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TECHNOLOGY TRANSFER

NEW INVADERS OF THE NORTHWEST

SECOND EDITION

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Second Edition

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About This Field Guide

Invasive plants are a major concern worldwide. They displace native species, decrease forage and agricultural production, alter soil nutrients and water cycling, and lower the aesthetic value of natural areas. With the increase of world travel, exotic plant introductions are on the rise.

Not all newly introduced species become invasive. Those which do often follow an invasion pattern; they remain at low levels for several years (lag phase) and then enter a phase where they increase dramatically. Attempting to control large weed infestations is a costly endeavor; it is much more cost effective to allocate resources toward weed prevention or the rapid treatment of new introductions. Unfortunately, the process of adding newly introduced species to watch lists or control lists is frequently tedious and lengthy. By the time many invasive species are on the radar, they have become widely established. The purpose of this guide is to help land users recognize new invasive plants, so they can be treated rapidly and eradicated rather than becoming large and expensive problems.

This guide focuses on cool and temperate regions of northwestern North America, including portions of: Alaska, California, Colorado, Idaho, Montana, Oregon, Nevada, Utah, Washington, Wyoming, Alberta and British Columbia. The hot and arid regions of southwestern USA are the focus of the sister guide, New Invaders of the Southwest. There is some overlap between species and regions, especially in areas bordering our superficial boundary.

The species in this guide were selected by:

1. Combining state and provincial noxious weed, watch, and new invader lists/alerts
2. Adding species with high ecological impact ratings as assigned by the California Invasive Plant Council and NatureServe
3. Identifying those species not yet widespread throughout northwestern North America as first-round candidates
4. Combining the opinions of numerous state, provincial and regional weed experts to narrow the candidate list to those present in this guide

It was not possible to include all new species of concern, but this manual will hopefully serve as a good starting point. The plants included herein are arranged first by flower color, and then grouped with related species progressing from grasses through forbs, vines, shrubs, and trees. Select definitions of plant terms are included in the glossary. For more in-depth explanations of plant parts and plant life cycles, or for more help with plant identification, please see the suggested references listed at the end of this guide.

Each plant is represented by multiple photos and descriptions emphasizing key identification traits and ways to distinguish it from look-alike species. Attempts were made to utilize the most current scientific names for all weeds. The USDA GRIN database (Germplasm Resources Information Network) was followed in this regard. Please note the scientific names for many species have changed since previous weed publications.

Plant distribution data is presented in a map for each species. The sources used to compile current distribution information are included in a table below. Distribution information was also provided by individuals and recent weed alert reports.

Weed Distribution Sources	
Consortium of California Herbaria	ucjeps.berkeley.edu/consortium/
Consortium of Pacific Northwest Herbaria	www.pnwherbaria.org
EDDMapS	eddmaps.org
Intermountain Region Herbarium Network	intermountainbiota.org/portal/index.php
USDA-NRCS PLANTS Database	plants.usda.gov/java/

Where information was available, counties and districts where the weed has been documented are represented by a solid gray fill. Some documented populations of weeds have since been eradicated. The locations of these populations are still included in the distribution maps because it is possible some plants, seeds, or propagules survived.

Weed spread is often rapid. Even if a weed is not depicted as occurring in a specific region, it could have spread into that region since the collection of distribution information presented herein. Particular care should be taken searching for species in regions surrounding known infestations, as weed spread into nearby areas is likely.

All states and provinces where a weed is listed as noxious are included in a special section. Some states and provinces have sub-levels for noxious weed designations. These are included in abbreviated form where applicable, and are explained in greater detail in a table on the following pages.

State/Province	Noxious Weed Classification
Alaska (AK)	Prohibited
	Restricted
Alberta (AB)	Prohibited
	Noxious
British Columbia (BC)	Provincial
	Regional
California (CA)	No sub-categories
Colorado (CO)	A
	B
	C
	Watch List
Idaho (ID)	EDRR
	Control
	Containment
Montana (MT)	1a
	1b
	2a
	2b

Definition
Species prohibited in the state.
Species restricted from sale, with designated maximum allowances in seed mixes.
Species that are not established in Alberta, but have demonstrated detrimental effects in other provinces or states. Prevent establishment.
Species that are widely spread in various areas of the province, but can still pose a significant economic hardship once established. Controlling the spread of noxious weeds is critical to protecting areas that are not infested.
Species designated as noxious throughout the entire province.
Species designated as noxious in select regions within British Columbia.
Species in Colorado that are designated by the Commissioner for eradication.
Species for which the Commissioner, in consultation with the state noxious weed advisory committee, local governments, and other interested parties, develops and implements state noxious weed management plans designed to stop the continued spread of these species.
Species for which the Commissioner, in consultation with the state noxious weed advisory committee, local governments, and other interested parties, will develop and implement state noxious weed management plans designed to support the efforts of local governing bodies to facilitate more effective integrated weed management on private and public lands. The goal of such plans will not be to stop the continued spread of these species but to provide additional education, research, and biological control resources to jurisdictions that choose to require management of List C species.
Species that have been determined to pose a potential threat to the agricultural productivity and environmental values of the lands of the state. The Watch List is intended to serve advisory and educational purposes only. Its purpose is to encourage the identification and reporting of these species to the Commissioner in order to facilitate the collection of information to assist the Commissioner in determining which species should be designated as noxious weeds.
Species designated for immediate eradication if found.
Medium priority species designated for control where found.
Species already widespread; designated for containment of existing populations.
These weeds are not present in Montana. Management criteria will require eradication, and education and prevention efforts if detected.
These weeds have limited presence in Montana. Management criteria will require eradication or containment and education.
These weeds are common in isolated areas of Montana. Management criteria will require eradication or containment where less abundant. Management shall be prioritized by local weed districts.
These weeds are abundant in Montana and widespread in many countries. Management criteria will require eradication or containment where less abundant. Management shall be prioritized by local weed districts.

State/Province	Noxious Weed Classification
Montana (MT) cont.	3
Nevada (NV)	A
	B
	C
Oregon (OR)	A
	B
Utah (UT)	A
	B
	C
Washington (WA)	A
	B
	C
	Prohibited
Wyoming (WY)	No sub-categories

Definition
Regulated Plants (not Montana listed noxious weeds) have the potential to cause significant negative impacts. The plant may not be intentionally spread or sold other than as a contaminant in agricultural products. The state recommends research, education, and prevention to minimize the spread of the regulated plant.
Weeds not found or limited in distribution throughout the state; actively excluded from the state and actively eradicated wherever found.
Weeds established in scattered populations in some counties of the state; actively excluded where possible, actively eradicated from nursery stock dealer premises; control required by the state in areas where populations are not well established or previously unknown to occur.
Weeds currently established and generally widespread in many counties of the state; actively eradicated from nursery stock dealer premises; abatement at the discretion of the state quarantine officer.
Weeds of known economic importance which occur in the state in small enough infestations to make eradication or containment possible; or are not known to occur, but their presence in neighboring states make future occurrences in Oregon seem imminent. Recommended action: the species are prohibited from entering the state unless specifically exempted, and infestations are subject to eradication or intensive control when and where found.
Weeds of economic importance which are regionally abundant, but which may have limited distribution in some counties. Recommended action: the species are probited from entering the state unless specifically exempted, and infestations are assigned limited to intensive control at the state, county or regional level as determined on a site specific, case-by-case basis. Where implementation of a fully integrated statewide management plan is not feasible, biological control (when available) shall be the primary control method.
Species declared as “Early Detection and Rapid Response (EDRR)”. These are not native to the state of Utah, pose a serious threat to the state, have a relatively low population size within the state and are of the highest priority for control.
Species declared as "Control". These are not native to the state of Utah, pose a threat to the state, have a moderate population throughout the state, and generally are thought to be controllable in most areas.
Species declared as "Containment". These are not native to the state of Utah, pose a threat to the agricultural industry and agricultural products, are found extensively in the state, and are thought to be beyond control. Statewide efforts are generally towards containment of smaller infestations.
Noxious weeds not native to the state that are of limited distribution or are unrecorded in the state and that pose a serious threat to the state. Eradication is required of all Class A noxious weeds.
Noxious weeds that are not native to the state and are designated for control in regions where they are not yet widespread. In regions where they are already abundant, control is decided at the local level, with containment as the primary goal.
Noxious weeds that are typically widespread in the state. Counties can provide education and have the option to require control if locally desired.
Species for which it is prohibited to transport, buy, sell, offer for sale, or distribute plants, plant parts, or seed mixes into or within the state.

If you find a new invader

Should you find one of the species listed in this manual in a new region (or a species you believe to be a new invader), notify your local weed authority immediately, and devise a treatment plan to eradicate the infestation as promptly as possible. Weed hotline numbers are listed below for those states and provinces providing this service.

State/Province	Weed Hotline
Alaska	
Alberta	
British Columbia	1-888-WEEDSBC (1-888-933-3722) for infestations in BC; or 250-857-2472 for infestations found on Vancouver Island, the Gulf Islands or the Sunshine Coast
California	1-800-491-1899
Colorado	
Idaho	1-866-IDWEEDS (1-866-439-3337)
Montana	
Nevada	
Oregon	1-866-INVADER (1-866-468-2337)
Utah	
Washington	1-877-9-INFEST (1-877-946-3378)
Wyoming	

Blueweed & Paterson's curse

Echium vulgare L. & *E. plantagineum* L.

Blueweed: a) plant (Robert Vidéki, Doronicum Kft.), b) stem, leaves, and flowers (Sue Winterowd, Stevens County NWCB), c) flowers (H. Zell) (a,b www.bugwood.org)

Paterson's curse: d) plant (Frank Vincentz), e) rosette leaves (D Hochmayr), f) flowers and stem (Wolfgang Sauber)

SYNONYMS: Blueweed (BW): viper's bugloss; Paterson's curse (PC): Salvation Jane, Riverina bluebell

ORIGIN: Europe (both species)

GROWTH TRAITS: Both species are herbaceous, growing 1-3' tall (0.3-0.9 m) from a taproot. Stems are one to many and typically branched toward the top. At high densities, plants grow erect; with less vegetation, plants appear more sprawling. Leaves are oblong to linear, growing alternate and smaller further up the stem. Stems and leaves are covered in stiff hairs. Stem hairs are dark and swollen at their bases, giving stems a spotted appearance. Flowers are present from late spring to early fall in fiddleneck arrangements. Flowers are somewhat funnel-shaped with 5 fused purplish-blue petals and dark pink stamens; the top petals overhang the bottom. Flowers are subtended by bracts with multiple lobes and folds. Each flower produces four 1-seeded nutlets. **BW** is a biennial or short-lived perennial. 4 stamens protrude beyond the flower petals. **PC** is an annual or biennial. 2 stamens protrude beyond the flower petals.

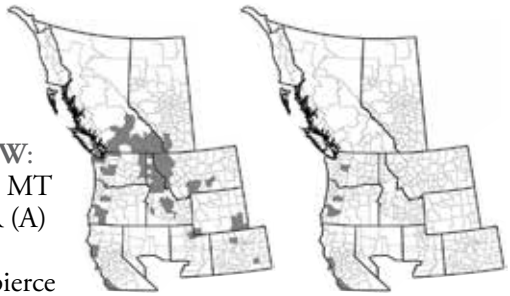
REPRODUCTION: Both species spread by seed. Seeds of **BW** are reportedly viable in the soil for up to three years; seeds of **PC** are viable for up to 10.

HABITAT: Both species capitalize on disturbed, sunny areas and can be found in pastures, abandoned fields, and roadsides.

LOOK-ALIKES: Both can be confused with other *Echium* and *Anchusa* species, all of which are exotic in North America. Several native species of *Phacelia* in the Hydrophyllaceae resemble these with their fiddleneck flower arrangements, protruding stamens, and similar flower color on some species. However, *Phacelia* flowers are symmetrical while *Echium* flower lobes are unequal. The higher number of protruding stamens and the sharper, more intrusive hairs help differentiate these two species from each other.

