

Documentation on Canadian wildlife:
Invasive Alien Species of the Atlantic Provinces

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Introduction

Alien invasive species can be predators, diseases of native vegetation and animals, competitors and/or aggressive breeders. They can come from another continent, country, or a different ecosystem within the same country. They can cause irreversible damage to native ecosystems and can be detrimental to the local economy. The introduction of alien invasive species can occur artificially through human activities or naturally due to migrating birds or the wind. The increase in the rate of introduction of invasive alien species is due mainly to an increase in international trade, travel, and business, as well as products purchased by mail or the Internet. According to the World Union for Nature, invasive alien species represent the second greatest menace to biodiversity after the disappearance of natural habitats. This document contains lists and descriptions of categorized species that have been introduced or have the potential, due to migration trends, to be introduced as well as those considered invasive or potentially invasive to the Atlantic Provinces' ecosystems. Potentially invasive species are said to be so because their impacts on the ecosystems are not yet known.

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Invasive alien plants and fungi in the Atlantic Provinces:

SPECIES NAME	COMMON NAME(S)
<i>Acer platanoides</i>	Norway Maple
<i>Aegopodium podagraria</i>	Goutweed
<i>Alliaria petiolata</i> *	Garlic Mustard
<i>Artemisia absinthium</i>	Absinth, Wormwood
<i>Berteroa incana</i>	Hoary-alyssum
<i>Betula pendula</i>	Silver birch, European white birch
<i>Butomus umbellatus</i> *	Flowering rush
<i>Celastrus orbiculatus</i> *	Oriental bittersweet
<i>Chelidonium majus</i>	Celandine, Swallow wort, Wartweed
<i>Cirsium arvense</i> *	Canada thistle, Creeping thistle
<i>Cronartium ribicola</i>	White pine blister rust
<i>Cryptodiaporthe populea</i>	Dothichiza canker of poplar
<i>Euphorbia esula</i> *	Leafy spurge, Wolf's milk, Faitour's grass
<i>Gremmeniella abietina</i> var. <i>Eu</i>	Scleroderris canker, European strain
<i>Hemerocallis fulva</i>	Orange daylily
<i>Hesperis matronalis</i>	Dame's rocket, Dame's violet
<i>Hypericum perforatum</i>	St. John's wort, Rosin rose, Tipton-weed
<i>Lachnellula willkommii</i>	European larch canker
<i>Lonicera tatarica</i>	Tartarian honeysuckle
<i>Lysimachia nummularia</i>	Moneywort, Creeping Charlie, Yellow myrtle
<i>Lythrum salicaria</i> *	Purple loosestrife, Swamp loosestrife
<i>Melilotus alba</i>	White sweet clover, Honey clover
<i>Melilotus officinalis</i>	Yellow sweet clover
<i>Ophiostoma ulmi</i> , <i>Ophiostoma novo-ulmi</i> *	Dutch elm disease
<i>Pastinaca sativa</i>	Wild Parsnip
<i>Phragmites communis</i>	Common reed, Reed grass
<i>Pinus sylvestris</i>	Scots pine, Scotch pine
<i>Polygonum cuspidatum</i> *	Japanese knotweed, Mexican bamboo
<i>Populus alba</i>	White poplar
<i>Rhamnus cathartica</i> *	European buckthorn, Common buckthorn
<i>Rhamnus frangula</i> , <i>Frangula alnus</i>	Glossy buckthorn, Black buckthorn
<i>Sirococcus clavigignenti-juglandacearum</i>	Butternut canker
<i>Venturia saliciperda</i>	Willow scab
<i>Verbascum thapsus</i>	Mullein, Velvet dock, Jacobs-staff
<i>Viburnum opulus</i>	Guelder rose, European highbush cranberry
<i>Vinca minor</i>	Periwinkle, Myrtle

*Species with high threat status as indicated in the Canadian Wildlife Federation's Invasive Species in Canada (16)

Invasive alien plants and fungi species in New Brunswick:

SPECIES NAME	COMMON NAME(S)
<i>Aegopodium podagraria</i>	Goutweed
<i>Alliaria petiolata</i> *	Garlic Mustard
<i>Artemisia absinthium</i>	Absinth, Wormwood
<i>Berteroa incana</i>	Hoary-alyssum
<i>Celastrus orbiculatus</i> *	Oriental bittersweet
<i>Cirsium arvense</i> *	Canada thistle, Creeping thistle
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<i>Cryptodiaporthe populea</i>	Dothichiza canker of poplar
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<i>Lythrum salicaria</i> *	Purple loosestrife, Swamp loosestrife
<i>Ophiostoma ulmi</i> , <i>Ophiostoma novo-ulmi</i> *	Dutch elm disease
<i>Pastinaca sativa</i>	Wild Parsnip
<i>Phragmites communis</i>	Common reed, Reed grass
<i>Pinus sylvestris</i>	Scots pine, Scotch pine
<i>Sirococcus clavigignenti-juglandacearum</i>	Butternut canker
<i>Venturia saliciperda</i>	Willow scab
<i>Vinca minor</i>	Periwinkle, Myrtle

*Species with high threat status as indicated in the Canadian Wildlife Federation's Invasive Species in Canada (16)

Invasive alien plants and fungi species in New Brunswick wetlands:

SPECIES NAME	COMMON NAME(S)
<i>Alliaria petiolata</i> *	Garlic Mustard
<i>Celastrus orbiculatus</i> *	Oriental bittersweet
<i>Chelidonium majus</i>	Celandine, Swallow wort, Wartweed
<i>Cronartium ribicola</i>	White pine blister rust
<i>Cryptodiaporthe populea</i>	Dothichiza canker of poplar
<i>Gremmeniella abietina</i> var. <i>Eu</i>	Scleroderris canker, European strain
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<i>Ophiostoma ulmi</i> *	Dutch elm disease
<i>Pastinaca sativa</i>	Wild Parsnip
<i>Pinus sylvestris</i>	Scots pine, Scotch pine
<i>Sirococcus clavigignenti-juglandacearum</i>	Butternut canker
<i>Venturia saliciperda</i>	Willow scab

*Species with high threat status as indicated in the Canadian Wildlife Federation's Invasive Species in Canada (16)

Potentially invasive alien plants and fungi species in the Atlantic Provinces:

