock, and more recently, for highway plantings. While multiflora rose grows most vigorously with full sun, it has become quite invasive in woods and can produce viable seeds under conditions of low light. Like autumn olive, it can also become established in dense sod and rapidly take over entire fields.

Multiflora rose now grows throughout most of the United States, and is classified as a noxious weed in many states (including New Jersey, Iowa, Illinois, Ohio, and West Virginia). Eradication methods include repeated plowing and mowing, burning, herbicides, and biological control with a European rose pest. [10]



**Asian or Oriental Bittersweet**, *Celastrus orbiculatus* Thunb. This woody vine is native to China and Japan, and was introduced in 1886. As an invasive, it does not cause much trouble in dense woods because it has a high requirement for light, but in open areas such as Beavertail State Park and some of the islands in Narragansett Bay, it can be devastating. It will overgrow and break down large trees, and can produce a trunk as large as a man's thigh.

This species produces large numbers of berries that are showy and palatable to birds, and has been widely recommended as a wildlife food and ornamental (used especially for autumn wreaths and decorations). The only method of control is removing the plants mechanically and where conditions permit, burning. In any event, new vines will be produced for years afterwards, so continued vigilance will be needed. Oriental bittersweet, whose fruit grows in axillary clusters, should not be confused with our native bittersweet, *Celastrus scandens* L. This species has terminal fruit clusters and is a beautiful and easily controlled ornamental that is rare in Rhode Island.



**Purple Loosestrife**, *Lythrum salicaria* L., is a beautiful native of Europe introduced during colonial times as a medicinal plant and an ornamental. This species became naturalized in eastern America so rapidly that early nineteenth century botanists Torrey and Gray considered it "probably native". In the 1800's its spread continued with increased shipping traffic into newly-established canals and waterways, which carried the seeds of purple loosestrife in ships' ballast and livestock forage and bedding, and on the wool and hides of sheep and other livestock. Since 1940 it has spread at a rate of about 248 square miles per year, and now grows from New Brunswick south to South Carolina, and from British Columbia to California.

Purple loosestrife is an herbaceous perennial aquatic to semiaquatic plant. It spreads by seed (a single mature plant can produce over 2 million seeds in a growing season, and the seeds can remain viable for more than three years). The seeds are dispersed in water, on mud on birds' feet and vehicles, and in fur, feathers, and numerous other mechanisms. This species can invade undisturbed habitats, but its spread is accelerated when soil is disturbed, such as by irrigation systems and highway building.

A lovely plant, purple loosestrife is nonetheless a serious pest in many wetlands, where it chokes out native vegetation and totally takes over. It is of special concern to managers of areas where rare and endangered wetland species cannot tolerate the competition, e.g. Long's bulrush (*Scirpus longii* Fern.) in Massachusetts; dwarf spike rush (*Eleocharis parvula* (R. & S.) Link) in New York; and the bog turtle (*Clemmys muhlenbergii* Schoepff) in the northeastern U.S. Less palatable than the grasses and sedges which are displaced, purple loosestrife also affects agriculture by degrading wetland pastures and wild hay meadows. In addition it has little wildlife value for food or shelter. Some states now ban its importation, and are working on eradication programs. [14,21,22,23,25]

**Tartarian Honeysuckle**, *Lonicera tatarica* L., is an extremely popular ornamental shrub that was introduced from southern Russia in 1752. This bush honeysuckle has smooth leaves, and pink or white flowers that do not turn yellow as they age. It is not so invasive as some of the other plants described, but it still has the potential of being a nuisance. Other bush honeysuckles are known invasives, especially Amur honeysuckle, *Lonicera mackii* (Rupr.) Maxim., a problem in the mid-western United States, where it forms dense stands and shades out native herbaceous groundcover. [4]

**Asian Fly Honeysuckle**, or Morrow Honeysuckle, *Lonicera morrowii* Gray, is another popular bush honeysuckle, introduced from Japan in 1875. It is similar to tartarian honeysuckle, but has downy leaves and white flowers that turn pale yellow as they age. It has been found growing in Rhode Island in habitats as diverse as fields, roadsides, woodlands, and edges of salt marshes, and may be becoming a problem locally. **Bella honeysuckle**, *Lonicera X bella* Zabel, is a hybrid between tartarian and Morrow honeysuckles, and is common in Rhode Island. It is intermediate between the two parent species. It has pink flowers which yellow as they age, and leaves less downy than those of Morrow honeysuckle and intermediate in shape between the two parent species.

**Japanese Honeysuckle**, *Lonicera japonica* Thunb., is a fragrant vine honeysuckle that was introduced directly to Bristol, Rhode Island by Dr. George Hall, who was the personal physician to the emperor of Japan. This honeysuckle was sent to "High Farm," Dr. Hall's estate in Bristol, about 1846. Dr. Hall cultivated plants from Japan, and shared his plantings with a friend who owned a nursery on Long Island and introduced to the nursery trade plants he thought had commercial value. Japanese honeysuckle, sometimes called Hall's honeysuckle, was one. In spite of growing in Rhode Island for a long time, it has never been as invasive as it is farther south, where it was widely planted as a wildlife plant and to prevent soil erosion. In recent years, however, it does seem to be spreading spontaneously in Rhode Island and should be watched as a possible invasive weed.[11]



**Japanese Barberry**, *Berberis thunbergii* DC. This plant was introduced from Japan in 1875 and has been extremely popular for ornamental hedges because of its scarlet fruit, fall leaf color, and ease of cultivation. It is extremely invasive, however, and has become established in undisturbed woodlands. Cutting it back seems to stimulate its growth. Research on control measures is needed.

