

Family
Asteraceae

Spotted Knapweed



Centaurea biebersteinii DC.

Synonyms

Acosta maculosa auct. non Holub,
Centaurea maculosa auct. non Lam.

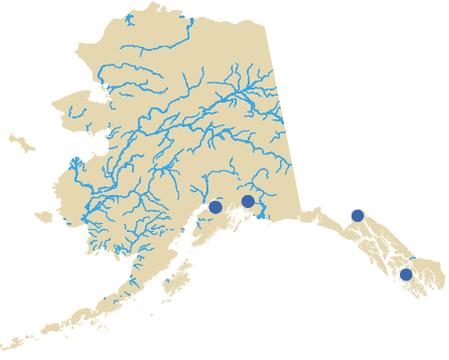
Related Species

Russian Knapweed
Acroptilon repens (L.) DC.

Description

Spotted knapweed is a biennial to short-lived perennial plant. Seedling cotyledons are ovate, with the first leaves lance-shaped, undivided, and hairless. (Young seedlings can appear grass-like.) Stems grow 1 to 4 feet tall, and are many-branched, with a single flower at the end of each branch. Rosette leaves are indented or divided about half-way to the midrib. Stem leaves are alternate, pinnately divided, and get increasingly smaller toward the tip of each branch. Flower heads are urn-shaped, up to 1 inch wide, and composed of pink, purple, or sometimes white disk flowers. A key characteristic of spotted knapweed is the dark comb-like fringe on the tips of the bracts, found just below the flower petals. These dark-tipped bracts give this plant its “spotted” appearance.

Russian knapweed is a creeping perennial plant that is extensively branched, with solitary urn-shaped pink or purple flower heads at the end of each branch. Similar in appearance to spotted knapweed, Russian knapweed can be distinguished by its slightly smaller flower heads, flower head bracts covered in light hairs, with papery tips, and scaly dark brown or black rhizomes, which have a burnt appearance.



Spotted knapweed flower.

XID Services photo by Richard Old

Leaves and stems of both spotted and Russian knapweeds are covered in fine hairs, giving the plants a grayish cast.

Similar Species

Knapweeds can be distinguished from thistles (*Cirsium* spp.) by their lack of spiny leaves. Spotted and Russian knapweeds could be confused with several other invasive knapweed species that are not yet found in Alaska but have the potential to grow here. Diffuse or spreading knapweed (*Centaurea diffusa* Lam.) is distinguished from spotted knapweed by its spine-tipped floral bracts. Yellow star thistle (*C. solstitialis* L.) also has spine-tipped floral bracts as well as yellow flowers.

Ecological Impact

Spotted knapweed often forms dense stands in natural communities outside of Alaska. It reduces native plant vigor, diversity, and forage quality and degrades wildlife habitat. For example, winter-ranging elk may avoid foraging in infested communities (Rice et al. 1997). Knapweeds are allelopathic, inhibiting the establishment and growth of surrounding plants (Whitson et al. 2000). Erosion of topsoil has been shown to increase after spotted knapweed invasion. Sediments in surface runoff from sites dominated



UAF Cooperative Extension Service photo by Michael Rasy

Spotted knapweed infestation along Turnagain Arm.

by spotted knapweed were found to be approximately three times greater than the amount of sediments from native bunchgrass sites (Rice et al. 1997).

Russian knapweed is extremely competitive, and dense patches will totally exclude other vegetation. The allelopathic compound cnicin is contained in the leaves and is released into the soil after leaves fall. Grazing animals generally avoid Russian knapweed due to the bitter taste, and it can cause chewing disease in horses.

Biology and Invasive Potential

Spotted knapweed reproduces entirely by seed. Large plants may produce over 20,000 seeds (Royer and Dickinson 1999), and 30% of seeds can remain viable after 8 years of burial (Mauer et al. 1987). Anthropogenic disturbances, including overgrazing and mechanical soil disturbance, accelerate its invasion. Other soil disturbances, such as frost heave, small mammal burrowing, or trampling and grazing by native ungulates, can also facilitate spotted knapweed invasion (Tyser and Key 1988). Seeds lack pappus but have been reported to be dispersed by wind as well as by rodents and livestock (Mauer et al. 1987). Humans are the primary vector for spotted knapweed movement, through seed dispersal on vehicles, machinery, and aircraft as well



Photo by Ron Broda.

Russian knapweed.



XID Services photo by Richard Old

Spotted knapweed rosette.

as the contamination of hay, commercial seed, and floral arrangements (Mauer et al. 1987). Spotted knapweed seeds germinate over a wide range of soil depths, moisture, and temperature regimes. Seedlings that emerge early in spring have a high probability of survival and reproduction in the following year. Those emerging later (June to July) have reduced survival and almost no stem production the following season (Schirman 1981). Spotted knapweed grows well in light, porous, fertile, well-drained, and often high pH soils, especially in areas with warm summers, and it tolerates both dry and moist conditions (Beck 2003). It is listed as a noxious weed in 15 of the United States and 4 Canadian provinces.

