

Other Families

Apiaceae
(Carrot Family)

Balsaminaceae
(Balsam Family)

Euphorbiaceae
{Spurge Family)

Haloragaceae
(Water Milfoil Family)

Lamiaceae
(Mint Family)

Lythraceae
(Loosestife Family)

Scrophulariaceae
(Figword Family)

Giant Hogweed



Heracleum mantegazzianum Sommier & Levier

Alternate Names

Giant cow parsnip

Description

Giant hogweed is an enormous, herbaceous biennial or perennial plant that grows 10 to 15 feet high. Stems are hollow, from 2 to 4 inches in diameter with dark reddish-purple spots and bristles. Large compound leaves measure 3 to 5 feet in width. The inflorescence is a broad flat-topped umbel composed of many small white to light pinkish flowers. Inflorescences can reach a diameter of 2 1/2 feet. The plant produces flat, 3/8 of an inch long, oval-shaped, dry fruits. Most plants die after flowering, while others flower for several years.



Norwegian Botanical Association
photo by Norman Hagen

Similar Species

Giant hogweed closely resembles cow parsnip (*Heracleum maximum* Bartr.), a plant native to the Pacific Northwest and Alaska that rarely exceeds 6 feet in height, has a flower cluster only 8 to 12 inches wide, and has palmately lobed rather than dissected leaves.

Ecological Impact

Giant hogweed forms a dense canopy, outcompeting and displacing native riparian species. The plant produces a watery sap that contains toxins causing severe dermal injury to humans, birds, and other animals. The flowers of giant hogweed are insect-pollinated (NWCP 2003, Pysek and Pysek 1995). This plant produces coumarins which have antifungal and antimicrobial properties. Hybrids between giant hogweed and eltrof (*H. sphondylium* L.) occur where the two grow in the same location. There are numerous

animals and parasites that feed on giant hogweed. Giant hogweed results in a reduction of native species and an increase in soil erosion along stream banks in winter (NWCP 2003, Tiley and Philp 1992, Wright 1984). The availability of nutrients increases in areas infested by giant hogweed due to the large amount of easily decomposed biomass (Pysek and Pysek 1995).

Biology and Invasive Potential

Giant hogweed reproduces by seed with each plant capable of producing between 27,000 and 50,000 seeds (Tiley et al. 1996, Pysek 1991).

Although this species is generally an early colonizer of disturbed communities, it can also invade closed communities such as grasslands (Tiley et al. 1996). The fruits of this species can float in water for up to 3 days and can be transported 6 miles in water courses (Clegg and Grace 1974). It has escaped from gardens and naturalizes readily in Europe and North America. Although its sale is prohibited, giant hogweed is sometimes misidentified and sold by nurseries. Dispersal is also facilitated by the use of seedheads in flower arrangements, and it is spread in topsoil and along right-of-ways (NWCP 2003, Tiley et al. 1996, Clegg and Grace 1974). Seeds germinate well in the surface organic layer, although sufficient soil depth is necessary to allow taproot development. Seed longevity can be greater than 7 years (NWCP 2003). Giant hogweed occurs most frequently on sandy and silty substrates. It is tolerant of saturation and winter flooding and requires moisture for establishment, but once established it also thrives on drier, well-drained sites. It tolerates pH levels ranging from 3.1 to 8.5 (Clegg and Grace 1974, Tiley et al. 1996). Giant hogweed is federally



*Norwegian Botanical Association
photo by Rune Aanderaa*



KULAK photo by Paul Busselen

listed as a noxious weed and is also considered noxious by 12 states, including Oregon and Washington.

Distribution and Abundance

Giant hogweed has not yet been found in Alaska, although it has been reported from British Columbia and Washington. It is native to the Caucasus Mountains and southwestern Asia. It has been naturalized throughout central Russia and Europe. It has been introduced to Australia, New Zealand, Canada, and the United States. Giant hogweed establishes along river banks, streams, and damp places as well as along roadsides and waste areas.



KULAK photo by Paul Busselen

Management

It is important to always wear protective clothing, including gloves, coveralls, and goggles, when handling giant hogweed since the sap from the leaves and stem is highly toxic; contact with the skin can lead to severe scarring, especially after subsequent exposure to sunlight. For manual removal, plants must be dug out entirely or the roots cut at least 3 to 4 inches below ground level. Cutting or mowing will not immediately kill the plant but may be effective if repeated at regular intervals (3 to 4 times per season) on the resprouting plants to eventually exhaust the nutrient reserves stored in the root system. Selective herbicides kill

foliage but will not kill the roots, while systemic herbicides can be effective if applied in the spring or early summer. A follow-up spray in mid-summer is recommended.

Notes

Giant hogweed is listed in The Guinness Book of World Records as the world's largest weed. The dried fruits of giant hogweed are used as a spice in Iranian cooking known in Farsi as golpar. The song "The Return of the Giant Hogweed" was on the album Nursery Cryme by the rock band Genesis.