NOXIOUS WEED LISTINGS: **BW**: AB, BC (Regional), ID (Control), MT (2A), WA (B, Prohibited); **PC**: OR (A)

NOTES: Hairs of both species can pierce skin, causing irration.



Blueweed Paterson's curse

Pine echium

Echium pininana Webb & Berthel.

SYNONYMS: giant viper's bugloss, tower of jewels

ORIGIN: Canary Islands

GROWTH TRAITS: Herbaceous biennial or triennial growing 6½-13' tall (2-4 m) from a deep taproot. The plant typically remains as a tall rosette the first year, flowers the second or third year, and then dies. Rosette leaves are 10-20" long (25-50 cm), narrowly lance-shaped, deeply veined, and covered in fine, rough hairs. There is one main, unbranched, cylindrical flowering stem resembling a woody trunk 3.2-10' tall (1-3 m). Stem leaves are similar to rosette leaves but are narrower and shorter (4-10" or 10-25 cm long). Flowers are present from late spring through summer in fiddleneck arrangements arising from stem leaf axils. Flowers are somewhat funnel-shaped with 5 fused purplish-blue petals and light pink stamens that extend beyond the petals. Flowers are subtended by lance-shaped bracts. Each flower produces 4 prickly, brown, 1-seeded nutlets.

REPRODUCTION: By seed. Seeds remain viable in the soil for many years.

Pine echium: a) flowering plant (©2001 CDFA), b) small infestation (Helena RG)

Pine echium: c) leaves (James Steakley), d) flowers in fiddleneck arrangements and leaves (Frank Wouters), e) old flowering stem (Zoya Akulova)

HABITAT: Prefers sunny habitats with mesic to moist conditions. Thrives on steep and disturbed hillsides in coastal habitats. Limited by harsh winters and full shade.

LOOK-ALIKES: Leaves and flowers are similar to other exotic *Echium* species, including the two included in earlier pages of this guide. The massive cylindrical flowering stem of pine echium is unlike any other *Echium* species in western North America.

NOXIOUS WEED LISTINGS: Not listed as noxious in any western state or province.

NOTES: Though not listed as noxious anywhere, this is a species of concern in California where it has recently been documented as spreading. Regularly escapes cultivation.

Look-alike: *Echium vulgare* (Sue Winterowd, Stevens County NWCB)

Clary sage & Meadow clary

Salvia sclarea L. & *S. pratensis* L.

Clary sage: a) plant, b) stem, stem leaves, and immature flowers (a,b Ettore Balocchi), c) flowers and bracts (Sue Winterowd, Stevens County NWCB)

Meadow clary: d) plant, e) basal leaves (d,e ©2014 Armadej Trnkoczy), f) flowers (H. Zell)

SYNONYMS: Clary sage (CS): Europe sage; Meadow clary (MC): Meadow sage

ORIGIN: CS: Eurasia; MC: Europe

GROWTH TRAITS: Both species are herbaceous with square stems and opposite leaves. Leaves are wrinkled, toothed, and often covered in fuzz. Leaves are progressively smaller up the stem. Flowers are produced in summer in multiple whorls of 2-6 found at leaf nodes and in long spikes at stem tips. Flowers are 1" long (2½ cm) and strongly 2-lipped with the lips widely separated. Each flower produces four 1-seeded nutlets. **CS** is a biennial to short-lived perennial growing 3-5' tall (90-150 cm) from a branched root system. Leaves may be doubly-toothed and are 6-12" long (15-30 cm). Basal leaves have petioles while stem leaves nearly clasp the stem. Upper lips of flowers are light purplish-blue while lower lips are typically white. Flowers are subtended by large, pinkish, petal-like bracts. **MC** is a perennial growing 1-2½' tall (30-75 cm) from a fibrous root system. Leaves are egg-shaped, warty, have rounded teeth, and are 3-6" long (7½-15 cm). Most leaves are basal. Flowers are purple to bluish and are subtended by small bracts.

REPRODUCTION: Both species spread by seed. Seeds of both are believed to remain viable in the soil for at least three years.

HABITAT: Both species capitalize on disturbance and can be found in pastures, meadows, hillsides, and roadsides, often in areas with at least partial sun.

LOOK-ALIKES: The opposite leaves, square stems, and 2-lipped flowers differentiate these plants from unrelated look-alikes. Within the family, there are many similar native and exotic species of *Salvia* and *Mentha*. The combination of widely separated flower lips, heavily flowered stems, and large basal leaves help differentiate these species from look-alikes. Plant size, bract size, and flower color help differentiate these species from each other.

NOXIOUS WEED LISTINGS: Both species: WA (A, Prohibited)

NOTES: Both species are aromatic and used in herbal remedies. They are frequently cultivated but are escaping and becoming problematic.

Clary sage Meadow clary

Silverleaf nightshade

Solanum elaeagnifolium Cav.

SYNONYMS: white horsenettle, tomato weed

ORIGIN: Southwest United States, Mexico, South America

GROWTH TRAITS: Herbaceous perennial growing 1-3' tall (30-90 cm) from a rhizomatous root system. The multiple stems are round with scattered, slender, and reddish spines. Leaves are alternate, lance-shaped with wavy margins, and 1-4" long (2½-10 cm). Leaves and stems are covered in short white hairs, giving the plant a silver-green or dusty appearance. The star-shaped flowers bloom through summer and are ¾" (2 cm) in diameter. Flowers typically have 5 bluish-purple petals (occasionally white) and bright yellow stamens. Petals are fused at their bases. The fruits are clusters of round berries 0.4" (1 cm) in diameter. Berries are striped green when young but turn orange-yellow with maturity.

REPRODUCTION: By seed, rhizomes, and root fragments. Seeds remain viable in the soil for up to 10 years.

Silverleaf nightshade: a) plant (Florida Division of Plant Industry Archive, Florida Department of Agriculture and Consumer Services, www.bugwood.org), b) small infestation (Stan Shebs)

Silverleaf nightshade: c) leaves (Joseph M. DiTomaso, University of California - Davis), d) flower and reddish spines on stem (Pschemp), e) fruits (Florida Division of Plant Industry Archive, Florida Department of Agriculture and Consumer Services) (c,e www.bugwood.org)

HABITAT: Occurs in semi-arid regions in cultivated fields, grasslands, pastures, and along roadsides.

LOOK-ALIKES: The 5-petaled flowers with yellow stamens and berry fruits help differentiate this species from unrelated look-alikes. Several similar-looking species of native and exotic *Solanum* occur in North America, such as Carolina horsenettle (*Solanum carolinense*). Most of these can be differentiated by having more lobed leaves, different colored fruits, or white flowers with non-fused petals.

Look-alike: Carolina horsenettle (James H. Miller & Ted Bodner Southern Weed Science Society)

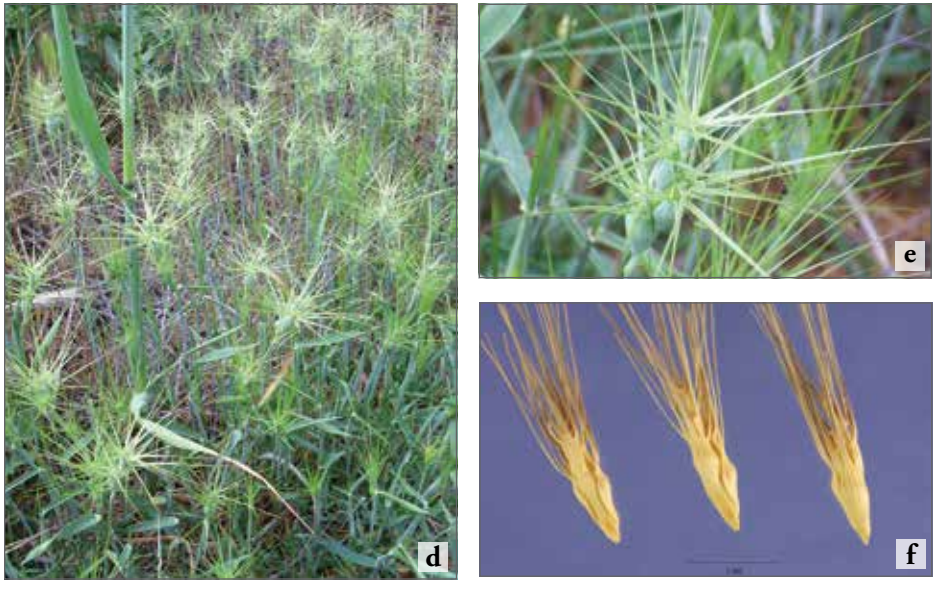
NOXIOUS WEED LISTINGS: CA, NV (B), OR (A), WA (A, Prohibited)

NOTES: Though native to portions of North America, it is regularly invasive inside and outside of its native range. All parts of the plant are toxic to livestock.

Barbed & Ovate goatgrass

Aegilops triuncialis L. & *A. geniculata* Roth

Barbed goatgrass: a) infestation (Javier Martin), b) inflorescence (zoomed out and in, Matt Lavin, Bozeman, Montana, USA), c) spikelets (joints) (Steve Hurst, USDA NRCS PLANTS Database)



Ovate goatgrass: d) infestation, e) inflorescence (d,e Javier Martin), f) spikes with joints (Steve Hurst, USDA NRCS PLANTS Database)

SYNONYMS: Barbed goatgrass (BG): barb goat grass; Ovate goatgrass (OG): *Aegilops ovata* auct., *Triticum ovatum* auct.

ORIGIN: Eurasia, northern Africa (both species)

GROWTH TRAITS: Both species are winter annuals growing from fibrous roots. Stems are erect and often branched and bent basally. Leaf blades are flat, 0.8-0.12" wide (2-3 mm), and have finely hairy margins. The lower surface (and sometimes upper) is sparsely covered in fine hairs. Nodes are hairy. Ligules are very short and finely fringed. Inflorescences are spike-like with spikelets each forming "joints" at stem tips. All awns are stiff, sharp, and minutely barbed. Flowering occurs from May-July. **BG** plants are spreading or trailing in appearance and can be up to 1½' tall (45 cm). Stems are solid when young, but become hollow with age. Spikes are cylindric, ¾-2⅓" long (2-6 cm), and have 2-6 spikelets. Immature spikes are often reddish or purple. Spikes break off as a whole unit at maturity, but eventually break apart into joints with sharp ends. **OG** plants are more tufted in appearance and grow to 10" tall (25 cm). Spikes are ovate-cylindric, ⅓-1¼" long (1-3 cm), and have 2-4 spikelets. Spikes break off as a whole and do not break into joints. Awns are more spreading.

REPRODUCTION: Both species spread only by seed, which are believed to stay viable in the soil for 3-5 years.

HABITAT: Both species prefer dry, disturbed fields, roadsides, and rangeland.

LOOK-ALIKES: The jointed inflorescences of goatgrasses are distinctive and unlikely to be confused with other weedy annual grasses. The widespread invasive jointed goatgrass (*Aegilops cylindrica*) is very similar to barbed goatgrass but grows slightly taller, has longer spikes, and has 3-12 spikelets. Separated joints have blunt ends. Stems of jointed goatgrass are always hollow, even when young.

NOXIOUS WEED LISTINGS: Both species: CA, OR (A)

NOTES: Both species can hybridize with winter wheat, often leading to sterile seeds and unmarketable crops.