SPECIES NAME	COMMON NAME(S)
<i>Acinos arvensis</i>	Mother-of-thyme
<i>Alnus glutinosa</i>	European alder, Black alder
<i>Angelica sylvestris</i>	Angelica
<i>Asperula odorata</i>	Sweet woodruffe
<i>Berberis thunbergii</i>	<i>Japanese barberry</i>
<i>Carduus nutans</i>	Nodding thistle, Musk thistle
<i>Centaurea maculosa</i>	Spotted knapweed
<i>Cytisus scoparius</i>	Scotch broom
<i>Galium mollugo</i>	White bedstraw, Cleavers, Wild madder
<i>Glyceria maxima</i>	Great manna grass
<i>Iris pseudoacorus</i>	Yellow flag
<i>Medicago sativa</i>	Alfalfa
<i>Origanum vulgare</i>	Wild marjoram, Wintersweet, Organdy
<i>Poa compressa</i>	Canada Blue grass
<i>Poa pratensis</i>	Kentucky blue grass

Invasive alien insect species in the Atlantic Provinces:

SPECIES NAME	COMMON NAME
<i>Adelges abietis</i>	Eastern spruce gall adelgid
<i>Adelges piceae</i>	Balsam woolly adelgid
<i>Coleophora laricella</i>	Larch casebearer
<i>Coleophora serratella</i>	Birch casebearer
<i>Cryptococcus fagisuga*</i>	Beech scale
<i>Diprion similis</i>	Introduced pine sawfly
<i>Fenusa pusilla</i>	<i>Birch leafminer</i>
<i>Forficula auricularia</i>	European earwig
<i>Gilpinia hercyniae</i>	European spruce sawfly
<i>Lymantria dispar</i>	Gypsy moth
<i>Operophtera brumata*</i>	Winter moth
<i>Orgyia antiqua</i>	Rusty tussock moth
<i>Paraphytomyza populicola</i>	Lombardy leafminer
<i>Paravespula vulgaris</i>	Common yellow-jacket hornet
<i>Pristiphora erichsonii</i>	Larch sawfly
<i>Pristiphora geniculata</i>	Mountain ash sawfly
<i>Profenusa thomsoni</i>	Ambermarked birch leafminer
<i>Rhizotrogus majalis</i>	European chafer beetle
<i>Rhyacionia buoliana</i>	European pine shoot moth
<i>Scolytus multistriatus</i>	Smaller European elm bark beetle
<i>Taeniothrips inconsequens</i>	Pear thrips
<i>Tetropium fuscum</i>	Brown spruce longhorn beetle
<i>Xanthogaleruca luteola</i>	Elm leaf beetle

*Species with high threat status as indicated in the Canadian Wildlife Federation's Invasive Species in Canada (16)

Invasive alien insect species in New Brunswick:

SPECIES NAME	COMMON NAME
<i>Adelges piceae</i>	Balsam woolly adelgid
<i>Coleophora laricella</i>	Larch casebearer
<i>Coleophora serratella</i>	Birch casebearer
<i>Cryptococcus fagisuga</i> *	Beech scale
<i>Diprion similis</i>	Introduced pine sawfly
<i>Fenusa pusilla</i>	Birch leafminer
<i>Forficula auricularia</i>	European earwig
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<i>Taeniothrips inconsequens</i>	Pear thrips
<i>Xanthogaleruca luteola</i>	Elm leaf beetle

*Species with high threat status as indicated in the Canadian Wildlife Federation's Invasive Species in Canada (16)

Invasive alien aquatic species in Atlantic Province waters:

SPECIES NAME	COMMON NAME
<i>Aphanius (Atherina) boyeri</i>	Black Sea silverside
<i>Benthophilus stellatus</i>	Starry goby
<i>Botrylloides violaceus</i>	Violet Tunicate
<i>Botryllus schlosseri</i>	Golden Star Tunicate
<i>Bythotrephes longimanus</i>	Spiny water flea
<i>Carassius auratus</i>	Goldfish
<i>Carcinus maenus</i>	Green Crab
<i>Channa argus</i>	Northern Snakehead
<i>Ciona intestinalis</i>	Vase Tunicate
<i>Codium fragile*</i>	Oyster Thief
<i>Colpomenia peregrine</i>	Oyster Thief
<i>Ctenopharyngodon idella</i>	Grass Carp
<i>Dorosoma cepedianum</i>	Gizzard Shad
<i>Dreissena polymorpha*</i>	Zebra Mussel
<i>Eriocheir sinensis</i>	Mitten Crab
<i>Esox niger*</i>	Chain pickerel
<i>Gambusia affinis</i>	Mosquitofish
<i>Gymnocephalus cernuus</i>	Eurasian Ruffe
<i>Hemigrapsus sanguineus</i>	Asian Shore Crab
<i>Hypophthalmichthys molitrix</i>	Silver Carp
<i>Lepomis humilis</i>	Orangespotted Sunfish
<i>Leuciscus idus</i>	Golden Orfe
<i>Neogobius melanostomus</i>	Round Goby
<i>Orconectes rusticus</i>	Rusty Crayfish
<i>Perca fluviatilis</i>	European Perch
<i>Proteorhinus semilunaris</i>	Tubenose Goby
<i>Styela Clava</i>	Clubbed Tunicate

*Species with high threat status as indicated in the Canadian Wildlife Federation's Invasive Species in Canada (16)

Potentially invasive aquatic alien species in Atlantic Province waters:

SPECIES NAME	COMMON NAME
<i>Clupeonella caspia</i>	Black Sea sprat
<i>Hypophthalmichthys nobilis</i>	Bighead Carp
<i>Lepisosteus platostomus</i>	Shortnose Gar
<i>Misgurnus anguillicaudatus</i>	Oriental Weatherloach
<i>Misgurnus fossilis</i>	Weatherloach
<i>Neogobius fluviatilis</i>	Monkey goby
<i>Notropis buchanaui</i>	Ghost Shiner
<i>Phenacobius mirabilis</i>	Suckermouth Minnow
<i>Phoxinus phoxinus</i>	Eurasian Minnow
<i>Scardinius erythrophthalmus</i>	Rudd
<i>Tinca tinca</i>	Tench