Ornamental Jewelweed



Impatiens glandulifera Royle

Alternate Names

Himalayan balsam, Policeman's helmet, Touch-me-not, Indian jewelweed, Ornamental jewelweed.

Synonyms

Impatiens roylei Walp.

Description

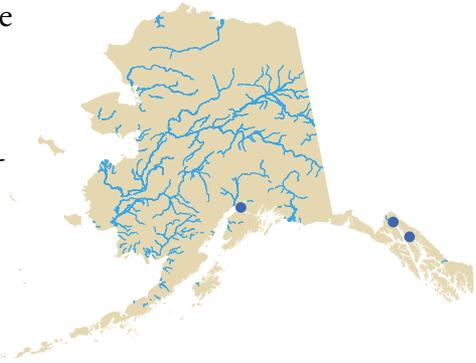
Ornamental jewelweed is an herbaceous annual plant growing from 3 to 6 feet tall. Stems are erect, hollow, smooth, and hairless. Stems are also reddish and multi-branched, with large, swollen nodes. The large, simple, oblong, and ovate to elliptic leaves are oppositely arranged, although occasionally a whorl of 3 leaves is formed. Leaves are about 6 inches long, 3 inches wide, and sharply toothed. One-inch long flowers are arranged in sparse clusters from the leaf axils and are irregular, having 5 petals of which 2 are fused together. Flower color ranges from white to pink to purple to red. The fruit is a capsule that explodes at touch when ripe, ejecting large, black seeds that are 1/4 to 1/2 of an inch wide.

Similar Species

Ornamental jewelweed could be confused with jewelweed (*Impatiens noli-tangere* L.), a common native wildflower. Jewelweed can be distinguished from the exotic species by its yellow flowers, more coarsely serrated teeth, and much smaller size.

Ecological Impact

Ornamental jewelweed is able to reduce the growth of



USDA Forest Service photo by Tom Heutte

native plant species and eventually replace them through aggressive competition, thereby forming dense stands (King County DNR 2004, Prots and Klotz 2004). The presence of jewelweed alters the composition and behavior of pollinating insects. Pollinators include several species of bumblebee, honeybee, moth, and wasp (King County DNR 2004, Chittka and Schürkens 2001, Beerling and Perrins 1993). Ornamental jewelweed also negatively impacts habitat for wildlife species. High water-insoluble carbohydrate content causes the stems to persist as litter the following spring, which suppresses competing seedlings of other species (Beerling and Perrins 1993). At high densities, this plant can alter water flow, increasing erosion and flooding (King County DNR 2004).



USDA Forest Service photo by Tom Heutte

Ornamental jewelweed infestation on a beach meadow in Southeast Alaska.

Biology and Invasive Potential

Ornamental jewelweed reproduces entirely by seeds. An individual plant can produce from 800 to 2500 seeds, which are viable for 18 months or more and can geminate underwater (King County DNR 2004). For successful establishment it requires a moderate amount of local disturbance and exposed ground (Beerling and Perrins 1993). The seeds are ejected from mature capsules for up to 20 feet, and they can also be dispersed along waterways and by small mammals (King County DNR 2004). Rate of linear spread in Britain was estimated to be 1 to 3 miles per year (Beerling and Perrins 1993). Ornamental jewelweed is frequently sold or shared as a garden ornamental (King County DNR 2004) and is widely planted in gardens of southcentral and southeast Alaska. The seeds require cold-stratification to break dormancy, and germination usually occurs in late spring. Best germination response occurs

when seeds are stored at 41°F (King County DNR 2004, Beerling and Perrins 1993, Mumford 1988). Ornamental jewelweed is tolerant of many types of soil, including fine and coarse stream-deposited sediments, free-draining mineral soils and peats, and both nutrient-rich and nutrient-poor soils. Values of acceptable soil pH range from 3.4 to 7.7, it is partially shade-tolerant, and plants of all ages are sensitive to frosts (Beerling and Perrins 1993). Ornamental jewelweed is listed as a noxious weed in British Columbia and Washington.

Distribution and Abundance

Ornamental jewelweed is native to the Himalayan region of Asia. In other areas, it has escaped garden cultivation to invade many areas, predominantly river edges, riparian areas, and wetlands and can also be found in forests, roadsides, yards and gardens.

It thrives in riparian zones, where seeds spread quickly downstream. In Alaska, patches of ornamental jewelweed have been found outside of cultivation in Juneau and Anchorage, and an acre-sized infestation was documented in a beach meadow in Haines in 2004 (AKEPIC Database 2004). This species is currently distributed throughout southern British Columbia.