Russian knapweed reproduces by seed or by vegetative root buds, although it is a very poor seed producer and germination rarely occurs in the field (Selleck 1964). Plants grow radially, and a patch can cover over 100 square feet within 2 years. Russian knapweed is commonly found on deep or moist soils and is tolerant of poorly drained, saline, and alkaline soils (Roche and Roche 1991). It is also drought-tolerant, surviving on sites that receive as little as 10 inches of annual precipitation (Watson 1980). Russian knapweed is listed as a noxious weed in 4 Canadian provinces and 25

of the United States, including Alaska (Alaska Administrative Code 1987).

Distribution and Abundance

Spotted knapweed establishes primarily along highways, waterways, railroad ways, and pipelines. Semi-arid grassland and open forests have been invaded in Montana, Idaho, Colorado, Massachusetts, and North Dakota (Lym and Zollinger 1992, Rice et al. 1997). This species has infested hundreds of thousands of acres in the northwestern United States and at least 8,500 acres of rangeland in British Columbia (Royer and Dickinson 1999). In Alaska, it has been found in Skagway and Valdez, on Prince of Wales Island, and along the Seward Highway between Anchorage and Girdwood. Available data suggest that this species was only recently introduced to Alaska, as it was first reported in 2001 (ALA 2004). Spotted knapweed is native to central and southeastern Europe and has also invaded northern Europe, Asia, and Australia.

Russian knapweed is native to Asia, and it was initially introduced to North America in the early 1900s, primarily as a seed contaminant. Its spread from these locations is linked to the distribution of infested hay. Russian knapweed is now widespread in the United States and especially common in the semi-arid portions of the western states and adjacent Canadian provinces. It invades disturbed grasslands, shrublands, and riparian woodlands, accounting for a total of 1,500,000 acres infested in North America in 2000 (Zouhar 2001a). It has not been documented in Alaska as of early 2005 but could arrive at any time.

Management

Long-term control of large knapweed infestations requires a combination of grazing management, herbicide use, biological control, and vegetative suppression. Hand-pulling can be effective if new infestations are small and control efforts are persistent. Areas must be monitored for several years for seedling control as they emerge from the seedbank. Most knapweed control has been conducted in

agricultural settings, with relatively little information available on the use of herbicides in native plant communities for conservation purposes (Lym and Zollinger 1992, Rice et al. 1997). A number of herbicides effectively control spotted knapweed on rangeland (Davis 1990). For long-term control, herbicides must be applied annually until the seed bank is exhausted, and a revegetation program is necessary to resist reinvasion. In order to suppress knapweeds, other plant species must remove a significant amount of moisture from the soil during periods when knapweeds are in the vulnerable seedling stage. However, knapweeds readily compete with seedlings of other species and need to be controlled prior to establishing vegetation for suppression. Vegetative suppression alone will not provide lasting knapweed control (Stannard 1993). A number of biological control agents have been moderately successful in Montana and other western states (Rees et al. 1996). Thankfully, the populations of knapweed in Alaska have been small, and in most cases have been eradicated or controlled via hand pulling.

Notes

Knapweeds originated in central Asia and were introduced to North America as contaminants of crop seed around 1898 in alfalfa and clover seed. They are now found on all continents except Antarctica.



USDA Forest Service photo by Michael Shephard

Spotted knapweed spreading along a roadside.

Canada Thistle



Cirsium arvense (L.) Scop.

Alternate Names

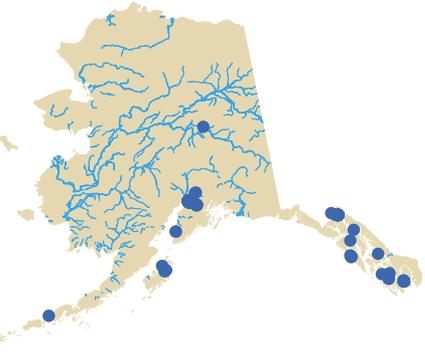
Creeping thistle, field thistle, cursed thistle, corn thistle, small-flowered thistle, green thistle

Synonyms

Cirsium incanum (Gmel.)
Fisch., *Cirsium setosum*
(Willd.) Bess. ex. Bieb.,
Serratula arvensis L.

Description

Canada thistle is a perennial plant that can form new shoots from deep and extensive horizontal roots. Stems are generally 1 to 4 feet tall, branching above. Leaves are alternate, lacking petioles, shallowly to deeply pinnatifid or merely lobed, with spiny margins. The leaf underside is covered with soft, woolly hairs. Flowers are purple in heads measuring 1/2 to 3/4 of an inch in diameter. Male and female flowerheads occur on separate plants. Flowers are almost exclusively insect-pollinated. Fruits are brownish, with a tuft of hair at the top.



Male flower heads.

XID Services photo by Richard Old

Similar Species

There are 3 native species of thistle whose ranges barely extend into the southern and northern portions of southeast Alaska as well as the western Aleutians (Hultén 1968): edible thistle (*Cirsium edule* Nutt.), Drummond's thistle (*Cirsium foliosum* (Hook.) DC.), and Kamchatka thistle (*C. kamtschaticum* Ledeb. ex DC.), respectively. Canada thistle is one of



Seed heads of female plants.