Invasive aquatic species that may have already invaded our watershed due to their ability to tolerate low salinity levels in the water:

SPECIES NAME	COMMON NAME
<i>Benthophilus stellatus</i>	Starry goby
<i>Botrylloides violaceus</i>	Violet Tunicate
<i>Botryllus schlosseri</i>	Golden Star Tunicate
<i>Bythotrephes longimanus</i>	Spiny water flea
<i>Carassius auratus</i>	Goldfish
<i>Channa argus</i>	Northern Snakehead
<i>Colpomenia peregrine</i>	Oyster Thief
<i>Ctenopharyngodon idella</i>	Grass Carp
<i>Dorosoma cepedianum</i>	Gizzard Shad
<i>Eriocheir sinensis</i>	Mitten Crab
<i>Esox niger*</i>	Chain pickerel
<i>Gambusia affinis</i>	Mosquitofish
<i>Gymnocephalus cernuus</i>	Eurasian Ruffe
<i>Hemigrapsus sanguineus</i>	Asian Shore Crab
<i>Hypophthalmichthys molitrix</i>	Silver Carp
<i>Lepomis humilis</i>	Orangespotted Sunfish
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<i>Neogobius melanostomus</i>	Round Goby
<i>Orconectes rusticus</i>	Rusty Crayfish
<i>Perca fluviatilis</i>	European Perch
<i>Proteorhinus semilunaris</i>	Tube-nose Goby

*Species with high threat status as indicated in the Canadian Wildlife Federation's Invasive Species in Canada (16)

Invasive mammals and birds in the Atlantic Provinces:

SPECIES NAME	COMMON NAME
<i>Carpodacus mexicanus</i>	House finch
<i>Columba livia</i>	Rock pigeon
<i>Odocoileus virginianus</i>	White-tailed deer
<i>Passer domesticus</i>	House sparrows
<i>Rattus norvegicus</i>	Norway rat
<i>Sturnus vulgaris</i>	European starling

Plant and fungus descriptions:

Species name: *Acer platanoides*

Common name: Norway Maple



Introduced from Europe to North America in 1756. (See Nowak and Rowntree, 1990) The palmate leaves have five lobed planes with narrow-tipped teeth. The petioles and the buds exude a milky sap when cut. They produce wide samaras with extending wings. (See Barnes and Wagner, 2004)

Introduced to North America to replace elms stricken by the Dutch Elm disease. Unfortunately, they have escaped the urban environment and now threaten the native maples. The tree is successfully invasive because it has a high shade tolerance, it grows quickly and it produces an enormous amount of seeds compared to native tree species. (See Go´ Mez-Aparicio and Canham, 2008) Landscaping professionals still sell them because they are inexpensive and people will buy them.

Species name: *Acinos arvensis*

Common name: Mother-of-thyme



Herbaceous annual species from Eurasia. It has purple flowers with white markings. Ovate to elliptical petiolate. It has 5 to 15 mm leaf blades and 10 to 20 cm ascending stems. (See Clapham *et al*, 1990)

Mother-of-thyme has become established along roadside ditches and in unmaintained fields. It is beautiful to look at and propagates easily in the garden making this plant a popular and inexpensive item in many garden stores.

Species name : *Aegopodium podagraria*

Common name : Goutweed



Herbaceous

perennial plant from Europe. The leaves are paired by three forming trternates once or twice compound. Toothed and sometime irregularly lobed leaves about 3.5 inch long. Small, white flowers with five petals that rise high on a long stalk blooming in June. They form a dense canopy excluding most other herbaceous vegetation. Sometimes used as a ground cover in home gardens. They also inhibit the establishment of conifers and other native trees. They disperse quickly by the extension of the rhizome system and propagate to new areas because of human plantings. Therefore, this plant should not be planted adjacent to natural areas. (See Czarapata, 2005)

Species name: *Alliaria petiolata*

Common name: Garlic Mustard



Photos by W I D

Biennial plant native to Europe. They have kidney shaped dark green basal leaves with scalloped edges and alternate deeply toothed triangular stem leaves who emanate a distinct garlic scent when crushed. They develop basal rosettes by midsummer which generates floral stalks the following spring.

Once they spread, they take over the understory vegetation preventing the growth of native plants. A single plant can produce up to 8,000 seeds. (See Loewer, 2001)

Species name : *Alnus glutinosa*

Common name : European alder, Black alder



Native to Eurasia, this tree prefers moist soils and grows between 12-18m tall. It is also a multi-trunk tree. The rounded alternate leaves have slightly toothed margins. The young leaves and buds are slightly sticky with resin giving the plant its Latin name: *glutinosa*. Young bark can be greenish or brown but tends to be darker as it gets older thus, the name black alder.

Black alders can grow in dense stands near the waters' edge and cause the displacement of native plants. They usually grow around streams and riverbanks. Nitrogen fixing bacteria such as *Frankia sp.* occupies the nodes of the Alder roots. (See Kaufman, 2007)

Species name: *Angelica sylvestris*

Common name: Angelica



Native to Europe, this herb belongs to the celery family and is defined by its culinary and medicinal purposes. The flowers have white or pinkish-white colored petals. They have ovate, abruptly acute leaflets. They also have an erect purplish stem which can grow up to 2.5m.

Angelica has escaped ornamental cultivation and now occupies New Brunswick's natural environment. It is now classified as a minor alien invasive species that inhabits mostly wetland areas but is also found in ditches, in damp open woods and damp grassy places. (See Stace, 1997)

Species name: *Artemisia absinthium*

Common name: Absinth, Wormwood



Native to Eurasia and northern Africa. Perennial grass that can resist infestations. The stem is covered by a fine silky gray hair and is woody at the base. It usually grows about 2.5 feet tall and has a fibrous root system. The spiky greenish yellow flowers bloom from July to August and the seeds disperse with the wind, the animals and the hay.

Absinth wormwood propagates in disturbed areas with low plant competition. The plant will out-compete the desired native grass and forbs thus reducing the biodiversity. The grass is also known for having the main active ingredient of the beverage absinthe. (See Kowalchik *et al*, 1998)

Species name: *Asperula odorata*

Common name: Sweet woodruffe



Native to most of Europe, south to northern Africa and east to Siberia. A perennial plant that prefers moist, fertile, humus-rich soils. It has weak, erect, square stems about 25 cm tall. The 6mm wide white flower has four petals and blooms from May to June. (See Aniško, 2008)

Used for flavor, especially in Europe, and as potpourri for its sweet smell. During summer, when humidity is adequate, woodruffe carpets the ground and displaces native plants. It grows primarily with creeping rhizomes.