Barbed goatgrass Ovate goatgrass

Chinese silvergrass

Miscanthus sinensis Andersson

SYNONYMS: eulalia, zebra grass

ORIGIN: Asia

GROWTH TRAITS: Perennial bunchgrass growing 5-10' tall (1½-3 m) from a rhizomatous root system. Leaves are upright to arching, up to 3' long (0.9 m), and 0.4-0.8" wide (1-2 cm). Leaves have a whitish upper midrib, sharp tips, rough edges, and may be solid green or variegated with light, horizontal stripes. The inflorescence is fan-shaped, showy with silvery to pink florets, and occurs at stem tips in late summer. Inflorescences are typically up to 1' long (30 cm). Each mature seed is rough with a twisted bristle tip that gives the overall inflorescence a cottony appearance.

REPRODUCTION: By seed, rhizomes, and root fragments. Rhizomatous spread is most common.

Chinese silvergrass: a) plant (James H. Miller, USDA Forest Service, www.bugwood.org), b) infestation (Jungle)

Chinese silvergrass: c) leaf blades: normal (left, Britt Slattery, US Fish and Wildlife Service), variegated (right), d) flowering inflorescence, e) mature inflorescence (right c,d,e all Leslie J. Mehrhoff, University of Connecticut) (all www.bugwood.org)

HABITAT: Found in a variety of habitats but prefers full sun and moist, well-drained soil. It is intolerant of full shade as well as extreme heat and humidity. Frequently escapes cultivation, capitalizing on disturbance to become problematic along roadsides and forest edges.

Look-alike: jubata grass (Gordon Leppig & Andrea J. Pickart)

LOOK-ALIKES: The bunched tussocks help differentiate Chinese silvergrass from the rhizomatous and linear-growing giant reed (*Arundo donax*) and common reed (*Phragmites australis*). Ravenna grass (*Saccharum ravennae*), jubata grass (*Cortaderia jubata*), and pampas grass (*C. selloana*) are all similar-looking bunchgrasses. Chinese silvergrass is typically shorter, has smaller leaves, and its plumes are more fan-like compared to jubata and pampas grass. Ravenna grass leaf and stem bases are densely hairy.

NOXIOUS WEED LISTINGS: Not listed as noxious in any western state or province.

NOTES: Listed as noxious and invasive in eastern North America. Tolerates cold climates well. Already present in California and recently found in shallow waters on the north shore of the Columbia River in Washington. The plant is highly flammable, creating a fire hazard.

False brome

Brachypodium sylvaticum (Huds.) P. Beauv.

SYNONYMS: slender false brome, wood false brome, *Bromus sylvaticus* (Huds.) Pollich, *Festuca sylvatica* Huds.

ORIGIN: Eurasia, northern Africa

GROWTH TRAITS: Perennial bunchgrass with individual clumps that merge to form one large mat up to 3' tall (0.9 m). Leaves are drooping with bright green, flat blades up to ½" wide (1.2 cm). Leaves have a fringe of hairs surrounding margins, do not clasp the stem tightly, are hairy and open at their base, and have a fringed ligule at the point of attachment. Leaves are bright green all season or year long. Spikelets of flowers are on very short stalks, are droopy and hairy, and have straight awns ¼-¾" long (6-18 mm).

REPRODUCTION: By seed and can re-sprout from vegetative fragments; roots are not rhizomatous. Seeds reportedly remain viable for only one year.

False brome: a) plants (Cillas), b) infestation (Daderot)

False brome: c) leaf blade and margins, d) ligule and leaf attachment (©2014 Keir Morse), e) spikelets (c,e Alison Halpern, Washington State Noxious Weed Control Board)

HABITAT: Found in forests and woodlands, but may grow in open areas such as roadsides and streambanks under a variety of environmental conditions.

LOOK-ALIKES: Though grasses can be difficult to tell apart, this species is distinguished by being hairy on its leaf margins and lower stems, and its perennial bright green color. It is most easily confused with species of true brome (*Bromus*) but differs by having leaf sheaths open to the base and spikelets with no (or very short) stalks. Bromes have sheaths closed more than ¼ of their length and spikelets on long stalks.

Look-alike: true brome (Robert Mohlenbrock, USDA NRCS PLANTS Database)

NOXIOUS WEED LISTINGS: OR (B), WA (A, Prohibited)

NOTES: It appears populations at the leading edge of the expanding range undergo an establishment phase before they can contribute to the local invasion. This is perhaps because newly colonized populations are suffering from inbreeding depression.

Giant reed

Arundo donax L.

SYNONYMS: elephant grass, Carrizo, Spanish/wild/giant cane, arundo

ORIGIN: Mediterranean region throughout the Middle East to India

GROWTH TRAITS: Perennial grass reaching up to 26' tall (8 m) and growing from an extensive rhizomatous root system. Each hollow stem resembles a corn stalk. First-year stems are unbranched, while second-year stems commonly branch and may only have leaves on the branches. Stems can root when they touch the ground. Leaves are long, flat, alternate, up to 1½' long (45 cm), and conspicuously in one plane. Leaf bases are heart-shaped, clasp the stem, and have small tufts of hair. Some cultivars have variegated coloration. Flowering occurs in late summer to early fall, though flowering is not frequently observed in the Pacific Northwest. Plumes are dense and can grow up to 3' in length (0.9 m).

REPRODUCTION: North American populations are not known to produce viable seeds. This species spreads predominantly by its rhizomatous root system and by producing roots when stems touch the ground.

Giant reed: a) plants (Shizhao), b) field planting (Jennifer Andreas, Washington State University Extension)

Giant reed: c) stem cross-section (Wendy DesCamp, Washington State Noxious Weed Control Board), d) leaf blade attachments with leaves all in one plane (Amy Ferriter, State of Idaho), e) flower plume (Chris Evans, Illinois Wildlife Action Plan)

HABITAT: Found in wetlands such as ditches, streambanks, and lake shores with fresh or moderately saline water.

LOOK-ALIKES: Can be mistaken for native and exotic subspecies of common reed (*Phragmites australis*), a large grass growing in similar habitat and producing similar plumes. Common reed grows shorter (up to 20' or 6 m), has smaller stems, has leaves that don't clasp stems, and produces runners in addition to rhizomes.

Look-alike: common reed (Richard Old, www.xidservices.com, www.bugwood.org)

NOXIOUS WEED LISTINGS: CA, CO & NV (A), WA (Prohibited, except for variegated cultivars)

NOTES: This species is a favorable candidate for use as a renewable biofuel source in Europe and Africa because of its fast growth rate and its ability to grow in different soil types and climatic conditions. The same traits make it extremely invasive in parts of North America. In Oregon, the species is restricted; it can be grown for commercial purposes with a permit, but only variegated cultivars can be sold in nurseries. Washington has a similar permit process in place.

Jubata & Pampas grass

Cortaderia jubata (Lemoine ex Carrière) Stapf & *C. selloana* (Schult. & Schult. f.) Asch. & Graebn.

Jubata grass: a) plant (Gordon Leppig & Andrea J. Pickart), b) leaf blade, c) inflorescence (b,c Forest & Kim Starr)

Pampas grass: d) plant (Wouter Hagens, taken in the Kijktuinen Nunspeet), e) variegated leaves of a cultivated plant (Kenpei), f) inflorescences (Kenneth M. Gale, www.bugwood.org)

SYNONYMS: Jubata grass (JG): Andean pampas grass, purple pampas grass, pampas grass; Pampas grass (PG): white pampas grass, Uruguayan pampas grass

ORIGIN: South America (both species)

GROWTH TRAITS: Both species are large, densely tufted perennial grasses growing from dense fibrous roots with shallow, short rhizomes. Leaves are very long and have sharply serrated margins. Ligules are dense rings of hairs 0.08-0.12" long (2-3 mm). Dense flower plumes appear summer through fall and are 1-3' long (30-90 cm). **JG** are all-female plants growing 6-23' tall (1.8-7 m) with the stems at least 2 times longer than the spreading tussock. Leaves are 3-5' long (0.9-1.5 m) and flat or slightly v-shaped in cross-section. Plumes are deep violet, turning pinkish then gold at maturity. Awns are very short. **PG** grows 6-13' tall (1.8-4 m). Plants are either all-female or hermaphroditic. Stems of hermaphroditic plants are 2 times longer than the tussock; female plant stems are equal to or slightly longer than the tussock. Leaves are up to 6' long (1.8 m), v-shaped in cross-section, and with bristly, curled tips. Plumes are light pink to silver white; awns are long. Tussocks are more fountain-like than jubata grass.

REPRODUCTION: Both species spread by seed and fragmented tillers. Seeds are believed to remain viable in the soil for less than six months.

HABITAT: Both species prefer disturbed coastal sites such as bluffs, roadsides, steep cliffs, and riverbanks, but can also grow inland. **PG** can tolerate standing water.

LOOK-ALIKES: The bunched tussocks help differentiate jubata and pampas grass from the rhizomatous and linear-growing giant reed (*Arundo donax*) and common reed (*Phragmites australis*). Chinese silvergrass (*Miscanthus sinensis*) and Ravenna grass (*Saccharum ravennae*) are similar-looking bunchgrasses. Chinese silvergrass is shorter with smaller leaves and fan-like plumes. Ravenna grass leaf and stem bases are densely hairy.

NOXIOUS WEED LISTINGS: **JG**: CO (Watch List), OR (B); **PG**: No NW states or provinces

NOTES: Both species are escaped ornamentals.

Jubata grass Pampas grass

Ravenna grass

Saccharum ravennae (L.) L.

SYNONYMS: hardy pampas grass, elephant grass, plume grass, *Erianthus ravennae* (L.) Beauv., *Andropogon ravennae* L., *Ripidium ravennae* (L.) Trin., *Tripidium ravennae* (L.) H. Scholz

ORIGIN: Eurasia, Mediterranean

GROWTH TRAITS: Perennial bunchgrass growing 8-13' tall (2.4-4 m) from a densely fibrous root system. Leaves are basal and also distributed up the stem to the base of the inflorescence. Leaves have serrated margins, a thick, white midvein on upper sides of blades, and can be 20-40" long (0.5-1 m) and ½" wide (1.2 cm). Leaf bases are unlobed and are densely covered with long, fuzzy hairs that typically hide the ligule. Dense flower plumes are purplish (maturing to silver to tan), up to 2' long (0.6 m), and bloom from July through October. Florets are covered in tufts of silky hairs, giving the inflorescence an overall fluffy appearance.

REPRODUCTION: By seed only. Seed viability is unknown.

Ravenna grass: a) plant (Jennifer Andreas, Washington State University Extension, b) infestation (The Nature Conservancy Archive, The Nature Conservancy, www.bugwood.org)

Ravenna grass: c) leaf blade with serrated margins and white midveins, d) hairy leaf base, e) inflorescences (c-e Wendy DesCamp, Washington State Noxious Weed Control Board)

HABITAT: Found in open, disturbed locations at both moist and dry sites including marshes, ditchbanks, seeps, floodplains, rocky hillsides, gravel roadsides, and escaped from yards. Tolerant of cold weather.

Look-alike: jubata grass (Gordon Leppig & Andrea J. Pickart)

LOOK-ALIKES: Several native and exotic grasses resemble Ravenna grass. The clumped bunches help differentiate Ravenna grass from the rhizomatous and linear-growing giant and common reeds (*Arundo donax* and *Phragmites australis*, respectively). Jubata and pampas grass (*Cortaderia jubata* and *C. selloana*) are similar-looking bunchgrasses, but Ravenna grass leaf and stem bases are densely hairy, its leaf margins are not as sharp, its leaf midveins are thick white on the upper sides of the blades, and its flowering stems can have red coloring.

NOXIOUS WEED LISTINGS: Not listed as noxious in any western state or province; proposed for listing in WA in 2015.

NOTES: Though not listed as noxious in the NW, its ecological impact ranking and potential for distribution are both high. Frequently used for soil erosion control and as an ornamental, but often escapes cultivation. Spreading rapidly in several parts of North America, and recently found in Wshington and Oregon.

Eggleaf & Myrtle spurge

Euphorbia oblongata Griseb. & *E. myrsinites* L.