XID Services photo by Richard Old

2 species of exotic thistle in Alaska – the other being bull thistle (*C. vulgare* (Savi) Ten., included in this book) – and is the only Alaskan thistle with narrow flowerheads. The edible thistle (*Cirsium edule* Nutt.) is found in the southern portion of southeast Alaska and is included in the Forest Service's Regional Forester's List of Sensitive Species. It has much larger flowerheads than Canada thistle.

Ecological Impact

Canada thistle threatens natural communities by directly competing for water and nutrients and displacing native vegetation, which often leads to a decrease in species diversity. It produces allelopathic chemicals that assist in this displacement (Evans 1984, Hayden 1934). Pollinating insects appear to be drawn away from native species to visit Canada thistle (Zouhar 2001b). This species has been reported to accumulate nitrates that cause poisoning in animals upon ingestion, and the spiny leaves scratch animal skin, potentially causing infection. It is a host for several pests, including bean aphids, stalk borers, and sod-web worms (Nuzzo 1997). Canada thistle can increase fire frequency and severity due to its abundant and flammable litter (Zouhar 2001b). It is an aggressive agricultural weed and has the potential to reduce crop yields by 100% (Royer and Dickinson 1999).



X1D Services photo by Richard Old

Biology and Invasive Potential

Canada thistle readily propagates from stem and root fragments. It reproduces by seeds but mostly spreads by sending up new shoots each year from lateral roots. An individual plant may produce over 40,000 seeds per year (Royer and Dickinson 1999). Canada thistle has been observed in natural areas around ponds and wetlands, areas of soil erosion, and gopher mounds. It apparently cannot become established or spread in undisturbed lands or in good to excellent pasture conditions (Zouhar 2001b,

Bossard et al. 2000, Evans 1984), while soil disturbance increases thistle densities (Hayden 1934). The pappus breaks off easily from Canada thistle seeds, and so most seeds land near the parent plant. However, a small proportion of seeds (0.2%) can disperse 1 km or more from the parent plant (Nuzzo 1997, Bostock and Benton 1979). The seeds float and are easily distributed by water, and they can also be dispersed in dung. Ducks and other waterfowl may also act as seed dispersal agents (Hayden 1934). Canada thistle also spreads as a contaminant of nursery rootstock, crop seed, hay, and packing material and in mud attached to vehicles and farm equipment (Nuzzo 1997). Seeds germinate best in the top half-inch of soil with abundant soil moisture and temperatures averaging between 68 and 86o F. New seeds will germinate in bright light. Approximately 90% of seeds germinate within one year, but some seeds can remain viable in the soil for up to 20 years (Hutchison 1992). Canada thistle can grow on a variety of soil types, including clay, loam, silt, gravel, and chalk, and is shade-intolerant (Nuzzo 1997). It has been declared noxious by 6 Canadian provinces and 35 of the United States, including Alaska (Alaska Administrative Code 1987), and is considered a serious pest in 37 countries (Zouhar 2001b).



*UAF Cooperative Extension Service photo
by Michael Rasy*

Distribution and Abundance

Canada thistle was introduced to North America in the early 17th century and was first declared a noxious weed by the state of Vermont in 1795 (Nuzzo 1997). It is found throughout Canada and the northern half of the United States (NRCS 2005). It has been found in many locations in southeast and southcentral Alaska, as well as Fairbanks, Delta Junction, Afognak Island, and Cold Bay. The first recorded occurrence in Alaska was in Palmer in 1946 (ALA 2004). Outside of Alaska, it is common on roadsides,

railway embankments, lawns, gardens, abandoned fields, agricultural fields, and pastures. Susceptible natural areas include prairies and wet grasslands in Canada and the Dakotas and sedge meadows in Wisconsin and Illinois. In eastern North America, it occurs in sand dunes, stream banks, lakeshores, swamps, and ditches (Nuzzo 1997). It is native to southeastern Europe, western Asia, and northern Africa. It has achieved nearly global distribution, excluding Antarctica.

Management

Canada thistle is very difficult to control once established. Hand-pulling is ineffective because it fails to remove the lateral roots. A combination of mechanical, cultural, and chemical methods are more effective than any single method alone. Mowing is effective only if repeated monthly for several years. When using herbicides, proper timing and dosage are essential; otherwise the plants recover, sometimes better off than before because competing vegetation was killed. Mature thistle plants will not absorb herbicides well enough to get a complete kill, but after a mid- to late-summer mowing they will readily absorb herbicide once they have resumed growth as rosettes prior to stem elongation. For best results, mow plants in mid- to late-summer and then apply herbicide in the early fall when photosynthetic products are being transported from the leaves to the roots. There are selective broadleaf herbicides that are effective for Canada thistle control if properly applied.

Notes

Despite its common name, Canada thistle was introduced from central Eurasia as a contaminant of crop seed.

Bull Thistle



Cirsium vulgare (Savi) Ten.

Alternate Names

Common thistle, spear thistle

Synonyms

Cardus lanceolatus L., *Cardus vulgaris* Savi, *Cirsium lanceolatum* (L.) Scop.

Description

Bull thistle is a biennial plant with a short, fleshy taproot. The stem is 2 to 5 feet tall, conspicuously winged and bearing many spreading branches. It is green to brownish and sparsely hairy. Leaves are pinnately lobed, hairy and prickly on the upper side, and cottony underneath. Leaf blades extend down the petiole and along the stem to form long, prickly wings. Flowerheads are 1 to 2 inches wide with deep purple flowers. The bristles on the pappus are feathery. Flowering occurs from July through September.