Species name: *Berberis thunbergii*

Common name: Japanese barberry



Native to Southern Europe and Central Africa. Available at local stores for ornamental purposes. Rarely grows up to 3 feet but can grow to 6 feet tall. The leaves have the shape of a narrow oval and cluster close around the branches with single spines. The color of the leaves varies from dark green to dark red sometimes verging on purple. During spring, small yellow flowers with 6 petals bloom disposed singly or in cluster of 2 to 4.

Propagation of Japanese barberry occurs primarily by seed dispersal but is also due to root creepers or to branches rooting when they touch the ground. They tend to lower plant diversity and the leaf litter changes the soil chemistry when they grow in high densities. (See Kaufman, 2007)

Species name: *Berteroa incana*

Common name: Hoary-alyssum



Native to Europe. They are annual, biennial or short lived perennial plants that produce hairy seedpods close to the stem. Small 4 petals flowers with deeply notched white petals. They grow about 1 to 2 feet high.

Hoary-alyssum prefers dry, sandy, or gravelly ground. Drought conditions augment their invasiveness but it is not ranked as a strong competitor to crop plants. It is toxic for horses to consume in large quantity but sheep and cattle usually reject them. (See Eastman, 2003)

Species name: *Betula pendula*

Common name: Silver birch, European white birch



Native to Eurasia and introduced for ornamental purposes. This deciduous tree has a smooth white bark that peels easily. The tree is triangular in shape. The leaves are doubly saw-toothed. It grows between 50 to 60 feet tall. It produces long cylindrical cones which are green when they are young and brown when ripe.

In some cases, the silver birch has become invasive and has become the dominant tree in the forest. Also called the weeping birch, these shade intolerant trees grow in acidic, nutrient-poor soils, or recently disturbed surfaces. In urban forests, they are often found among other exotic species. (See Czarapata, 2005)

Species name: *Butomus umbellatus*

Common name: Flowering rush



Native to Eurasia and is expanding its distribution in North America. It reproduces by seeds and vegetative spreads of the rootstocks producing bulblets (spores). (See White *et al*, 1993) It has long stiff triangular leaves that end in a spiral and has a concave side. (See St. Lawrence Center, Environment Canada. ST. LAWRENCE INFO)

Flowering rush is considered a low invasive plant since it does not seem to seriously affect diversity. It is an emergent plant that lives mostly in low marshes but is sometimes found submersed with aquatic grass bed. (See St. Lawrence Center, Environment Canada. ST. LAWRENCE INFO)

Species name: *Carduus nutans*

Common name: Nodding thistle, Musk thistle



This potentially invasive noxious weed is native to Eurasia. It belongs to the daisy family: *Compositae*. It has a spiky erect stem about 1 to 3 feet high with spiny wings disposed alternately on the stem. The reddish/purple nodding flower has purple bracts.

Nodding thistles form dense stands. They grow in fields and waste places. (See Peterson and Mckenny, 1996)

Species name: *Celastrus orbiculatus*

Common name: Oriental bittersweet



Photos by WI DNR

Native to Asia. The stem of this vine can grow up to 4 inches in diameter and becomes woody as it matures. They have alternate rounded and slightly toothed leaves. Small greenish flowers emerge from the leaf axils and develop into greenish yellow fruits that split open to reveal arils.

Oriental bittersweet was used for ornamental vines for esthetic reasons but the showy red arils that cover the seeds get eaten by birds and give the plant the opportunity to escape cultivation. Once established, they out-compete almost every indigenous plant and hybridize with the closely related *Celastrus scandens*. (See Tallamy, 2007) Oriental bittersweet also produces more seeds than the native species *C. scandens*, giving them higher a probability of dispersal. (See Czarapata, 2005)

Species name: *Centaurea maculosa*

Common name: Spotted knapweed



This noxious weed is native to Europe. It has deeply cleaved leaves, black, triangular pointed bracts that give it a spotted look and a wiry, very branched stem that grow about 1 to 4 feet high. The flowers are purple, white or red and bloom from June to August. This biennial to short lived perennial weed spreads by seed.

Spotted knapweed grows in fields and along roadsides. (See Peterson and Mckenny, 1996) They also exude toxins which inhibit the growth of other plant species around them and discourage herbivores to feed on them. (Jogesh *et al*, 2008)

Species name: *Chelidonium majus*

Common name: Celandine, Swallow wort, Wartweed



Native to Eurasia. Made recognizable by its orange to yellow sap and frail stem, *C. majus* grows between 1 to 2 feet tall. Loped alternate leaves. Yellow flowers with four petals bloom from midsummer to fall and eventually produce smooth seedpods. (See Kaufman, 2007)

Celandine may out-compete native plants although scientific literature supports no major effect in natural habitats. (See Kaufman, 2007) The ingestion of 500g of the plant is toxic to cattle or horses. (See Frohne and Pfander, 1983) The ingestion of this poisonous naturalized herb is also suspected to have caused the death of a four year old boy. (See Koopman, 1937)

Species name: *Cirsium arvense*

Common name: Canada thistle, Creeping thistle



Ironically, the Canada thistle is native to Europe, western Asia and northern Africa. It is a perennial, herbaceous, noxious weed that grows between 1 to 4 feet high. The leaves are disposed alternately along the branch and are usually dark green with a greyish under surface. Spines are found along the outer edges of the leaves, on the branches and on the main stem.