Eggleaf spurge: a) plants (Marty Hudson, Klickitat County NWCB), b) leaves, bracts, and flowers (Dominicus Johannes Bergsma), c) stem, bracts, flower, and fruit (San Juan County NWCB)

Myrtle spurge: d) plant/small infestation (Jebulon), e) leaves, bracts, and flowers from above (D Hochmayr), f) and from the side (Steve Dewey, Utah State University, www.bugwood.org)

SYNONYMS: Eggleaf spurge (ES): oblong spurge; Myrtle spurge (MS): blue spurge, creeping spurge, donkey tail

ORIGIN: Eurasia (both species)

GROWTH TRAITS: Both species are herbaceous and perennial, exuding a white latex sap when torn. Flowers are inconspicuous, yellow, and surrounded by yellowish-green, showy bracts. Seeds are brown, round, smooth, and can be propelled several feet from the plant upon drying. **ES** is erect, reaching heights of 3' (0.9 m) from a woody, branched taproot. It has alternate, lance-shaped, green leaves up to 2½" long (6 cm) with very fine teeth along all margins. Stems are often densely hairy. Flowering occurs summer through fall. **MS** is a spreading plant reaching a height of 8"(15 cm) from a taproot, though its leaning stems are up to 16" (40 cm) long. Leaves are succulent, gray green, ovate with sharp tips, and arranged spirally along the succulent stem. Flowering occurs throughout spring.

REPRODUCTION: Both species spread by seed, root fragments, and root crown budding. Seeds are typically short-lived but can be viable for up to eight years.

HABITAT: Both species capitalize on disturbance and can be found from moist meadows to dry hillsides.

LOOK-ALIKES: Many species of *Euphorbia* resemble eggleaf and myrtle spurge. The majority of those which occur in the Northwest are exotic. These species can be differentiated by comparing the toothed leaf margins of eggleaf spurge and succulent leaves of myrtle spurge to features of other exotic and native *Euphorbia*, which often lack these traits. Carnation spurge is similar to eggleaf spurge, but has hairless stems. Pre-flowering myrtle spurge can resemble pre-flowering Dalmatian toadflax shoots, but myrtle spurge has a leaning habit and latex sap.

NOXIOUS WEED LISTINGS:
ES: CA, OR (A), WA (A, Prohibited);
MS: CO (A), OR & WA (B)

NOTES: Both species are escaped ornamentals. The latex sap is toxic and should be handled with care.

Eggleaf spurge Myrtle spurge

Japanese chaff flower

Achyranthes japonica (Miq.) Nakai

SYNONYMS: Not applicable

ORIGIN: eastern Asia

GROWTH TRAITS: Herbaceous, upright perennial typically growing 20-40" tall (½-1 m) from a well-developed but non-rhizomatous root system. Young plants have one stem, while older plants have multiple stems arising from the same root crown. Stems are thin, wiry, 4-angled, branched, and red at their base. Leaves are opposite, elliptic, and have deep veins and smooth margins. Leaves are 4-8" long (10-20 cm), gradually becoming smaller up the stem. Leaves and stems are slightly hairy. Flowers occur in tight clusters on spikes at branch and stem tips from late summer to early fall. Flowers are tiny with no petals and 5 green stamens. Flowers diverge at nearly a 90° angle from the spike, but as fruits mature they lay flat (downwards) against the spike. The fruits are slender and dry with a single hard seed, and have a pair of stiff bracts that aid the fruit in attaching to clothes or fur.

Japanese chaff flower: a) plant, b) infestation (a,b both Chris Evans, Illinois Wildlife Action Plan, www.bugwood.org)

Japanese chaff flower: c) leaves, d) flowers, e) fruit and hairy stem (c-e all Chris Evans, Illinois Wildlife Action Plan, www.bugwood.org)

REPRODUCTION: By seed. Seeds have very high viability rates, though it is unknown for how long seeds remain viable in the soil.

HABITAT: Usually found in partial shade and moist soil, but it will also grow in drier areas in both sunny and densely-shaded habitats. Often found in bottomland forests, along waterways, and at the edges of fields.

Look-alike: American lopseed (Karan A. Rawlins, University of Georgia, www.bugwood.org)

LOOK-ALIKES: Related pigweed species (*Amaranthus*) have similar flowers and reddish stem bases, however they have alternate leaves. The native American lopseed (*Phryma leptostachya*) has opposite leaves and similar fruit, however its leaves are toothed and it has pinkish-white petals.

NOXIOUS WEED LISTINGS: Not listed as noxious in any western state or province.

NOTES: While not currently established in the Northwest, nor listed as noxious anywhere, a recent APHIS weed risk assessment predicted the species would be able to grow in areas of the Pacific Northwest. It is established in the Midwestern US and causes extensive ecological damage throughout its weedy range.

White bryony

Bryonia alba L.

SYNONYMS: white bryonia, wild hops, devil's turnip, western kudzu

ORIGIN: Eurasia

GROWTH TRAITS: Herbaceous, perennial vine growing from a tuberous yellow root. Vines re-sprout from the root each year, growing up to 30' (9 m) during the growing season. Vines smother trees, shrubs, utility poles, etc. with the aid of tendrils, and form a mat on the ground when growing without supporting vegetation or structures. Leaves are alternate, distinctly 3 or 5-lobed, toothed, green, and have small white glands on both upper and lower surfaces. Flowers have 5 greenish-white petals with strong green venation; separate male and female flowers appear on the same plant. Flowers are up to ½" across (1¼ cm) and appear in clusters from early spring through early fall. Fruits are clusters of berries that are green at first but turn black with maturity.

White bryony: a) vines, b) infestation spreading over existing vegetation (Robin Kusske, Franklin County NWCB)

White bryony: c) leaf, d) flower cluster (c,d Robin Kusske, Franklin County NWCB), e) mature fruits (Jan Samanek, State Phytosanitary Administration) (c-e www.bugwood.org)

REPRODUCTION: By seed. Seeds can remain viable in the soil for many years.

HABITAT: As birds are the most common dispersal agent, the plant is prevalent at bird feeding and nesting sites including riparian buffers, windrows, parks, fences, and wildlife plantings.

LOOK-ALIKES: Several wild cucumber species native to North America resemble the leaf shape and climbing habit of white bryony. *Echinocystis lobata* is an annual vine with long clusters of male flowers with 6 narrow petals each. *Marah* spp. (manroot) are perennial and have flowers similar to but more white than white bryony. The fruits of both *E. lobata* and *Marah* spp. resemble small, spiny cucumbers.

Look-alike: wild cucumber (Barbara Tokarska-Guzik, University of Silesia, www.bugwood.org)

NOXIOUS WEED LISTINGS: CO (Watch list), ID (Containment), OR (A), WA (B)

NOTES: All parts of the plant are poisonous to humans and most livestock. Crushed berries give off a foul odor.

Mayten

Maytenus boaria Molina

SYNONYMS: Chilean mayten, green showers

ORIGIN: South America

GROWTH TRAITS: Evergreen tree typically growing 20-50' tall (6-15 m) from an extensive root system that regularly sends up suckers near the parent tree. The tree has a rounded crown with weeping, pendulous branches that are green when young but age gray-brown. The straight trunk has rough bark and is up to 30" in diameter (76 cm). Leaves are thick, elliptic, 1-2" long (2½-5 cm), and light green with toothed margins. Leaves are alternate and held perpendicular to the branch. Flowers appear in spring and are either male (brownish-yellow) or female (5 green petals with light purple lines). Both flower types are small and appear on the same tree. The fruit is a yellow capsule containing 1-2 seeds and is covered by a red-colored membrane.

REPRODUCTION: By seed and suckering from roots. It is unknown how long seeds may remain viable in the soil.

Mayten: a) tree (jpsti_777), b) numerous suckers sprouting around large tree (Jon Sullivan)

Mayten: c) leaves (Jon Sullivan), d) female flowers (Pato Novoa), e) fruits (Inao Vásquez)

HABITAT: Found in full sun and moist, well-drained soil. It is intolerant of full shade and harsh winters. Frequently escapes cultivation, capitalizing on disturbance to become problematic along hillsides and in pastures.

Look-alike: weeping willow (Antilived)

LOOK-ALIKES: Weeping willow (*Salix babylonica* and related hybrids) resembles mayten with its weeping, pendulous branches and rough bark. However, weeping willow is deciduous with golden branches while mayten is evergreen with green or brown branches. Weeping willow leaves are half as wide as mayten and are not perpendicular to the branches. Finally, the flowers of weeping willow are tiny and occur in small, tight clusters, and its male and female flowers occur on separate trees.

NOXIOUS WEED LISTINGS: Not listed as noxious in any western state or province.

NOTES: Though not listed as noxious anywhere, this is a species of concern in California where it has escaped cultivation and has recently been documented spreading.

Carduus thistles

Trait	Italian *Carduus pycnocephalus*	Plumeless *Carduus acanthoides*	Slenderflower *Carduus tenuiflorus*
Life History	Annual or Biennial	Annual or Biennial	Annual or Biennial
Preferred Habitat	Disturbed, open; High pH soil; Dry	Disturbed; Well-drained soil; Mesic	Open areas; Fertile soil; Dry
Avg Height	4' (1.2 m)	3½' (1.1 m)	3.2' (1 m)
Basal Leaves	≤5" long (13 cm); Deeply lobed; Short matted hairs on undersides; Spines on lobe tips and margins	≤8" long (20 cm); Deeply lobed to midvein; Hairy underside; 1-3 spines on each lobe margin	≤5" long (13 cm); Deeply lobed; Short matted hairs on undersides; Spines on lobe tips and margins
Stems	Slightly winged and spiny along entire length	Leaf-like spines covering stems entire length	Triangular stem wings tipped with spines along entire length
Capitulum Diameter	≤ 1" (2½ cm)	≤ 1" (2½ cm)	<1" (<2½ cm)
Bracts	Triangular; Have stiff, forward-pointing hairs; Cobwebby	Spiny; Needle-like	Spiny; Triangular but narrow

Italian thistle: a) plant (Eric Coombs, Oregon Department of Agriculture), b) stem (©1995 Saint Mary's College of California), c) flower heads (Mary Ellen Harte) (a,c www.bugwood.org)

Plumeless thistle: d) plants, e) stem (Richard Old, www.xidservices.com), f) flower heads (d,f Becca Van Kampen, MIA Consulting)

Slenderflower thistle: g) plants (Javier Martin), h) leaf base and stem (Thurston County (WA) Noxious Weed Board), i) flower heads (Washington State Noxious Weed Control Board)

Carduus thistles (continued)

NAMES: Italian thistle, *Carduus pycnocephalus* L. (IT)
Plumeless thistle, *Carduus acanthoides* L. (PT)
Slenderflower thistle, *Carduus tenuiflorus* Curtis (ST)

SYNONYMS: IT: Italian plumed thistle; PT: bristly thistle, spiny plumeless thistle; ST: winged plumeless thistle

ORIGIN: Europe, Asia, northern Africa (all species)

GROWTH TRAITS:

Italian thistle (IT): Herbaceous winter annual or biennial often growing to 4' tall (1.2 m) from a long taproot. Leaves (≤5" or 13 cm long) are lance-shaped, green and hairless above, hairy below, and have spines on lobe tips. Stem leaves grow alternately and lightly clasp the winged stem, which is spiny along its entire length. Flower heads are thimble-sized (up to 1" or 2½ cm in diameter) in clusters of 2 to 5 at branch tips. Bracts are triangular and have tiny, firm, forward-pointing hairs along the midrib. Bracts are cobwebby at the base. Flowers are pink to purple and appear from April to July.