XID Services photo by Richard Old

Similar Species

There are 3 native species of thistle whose ranges barely extend into Alaska – see the Canada thistle account for more information. Bull thistle is the only large-headed thistle in Alaska with a prickly, winged stem. The edible thistle (*Cirsium edule* Nutt.) is found in the southern portion of southeast Alaska and is included in the Forest Service's Regional Forester's List of Sensitive Species. It lacks the winged stem of bull thistle.

Ecological Impact

Bull thistle competes with native species for water, nutrients, and space, displaces native plants, and decreases forage quality for grazing animals.



Biology and Invasive Potential

Bull thistle reproduces only by seeds, and cross-pollination is required. A wide variety of insects pollinate this species. Average fruit production is nearly 4,000 per plant. Seed viability is high, and up to 90% may germinate within a year, but bull thistle is not known to form persistent seedbanks (Klinkhamer and DeJong 1988). Disturbance of soil and vegetation increases seedling emergence and establishment. Most seeds fall within 3 feet of the parent plant, but up to 10% may travel greater distances with little wind (Klinkhamer et al. 1988). Bull thistle is also spread by the movement of livestock, vehicles, farm machines, seed, and hay. Germination is stimulated by soil moisture and light, and seeds have no innate dormancy. Bull thistle is most common on soils with intermediate moisture, and it tolerates a wide pH range. It is listed as a noxious weed in Colorado, Iowa, Kansas, Maryland, Michigan, Minnesota, New Mexico, Oregon, Pennsylvania, and Washington and in Manitoba and Ontario.



XID Services photo by Richard Old

Distribution and Abundance

Bull thistle is most common in recently or repeatedly disturbed areas such as pastures, rangelands, roads, and ditches. It can also colonize areas in relatively undisturbed grasslands, meadows, and forest openings. It is native to Europe, western Asia, and northern Africa. It is now naturalized and widespread throughout the United States and southern Canada and present on every continent except Antarctica. In Alaska, bull thistle has been found in Ketchikan, Juneau, Haines, Gustavus, Cordova, Anchorage, and Fairbanks. The first documented occurrence in the state

was from Cape St. Elias on remote Kayak Island in 1978 (ALA 2004). It was probably introduced to North America as a contaminant of seed or ballast in the late 1800s.

Management

Bull thistle plants are easily pulled up by hand, but be sure to wear stout leather gloves to protect against the spines. It does not withstand cultivation, and mechanical cutting of plants at the soil surface is also an effective method of control. Control programs should be maintained for at least 4 years. Herbicides are often most effective when applied to rosette stage plants. Rosettes can be induced by mowing several weeks before the application. A variety of natural seed predators are present in the Netherlands, and so biological control may become an option in the future (Klinkhamer et al. 1988).



USDA Forest Service photo by Michael Shephard

Notes

Horses will eat bull thistle flowerheads, carefully avoiding ingesting the spines, because they are attracted by the sugary nectar found at the base of each floret.

Orange Hawkweed and other hawkweeds



Hieracium aurantiacum L.

Alternate Names

Devil's paintbrush, king-devil

Related Species

Hieracium pilosella L.

Mouseear hawkweed

Hieracium caespitosum

Dumort.

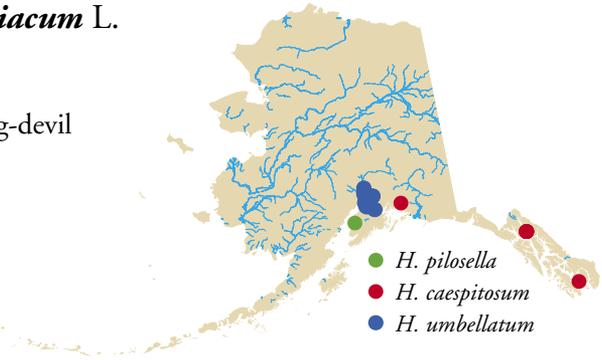
Meadow hawkweed

Hieracium umbellatum L.

Narrowleaf hawkweed

Description

Orange hawkweed is a perennial plant with shallow, fibrous roots, stolons, and well-developed basal rosettes. Leaves are oblanceolate to narrowly elliptic, up to 5 inches long, almost exclusively basal, and darker on the upper surface than on the lower surface. Leaves are covered with soft white hairs and stems are covered with shorter dark-colored hairs. Stems and leaves exude milky latex when cut or broken. Stems reach a height of 12 inches and bear up to 30 flowerheads greater than 1/2 of an inch wide near the top. Flowerheads are dark red on the edges and orange in the center and consist of ray florets with notched upper margins. Each floret produces a single-seeded fruit. In Alaska, orange hawkweed produces flowers from mid-July through October. When flowers are absent, look for clumps of serrated leaves covered with downy



Orange hawkweed.

National Park Service photo by Jeff Heys



Roadside infestation of orange hawkweed.

UAF Cooperative Extension Service photo by Jannie Snyder

white hairs. Seeds are oblong, purplish black, and 1/16 to 1/8 of an inch long.