The creeping thistle propagates by seed dispersal and adventitious buds. It is a very destructive weed since it significantly reduces the yields of various crop systems. Creeping thistles are commonly found in hay fields, pastures, rangelands, industrial sites, parks, forests, wastelands and along roadsides and stream banks. (See Anderson, 1999)

Species name: *Cronartium ribicola*

Common name: White pine blister rust



This exotic fungus which attacks white pine trees originated in Europe. The fungus attacks the needles in autumn and then spreads to cover the branches and the trunk within a year or two. The primary symptom of infection is the formation of orange pustules on the bole which exude spores in a liquid form. The spores then form white blisters on the bark the following spring. The white blisters will form cankers on the tree bark that will in turn make the branch above it fall or cause breakage in the stem providing access for other fungi to attack the core of the tree. The white fruiting bodies will produce spores that will be disseminated by the wind or by animals and infect other trees. White pine blister rust causes great economic impact. (See Forest Invasive Alien Species, Natural Resources Canada)

Species name: *Cryptodiaporthe populea*

Common name: Dothichiza canker of poplar



1. Ressources naturelles Canada, Service canadien des forêts, Centre de foresterie des Laurentides

2. Petr Kapitola, Forestry and Game Management Research Institute - Czechia, www.forestrvimages.org

3. Petr Kapitola, Forestry and Game Management Research Institute - Czechia, www.forestrvimages.org

Native to Europe, *Dothichiza* cankers of poplar establish themselves mostly on bark, branches or shoots of hybrid poplars and Lombardy poplars. Cankers grow around the base of the shoots and the branches or close to lesions causing abnormally dark coloured bark. During spring, dark, fruiting bodies, the size of a pin-head develop on the dead bark. The bark can also crack when the fungus surrounds the stem thus likely killing the host. This fungus mainly attacks saplings, trees in nursery, young trees under stress and big ornamental trees. The cankers destroy the branches, which not only diminishes the aesthetic aspect of the host, but can result in its death. The lesions caused by the broken branches constitute an entry way for more infection by *C. populea* or other species of fungi.

This species used to be known under the name of *Dothichiza populea* Sacc. Trees under stress are more susceptible for infections. It is recommended to keep plantation trees well spaced in order to lower the risks of propagation. It is also recommended to only trim the trees during the warm growing season, not the cold seasons. (See Forest Invasive Alien Species, Natural Resources Canada)

Species name: *Cytisus scoparius*

Common name: Scotch broom



Native to Europe. Bright yellow, sometime red or purple flowers blossom from April to June. The flowers mature to become flat, brown to black hairy seedpods. This woody, perennial shrub produces seeds that remain viable for many years. The leaves are small and alternate. The plant can grow up to 10 feet tall.

Scotch broom has escaped the ornamental gardens and is now found in the wild. It is a strong competitor for light, soil nutrients and moisture especially in disturbed areas. They out-compete native species. The seeds are toxic. (See Bossard *et al*, 2000)

Species name: *Euphorbia esula*

Common name: Leafy spurge, Wolf's milk, Faitour's grass



Native to Eurasia. All parts of this plant contain milky white latex that irritates the skin and it inhibits the growth of other plants. Green and yellow flowers above two leaf-like bracts bloom from May to June. The leaves are arranged spirally on the stem. It is an herbaceous perennial weed that produces creeping vertical and horizontal roots.

E. esula propagates mainly by extension of its root system or by the dispersal of seeds. Vertical roots can reach depths of 8 to 15 feet. The lateral roots are called feeder roots because they do not contribute to the secondary growth of the plant and therefore the cambium is inactive. This plant is of major concern since it is toxic to some animals and since they often compete with native pasture plants in forage areas, therefore restricting cattle grazing. (See Anderson, 1999)

Species name: *Galium mollugo*

Common name: White bedstraw, Cleavers, Wild madder



Native to Europe, this plant has white flowers that bloom from late June to early July. It is a perennial weed consisting of many weak, square stems which are smooth to the touch. The plant is about 10 to 48 inches and most commonly reproduces by seeds or by underground stems.

White bedstraw usually occupies pastures, hayfields and field margins. The weed contains anthraquinone that causes systemic toxicity and skin disorders on mammals. Very tolerant, prefers moisture but can survive drought. (See Kohli *et al*, 2009)

Species name: *Glyceria maxima*

Common name: Great manna grass



Native to Eurasia. Perennial rhizomatous grass that can grow up to 2.5 meters high. The leaves that remain clustered at the base of the plant have visible transverse veins and short stiff hair that is rough to the touch. It has an obtuse ligule – a thin outgrowth at the junction of leaf and leafstalk, about 5 to 7mm long.

Great manna grass has a growth advantage because it grows earlier in the spring compared to other wetland vegetation. It grows in big stances and displaces native plants whose seeds were originally located in an ideal habitat with a good food source. It is a poor source of food and nesting substrate for wildlife. (See Homeyer, 2007)

Species name: *Gremmeniella abietina* var. *Eu*

Common name: Scleroderris canker, European strain



1. Denis Lachance, Natural Resources Canada, Canadian Forest Service, Laurentian Forestry Centre

2. Natural Resources Canada, Canadian Forest Service, Laurentian Forestry Centre

There are two strains of this plant in North America; one is native while the other is European. Unfortunately, it is the European strain which is more virulent. It attacks the branches of the Eastern White Pine, the Jack Pine and the Red Pine. The infections spread along the shoots which cause the needles to turn greenish yellow and die. The European strain can infect and kill the whole crown of a host possibly resulting in the death of the tree in just a few years. (See Forest Invasive Alien Species, Natural Resources Canada)

Species name: *Hemerocallis fulva*

Common name: Orange daylily



An herbaceous perennial native to eastern Asia, from Xizang in China, south to India, north to Russia, and east to Korea and Japan. The rounded stalks grow to be approximately 1.5 m tall. The flowers are composed of 6 petals (3 petals and 3 sepals), are about 12 cm wide and are unscented. The flowers are held together in helicoidally cymes of 6 to 12. The buds are cigar shaped. The basal leaves are only about 1 m long.