USDA Forest Service photo by Michael Shephard

Management

Mechanical methods such as pulling, mowing or cutting have been successful in eradicating stands of ornamental jewelweed. Such methods should be completed before seed is set, and care should be taken when cutting plants. Unless the plant is cut below the lowest node, it will regrow and flower later in the season, and so a single cut is only effective if made very close to the soil level. Small infestations can be controlled by hand-pulling as the plant is shallow

rooted. Regular mowing will also control this plant even if the cutting level is above the lowest node, provided the frequency is sufficient to prevent the formation of flowers and seeds. Mowing is likely to be effective only in those locations where good access is available and the ground is smooth enough for close mowing. herbicides have been effective in controlling ornamental jewelweed, especially if applied before flowering. Ornamental jewelweed should be sprayed in the spring before flowering but late enough to ensure that germinating seedlings have grown up sufficiently to be adequately covered by the spray. If working in or near a wetland, make sure to select a herbicide approved for that use.. No specific biological control agents are known to control ornamental jewelweed.

Notes

Ornamental jewelweed is considered invasive in the British Isles, where it is naturalizing along river valleys, but in 1938 the famous Irish naturalist Praeger described this plant as rare and cited the shores of Lough Neagh as one of its sites. One of its common names, coined in the 1950s, is “policeman’s helmet,” which refers to the flower’s resemblance to an English police helmet. Recent research by German botanists has shown that it competes successfully with native riverbank species for pollinators like bumblebees, reducing seed set in these other plants. This success can be attributed to abundant nectar production.



USDA Forest Service photo by Tom Heutte

Leafy Spurge



XID Services photo by Richard Old

Euphorbia esula L.

Alternate Names

wolf's-milk, euphorbia, spurge, faitours-grass

Description

Leafy spurge is a long-lived, deep-rooted perennial plant that reproduces by vigorous rhizomes and seed. Stems are hairless and pale green and grow 16 to 32 inches high in dense patches. Leaves are alternate, narrow, and 1 to 4 inches long. Flowers are yellowish-green, small, and arranged in numerous small clusters and are subtended by paired, heart-shaped, yellow-green bracts. Seeds are oblong, grayish to purple, and contained in a 3-celled capsule, each containing a single seed.



Similar Species

There are no native *Euphorbia* species in Alaska. Leafy spurge is closely related to cypress spurge (*E. cyparissias* L.), which is distinguished from leafy spurge by the presence of fewer, pale green leaves. Cushion spurge (*E. epithymoides* L.) is an exotic species of gardens and greenhouses in Alaska and can be distinguished from leafy spurge by its smaller stature, 10 to 18 inches high, and bright yellow flowers.

Ecological Impact

Outside of Alaska, leafy spurge is a highly competitive plant that displaces native vegetation, forming large monospecific stands. As of 1997, it infested nearly 3 million acres in the United States and Canada. It is allelopathic, preventing the growth of other species nearby. A significant reduction in the 5 most common native species was recorded in native mixed grass prairie invaded with leafy spurge (Belcher and Wilson 1989). In addition to loss of plant

diversity, loss of wildlife forage and habitat are significant impacts of this species. Areas dominated by leafy spurge received much less use by native ungulates when compared to similar uninfested areas (MWCA 2005). Leafy spurge reduces the carrying capacity of infested rangeland for cattle to near zero (Hanson and Rudd 1933).

Biology and Invasive Potential

Each flowering stem of leafy spurge produces an average of 140 seeds, and seed production of a stand ranges from 25 to 4,000 pounds per acre (Best et al. 1980). The seeds of leafy spurge float on water, resulting in dispersal and establishment of plants along rivers and in areas receiving periodic or seasonal flooding. Seeds are also spread in mud on equipment, on vehicles, or on the feet or hair of animals. Crop seed, feed grain, and hay containing leafy spurge seed can spread this weed over long distances. Seeds may remain viable in the soil for up to 8 years and an extensive root system with large nutrient reserves makes control of this species extremely difficult. Large numbers of buds are found on each root to depths of 10 feet or more and each bud is capable of producing a new, independent plant. Leafy spurge has been declared noxious by 6 Canadian provinces and 20 of the United States, including Alaska (Alaska Administrative Code 1987).

Distribution and Abundance

Leafy spurge is native to Eurasia and was brought into the United States as a contaminant of seed around 1827. It is a serious problem in North America, mostly in southern Canada and the north-central United States. It is found primarily in pastures, rangelands, waste areas, abandoned cropland, along roadsides, and in areas associated with ongoing human development, and it can invade a variety of natural habitats from mead-



XID Services photo by Richard Old

ows to woodlands. Leafy spurge has not yet been found in Alaska but has been documented in the Yukon Territory of Canada; its impacts elsewhere suggest that it would be a serious problem should it be introduced to Alaska.