Similar Species

Seven *Hieracium* species are found in Alaska, including 3 native species and 4 exotic species. All have yellow flowers except for orange hawkweed and white hawkweed (*H. albiflorum* Hook.), and no other composite species in Alaska has dark orange to red flowerheads. The native hawkweeds can be distinguished from the other exotic species by their smaller flowerheads, less than 3/8 of an inch wide.



XID Services photo
by Dan Tenaglia

Mouseear hawkweed.

Several characteristics can be used to differentiate the other exotic hawkweeds. Meadow hawkweed (*H. caespitosum* Dumort.) forms from short, stout rhizomes and long, leafy stolons. Stems are erect and solitary with glandular, starlike hairs. Basal leaves are oblanceolate to spoon-shaped and toothed. Stems bear up to 30 flowerheads greater than 1/2 of an inch wide near the top. Ray florets are yellow. Mouseear hawkweed (*H. pilosella* L.) has a basal rosette and stolons and produces only one yellow flowerhead on a single slender stem. The stem and leaves are covered with dense wooly hair. Narrowleaf hawkweed (*H. umbellatum* L.) has a stem with leaves but does not form a basal rosette and has no stolons. Most published literature suggests that the exotic hawkweeds are similar in biology and management, and so the following information will generally apply to all 4 species.

Ecological Impact

Orange hawkweed forms a dense mat of plants in which no other species can grow, thereby lowering species diversity and reducing the forage value of grasslands for grazing animals. It is a successful allelopathic competitor that crowds out native, pasture, and range species. It hybridizes freely with native and exotic hawkweeds. It likely reduces soil

moisture and nutrient availability (J. Snyder, pers. comm. 2004). Orange hawkweed can invade undisturbed sites and is considered one of the worst nuisance species in agricultural and natural areas.

Biology and Invasive Potential

Orange hawkweed typically produces 12 to 30 seeds per flower, for about 50 to 600 per plant, and sends out 4 to 8 stolons each season. It can resprout from any fragments left in the soil. Seeds are viable for up to 7 years, and infested areas can have extensive seed banks. Orange hawkweed readily grows in cleared areas in forests. Mowing promotes flowering and the spreading of stolons. Fruits are adapted to wind dispersal. Seeds are easily carried by vehicles, animals, and clothing. It is common in urban areas due to its use as an ornamental. Orange hawkweed is listed as noxious in Colorado, Idaho, Minnesota, Montana, and Washington.

Distribution and Abundance

Orange hawkweed was introduced to North America for use as an herbal remedy and ornamental before 1818. It is native to the alpine and hillside meadows of Europe and has now established across Eurasia, as well as from coast to coast in North America as far south as Indiana and West Virginia. It prefers well-drained soils, growing in permanent meadows, grasslands, rangelands, and pastures, and thrives in nutrient-poor, uncultivated, or disturbed soils. In Alaska, the first documented occurrence was from the Juneau area in 1961 (ALA 2004). Orange hawkweed is abundant in communities throughout southeast and southcentral Alaska and has been found in the remote community of Dillingham. It has been found in undisturbed meadows of the Kodiak National Wildlife Refuge, where control measures are underway.



Narrowleaf hawkweed.

USDA Forest Service photo
by Tom Heutte

Management

Mechanical methods such as mowing, cutting, and digging will not eliminate hawkweed. Treatment with selective herbicides is most effective. Hand-pulling can be effective for small infestations if care is taken to remove as much of the root as possible. Mowing is ineffective because rosettes are so close to the ground. No single management practice can be implemented just once to manage hawkweed. Effective hawkweed management will depend on a program that integrates control methods with restoration techniques that increase the competitive ability of desired species. Hawkweed can be controlled with herbicides, proper use of surfactants is necessary to increase the adherence of herbicides to the hairy leaves and stems of hawkweeds. Plants should generally be treated when they are in the rosette stage. There are no biological controls currently available.

Notes

There are over 700 species in the taxonomically complex Hieracium genus, mostly native to Europe and South America, although there are a few native North American species. The genus Hieracium was derived from the Greek hierax, “a hawk”. Orange and yellow hawkweeds are considered the worst invasive plant species in New England. Mouseear hawkweed is one of the smallest of all the hawkweeds.



Meadow hawkweed.

XID Services photo by Richard Old

Oxeye Daisy



Leucanthemum vulgare Lam.

Alternate names

White daisy

Synonyms

Chrysanthemum leucanthemum L., *Chrysanthemum leucanthemum* L. var. *boecheri* Boivin, *Chrysanthemum leucanthemum* L. var. *pinnatifidum* Lecoq & Lamotte, *Leucanthemum leucanthemum* (L.) Rydb., *Leucanthemum vulgare* Lam. var. *pinnatifidum* (Lecoq & Lamotte) Moldenke

Description

Oxeye daisy is a shallow-rooted perennial plant with numerous stems from 1 to 3 feet tall.

Stalked basal leaves are spatula-shaped, broadly toothed, 2 to 5 inches long, and 2 inches wide. The stem leaves are alternate, smooth, and glossy, becoming progressively smaller towards the top. The leaf stalks are short and clasp the stem. Solitary flowerheads at the ends of stems are 1 to 2 inches in diameter and composed of white ray florets and yellow disc florets. Seeds have no pappus.