The main way of dispersal is by the tuberous roots and rhizome since the seeds are seldom fertile. Orange daylilies spread rapidly even in difficult soil conditions. (See Aniśko, 2008)

Species name: *Hesperis matronalis*

Common name: Dame's rocket, Dame's violet



Native to Eurasia, this short-lived perennial plant belongs to the mustard family. (See Czarapata, 2005) The stem grows to be between 1 to 3 feet high. Pink, purple or white 4 petal flowers bloom from May to July. The flowers form long seedpods. Lanceolate toothed leaves are disposed alternately along the stem. (See Peterson and Mckenny, 1996)

Dame's rocket reproduces only by seeds. Outside the garden it is found along roadsides and woodland edges. It is suggested to gardeners to dispose of the flower heads once the blooming season is finished to prevent out of control reproduction by seed. (See Czarapata, 2005)

Species name: *Hypericum perforatum*

Common name: St. John's wort, Rosinrose,



Native to Europe, Western Asia, North Africa, Madeira, and the Azores. *Hypericum perforatum* is an herbaceous, medicinal plant with numerous stems growing to reach about 1 meter high. It has opposite set, sessile, oblong and ovate or linear leaves. Many tiny translucent dots are visible on the leaves when you hold them under a light. The bright, yellow flowers have 5 separate petals and the plant emits a balsamic fragrance. (See Nelson *et al*, 2007) Blooms from June to September. (See Peterson and Mckenny, 1996)

H. perforatum contains a toxin that causes photosensitization in livestock who feed upon it. Preferred environmental conditions are flat woods, bogs, swamps and pond margins. *H. perforatum* is invasive and crowd the soil, poisoning the substrate so that native plants cannot grow. They spread by rhizome. (See Nelson *et al*, 2007)

Species name: *Iris pseudoacorus*

Common name: Yellow flag



Native to Europe, yellow flag has escaped ornamental gardens. (See Peterson and Mckenny, 1996) This herbaceous perennial plant is the only yellow iris found in the wild in New Brunswick. (See Nelson *et al*, 2007) The stem grows 1 to 3 feet high in erect stalks with several flowers on top that bloom from May to July. It lives mainly in marshes and along stream sides. (See Peterson and Mckenny, 1996)

Iris pseudoacorus is easily recognizable since it is the only yellow iris that has a “wet-foot”. Meaning that it exudes a toxic resin from leaves and the rootstock. (See Nelson *et al*, 2007) Spreads by underground rhizomes and seeds.

Species name: *Lachnellula willkommii*

Common name: European larch canker



1. Petr Kapitola, Forestry and Game Management Research Institute - Czechia, www.forestryimages.org
2. Andrej Kunca, National Forest Centre - Slovakia, www.forestryimages.org
3. Andrej Kunca, National Forest Centre - Slovakia, www.forestryimages.org

This fungal disease was introduced from infected seedlings brought over from Europe. It attacks the branches and the trunk of the tamarack tree causing the development of numerous cankers and a significant loss of foliage. If young trees are seen to have developed cankers, they are often killed through girdling. Exudations of resin appear with the cankers giving them a bluish appearance. The cankers, which resemble open sores, also present an entryway for other pathogen agents. Fruiting bodies appear on or near the cankers during certain times of the year. The fruiting bodies are white and hairy with yellow orange centers and resembling small cups. The needles on the branches above the cankers become discoloured early in the fall. The presence of cankers on the trunk usually indicates that the disease is at an advanced stage. It mainly attacks indigenous trees killing young and mature trees alike. (See Forest Invasive Alien Species, Natural Resources Canada)

Species name: *Lonicera tatarica*

Common name: Tartarian honeysuckle



This multi-stemmed shrub is native to Turkey and southern Russia. (See Randall and Marinelli, 1996) Its bluish-green leaves are about 1 ½ to 2 ½ inches long. The pink to white flowers start to bloom in May. Then, from July to August, these flowers develop into bright red berries. Plant grows between 10 to 12 feet high. (See Dirr, 1997)

Tartarian honeysuckles colonize a variety of habitats and can transform a prairie into an area of shrubs, reduce the diversity of forest floors and reduce the growth of tree seedlings which could possibly have a long term effect in tree populations. (See Randall and Marinelli, 1996)

Species name: *Lysimachia nummularia*

Common name: Moneywort, Creeping Charlie, Yellow myrtle



Native to Europe and central Russia. Creeping Charlie is an herbaceous, perennial plant with multiple stems at the base. The flowers have a green style about 5 mm long and yellow anthers about 2 mm long. The flowers have 5 to 6 petals and are about $\frac{3}{4}$ of an inch wide. The plant seldom flowers, but when it does it is in bloom from May to August.

Creeping Charlie inhabits stream banks, roadsides and cultivated ornamental gardens for which the plant was brought to New Brunswick. The species spreads by creeping stems and is considered invasive in certain regions. Certain agriculturists would suggest planting the golden creeping Jenny instead of Creeping Charlie in ornamental gardens, since the Jenny is less invasive and it gives the same effect in the garden. (See Czarapata, 2005)

Species name: *Lythrum salicaria*

Common name: Purple loosestrife, Swamp loosestrife



Native to Eurasia, *Lythrum salicaria* came to America in ship ballasts. It is an herbaceous perennial. (See Piper, 1996) Auxiliary flowers are between 15 and 20mm wide and are composed of 4 to 8 green sepals, 4 to 8 pink to purple petals, 8 to 16 stamens and 1 pistil. (See Royer and Dickinson, 1999) Purple loosestrife blooms from July to September. (See Piper, 1996) There are several woody square stems per plant which grow between 0.5 to 1.5 meters tall. The slightly hairy leaves are disposed opposite one another or in whorls of three. (See Royer and Dickinson, 1999)

Purple loosestrife is a highly invasive species that invades the high marshes, and chokes out native plants. A mature, multi-stemmed plant can produce between 2 and 3 million seeds per year. The fibrous root system also clogs the water channels in the marshes and inhibits the migration of aquatic animals. (See Piper, 1996) The best solution is biological control by introduction of two particular species of leaf beetle. (See Malecki *et al*, 1993)

Species name: *Medicago sativa*

Common name: Alfalfa



Introduced from Europe, alfalfa is a perennial herb that has an erect or ascending stem that grows to be about 1 meter tall. The color of the flowers varies from blue to purple. The flowers have 5 united sepals, 5 united petals, 10 stamens and one pistil. Alfalfa has alternate, compound leaves of three leaflets. (See Royer and Dickinson, 1999)

Alfalfa is found in cultivated fields and ditches and along roadsides. (See Royer and Dickinson, 1999) It could be considered potentially invasive but is not at the moment.