Management

Because of its persistent nature and ability to regenerate from small pieces of root, leafy spurge is extremely difficult to eradicate. Cultivation can be used to control leafy spurge on cropland where few options are available. Timing of cultivation is important, with the most successful efforts begun in the spring, 2 to 4 weeks before plant emergence. Mowing and burning are ineffective, but burning prior to herbicide application can increase visibility of the weed, improving spray coverage by eliminating old stems and ground cover (Winter 1992, Wolters et al. 1994). Annual applications of herbicides can prove effective. Biological control offers a highly promising management tactic for leafy spurge, for which 6 natural predators have been imported from Europe.

Notes

Leafy spurge is in the same family as the holiday favorite, poinsettia. First recorded from Massachusetts in 1827, leafy spurge quickly spread westward and reached North Dakota within 80 years.



X1D Services photo by Richard Old

Eurasian Watermilfoil



Myriophyllum spicatum
L.

Alternate Names

Spike watermilfoil, spiked watermilfoil

Synonyms

Myriophyllum spicatum L. var. *spicatum* in part [H&C]



University of Florida photo
by Alison Fox

Description

Eurasian watermilfoil is a submersed aquatic plant, with stems 3 feet high or more. Leaves are whorled, highly dissected, and composed of 28 to 48 thread-like divisions. Spikes emerge above the water, and flowers are borne in the axis of bracts. Fruits are 1/16 to 1/8 of an inch long.

Similar Species

Northern watermilfoil (*M. sibiricum* Fern.), a closely related native species, is often mistaken for Eurasian watermilfoil. It can be distinguished from Eurasian watermilfoil by its leaves, which have only 12 to 24 thread-like segments rather than 28 to 48 (Royer and Dickinson 1999). Eurasian watermilfoil is distinguished from another native species, whorlleaf watermilfoil (*M. verticillatum* L.), by the presence of 4 rather than 5 leaves per whorl. Also, whorlleaf watermilfoil has leaves that exceed the length of the



XID Services photo by Richard Old

internodes.

Ecological Impact

Eurasian watermilfoil forms dense canopies that often shade out native vegetation. Unlike northern watermilfoil, which remains upright and completely submersed, Eurasian watermilfoil grows over the surface of the water, forming dense mats with interlacing leaves on the surface that block most light penetration into the water. Mono-specific stands of Eurasian watermilfoil offer poor habitat for waterfowl, fish, and other wildlife. The dense mats of vegetation slow water flow, which can increase sedimentation by allowing suspended sediment to precipitate and can provide good breeding conditions for mosquitoes. Eurasian watermilfoil stands can alter water quality by raising pH, decreasing dissolved oxygen, and increasing water temperature.



XID Services photo by Richard Old

Biology and Invasive Potential

Eurasian watermilfoil reproduces by seed and fragmentation. It thrives in areas that have been subjected to various kinds of natural and manmade disturbances. Fragments may be moved long distances in flowing water. Eurasian watermilfoil is spread from lake to lake on boats, trailers, and floatplanes. Germination requirements are unknown. Eurasian watermilfoil is an extremely adaptable plant, capable of tolerating a variety of environmental conditions. It can grow in still to moderately flowing water and rooted in water depths from 1 to 10 meters. It can survive under ice and tolerate pH levels ranging from 5.4 to 11.0. Eurasian watermilfoil requires high light and can grow over a broad temperature range. It grows best on fine-textured, inorganic sediments and relatively poorly on highly organic sediments (Jacono and Richerson 2004). Eurasian watermilfoil is listed as a noxious weed in 11 states.

Distribution and Abundance

Typical habitat for Eurasian watermilfoil includes fresh to salty water of ponds, lakes, slow-moving streams, reservoirs, estuaries, and canals. Eurasian watermilfoil is native to Europe, Asia, and northern Africa. It now occurs in North and South America, Australia, Greenland, and southern Africa. It had been found in 32 of the United States and the Canadian provinces of British Columbia, Ontario, and Quebec (Jacono and Richerson 2004). Eurasian watermilfoil was reported to occur in Alaska by Hul-tén (1968), although at the time of writing (early 2005) its presence is being investigated.

Management

Once Eurasian watermilfoil becomes well established within a waterbody, it is very difficult or impossible to remove. In smaller waterbodies, there has been some limited success with the use of an aquatic herbicide. Other control methods include harvesting, use of an aquatic rototiller-like device, installation of bottom barriers, and hand-pulling by divers.

Notes

Eurasian watermilfoil could be spread from one lake to another in Alaska by sticking to floatplanes and boats, especially floatplane rudders and outboard motors. It was accidentally introduced into the United States in the late 1800s, probably as an escaped aquarium species or from ballast water.



Photo by Patrick Vandael

Hempnettle



Galeopsis bifida Boenn.