National Park Service photo
by Penny Bauder

Similar Species

In Alaska, the native arctic daisy (*Dendranthema arcticum* (L.) Tzvelev) could be confused with oxeye daisy but is confined to rocky seashores and estuaries throughout coastal Alaska and is more low-growing, with wedge-shaped rather than spatula-shaped basal leaves. Shasta daisy (*Leucanthemum maximum* (Ramond) DC.) is a commonly cultivated garden flower that can only be distinguished from oxeye daisy by microscopic characteristics. All other

Alaskan composite species with white ray florets have either entire leaves or highly dissected leaves.

Ecological Impact

Seemingly an innocuous wildflower, oxeye daisy is invasive in natural habitats in many locations. Often included in wildflower seed mixes, it is widely planted and easily escapes cultivation, out-competing and displacing native species. It can form dense colonies, decreasing overall vascular plant diversity, and can quickly replace up to 50% of the grass species in pastures (Royer and Dickinson 1999). The entire plant has a disagreeable odor, grazing animals avoid it, and it contains chemicals that are highly toxic to most insect herbivores. Oxeye daisy can host various plant diseases, including chrysanthemum stunt, aster yellows, tomato aspermy viruses, and several nematode species (Royer and Dickinson 1999). Dense infestations increase the potential for soil erosion.

Biology and Invasive Potential

Oxeye daisy is a perennial plant that flowers in the second year and can spread both vegetatively and by seed. It is primarily insect-pollinated by a number of different orders of insect species. A single plant normally produces 1,300 to 4,000 fruits (Howarth and Williams 1968). Estimates of the duration of seed viability vary widely, but most exceed 20 years. Fruits lack the elongated pappus necessary for wind dispersal but can be transported in dung, with timber products, in contaminated forage grass, and in legume seed batches. Seedling germination is greatest with high moisture and is inhibited by continuous darkness. Dense groundcover can prevent establishment, although chilling and drought



USDA Forest Service photo by Tom Heutte

appear to have no effect on germination rates. No cold-stratification is required for germination, and it withstands temperatures to -28°F and requires 130 frost-free days for reproduction (GRIN 2004). Oxeye daisy is adapted to coarse and medium textured soils with pH levels ranging from 5.2 to 7.0. Cutting, mowing, trampling, and grazing promote establishment. Oxeye daisy continues to be used as a component in wildflower seed mixes available in Alaska, despite its listing as a noxious weed in 8 states and 4 Canadian provinces.

Distribution and Abundance

Introduced from Europe as an ornamental, oxeye daisy has escaped cultivation and is now common outside of Alaska in native grasslands, pastures, beach meadows, waste areas, and roadsides. It is a serious weed of 13 crops in 40 countries and is found in every state in the United States. It was introduced to the Pacific Northwest in the late 1800s from its native range in Europe (Mediterranean to Scandinavia) and Siberia. Populations have established in eastern Asia, Iceland, Greenland, North and South America, Hawaii, Australia, and New Zealand (Hultén 1968). The first documented occurrence in Alaska was near Ketchikan in 1963 (ALA 2004). It is now common around communities in southeast and southcentral Alaska and has been found in Fairbanks, McCarthy, and Afognak in addition to a number of remote locations around the state (AKEPIC Database 2004).

Management

Hand-pulling and mechanical control can be effective for small infestations if repeated over multiple years, and treatments should be completed before seed production and regularly monitored afterward. For lawns or other level ground, regular



XID Services photo by Richard Old

mowing will control this species. Several herbicides will control oxeye daisy, but they are not selective. In eastern Washington, application of nitrogen fertilizer was found to be almost as effective as herbicide application for reducing its canopy cover in mountain meadows (NWCB 2000). No effective biological control agents have been identified for oxeye daisy.

Notes

Taxonomists have placed oxeye daisy in the genus *Leucanthemum* and *Chrysanthemum* at different times. Its seeds can remain viable after passing through the digestive tracts of animals. The plant has been employed successfully in the treatment of whooping cough, asthma and “nervous excitability.”

Tansy Ragwort



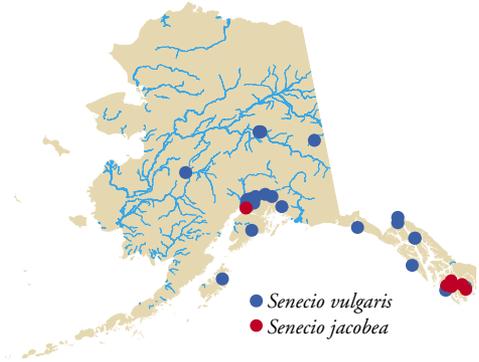
Senecio jacobaea L.

Alternate Names

Common ragwort, staggerwort

Description

Tansy ragwort is a biennial or perennial plant with one to several stems growing 1 to 4 feet tall from a taproot. Leaves are deeply cut. Basal leaves have stalks and are 2 to 8 inches long. Ascending the stem, leaves become smaller and stalks become shorter. Leaves are alternate, equally distributed, and generally 2 to 3 times pinnately lobed with the terminal lobe larger than the lateral ones. Flowerheads are borne in terminal clusters and consist of yellow ray and disc florets. There are 10 to 13 ray florets per flowerhead that are 1/4 to 1/2 of an inch long. The fruits of the disk florets are minutely hairy, while those of the ray florets are hairless.