Species name: *Melilotus alba*

Common name: White sweet clover, Honey clover



Native to Eurasia. White sweet clover stems can grow over two meters tall; they are smooth and slender with branches. The leaves grow in pairs of three leaflets and are disposed alternately on the stem. (See Haragan, 1991) The flowers have 2 mm long, yellow anthers and a 2 mm long, glabrous style. The upper lip of the flower has two lobes and the lower lip has 3 which are slightly larger than those of the upper lip, it blooms from May to October.

White sweet clover grows on disturbed sites, along railroads and roadsides. The plant is considered highly invasive. *M. alba* used to be utilized for fodder because of its high protein content until it was discovered that the plant produces dicoumarin which causes internal hemorrhages if ingested. (See Haragan, 1991)

Species name: *Melilotus officinalis*

Common name: Yellow sweet clover



A biennial plant native to Eurasia. Sweet clovers were brought to America for honey and forage production. They have compound alternate leaves divided into three leaflets. They have numerous yellow pea-like flowers densely arranged on spikes. The flowers are fragrant. They reproduce by seed, and each plant can produce up to 350,000 seeds. They have extensive lateral roots.

Yellow sweet clovers out-compete native plants for water and nutrients and produce chemicals that inhibit the growth of other plants. Yellow sweet clover is still planted because of its ability to fix nitrogen in the soil, its ability to be used as a medical anti-clotting agent and for the production of rat poison even though they constitute a problem for land managers. (See Czarapata, 2005)

Species name: *Ophiostoma ulmi* and *Ophiostoma novo-ulmi* strains

Common name: Dutch elm disease



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This fungus was introduced in Canada in 1940. Since then its main host has been the American elm, *Ulmus americana*. The main vectors of this fungus are the native beech bark beetle and the European beech bark beetle. Those beetles are responsible for the infections of healthy elm trees. The *O. ulmi* strain mutated into the *O. novo-ulmi* strain and has since been completely replaced by it. The new, more aggressive, strain has spread from the Midwest United States up to New Brunswick. Dutch elm disease causes wilting of vessels which in turn will cause leaves to turn brown and lead to the death of the tree within anywhere from a few days to a few years. This fungus usually manifests itself from mid-June to mid-July. When the branch of an affected tree is cut, brown vessels are evident. (See Forest Invasive Alien Species, Natural Resources Canada)

Species name: *Origanum vulgare*

Common name: Wild marjoram, Wintersweet, Organdy



Native to Eurasia. Wild marjoram occupies fields and roadsides in southwest British Columbia and eastward from Ontario to Nova Scotia. The stem grows between 12 and 30 inches high. The flowers are about 3/8 inch long. The pink flowers bloom from July to September. (See Lane, 2005)

Species name: *Pastinaca sativa*

Common name: Wild Parsnip



1. John Cardina, Ohio State University, Bugwood.org

Native to Eurasia. (See Black and Judziewicz, 2009) The biennial plant belongs to the Parsley family. (See Peterson and Mckenny, 1996) The stem grows about 1 to 5 feet tall. (See Black and Judziewicz, 2009) The leaves are divided into 5 to 15 ovate, toothed leaflets. (See Peterson and Mckenny, 1996) Yellow flowers organized in a compound, flat umbel between 4 to 8 inches wide with 15 to 25 umbellets. (See Black and Judziewicz, 2009) The flowers bloom from May to October. (See Peterson and Mckenny, 1996)

Wild parsnip is found growing in pastures, disturbed areas, along roadsides and in old fields. (See Black and Judziewicz, 2009) The entire plant contains xanthotoxins which cause photodermatitis, producing symptoms similar to those of poison ivy when, under sunny conditions, it comes into contact with human skin. (See Vizgirdas and Rey-Vizgirdas, 2005)

Species name: *Phragmites communis*

Common name: Common reed, Reed grass



Reed grass is native to much of the world but much there are native and non-native strains that grow in the Atlantic provinces. The non-native plant has linear leaves about 0.5 to 1.5 inches wide at the base and between 10 and 20 inches long. The leaves are smooth but rough at the margin and stay attached to the stem all winter long. Color varies from green to greyish-green. They produce gray to purple featherlike seed heads. The plumes are about 5 to 16 inches long. The stem is un-branched, rough, tan, hollow and rigid.

Reed grass occupies both disturbed and undisturbed sites including wetlands. They prefer alkaline, brackish waters but will also tolerate highly acidic conditions, they can grow in water up to 6 feet deep but they can also inhabit somewhat dry areas. Reed grass spreads by horizontal shoots from the rhizome and horizontal runners, and by spreading seeds. (See Czarapata, 2005)

Species name: *Pinus sylvestris*

Common name: Scot pine, Scotch pine



Native to Northern Europe. (See Kaufman, 2007) Scotch pine is a monoecious perennial pine, (See Lo Rito, 1997) with good conditions the Scotch pine can grow up to 100 feet tall. (See Kaufman, 2007) Younger trees have a pyramidal shape but become rounded at the top and irregular in shape as they age. (See Lo Rito, 1997) *Pinus sylvestris* is the most widely distributed conifer in the world. Its needles grow in clusters of two and measure 1.5 to 4 inches long. (See Kaufman, 2007) Its orange coloured bark contrasts against its blue-green to slate-green needles. Green cones turning greyish when maturing. (See Kaufman, 2007)

Scotch pines grow on a variety of soils; sandy to loamy. (See Lo Rito, 1997) They were introduced for erosion control or for land reclamation. (See Kaufman, 2007) Scotch pine usually out-competes other species because their seeds develop into mats, they also have a short juvenile period, however they are not considered aggressive invaders, since they do not tolerate shade. (See Kaufman, 2007) The Scotch Pine acts as a vector of disease and insects that infect native tree species. (See Richardson, 2000)

Species name: *Poa compressa*

Common name: Canada Blue grass



Perennial grass native to Europe. Canada blue grass has a broad and flat stem that measures about 15 inches high. The color of the grass varies from a pale to dark blue-green. The leaves are flat or v-shaped in cross-sections and are pointed at the tip. The usually paired panicles measure from 1 to 3 inches. They have a fibrous rhizomatous root system that starts bellow the soil surface.