Plumeless thistle (PT): Herbaceous winter annual or biennial growing 3-4' tall (0.9-1.2 m) from a fleshy taproot that is hollow near the crown. Leaves (≤8" or 20 cm long) are hairy on the undersides, narrow, deeply lobed (almost to the midrib), finely divided, and have spines along margins. Basal leaves on some plants may have white margins. Stem leaves grow alternately and lightly clasp the stem. Flower heads are up to 1" (2½ cm) in diameter and are either solitary or form small clusters of up to 5 heads at the ends of stems and branches. Bracts are needle-like and tipped with sharp spines. Flowers are pink to purple and appear from June to October.

Slenderflower thistle (ST): Herbaceous winter annual or biennial growing 3-4' tall (0.9-1.2 m) from a shallow and slender taproot. Stems are winged and spiny along their entire length. The alternate leaves are lance-shaped and gray-green with light-colored veins and spiny margins. They are hairless and spiny above, hairy below. Flower heads are less than 1" (2½ cm) in diameter, growing in clusters of 5 to 20 at the ends of stems. Bracts are triangular, tipped with spines, and not hairy. Flowers vary from pink to purple and bloom from April to June.

REPRODUCTION: All three species reproduce by seed only. Seeds of many *Carduus* species may remain viable in the soil for up to 10 years, though most germinate within three.

HABITAT: All three species capitalize on disturbance for establishment and can be found in open areas such as pastures, rangelands, and rights-of-way. **IT** prefers dry conditions and high pH soil. **PT** prefers moist conditions with well-drained soil. **ST** prefers dry conditions with fertile soil.

LOOK-ALIKES: Over 80 native thistle species occur in North America and could be confused for all three *Carduus* species described on these pages. Native thistles never have spines along their entire stems as do Italian, plumeless and slenderflower thistles. To differentiate these three species from the more than 20 exotic thistle species established in North America, these three have the following combination: spines along their entire stem length, small flower heads (≤ 1" or 2½ cm), and narrow triangular bracts. To differentiate these three species from each other, refer to the comparison table three pages previous. **IT** and **ST** resemble each other the most but can be differentiated by the presence of hairs or cobwebs on bracts.

Look-alike: native thistle (Rich Hansen, USDA APHIS PPQ)

NOXIOUS WEED LISTINGS: **IT & ST**: CA, OR (B), WA (A, Prohibited); **PT**: AB (Prohibited), BC (Regional), CA & CO (B), OR (A), WA (B, Prohibited), ID (Containment), WY

NOTES: **PT** produces one type of seed which has a pappus of small white bristles. Both **IT** and **ST** produce two types of seeds. Those in the center of the capitulum are cream-colored and have a plume of whitish barbed hairs that aid in wind dispersal. Seeds from the outer portions of the capitulum are smooth, dark, and lack a pappus. These have no obvious means of dispersal and are often dormant.

Italian thistle | Plumeless thistle | Slenderflower thistle

Iberian & Purple starthistle

Centaurea iberica Trevir. ex Spreng. & *C. calcitrapa* L.

Iberian starthistle: a) plant with flower heads (Eitan f), b) leaf, c) seeds (b,c ©2001 CDFA)

Purple starthistle: d) plant with flower heads (Xemenendura), e) leaf and stem (Solanum), f) seeds (D. Walters and C. Southwick, USDA, www.bugwood.org)

SYNONYMS: Iberian starthistle (IS): Iberian knapweed; Purple starthistle (PS): red starthistle

ORIGIN: southern Europe, Middle East (both species)

GROWTH TRAITS: Both species are herbaceous annuals to short-lived perennials typically growing 2-4' tall (0.6-1.2 m) from a stout taproot. Plants often grow as rosettes with spiny centers the first year and then flower the second year. Stems and leaves are covered with fine hairs. Lower and basal leaves are divided or deeply lobed while upper leaves are not. All leaves often have a light green or gray-green appearance. Flowering occurs from July to October when numerous lavender to purple flower heads (¾-1" or 2-2½ cm in diameter) develop at stem tips. Floral bracts are tipped with 1" long (2½ cm) straw-colored spines. The two species can be differentiated by their seeds. **IS** produces plumed seeds while seeds of **PS** are plumeless.

REPRODUCTION: Both species spread only by seed. Most seed germinates the first year, but buried seeds of both species can remain viable in the soil for approximately three years.

HABITAT: Both species are found in dry and/or disturbed areas, especially along roadways and in dry, grazed rangeland.

LOOK-ALIKES: Both species resemble other members of the *Centaurea* genus. Starthistles can be distinguished by the very long, straw-colored spines extending from bract tips. Yellow starthistle differs from these two species with its yellow flower head color and winged stems.

NOXIOUS WEED LISTINGS: **IS**: CA, NV & OR (A); **PS**: CA, NV & OR (A), WA (A, Prohibited)

NOTES: Unpalatable to livestock; may cause the fatal "chewing disease" in horses.

Iberian starthistle Purple starthistle

Squarrose knapweed

Centaurea virgata Lam. ssp. *squarrosa* (Boiss.) Gugler

SYNONYMS: *Centaurea squarrosa* Willd., *C. virgata* auct. Amer., *C. triumfettii* All.

ORIGIN: Eurasia

GROWTH TRAITS: Herbaceous perennial growing 1½-3' tall (0.45-0.90 m) from a stout taproot. The many-branched plant has leaves that are gray-green, alternate, and deeply dissected. Stem leaves have fewer to no lobes further up the plant. Flower heads develop singly or in pairs at the tips of branches. Flower heads are ≤¼" (6 mm) in diameter so are much more slender than most other knapweeds. Florets are pink or rose-colored. Bracts have recurved tips, with the terminal spine longer than the lateral spines on each bract. Flowering occurs in early to mid-summer. Seeds are golden to dark brown and have a white pappus.

REPRODUCTION: By seed. Seeds may remain viable in the soil for many years.

HABITAT: Found in dry, open, and disturbed sites such as rangelands, roadsides, and grasslands.

Squarrose knapweed: a) bushy plant, b) infestation (a,b Steve Dewey, Utah State University, www.bugwood.org)

Squarrose knapweed: c) rosette, d) leaves (Joseph M. DiTomaso, University of California - Davis), e) flower heads (c,e Steve Dewey, Utah State University) (c-e www.bugwood.org)

LOOK-ALIKES: Numerous *Centaurea* resemble this species; most are themselves exotic and invasive. Diffuse knapweed (*C. diffusa*) is the most similar weedy knapweed, and can be differentiated by having a thicker flower head with non-curved bracts. The florets of diffuse knapweed are typically white but may occasionally be pink, similar to squarrose knapweed. Several native plants are similar to squarrose knapweed during various stages, especially asters when in bud. Asters (spanning several genera) can be differentiated by their undivided leaves and smooth, non-toothed bracts. Asters also have two types of flowers in one flower head, somewhat resembling daisies or sunflowers.

Look-alike: diffuse knapweed (Jennifer Andreas, Washington State University Extension)

NOXIOUS WEED LISTINGS:
AB (Prohibited), CA, CO NV & OR (A), ID (EDRR), UT (B)

NOTES: Individual seed heads fall or detach as a unit and can attach to fur and clothing, which aids in seed dispersal.

Hairy willowherb

Epilobium hirsutum L.

SYNONYMS: great willowherb, great hairy willowherb, codlins and cream

ORIGIN: Africa, Asia, Europe

GROWTH TRAITS: Upright, herbaceous perennial growing up to 6½' tall (2 m) from extensive rhizomes. Stems are robust and multi-branched. Leaves are opposite, attached without stalks, lance-shaped, and have toothed margins. Leaves can be 1-5" long (2½-12½ cm). Stems and leaves are covered in fine hairs. Flowers have 4 pinkish-purple, notched petals with white centers. Flowers can be up to 1" in diameter (2½ cm) and appear from summer through early fall. Sepals are green. Fruits are capsules that are very thin and long (2-3" or 5-7½ cm) and open at maturity to release numerous seeds. Each seed is small, oblong, flattened, and has a tuft of long whitish hairs.

REPRODUCTION: By seed and rhizomes. Seeds may remain viable in the soil for three or more years.

Hairy willowherb: a) young plants (André Karwath), b) infestation (Wendy DesCamp, Washington State Noxious Weed Control Board)

Hairy willowherb: c) leaves, d) flowers, e) mature and splitting fruit (c-e Wendy DesCamp, Washington State Noxious Weed Control Board)

HABITAT: Typically found in moist areas, including ditches, wetlands, meadows, and moist pastures. Prefers open, sunny conditions but can tolerate semi-shade.

Look-alike: fireweed (Kallerna)

LOOK-ALIKES: Several other species of *Epilobium* are native to North America and closely resemble hairy willowherb. Most look-alikes have either smaller flowers, different leaf shapes, occur in different habitats, or are annuals with different root systems. Fireweed is a very similar, related species whose name was recently changed from *E. angustifolium* to *Chamaenerion angustifolium.* It can be differentiated from hairy willowherb by its spiral leaf arrangement, greater numbers of flowers occurring at stem tips, petals that overlap less than hairy willowherb, and by its pink sepals. The exotic Himalayan balsam (*Impatiens glandulifera*) is also similar, but its flowers occur in larger clusters, its petals are fused and somewhat tubular, and its stems are purple-tinged and hollow.

NOXIOUS WEED LISTINGS: CO (Watch List), WA (B, Prohibited)

NOTES: Often found growing with purple loosestrife, which it can out-compete in the fall. The opposite is true in spring.

Himalayan balsam

Impatiens glandulifera Royle

SYNONYMS: ornamental jewelweed, policeman's helmet, *Impatiens roylei* Walp.

ORIGIN: Asia (Himalayas)

GROWTH TRAITS: Herbaceous annual growing 3-10' tall (0.9-1 m) from a shallow, fibrous root system. Stems are smooth, hairless, hollow, and often have a purplish tinge. Leaves are elliptic, 2-9" long (5-23 cm), and either opposite or in whorls of 3. Leaves have serrated margins and glandular stalks at their bases. Flowers appear from June to October on flower stalks in clusters at leaf nodes and stem tips. Flowers vary from white to deep pink, are ~1⅓" tall (3-4 cm), and have 5 petals. Some of the petals are fused, giving the flower a unique shape resembling an old-fashioned English policeman's helmet. Seed pods are teardrop-shaped, ¾-1¼" long (2-3 cm), and green. Seed pods explode when disturbed, scattering the small brown seeds up to 23' (7 m).

REPRODUCTION: By seed. Seeds may remain viable in the soil for up to 18 months.

Himalayan balsam: a) plant (Udo Schmidt), b) roadside infestation (Wassily)

Himalayan balsam: c) leaves and stem (Markus Nolf), d) flower and fruit (Barbara Tokarska, Guzik University of Silesia, www.bugwood.org), e) 2 mature and 1 exploded seed pod (Rasbak)

HABITAT: Largely found in moist areas including woodlands, forest clearings, streambanks, meadows, and roadsides where water collects.

Look-alike: fireweed (Kallerna)

LOOK-ALIKES: Many native and exotic species within the *Impatiens* genus resemble Himalayan balsam. Most look-alike relatives have smaller leaves (frequently alternate) and/or flowers with different colors. Fireweed (*Chamaenerion angustifolium*, previously *Epilobium angustifolium)* is an unrelated native species that has similar leaves and deep pink flowers. However, petals of fireweed are not fused, and its leaves are alternate. Hairy willowherb (*Epilobium hirsutum*) is also similar, but its flowers are more solitary and have 4 notched, unfused, and overlapping petals.

NOXIOUS WEED LISTINGS:
AB (Prohibited), ID (EDRR), OR (B), WA (B, Prohibited)

NOTES: Seeds require a cold treatment in order to germinate; some can germinate under water. Sold as an ornamental that frequently escapes cultivation.

Shiny geranium

Geranium lucidum L.