UAF Cooperative Extension Service photo by Michael Rasy

Similar Species

Hultén (1968) describes 19 *Senecio* species in Alaska, most of which are native, with the exception of common groundsel (*S. vulgaris* L.) and desert ragwort (*S. eremophilus* Phil.). Common groundsel is an annual weed reported from multiple regions of Alaska and can be differentiated from other species by its deeply pinnatifid leaves that lack the feathery appearance of tansy ragwort leaves. Desert ragwort can be distinguished from other species by the presence of leaves that are shallowly pinnatifid and not

reduced upward. Sticky ragwort (*S. viscosus* L.) is another species that may show up in Alaska in the future and is similar to common groundsel but sticky-haired throughout, whereas common groundsel is hairless. Common tansy leaves (*Tanacetum vulgare* L.), included in this book) resemble those of tansy ragwort, but the ray florets are either minute or absent.

Ecological Impact

Tansy ragwort is poisonous to livestock. The plant contains a toxic alkaloid that reacts with enzymes to cause cumulative liver damage. Ingestion of the plant causes livestock to stagger, hence the common name staggerwort. It is estimated that the state of Oregon has lost 4 million dollars a year to livestock poisoning by this species.

Biology and Invasive Potential

Tansy ragwort usually germinates in fall or early winter, lives through the next year as a rosette, and then dies the following year after producing flowers and seeds. A single large plant may produce up to 150,000 seeds that can lie dormant in the soil for as long as 15 years. The fibrous root system can produce small adventitious shoots when stimulated by mechanical destruction or pulling (King County DNR 2004a). Seeds are tiny and are tipped by hairlike plumes that can carry seeds in the wind over long distances. Tansy ragwort is listed as a noxious weed in Washington, Idaho, and British Columbia.

Distribution and Abundance

Tansy ragwort is native to Eurasia and is now widespread in California, Oregon, Washington, and British Columbia, infesting millions of acres of range and pasture



XID Services photo by Richard Old



KULAK photo by Paul Busselen

land. In Alaska, this species has been found in Ketchikan, on Annette Island, and on Prince of Wales Island. It was first reported in North American seaports in the early 1900s and is often spread in contaminated hay.

Management

Hand-pulling tansy ragwort before seed set can be effective. Herbicide application is effective for controlling large infestations, although follow-up treatments may also be necessary. Biological control agents, including seedhead flies, root and defoliating beetles, and a defoliating moth, provide fair to excellent control for very large infestations (Callihan and Miller 1999). Seeding disturbed areas with perennial grasses may help to prevent reestablishment.

Notes

Tansy ragwort is extremely poisonous to horses, whereas at least 30 species of invertebrates are totally dependent on it for food in Europe.



XID Services photo by Richard Old

Common groundsel.

Perennial Sowthistle



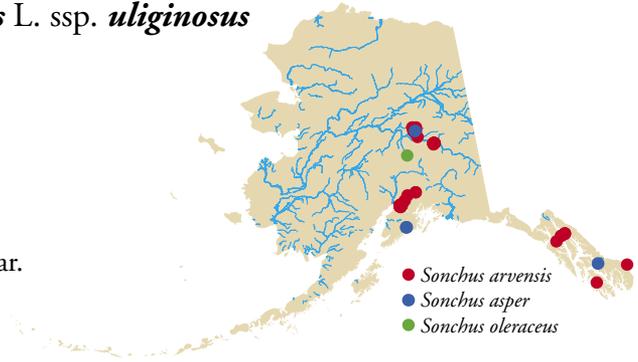
Sonchus arvensis L. ssp. *uliginosus*
(Bieb.) Nyman

Alternate Names

moist sowthistle

Synonyms

Sonchus arvensis L. var.
glabrescens Guentth.,
Grab. & Wimmer
Sonchus uliginosus
Bieb.



Description

Despite the common name, sowthistles resemble dandelions more than they do the true thistles. Perennial sowthistle usually grows 2 to 4 feet high and has an extensive horizontal root system that grows up to 10 feet deep. All parts of the plant contain a milky white juice. Early in the season, the plant is a basal rosette that could be mistaken for dandelion. Leaves are alternate, lanceolate, and 2 1/2 to 16 inches long, with a clasping base and soft prickly margins that vary from deeply toothed to nearly entire. The flowerhead is bright yellow and 1 to 2 inches wide. The floral bracts are green with white margins. Seeds are dark brown and prominently ridged and wrinkled, with a tuft of soft white pappus bristles. Subspecies *uliginosus*, found in Alaska, lacks the glandular hairs on floral bracts and flower stalks that are generally present on perennial sowthistle.



Perennial sowthistle flowers.

UAF Cooperative Extension Service
 photo by Michael Rasy



Perennial sowthistle flowers.

UAF Cooperative Extension Service
 photo by Michael Rasy

Similar Species

Annual sowthistle (*S. oleraceus* L.) is another exotic species in Alaska. It can be distinguished from perennial sowthistle by the presence of a short taproot rather than long horizontal roots.