Canada blue grass thrives in meadows, along roadsides, in dry acidic soils, and waste areas. It has a tendency to out-compete native prairie species and spreads quickly when there is little competition but it is less invasive than the Kentucky blue grass whose origin is still widely debated. (See Czarapata, 2005)

Species name: *Polygonum cuspidatum*

Common name: Japanese knotweed, Mexican bamboo



Native to Eastern Asia. Japanese knotweed is an herbaceous perennial that belongs to the buckwheat family. It reproduces by seeds and underground rhizomes which can reach a distance of twenty horizontal feet. Japanese knotweed is found to grow everywhere it can find a space to grow. In the past, it was utilized as a laxative and as a digestive enzyme but it is now suspected to have carcinogenic consequences when a large quantity of tannins from this plant is ingested. (See Loewer, 2001)

Species name: *Populus alba*

Common name: White poplar



Photos by Elizabeth J. Czarapata

Native to Europe. The blunt toothed leaves have a leathery texture. The trunk is dark and rough at the base and becomes paler and smoother in texture as it progresses upward. The tree grows between 60 to 80 feet. White poplar spreads by sucker roots and is widely distributed throughout the northern hemisphere. (See Petrides, 1973)

Species name: *Rhamnus cathartica*

Common name: European buckthorn, Common buckthorn



Introduced from Eurasia. European buckthorns grow between 6 and 25 feet high. They have sharp thorns that grow at the extremities of the branches. The bark varies from gray to brown and has a rough texture. The leaves are finely toothed, have a round shape and a pointy tip. (See Loewer, 2001)

European buckthorns displace native species. The fruit contains anthraquinone which induces vomiting and diarrhea when ingested which is thought to help distribute the tree when birds feed on them. (See Loewer, 2001) This tree is also an alternate host to the crown rust disease which is caused by the fungus *Puccinia coronata*. (See Nyvall, 1999)

Species name: *Rhamnus frangula* or *Frangula alnus*

Common name: Glossy buckthorn, Black buckthorn



Photos by WI DNR

Native to Europe, the black buckthorn was introduced to northeastern North America in the 1800s. In Canada, it occurs mainly in southern Ontario but is also found in New Brunswick, Nova Scotia, Quebec, and Manitoba. The glossy buckthorn is a shrub or small tree with glossy leaves that produces small dark red-black coloured poisonous berries. Seeds are dispersed by birds and small mammals which eat the berries. The glossy buckthorn prefers wetlands but can also grow in upland habitats such as forests, fencerows, old fields, and prairies. Affecting species diversity, it displaces native species by creating dense shade as the stand grows. (See Kaufman, 2007)

Species name: *Sirococcus clavigignenti-juglandacearum*

Common name: Butternut canker



1. Natural Resources Canada, Canadian Forest Service, Laurentian Forestry Centre
(bark has been removed to show the color of the wood killed by this fungus)

2. Minnesota Department of Natural Resources Archives, Minnesota Department of Natural Resources,
www.forestryimages.org

3. USDA Forest Service - Northeastern Area Archives, USDA Forest Service, www.forestryimages.org

Butternut canker's geographical origin is unknown; its main host is the butternut tree, *Juglans cinerea*. Butternut canker is caused by the fungus *Sirococcus clavigignenti-juglandacearum*. The cankers develop on the foliar scars, the buds and wounds. In the summer, the canker shows a dark spot in its center and is surrounded by a white border. In the spring, a black liquid resembling ink exudes from the cracks. It usually infects the lower part of the crown and propagates to the lower parts of the tree by the dispersion of spores. The old cankers are persistent.

Butternut canker fungus was first identified in New Brunswick in 1998. In Canada, the disease is also found in Ontario and Quebec. There is no effective treatment of the infection once the fungus is established. (See Forest Invasive Alien Species, Natural Resources Canada)

Species name: *Venturia saliciperda*

Common name: Willow scab



1. Minnesota Department of Natural Resources Archives, Minnesota Department of Natural Resources, www.forestryimages.org

Native to Europe. Willow scab affects mostly the branches and the leaves of willow species. This disease is caused by the fungus *V. saliciperda*. Its presence can be recognized by the progressive blackening or darkening of the foliage. This disease is often followed by black canker disease which is caused by the fungus *Glomerella miyabeana* (Fukushi) Arx. The worst damage is to the lower part of the tree. Willow scab infects the leaves then the petioles, after that it forms cankers which look like small greyish depressions on the branches. Once the whole circumference of the branch is infested, the branch will die.

This fungus is widely distributed in Canada. Native willow species seem to be more resistant to willow scab disease than the ornamental and nursery tree varieties. (See Forest Invasive Alien Species, Natural Resources Canada)

Species name: *Verbascum thapsus*

Common name: Mullein, Velvet dock, Jacobs-staff



1. Oregon State University Larry Burrell and Jed Colquhoun photo

Native to Eurasia. Mulleins produce yellow flowers that grow on a spike. The flowers bloom from June to September. The stem grows between two and seven feet tall. They also possess thick pale green, oblong, alternate, close to the stem, velvety leaves.

Mullein is widely distributed in North America. It prefers dry lands, banks and stony waste lands. (See Blanchan, 2007)

Species name: *Viburnum opulus*

Common name: Guelder rose, European highbush cranberry



1. The Dow Gardens Archive, Dow Gardens, Bugwood.org

Native to Eurasia. Guelder roses possess toothed and three lobed leaves. They can grow up to 12 feet tall. They have the ability to interbreed with the native highbush cranberry shrub, *Viburnum americanum*. Unlike *V. americanum*, they possess large saucer-like glands on the petiole.

Guelder roses grow across North America. This shrub can tolerate a variety of pH ranges and environmental habitats; from floodplains to roadsides. (See Randall and Marinelli, 1996)

Species name: *Vinca minor*

Common name: Periwinkle, Myrtle



1. Chris Evans, River to River CWMA, Bugwood.org

2. Dan Tenaglia, Missouriplants.com, Bugwood.org

3. Dan Tenaglia, Missouriplants.com, Bugwood.org

Native to Europe. Periwinkle grows on average between 6 to 8 inches high. Its leaves are opposite, short petiole, simple, and evergreen and have a shiny gleam. It produces blue-violet or white flowers that transforms into brown beanlike fruits. Periwinkle reproduces by rooting expansion where the root nodes touch the ground.

Periwinkle prefers moist, rich soils. Often sold for ground cover in the gardens, these aggressive competitors compete with native under layer forest plants. (See Czarapata, 2005)