**Common Barberry**, *Berberis vulgaris* L., was brought to America by the early settlers, who used it as an edible and medicinal plant. Common barberry was later found to be an intermediate host for black stem rust, a fungus disease of wheat, and an eradication campaign destroyed most of this barberry. Now that wheat is no longer grown commercially in Rhode Island, common barberry is beginning to reappear. It does not seem to be nearly so invasive as Japanese barberry, but should be watched.

**Winged Euonymus and Burning Bush** are cultivars of the species *Euonymus alatus* (Thunb.) Regel. Winged euonymus was selected for the conspicuous corky wings along the stems and the more sparse foliage, burning bush for its green stems with few if any corky wings, but with abundant foliage that turns flaming orange red in autumn. A native of eastern Asia, this species has been widely used as an ornamental, for wildlife plantings, and highway landscaping. Unlike many introduced shrubs, it can grow and reproduce in deep shade, and invade relatively undisturbed forests. [4,9]

**Tree of Heaven**, *Ailanthus altissima* (P. Mill) Swingle, was introduced from east Asia as a shade tree in colonial times. Widely planted in urban areas because of its tolerance to air pollution and other adverse conditions, this tree has escaped and become established along roadsides, on vacant lands, and occasionally in woodlands. It is difficult to eradicate because it produces numerous wind-borne seeds, sprouts readily from stumps and pieces of roots, and appears to produce toxic chemicals (known as allelopaths) which inhibit the growth of other plants. [4]

**Common Buckthorn**, *Rhamnus cathartica* L., a native of Europe, and **Glossy Buckthorn**, *Rhamnus frangula* L., a native of Eurasia and north Africa, were both introduced by the early colonists for their use as medicinal plants and to make dyes and charcoal. In some areas these can be troublesome invasives, but at present do not seem to be statewide problems in Rhode Island.

**Norway Maple**, *Acer platanoides* L., is a popular shade tree native to Eurasia, introduced in colonial times and widely planted because of its tolerance to air pollution. Both the Norway Maple and the **Sycamore Maple**, *Acer pseudo-platanus* L. (also a Eurasian native planted extensively in the U.S.) are invasive; their dense foliage, surface feeding roots, and toxic allelopathic chemicals combine to prevent the growth of native understory plants and tree saplings, eventually creating solid maple stands. Not even lawn grasses or ground covers can grow beneath them, making these stands subject to soil erosion. The city of Philadelphia has now stopped recommending Norway maple, and other municipalities are beginning to follow suit.[1]

**Japanese Black Pine**, *Pinus thunbergiana* Franco, was introduced from Japan in 1855. An extremely salt-tolerant species, it has been widely used for dune stabilization and protective screens in coastal areas. In Rhode Island, it has been planted most frequently on Block Island, where it seems to have become naturalized and is spreading. It may not become invasive, however, since Japanese black pines in coastal southern New England are apparently succumbing to an infection of blue stain fungi (*Ceratocystis* spp.), carried to pines by bark beetles. Gary Koller, the chief horticulturist at Arnold Arboretum, has informed us that this disease is "extremely severe on Japanese black pine". [8,15,17,18]

**Cypress Spurge**, *Euphorbia cyparissias* L., is another European native introduced to the United States during colonial times. It is often planted as a groundcover, as it will grow in poor soils. Capable of reproducing by seeds, rhizomes, and buds on the creeping roots, this species is a noxious weed which can overwhelm nearby plants. Cypress spurge is poisonous to cattle, both fresh and when dried and mixed with hay; its milky sap can also cause an allergic dermatitis in people who try to pull it out without wearing gloves. It is difficult to eradicate, and usually requires a combination of frequent cultivation and herbicides to eliminate it completely. [20]

Other invasives that biologists recommend avoiding in the northeast include: Crown Vetch, *Coronilla varia* L.; European alder, *Alnus glutinosa* (L.) Gaertn; White cottonwood, *Populus alba* L.; White mulberry (*Morus alba* L.; Amur cork tree, *Phellodendron amurense* Rupr.; Amur privet, *Ligustrum amurense* Carr.; Ovate-leaved privet, *Ligustrum obtusifolium*; Chinese Privet, *Ligustrum sinense* Lour.; Porcelainberry, *Ampelopsis brevipedunculata* (Maxim.) Trautv.; Kudzu, *Pueraria lobata* (Willd.) Ohwi; Japanese wisteria, *Wisteria floribunda* (Willd.) DC.; and Scotch Broom, *Cytisus scoparius* (L.) Link. [1,4,24].

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