SYNONYMS: shiny crane's-bill

ORIGIN: Europe, Asia, northern Africa

GROWTH TRAITS: Herbaceous erect winter annual or biennial growing 2-18" tall (5-45 cm) from a weak central root. Stems are hairless and often reddish-colored. The alternate leaves are shiny and rounded, divided into 5-7 lobes with lobed edges, and sparsely covered with stiff hairs. Flowers appear in clumps of 2 throughout spring and early summer, or at other times of the year depending on the climate. Flowers have 5 pink petals; each petal is less than 0.4" long (1 cm). Sepals are fused, hairless, and strongly keeled with transverse wrinkles, appearing like ridges with bristled tips. The fruit has a beak-like projection that coils back forcefully at maturity to project seeds outwards, typical of most species in the family. Seeds are small and oval, reddish, and with a black projection. All green parts of the plant are tinged red either with age or with differing light conditions.

Shiny geranium: a) plant, b) infestation (a,b Alison Halpern, Washington State Noxious Weed Control Board)

Shiny geranium: c) leaf (Alison Halpern, Washington State Noxious Weed Control Board), d) flower, e) fruit at full length (left) and zoomed in (right) to show the sepal ridges (d-e Ben Legler)

REPRODUCTION: By seed. Seeds may remain viable in the soil for many years.

HABITAT: Found in moist, disturbed areas such as roadsides and ditches at low elevations as well as in shady woodlands.

Look-alike: dovefoot geranium (Jennifer Andreas, Washington State University Extension)

LOOK-ALIKES: Resembles many species in the Geraniaceae family with its pinkish-purple flowers and long crane's-bill fruit. The strongly keeled sepals help differentiate shiny geranium. Dovefoot geranium (*Geranium molle*) has fuzzy sepals and similarly-shaped but hairier leaves with prominent veins in both leaves and flowers. Dovefoot flowers are deeply lobed, so the 5 petals appear almost as 10. Other related Geraniaceae have larger, veined flowers and leaves that are either much pointier or are so deeply lobed that they appear divided.

NOXIOUS WEED LISTINGS: OR (B), WA (A, Prohibited)

NOTES: Seeds require a period of desiccation to break dormancy.

Wild four-o'clock

Mirabilis nyctaginea (Michx.) MacMill.

SYNONYMS: heartleaf four o'clock, heartleaf umbrella wort, *Allionia nyctaginea* Michx.

ORIGIN: North America (east of the Rocky Mountains)

GROWTH TRAITS: Herbaceous perennial growing up to 4' tall (1.2 m) from a fleshy, black taproot. Stems are smooth with a waxy bloom and produce opposite branches. Leaves are opposite, up to 4" long (10 cm), waxy, and either ovate or heart-shaped. Flowers occur in clusters of 3-5 near branch tips. Each flower has no petals but 5 notched, pink to lavender sepals and yellow stamens. Flowers are 0.4" (1 cm) in diameter and are subtended by a whorl of large, papery bracts. Brown fruits have 5 prominent veins, are warty, and <¼" long (3-6 mm). The seeds are hard, oblong nutlets that are produced from July to September.

REPRODUCTION: By seed. Seeds may remain viable in the soil for a few years.

Wild four-o'clock: a) plant (Jennifer Andreas, Washington State University Extension), b) infestation (Laura Blanchard)

Wild four-o'clock: c) leaves, d) flower and bracts surrounding fruits (c,d Jennifer Andreas, Washington State University Extension), e) fruits surrounded by bracts (Catherine Herms, The Ohio State University, www.bugwood.org)

HABITAT: Found in a wide range of conditions including waste areas, roadsides, railroad lines, orchards, perennial crop fields, dry meadows, riparian areas, and rangelands. Most often (though not always) found in well-drained soil.

LOOK-ALIKES: The opposite and ovate leaves, lack of petals, and short-lived pink sepals help differentiate this species from unrelated look-alikes. Several native four-o'clock species occur in North America, including the threatened and endangered Macfarlane's four-o'clock (*Mirabilis macfarlanei*). Many look very similar to wild four-o'clock so care should be taken in identification. The related species often have subtle differences in the shape, size, texture and color of leaves and flowers.

Look-alike: Macfarlane's four-o'clock (Thomas Kaye, Oregon Department of Agriculture)

NOXIOUS WEED LISTINGS: WA (A, Prohibited)

NOTES: Though native to portions of North America, it is regularly invasive inside and outside of its native range. The name "four-o'clock" refers to the flowers opening late in the day and withering early the next morning.

Crown vetch

Securigera varia (L.) Lassen

SYNONYMS: Purple crown vetch, common crown-vetch, *Coronilla varia* L.

ORIGIN: Eurasia

GROWTH TRAITS: Perennial, herbaceous forb often behaving as a vine that forms thick mats over open ground or competing vegetation. Plants typically grow 1' tall (0.3 m) from a fleshy, rhizomatous root system; however, flowering plants may be up to 3' tall (0.9 m). Leaves are alternate, 2-6" long (5-15 cm), and divided into 3-12 pairs of leaflets and a single terminal leaflet. Leaflets are 0.4-1" long (1-2½ cm). Flowers appear in leaf axils from late spring through early fall in a spreading umbel that resembles a crown with 6-25 flowers. Flowers are pale pink to deeper rose, pea-like (having a banner, wing and keel, typical of the pea family), and are ⅓-½" long (9-12 mm) with 10 stamens. Fruits are pods up to 2" long (5 cm) containing 3-7 rod-shaped seeds.

REPRODUCTION: By seed and the rhizomatous root system. Seeds may remain viable in the soil for 2-15 years.

Crown vetch: a) plant (Jan Samanek, State Phytosanitary Administration), b) infestation (James H. Miller, USDA Forest Service) (a,b www.bugwood.org)

Crown vetch: c) leaves, d) flowers (c,d both Dan Tenaglia, Missouriplants.com, www.bugwood.org), e) fruits (Matt Lavin, Bozeman, Montana, USA)

HABITAT: Most often found in open meadows, grasslands, savannas, and forest edges. Capitalizes on disturbance so can be found along roadsides, in abandoned fields, and disturbed forests under conditions varying from dry and sunny to moist and semi-shaded.

LOOK-ALIKES: The pea-like flowers and the compound leaves help differentiate this species from other plants outside of the Fabaceae family. Within the family, a number of milkvetch (*Astragalus*) and vetch (*Vicia*) species resemble crown vetch. Milkvetch leaves also have a terminal leaflet, but they have more leaflet pairs (10-16). Vetches are more vining in habit, and have clasping tendrils in place of the terminal leaflet.

Look-alike: vetch (Richard Old, www.xidservices.com, www.bugwood.org)

NOXIOUS WEED LISTINGS: Not listed as noxious in any western state or province.

NOTES: Though not listed as noxious anywhere, its ecological impact ranking and potential for distribution are both high. The plant is toxic to horses; if consumed in large amounts, it can cause slow growth, paralysis, or even death.

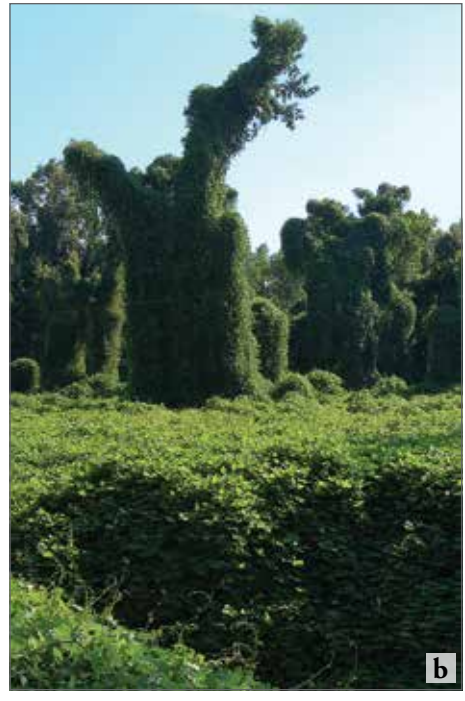
Kudzu

Pueraria montana var. *lobata* (Willd.) Maesen & S. M. Almeida ex Sanjappa & Predeep

SYNONYMS: Japanese arrowroot, *Pueraria montana* (Lour.) Merr., *P. lobata* (Willd.) Ohwi

ORIGIN: Asia

GROWTH TRAITS: Semi-woody, perennial vine growing from woody, tuberous roots. Roots can be >6' long (1.8 m) and weigh up to 300 pounds. A single root can produce up to 30 vines, each growing up to 100' long (30 m) in total and up to 1' (30 cm) per day. Vines smother trees, shrubs, utility poles, etc., and form extensive mats on open ground. Young vines are green while older vines have brownish bark and are up to 4" (10 cm) in diameter. Stems (vines) regularly root from any node touching the ground. Leaves are alternate and compound. Each leaflet is 3-4" long (7½-10 cm), dark green with lighter veins, and can be oval or goosefoot-shaped. Leaves and stems are hairy. Flowers appear in long clusters in late summer. Each flower is pea-like (having a banner, wing and keel, typical of the pea family), ½-¾" (1½-2 cm), and can be pink, purple, or red. Fruits are



Kudzu: a) plant (Miya), b) large infestation in foreground and smothering other species in background (Galen Parks Smith)

Kudzu: c) leaf (Rebekah D. Wallace, University of Georgia), d) flowers, e) fruits (d,e Leslie J. Mehrhoff, University of Connecticut) (c-e www.bugwood.org)

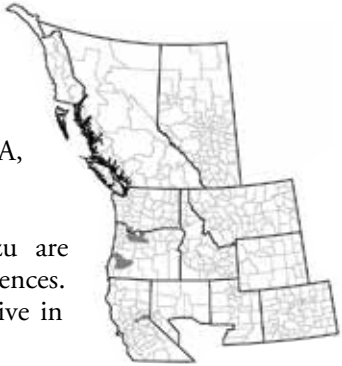
flattened, hairy seed pods up to 2" long (5 cm) that turn dark brown at maturity.

REPRODUCTION: By seed (minimal) and vegetatively through rooting nodes (primary means).

HABITAT: Found in open, disturbed areas such as abandoned fields, roadsides, and forest edges. It is most prolific in full sun, in deep, well-drained soils, and where winters are mild and annual rainfall high.

Look-alike: western poison ivy (Dave Powell, USDA Forest Service, www.bugwood.org)

LOOK-ALIKES: In the Northwest, the majority of climbing vines have very different flowers and a different number of leaflets. English ivy (*Hedera helix*) is sometimes mistaken for Kudzu, but has undivided and much smaller leaves. Western poison ivy (*Toxicodendron rydbergii*) has 3 leaflets with strong venation, but this species grows as a short shrub and has drooping white flower clusters and berry fruits.



NOXIOUS WEED LISTINGS: OR (A), WA (A, Prohibited)

NOTES: Several species and varieties of kudzu are known, all with only subtle morphological differences. The majority of sources refer to the form invasive in North America as *Pueraria montana* var. *lobata.*

Camelthorn

Alhagi maurorum Medik.

SYNONYMS: Caspian manna, Persian manna, *Alhagi camelorum* Fisch., *Alhagi pseudalhagi* (M. Bieb.) Desv. ex B. Keller & Shap.

ORIGIN: Mediterranean, Eurasia

GROWTH TRAITS: Perennial shrub growing 2-3' tall (0.6 to 0.9 m) from a deep and extensive rhizomatous root system. Stems and leaves are gray-green. Leaves are small, elliptic with smooth margins, and occur alternately up the stem. Sharp, yellow-tipped spines 1-2" long (2½-5 cm) are produced in leaf axils. Small, pea-like flowers (having a banner, wing and keel, typical of the pea family) are produced from June to August. Flowers range from pink to maroon and are borne on short, spine-tipped branches. Reddish-brown seed pods are constricted between the individual seeds and are tipped with a small beak. Seeds are dark brown and kidney-shaped. Plant growth varies with environmental conditions; thorns are smaller and fewer and leaves are larger and more numerous in moister climates.