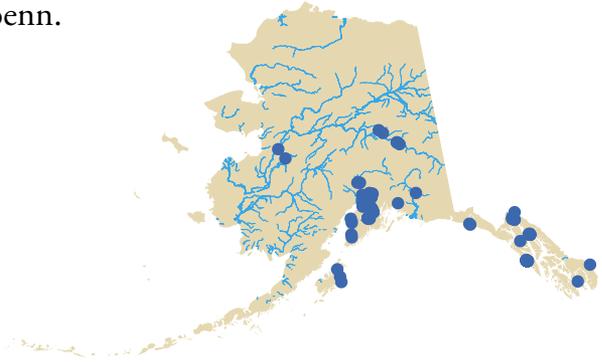
Galeopsis tetrahit L.

Alternate Names

Bifid hempnettle,
split-lip hempnettle

Synonyms

Galeopsis tetrahit L. var.
bifida (Boenn.) Lej. &
Court.



Description

Hempnettle is an annual plant that grows 1/2 to 3 feet high. The stem is erect and simple or branched above. The leaves are 1 to 5 inches long, short-stalked, opposite, ovate-lanceolate to lanceolate, coarsely serrate, and sparsely pubescent on both sides. The stem is usually swollen below leaf nodes.



USDA Forest Service photo
by Tom Heutte

The flowers are terminal or borne in axillary clusters. Flowers range in color from purple and pink to white and are 1/2 to 3/4 of an inch long and bilaterally symmetrical. Plants of the two species are quite similar and sometimes are treated as subspecies. The flowers of *G. bifida* are smaller with a split lower lip, while those of *G. tetrahit* are larger with an entire lower petal. Seeds are egg-shaped and mottled grayish-brown.

Similar Species

Native species similar to hempnettle include field mint (*Mentha arvensis* L.), American dragonhead (*Dracocephalum parviflorum* Nutt.), and hairy hedgenettle (*Stachys pilosa* Nutt.). Field mint is easily identified by its strong mint odor. American dragonhead has serrated leaves similar

to hempnettle, but the flowers are crowded in dense heads with sharp spiny bracts. Hairy hedgenettle is a wetland plant that can be distinguished from similar species by its open terminal flowerhead and rounded teeth on the leaves.

Ecological Impact

Hempnettle has been observed primarily in disturbed areas, where it creates a dense mid-forb layer and reduces the cover of grasses and low forbs. It consumes soil moisture and limited nutrients and can delay the establishment of native species in disturbed sites.



USDA Forest Service photo by Michael Shephard

Biology and Invasive Potential

Each plant is capable of producing up to 2,800 seeds, which can remain dormant in the soil for several years. Hempnettle does not reproduce vegetatively and generally occurs only in disturbed sites. The seeds are large and do not have any apparent adaptations for long-distance dispersal. This species appears to spread as a contaminant of hay or other agricultural products. Germination occurs at 1/2 to 1 1/2 inches deep. Hempnettle has been declared noxious in Quebec, Manitoba, Alberta, and Alaska (Alaska Administrative Code 1987).

Distribution and Abundance

Hempnettle is a plant of disturbed sites, roadsides, gardens, and agricultural lands. Native to Europe and Asia, it is now found throughout Canada and the northeastern quarter of the United States. It is introduced into New Zealand and the Canary Islands (GRIN 2004, Hultén 1968). Hempnettle has been reported from southeast, southcentral, interior, and western Alaska, including 2 remote locations in the Yukon River delta (ALA 2004). It is an important weed of both agricultural areas and communities in Alaska.

Management

Hempnettle is difficult to control once established, and so maintaining weed-free areas is of primary importance. Once established, dense cover crops planted early may inhibit hempnettle in agricultural settings. Herbicides are also effective (MAFRI 2001a).

Notes

A drying oil used for polishing leather is obtained from the seed of hempnettle. The genus name *Galeopsis* means “looks like a weasel” as early botanists thought that is what the corolla resembled, and the species epithet tetrahit means “four-parted,” probably for the ovary of the plant.



Sitka Conservation Society photo by Nanna Borchert

Purple Loosestrife



Lythrum salicaria L.

Alternate Names

Spike loosestrife

Synonyms

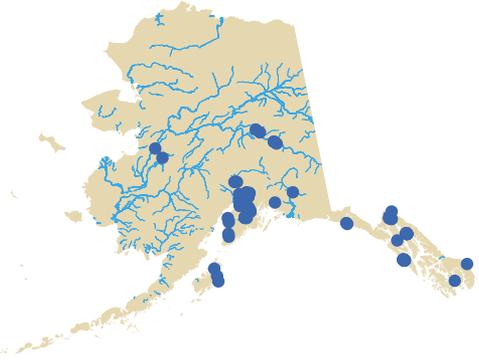
Lythrum salicaria L. var. *gracillor*

Turcz., *Lythrum salicaria* L.

var. *tomentosum* (P. Mill.)