Ecological Impact

At high densities perennial sowthistle can drastically reduce water resources and possibly decrease the number of plants in communities (Butterfield et al. 1996). It is also a host of a number of plant pests. This species is acceptable feed for rabbits and other foraging animals (NWCB 2003). Perennial sowthistle may modify or retard the successional establishment of native species (Butterfield et al. 1996).

Biology and Invasive Potential

Perennial sowthistle reproduces by seed and horizontal roots. Each plant can produce 4,000 to 13,000 seeds that can remain dormant in the soil for up to 6 years. Viability is commonly under 40% (Royer and Dickinson 1999). Plants are capable of producing new plants from buds on the rhizome up to 2 feet in depth, and spreading rootstocks are the primary means of invasion into new areas (Royer



UAF Cooperative Extension Service photo by Michael Razy

Roadside infestation of perennial sowthistle.

Family: Asteraceae

Perennial Sowthistle

and Dickinson 1999, Rutledge and McLendon 1996). Perennial sowthistle seeds possess hairs and are spread by wind or may become attached to animals (Butterfield et al. 1996). Seeds can also be moved on vehicles and farm equipment and may contaminate commercial seeds and hay (NWCB 2003, Butterfield et al. 1996). Seeds germinate at 1/4 to 1 1/4 inches deep, and the optimal temperature is between 77° and 86°F. Plant cover and litter promote germination. Although perennial sowthistle is adapted to a variety of soils, it prefers rich, non-compacted, moist, and fine-textured soil with pH levels ranging from 5.2 to 7.2. This plant can survive temperatures to 3.2°F (Butterfield et al. 1996, Rutledge and McLendon 1996). Perennial sowthistle is listed as a noxious weed in 20 of the United States and 5 Canadian provinces. It has also been declared a federal noxious weed in the United States and Canada and a prohibited noxious weed in Alaska (Alaska Administrative Code 1987).



XID Services photo by Richard Old

Annual sowthistle.

Distribution and Abundance

Perennial sowthistle is common in gardens, cultivated crops, roadsides, and fertile waste areas. It may also occur on disturbed sites of prairies, woods, meadows, lawns, streams, and lake shores (NWCB 2003, Butterfield et al. 1996, Gubanov et al. 1995). This species is native to Europe, western Asia, and Iceland. It has spread widely throughout the northern United States and southern Canada and has also established in South America, Australia, and New Zealand. The first North American report of perennial sowthistle was from Pennsylvania in 1814 (Butterfield et al. 1996). In



XID Services photo by Richard Old

Annual sowthistle.

Alaska, the first documented occurrence was from Hoonah in 1979 (ALA 2004). It has since been found in Fairbanks, Delta, Anchorage, Juneau, and Prince of Wales Island (AKEPIC Database 2004).

Management

Biological, chemical, manual, and mechanical control methods all have been used successfully on perennial sowthistle. Mowing or cutting to reduce seed production and root reserves should be done a few times per season for several years. When hand-pulling, use a shovel and take care to get as much of the root as possible. Tillage may increase numbers by breaking up the rhizomes into separate pieces that can grow into new plants, while tillage that buries all root fragments more than a foot deep is reported to be effective. This weed is relatively resistant to many common broadleaf herbicides (Butterfield et al. 1996, Rutledge and McLendon 1996), while others are effective. Annual sowthistle may be controlled through hand-pulling or cutting prior to flowering, with herbicide application unnecessary except for large infestations.

Notes

Perennial sowthistle is a relative of chicory, and its roots have been used to make a coffee-like beverage. Because of the high hydrocarbon content of its milky sap, it has been investigated as a source of oil for manufacture of plastics and pharmaceuticals.



XID Services photo by Richard Old

Leaf and stem of perennial sowthistle.



XID Services photo by Richard Old

Leaf and stem of annual sowthistle.

Common Tansy



Tanacetum vulgare L.

Alternate Names

golden buttons, garden tansy, bitter buttons, hind-head, parsley-fern, ginger-plant

Synonyms

Chrysanthemum uliginosum
Pers., *Chrysanthemum vulgare* (L.) Bernh.,
Tanacetum vulgare L. var. *crispum* DC.

Description

Common tansy is a rhizomatous perennial plant that grows 1 1/2 to 6 feet high. The stems are often purplish-red at the base. Leaves are alternate, 2 to 10 inches long, 1 1/2 to 3 inches wide, and deeply divided into numerous, toothed segments, giving the plant a feathery appearance. Common tansy

produces a strong odor reminiscent of creosote. Stems have 20 to 200 yellow flowerheads without ray florets. Each flowerhead is button-like and 1/4 to 1/2 of an inch wide. Seeds are yellowish-brown without pappus or with short 5-toothed crowns.



US Geological Survey photo by Chris McKee

Similar Species

Common tansy resembles tansy ragwort (*Senecio jacobaea* L., included in this book), but tansy ragwort has ray florets and seeds with pappus. Lake Huron tansy (*Tanacetum bipinnatum* (L.) Schultz-Bip.) is native to Alaska and can be distinguished from common tansy by the presence of solitary to several flowerheads and the lack of odor.