Camelthorn: a) plant section (John M. Randall, The Nature Conservancy, www.bugwood.org), b) large plant, from above (Eitan f)

Camelthorn: c) leaves and thorns (Steve Dewey, Utah State University), d) flowers (Eitan f), e) seed pods from spine (John M. Randall, The Nature Conservancy) (c,e www.bugwood.org)

REPRODUCTION: By seed and the rhizomatous root system. Seeds may remain viable in the soil for many years.

HABITAT: Found in moist to dry areas in disturbed soil.

LOOK-ALIKES: Though individual characteristics of camelthorn may resemble other plants, the combination of small, pink, and pea-like flowers, long spines, short height, and undivided, smooth-margined leaves help differentiate this species. Russian thistle (*Salsola tragus*) resembles camelthorn with its shrubby form and green, spiny stems. However, the exotic Russian thistle does not have showy pink flowers or elliptic leaves.

Look-alike: Russian thistle (Eric Coombs, Oregon Department of Agriculture, www.bugwood.org)

NOXIOUS WEED LISTINGS: CA, CO NV & OR (A), WA (B)

NOTES: Seeds require scarification and do not germinate while exposed to light. Germination is highest following flash floods or after seeds pass through the digestive system of animals.

Bur & Wild chervil

Anthriscus caucalis M. Bieb. & *A. sylvestris* (L.) Hoffm.

Bur chervil: a) plant with flowers (Olivier Pichard), b) foliage (Joseph DiTomaso, University of California - Davis), c) fruits (D. Walters and C. Southwick, USDA) (b,c www.bugwood.org)

Wild chervil: d) plant with flowers, e) foliage, f) fruits - still attached (d-f Leslie J. Mehrhoff, University of Connecticut, www.bugwood.org)

SYNONYMS: Bur chervil (BC): *Anthriscus scandicinus* Mansf.; Wild chervil (WC): cow parsley, raven's wing

ORIGIN: Eurasia (both species)

GROWTH TRAITS: Both species are herbaceous, taprooted, and generally less than 3' tall (0.9 m) but may reach 6' (1.8 m) on occasion. Stems are hollow and branching with alternate leaves that are 2-3 times divided, appearing fern-like. Leaves are larger at the plant base, have short, stiff hairs, and are gradually reduced in size upwards on the plant stem. Flowers are white and have 5 petals. **BC**: Annual species that typically germinates in fall. Flowers are arranged in compound umbels at leaf axils and bloom in spring. Fruits are <¼" long (6 mm), beaked, and covered with hooked hairs. **WC**: Annual, biennial, or short-lived perennial. Flowers are arranged in compound umbels at stem tips and bloom from spring through summer. Fruits are <¼" long (6 mm), beaked, and smooth.

REPRODUCTION: Both species spread only by seed. Seed viability is unknown.

HABITAT: Both species frequent moist and disturbed areas along ditchbanks and in meadows, open forests, and irrigated pastures. **BC** can withstand drier conditions than **WC**.

LOOK-ALIKES: The combination of hollow stems, fern-like leaves, and 5-petaled white flowers arising from umbels help differentiate these species from many non-Apiaceae look-alikes. Examining the fruits can help differentiate species in the Apiaceae family. Both species resemble the related poison hemlock (*Conium maculatum*), a deadly species invasive in North America. Poison hemlock can grow much taller (10' or 3 m) and has larger stems overall covered in small, purple spots. The umbel location (leaf axils rather than stem tips) and hair on fruits help differentiate bur chervil from wild chervil.

NOXIOUS WEED LISTINGS: **BC**: BC (Provincial); **WC**: BC (Regional), WA (B, Prohibited)

NOTES: The hooked hairs on bur chervil seeds readily adhere to fur, clothing, and objects.

Bur chervil Wild chervil

Giant hogweed

Heracleum mantegazzianum Sommier & Levier

SYNONYMS: cartwheel flower

ORIGIN: Eurasia

GROWTH TRAITS: Herbaceous, short-lived perennial growing from a taproot and reaching 10-15' tall (3-4½ m) during flowering. The large stems are hollow and usually marked with purple, bumpy blotches. Leaves are deeply lobed, sharply pointed, and up to 3' wide (0.9 m). The white flowers are on a large compound umbel (all flower stalks arising from the same point) that can be 2½' (0.8 m) in diameter. Flowering occurs from late spring to early summer. Fruits are elliptic and when dry are marked with brown, swollen resin canals less than 1/16" (1 mm) in diameter. The plant typically grows several years before flowering, and then dies following flowering.

REPRODUCTION: By seed. Seeds are dormant the first year but can remain viable in the soil for many years.

Giant hogweed: a) plant (Fritz Geller-Grim), b) infestation (Jan Samanek, State Phytosanitary Administration, www.bugwood.org)

Giant hogweed: c) leaf (Sasha Shaw, King County NWCB), d) leaf attachment on stem (Richard Old, www.xidservices.com), e) flowers (Frank Schwichtenberg), f) seed (USDA APHIS PPQ) (d,f www.bugwood.org)

HABITAT: Found in moist, disturbed soils such as riverbanks, ditches and railroad rights-of-way.

LOOK-ALIKES: Numerous species in the Apiaceae family are present in North America and resemble giant hogweed with their white umbel inflorescences and hollow stems. Only one species (common cowparsnip, *Heracleum maximum*) is large like giant hogweed and has massive lobed leaves. Common cowparsnip differs in that even at its maximum size, it can only reach heights of 10' (3 m) and has smaller leaves up to 18" (45 cm) wide. The native sweet coltsfoot (*Petasites frigidus*) can have very similar leaves to giant hogweed, however while giant hogweed grows as a rosette of leaves, coltsfoot leaves emerge from the soil on single stems. Also, sweet coltsfoot only grows up to 2' tall (60 cm), and its inflorescences are clusters of flower heads with multiple white to pink florets.

Look alike: common cowparsnip (Richard Old, www.xidservices.com, www.bugwood.org)

NOXIOUS WEED LISTINGS: AB (Prohibited), ID (EDRR), OR (A), WA (A, Prohibited)

NOTES: The plant produces sap that causes skin sensitivity to UV radiation and leads to blistering and severe burns. Consequently, great care should be taken when handling.

Cutleaf teasel

Dipsacus laciniatus L.

SYNONYMS: cut-leaved teasel

ORIGIN: Eurasia

GROWTH TRAITS: Herbaceous perennial that grows from a taproot. The plant remains as a basal rosette for 1-3 years, after which it sends up flowering stalks that can reach 6-7' (2 m) in height. Opposite leaves are fused at the base and form cups that surround the prickly stem. Leaves are deeply lobed, appearing fringed. Large, oval flower heads are covered in tiny white flowers, with each flower having a stiff, spiny bract. Even larger spiny bracts subtend the flower heads. Flowers bloom from June to September. The middle of the head blooms first, followed by the upper and lower parts.

REPRODUCTION: By seed. Seeds can be viable in the soil for more than three years, though the majority germinate within one.

Cutleaf teasel: a) plants, b) leaves (a,b Chris Evans, River to River CWMA, www.bugwood.org)

Cutleaf teasel: c) infestation, d) prickly stem (Todd Pfeiffer, Klamath Country Weed Control), e) flower heads (c,e Chris Evans, River to River CWMA) (c-e www.bugwood.org)

HABITAT: Found in open, sunny habitats preferring roadsides and other disturbed waste areas, although it can sometimes be found in high quality habitats such as prairies, seeps, and meadows.

LOOK-ALIKES: The opposite and jagged leaves, prickly stems, and stiff flower heads subtended by long bracts help differentiate this species from unrelated look-alikes. Another species of invasive teasel, common teasel (*Dipsacus fullonum*), is very similar to cutleaf teasel, but has purple-colored flowers and leaves without deep teeth or lobes.

Look-alike: common teasel (Ohio State Weed Lab Archive, Ohio State University, www.bugwood.org)

NOXIOUS WEED LISTINGS: CO & OR (B)

NOTES: Flower heads of many teasel species were once used to card wool.

Garlic mustard

Alliaria petiolata (M. Bieb.) Cavara & Grande

SYNONYMS: hedge garlic, *Alliaria officinalis* Andrz. ex M. Bieb.

ORIGIN: Europe

GROWTH TRAITS: Herbaceous biennial that forms a rosette the first year and a 1-4' tall (0.3-1.2 m) flowering stalk the second year. The root is a slender, white taproot, typically having a distinctive "s" curve at the top, just below the root crown. Basal leaves are rounded to kidney-shaped, and stems leaves are alternate and triangular. Both leaf types have coarse, wavy-toothed margins and are 1-6" long (2½-15 cm). Small white flowers have 4 petals and 6 stamens and bloom in early spring. Seeds are produced in erect, slender pods that become brown when mature. By late summer plants can only be distinguished by the erect, leafless stalks with dry, brown seed pods.

REPRODUCTION: By seed. Most seeds germinate once dormancy is broken; a small percentage remains viable in the soil for four or more years.

Garlic mustard: a) plant (Robert Vidéki, Doronicum Kft.), b) infestation (Steven Katovich, USDA Forest Service) (a,b www.bugwood.org)

Garlic mustard: c) s-shaped curve at top of root, d) leaf (Rob Routledge, Sault College), e) flowers (Leslie J. Mehrhoff, University of Connecticut), f) fruits (c,f Wendy DesCamp, Washington State Noxious Weed Control Board) (d,e www.bugwood.org)

HABITAT: Found in moist, shaded soil of floodplains, forests, riverbanks, roadsides, and trailsides, capitalizing on disturbance.

Look-alike: piggyback plant (Edgeplot)

LOOK-ALIKES: The four petals in combination with six stamens help differentiate this species from those outside the Brassicaceae. Within the family, most species in the Northwest have different colored flowers. Other invasive white-flowered mustards such as whitetop and perennial pepperweed can be distinguished by their leaves, which are not heart-shaped or deeply toothed. When growing as a rosette, garlic mustard resembles rosettes of the native piggy-back plant (*Tolmiea menziesii*) and fringecup (*Tellima grandiflora*). Piggy-back plant and fringecup are covered in long hairs while garlic mustard has few, short hairs. The exotic and weedy nipplewort (*Lapsana communis*) looks similar when young, but it is covered in whitish hairs, has white sap, and its leaves have a few smaller lobes below a larger terminal leaflet.

NOXIOUS WEED LISTINGS: AB (Prohibited), BC (Provincial), OR (B), WA (A, Prohibited)

NOTES: Plant parts (especially when young) can give off a garlic odor when crushed.

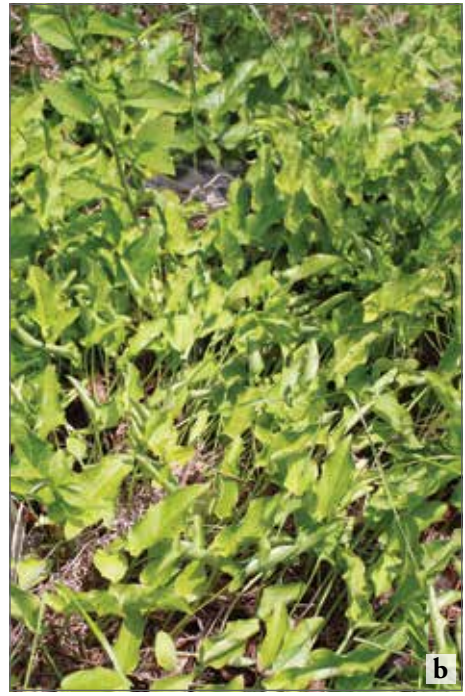
Italian arum

Arum italicum Mill.