DC., *Lythrum salicaria*

L. var. *vulgare* DC.



Description

Purple loosestrife is a perennial plant with erect square stems growing 6 to 8 feet high. Stems have soft hairs. Leaves are simple, entire, opposite or whorled, stalkless, lance-shaped, and slightly hairy. Rose purple flowers are arranged in long vertical racemes.

Similar Species

Another non-native loosestrife, introduced as a garden ornamental, is garden yellow loosestrife (*Lysimachia vulgaris* L.), which has begun to aggressively colonize the same wetland habitats in North America as purple loosestrife. Garden yellow loosestrife can be distinguished by its bright yellow 5-petaled flowers.



XID Services photo by Richard Old

Ecological Impact

Outside of Alaska, purple loosestrife displaces native vegetation through rapid growth and heavy seed production. Important wildlife food plants such as cattails and pondweed are displaced or shaded out by loosestrife. Generally, it becomes a virtually monospecific stand, and native

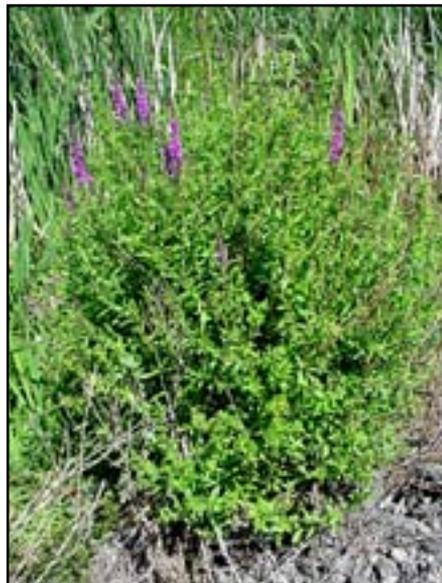
animals avoid nesting and foraging in these stands. It lacks natural enemies in the United States (Blossey 2002) and is able to invade intact wetlands. Purple loosestrife can also invade deeper water and push out floating vegetation by closing out open water species. This species alters biogeochemical and hydrological processes in wetlands by lowering phosphate levels in the summer. Outside of Alaska, purple loosestrife leaves decompose quickly in the fall, resulting in a nutrient flush, whereas leaves of native species decompose in the spring.



The Nature Conservancy photo by John M. Randall

Biology and Invasive Potential

Purple loosestrife begins to bloom in July or August and continues until September or October. Seed production is prolific, averaging 120 seeds per capsule for up to 900 capsules per plant (Shamsi and Whitehead 1974). It can spread vegetatively by resprouting from cut stems and regenerating from root and stem fragments (Bender 1987, Royer and Dickinson 1999). Seed dispersal is mainly by wind, but seeds can also be transported by waterfowl or other wetland animals. The seeds and seedlings are buoyant and can be dispersed by water. Minimal levels of light are required for germination (Shamsi and Whitehead 1974). Temperature at the soil surface is a critical factor for germination, with an optimal range of 60° to 70°F. Purple loosestrife grows best in highly organic soils, but tolerates a wide range of soil textures including clay, sand, muck, and silt. Generally, the plant is found in full sun,



XID Services photo by Richard Old

but it can survive in 50% shade. Purple loosestrife is listed as a noxious weed in 25 of the United States and 2 Canadian provinces.

Distribution and Abundance

Currently, purple loosestrife is found all over the world except in extremely cold and arctic regions. It occurs in wetlands such as cattail marshes, sedge meadows, and open bogs, as well as along streambanks, riverbanks, lake shores, ditches, and other disturbed wet soil areas. Purple loosestrife is native to Eurasia. It has not yet been reported growing wild in Alaska but is grown in Alaska gardens and sold in nurseries and seed catalogs. It is included in this book because of its tremendous destructive potential.

Management

Small infestations can be controlled by removing all roots and underground stems. It is difficult to remove all of the roots in a single digging, and so the area should be monitored for several growing seasons to ensure that purple loosestrife has not regrown from roots or seed. Follow-up treatments are recommended for 3 years after plants are removed. Current control methods for large, dense populations of loosestrife are not totally effective, as mechanical control methods are inefficient and most herbicides are non-selective. Biological control measures are being developed in the western United States.

Notes

Loosestrife cultivars previously thought to be non-invasive as well as cultivars of a native species are now known to cross-pollinate with invasive loosestrife varieties. These plants were introduced from Europe as ornamentals. The Latin species name *salicaria* means willow-like, for the leaves resemble those of willows.



XID Services photo by Richard Old

Yellow Toadflax



Linaria vulgaris P. Mill.

Alternate Names

Common toadflax, toadflax, butter and eggs, wild snapdragon

Synonyms

Linaria linaria (L.) Karst.

Related Species

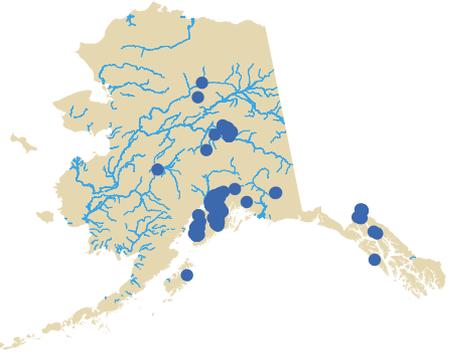
Dalmatian Toadflax

L. dalmatica (L.) Mill.

Description

Yellow toadflax is a perennial plant, rarely branched, that often grows in clumps up to 2 1/2 feet high. Leaves are numerous, alternate, pale green, narrow, up to 2 1/2 inches long, and pointed at both ends. Flowers are yellow with an orange throat and 1 to 2 inches long that appear in dense terminal clusters and resemble snapdragons, with a tube-like structure extending below the lower lip of the corolla. The fruit is an ovate to egg-shaped capsule that is 1/4 to 1/2 of an inch long. Seeds are flattened, ovate, and winged.

Dalmatian toadflax (*L. dalmatica* (L.) Mill.) is another exotic species to look out for that is common in the western United States. This perennial plant is larger than yellow toadflax, growing to 5 feet rather than 2 1/2 feet high, and its leaves are broad and ovate to ovate-lanceolate rather than linear to linear-lanceolate. Dalmatian toadflax has alternate leaves



USDA Forest Service photo by Michael Shephard

Yellow toadflax, *Linaria vulgaris*.

that are 1 to 2 inches long and about $\frac{1}{2}$ of an inch wide. Stem leaves are stalkless and clasp the stem. All leaves are bluish-green and hairless. Flowers are large, yellow, and borne in long terminal clusters. A prominent spur, $\frac{1}{2}$ to $\frac{3}{4}$ of an inch long, is projected from the back of the petals. Dalmatian toadflax is similar in biology and management to yellow toadflax, and so the information below will generally apply to both species.



USDA Forest Service photo
by Michael Shephard

Yellow toadflax, Linaria vulgaris.

Similar Species

There are no other yellow, spurred species in Alaska that might be easily confused with the toadflaxes.

Ecological Impact

Yellow toadflax is a persistent and aggressive invader that is capable of forming dense colonies. It can suppress native grasses and other perennials, primarily through intense competition for limited soil and water. This species contains a poisonous glucoside that is reported to be unpalatable and moderately poisonous to livestock. Yellow toadflax is an alternate host for tobacco mosaic virus. It reduces soil moisture and nutrient availability, changes soil texture and composition, and alters local pollination ecology (M. Carlson, pers. comm. 2004).



National Park Service photo by Penny Bauder

Yellow toadflax, Linaria vulgaris.

Biology and Invasive Potential

Yellow toadflax reproduces by seeds and creeping rhizomes. Plants cannot

self-fertilize and are pollinated by insects. Seed production ranges from 1,500 to 30,000 seeds per individual, but seed viability is generally low. Seeds are winged and can be carried by the wind, and they may remain dormant for a period of up to 10 years. Taproots may penetrate the soil to 3 feet deep and extend 10 feet away from the parent plant. Disturbance promotes invasion and is necessary for establishment to occur. Once established, yellow toadflax readily spreads into adjacent non-disturbed areas. It may be dispersed by water and ants and is often found as a contaminant in commercial seed or sold by nurseries. Germination is minimal without a 2 to 8 week period of chilling (J. Gibson, unpubl. data). Vegetative reproduction may begin as soon as 2 to 3 weeks after germination, and this species can establish from root fragments as short as 1/2 of an inch. Generally, it does well in wet or dark areas with high fertility (Pokorny and Sheley 2003). Yellow toadflax is listed as noxious in Colorado, Idaho, Nevada, New Mexico, Montana, Oregon, South Dakota, Washington and a restricted noxious weed in Alaska (Alaska Administrative Code 1987).

Distribution and Abundance

Yellow toadflax was imported into North America in the late 1600s as an ornamental and for folk remedies. It occurs on sandy and gravelly soil on roadsides, pastures, lake and beach shores, cultivated fields, meadows, and gardens. It is found throughout the United States and in every Canadian province and territory. It is commonly found throughout southcentral and interior Alaska, particularly near settlements or anthropogenic disturbance. Native to southcentral Eurasia, the present world distribution of yellow toadflax includes most of Europe and Asia, Australia, New Zealand, South Africa, Jamaica, and North and South America.

Management

Cutting, mowing, and tilling are effective ways to eliminate plant reproduction by seed, and hand-pulling can control small infestations if monitored and retreated over many

Family: Scrophulariaceae

Yellow Toadflax

years. Control is most effective in early summer, after flower bud formation but before flowering. Herbicide treatment can significantly reduce plant infestations, especially when used as a follow-up to other methods. Vigorous grasses can be used to compete with toadflax. Several biological agents effective against yellow toadflax have been approved by the USDA. The weevil, *Gymnetron antirrhini*, is the most important agent for biological control in British Columbia and the northwestern United States. Other agents include shoot and flower-feeding beetles (*Brachyterolus pulicarius*) and root-boring moths (*Eteobalea serratella* and *E. intermediella*) (Carpenter and Murray 1998). Fruits and seeds recently collected in Anchorage had about 20% infestation by an unknown weevil (M. Carlson, pers. comm. 2004).



USDA-Aphis-PPQ photo by R. Hansen

Dalmatian toadflax, Linaria dalmatica.

Notes

Toadflaxes were brought to North America as ornamentals because they are easy to grow and very hardy. Yellow toadflax was often one of the first flowers planted at mining settlements, and it often still remains in these abandoned townsites and spreads into surrounding wild areas. A mature dalmatian toadflax plant can produce 500,000 seeds in a year.



XID Services photo by Richard Old

An infestation of dalmatian toadflax, Linaria dalmatica.

Foxglove

Digitalis purpurea L.

Alternate Names

Purple foxglove

Description

Foxglove is a biennial plant that grows 2 to 5 feet tall and unbranched. Leaves are soft, hairy, toothed, and lance- to egg-shaped.

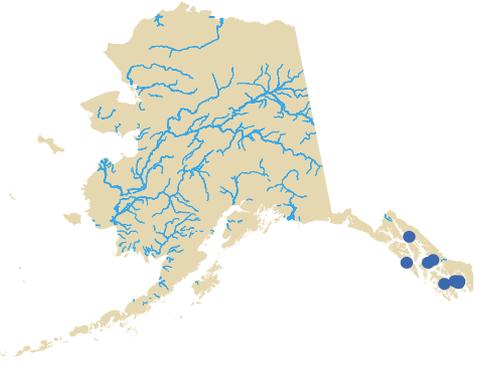
Basal leaves to 12 inches long. Flowers are bell-shaped, very showy, purple with purple mottling on the inside, and borne on a spike. Most foxglove cultivars have flowers arranged on one side of the spike.

Similar Species

It would be difficult to mistake a native Alaskan plant for foxglove. There are a couple of *Penstemon* species of the same family whose ranges may barely extend into eastern interior Alaska, but their flowers are smaller and bluer than those of foxglove.

Management

Hand pulling can effectively control foxglove. Herbicides are more effective on large infestations. Control efforts must continue for at least 5 years with site monitoring for at least 10 years due to a long-lived seedbank. Biological controls have not been developed due to the species' horticultural value (Harris 2000). First-year rosettes do not survive interior Alaska winters and usually do not survive southcentral Alaska winters (J. Riley, pers. comm. 2005).



USDA Forest Service photo by Tom Heutte

Notes

Foxglove is common in communities throughout southeast Alaska, where it is a popular garden plant that has escaped from cultivation. Potential ecological effects are not known, but it has been observed forming dense stands along roadsides and vacant lots. This plant is the source of the cardiac drug digitalin, which makes the plant highly poisonous. The earliest known name for this plant is the Anglo-Saxon “foxes glofa” (the glove of the fox). The name is derived from the shape of the flowers, which resemble the fingers of a glove, or possibly from a northern legend that bad fairies gave the blossoms to the fox to put on his toes, so that he might soften his tread while he hunted for prey.



USDA Forest Service photo by Tom Henette

Common Eye-bright

Euphrasia nemorosa (Pers.) Wallr.

Synonyms

Euphrasia curta (Fries) Wettst., *Euphrasia officianalis* ssp. *nemorosa* Pers., *Euphrasia stricta* auct.

Description

Common eyebright is a small annual plant that usually grows less than 6 inches high. It has small, deep green leaves and tiny white open trumpet-shaped flowers with a divided lower lip and a purple tinge to the outside of the petals, deep lines into the throat, and a yellow blotch on the lower lip.



Photo by Andy Horton

Similar Species

There are 2 similar species in this genus that are native to Alaska and found on dry, grassy heaths, beside paths, and in open woods, on chalky and acidic soils. Arctic eyebright (*Euphrasia subarctica* Raup) and subalpine eyebright (*Euphrasia mollis* (Ledeb.) Wettst.) look similar to common eyebright but can be differentiated by the presence of a white corolla with purple lines and a lavender upper lip.



Photo by Andy Horton

Management

Little information is available concerning control methods for common eye-bright. Hand-pulling is in trial at Klondike Gold Rush National Historical Park, but the effectiveness of this treatment is not yet known.

Family: Scrophulariaceae

Common Eye-bright

Notes

Common eyebright is native to Europe. The common name comes from its use to make a tincture to improve vision.