SYNONYMS: Italian lords-and-ladies, orange candleflower, cuckoo's pint

ORIGIN: Eurasia, Mediterranean

GROWTH TRAITS: Herbaceous, stemless perennial growing 1-1½' tall (30-45 cm) from a tuberous root system. Main tubers produce a number of daughter tubers that are attached during the growing season, but separate from the main tubers over time, forming separate plants. In mild climates, new leaves appear in autumn; in cold climates leaves die back for winter and new leaves appear in spring. Leaves are typically 3½-8" long (9-20 cm) and have long petioles (6-14" or 15-35 cm). Leaves are oval to arrowhead-shaped, have smooth margins, and may be solid green or have veins colored silver-gray to yellow-green. Tiny white flowers are produced in spring on a long, narrow spadix surrounded by a large green spathe. The leaves and spathe die back after flowering, leaving only the spadix, which produces tight clusters of orange-red berries.



Italian arum: a) plant, b) infestation (Wendy DesCamp, Washington State Noxious Weed Control Board)

Italian arum: c) leaf (Hectonichus), d) spadix and portions of the spathe (Meneerke Bloem), e) berries (Wendy DesCamp, Washington State Noxious Weed Control Board)

REPRODUCTION: By seed and vegetatively by daughter tubers. Seeds are reportedly only viable for a short time.

HABITAT: Found in open woodlands, forest edges and understories, open scrub, riparian areas, old gardens, and disturbed locations near urban development.

Look-alike: water arum (Anneli Salo)

LOOK-ALIKES: Though the leaves of Italian arum may resemble unrelated species, the spadix/spathe inflorescence distinguishes this species from all potential look-alikes outside the Araceae. Within the family, the white flowers and arrow-head leaves largely help distinguish Italian arum. The more similar green arrow arum (*Peltandra virginica*) and water arum (*Calla palustris*) occur in bogs and marshes.

NOXIOUS WEED LISTINGS: Not listed as noxious in any western state or province; proposed for listing in WA in 2015.

NOTES: Though not listed as noxious anywhere, its ecological impact ranking and potential for distribution are both high. In Washington, the plant appears to be leaving the lag phase and becoming more common. All parts of the plant are poisonous.

Mediterranean sage

Salvia aethiopis L.

SYNONYMS: African sage

ORIGIN: Eurasia

GROWTH TRAITS: Herbaceous biennial growing 2-3' tall (0.6-0.9 m) from a stout taproot. Rosette leaves are grayish-green, triangular with jagged teeth, and 4-12" long (10-30 cm). Stem leaves are opposite, smaller, and aromatic when crushed. Branching stems are square in cross-section. Stems, new leaves, and mature leaf undersides are all covered in fine, woolly hairs. Mature plants become less hairy and develop prominent venation on the leaves. Whitish flowers are bilabiate (2-lipped), clustered at stem tips, and bloom from June through August. Flowers form four 1-seeded nutlets that are oval-shaped, smooth, and brown. The leaf arrangement and the shape of the stems and flowers are characteristic of the Lamiaceae family.

Mediterranean sage: a) plant, b) infestation (a,b Eric Coombs, Oregon Department of Agriculture, www.bugwood.org)

Mediterranean sage: c) rosette leaves, d) flowers (c,d Pipi69e), e) seeds (Steve Hurst, USDA NRCS PLANTS Database, www.bugwood.org)

REPRODUCTION: By seed. Seeds can be viable in the soil for up to 10 years.

HABITAT: Found in dry soils and disturbed habitats such as roadsides, pastures, and abandoned fields.

LOOK-ALIKES: The opposite leaves and square stems differentiate this plant from non-Lamiaceae look-alikes. Within the family, there are many native and exotic species of *Salvia* that resemble Mediterranean sage. Most look-alikes do not have white flowers; those which do (such as lyreleaf sage, *Salvia lyrata*) are not strongly 2-lipped. In addition, most *Salvia* look-alikes also have very different leaves and their inflorescences are not as large and branched as Mediterranean sage.

Look-alike: lyreleaf sage (David Stephens, www.bugwood.org)

NOXIOUS WEED LISTINGS: CO & NV (A), ID (Control), OR (B), WA (A, Prohibited)

NOTES: Stems bases break in autumn and spread seeds by tumbling with the wind.

Goatsrue

Galega officinalis L.

SYNONYMS: professor weed

ORIGIN: Middle East

GROWTH TRAITS: Herbaceous perennial that grows up to 6' tall (1.8 m) from a deep taproot. Plants are shrubby and multi-stemmed. Stems are somewhat hollow and cylindrical. Leaves are alternate and compound, divided into 6-10 pairs of leaflets and a single terminal leaflet. Flowers are white to light purple, pea-like (having a banner, wing and keel, typical of the pea family), and are arranged in clusters at stem tips or leaf axils. Flowering is from June to July. Fruits are narrow pods just over 1" long (3 cm).

REPRODUCTION: By seed. Seeds can be viable in the soil for up to 10 years.

HABITAT: Found in or along cropland, ditchbanks, irrigation waterways, uncut pastures, fence lines, roadways and wet, marshy areas.

Goatsrue: a) plant (Sasha Shaw, King County NCWB), b) close-up of scattered infestation (Carl Bullock)

Goatsrue: c) leaves with leaflets, d) flowers (H. Zell), e) seed pods (c,e Sasha Shaw, King County NWCB)

LOOK-ALIKES: The unique, pea-like flowers as well as the compound leaves help differentiate this species from all other plants outside of the Fabaceae. Within the family, a number of milkvetch (*Astragalus*) and vetch (*Vicia*) species resemble goatsrue. Milkvetch leaves also have one terminal leaflet, but they tend to have more leaflet pairs (10-16). Vetches are more vining in habit, and have clasping tendrils in place of the terminal leaflet.

Look-alike: vetch (Richard Old, www.xidservices.com, www.bugwood.org)

NOXIOUS WEED LISTINGS: NV & OR (A), WA (A, Prohibited)

NOTES: Initially introduced to North America as a potential forage plant, however the leaves and stems contain a poisonous alkaloid that makes the plant unpalatable to livestock and toxic in large quantities.

Bridal veil broom

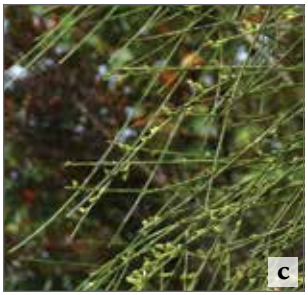
Retama monosperma (L.) Boiss.

SYNONYMS: *Genista monosperma* (L.) Lam., *Spartium monospermum* L., *Lygos* monosperma (L.) Heywood

ORIGIN: Mediterranean

GROWTH TRAITS: Upright, perennial shrub growing up to 10' tall (3 m) and 20' across (6 m) from a deep taproot. Young plants are dominated by a leading stem; plants become more branched and broaden with age. Stems are slender, green, and drooping. Leaves are small, linear, and usually simple (not divided into leaflets). Leaves are quickly deciduous so stems are leafless much of the year. Flowers are small, have purple sepals, and have petals that are white and pea-like (having a banner, wing and keel, typical of the pea family). Flowers appear in short clusters of 2-20 from the stems in early spring, though some plants have been observed flowering year-round in warm climates. The fruits are pods that are nearly circular, typically 0.4" long (1 cm), and contain 1-2 seeds each.

Bridal veil broom: a) plant (Javier Martin), b) infestation prior to blooming (Jean-Paul Peltier)



Bridal veil broom: c) stems and leaves (James Gaither), d) flowers (Javier Martin), e) fruits (Fouad Msanda)

REPRODUCTION: By seed. Seeds may remain viable in the soil for several years.

HABITAT: Does well in dry, rocky, infertile soils such as sage scrub, chaparral, and grasslands.

LOOK-ALIKES: Multiple exotic broom species are established in similar habitats in North America, such as Scotch broom (*Cytisus scoparius*) and Spanish broom (*Spartium junceum*). These other brooms resemble bridal veil broom when not in bloom or not fruiting. Their larger yellow flowers and long seed pods containing more seeds help differentiate them from bridal veil broom which has small white flowers, nearly circular pods, and typically only one seed per pod.

Look-alike: Scotch broom (Steve Dewey, Utah State University, www.bugwood.org)

NOXIOUS WEED LISTINGS: CA

NOTES: Likely an escaped ornamental. In southern California, an infestation grew from 10 acres (4 ha) to over 2,000 acres (809 ha) in 6 years. It was recently reported from the Columbia River Gorge (Hood River County, Oregon).

Common privet

Ligustrum vulgare L.

SYNONYMS: European privet, wild privet

ORIGIN: Europe, Mediterranean

GROWTH TRAITS: Perennial shrub that grows 10-15' tall (3-4.8 m) from a shallow root system. Plants are typically deciduous but may be evergreen in mild climates. Multiple stems have smooth, gray-brown bark and produce several long, leafy branches. Stems can root when they touch the ground, leading to a sprawling growth form. Leaves are opposite, elliptic, narrow, and grow up to 2½" long (6 cm). Leaves have smooth margins and a deep midvein. Flowers appear in spring to early summer in clusters at the ends of branches. Each small flower has 4 white petals that are free at their tips but fused at their bases, giving them a tubular appearance. Fruits are berries that turn from green to shiny black with maturity. Each berry has up to 4 seeds.

REPRODUCTION: By seed and by producing roots when stems touch the ground. Seeds remain viable for only one year.

Common privet: a) plant, b) infestation (a,b Robert Vidéki, Doronicum Kft., www.bugwood.org)

Common privet: c) leaves, d) flowers, e) fruits (a-c Robert Vidéki, Doronicum Kft., www.bugwood.org)

HABITAT: Frequently occurs in edge habitats such as roadsides, fence rows, and bottom-land forests, before expanding into woods and abandoned fields.

LOOK-ALIKES: Numerous shrub species superficially resemble common privet. The combination of opposite leaves, 4-petal white flowers, brown stems, and a single leaf midvein all help differentiate common privet from potential look-alikes. Several other privet species occur in North America, such as Chinese privet (*Ligustrum sinensis*); all are exotic and many are highly invasive. The color of fruits and leaves, shape of leaves and flowers, and presence of hair on stems and flowers help differentiate privet species from each other.

Look-alike: Chinese privet (Karan A. Rawlins, University of Georgia, www.bugwood.org)

NOXIOUS WEED LISTINGS: Not listed as noxious in any western state or province.

NOTES: Though not listed as noxious anywhere, its ecological impact ranking and potential for distribution are both high. Berries are poisonous to humans but readily eaten by birds.

Syrian beancaper

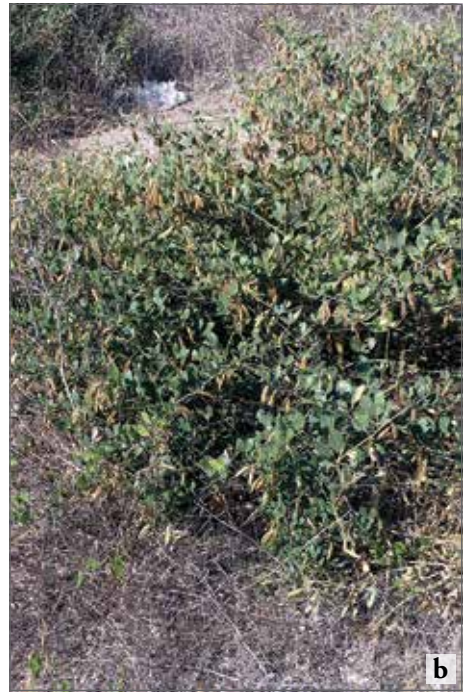
Zygophyllum fabago L.

SYNONYMS: Syrian bean-caper

ORIGIN: Eurasia

GROWTH TRAITS: Typically a shrubby perennial growing up to 3' tall (0.9 m) from a deep, woody taproot with creeping rhizomes. In cold climates, the plant may behave as an annual. Stems are multi-branched and hairless. Leaves are opposite and each composed of 2 leathery, oval-shaped leaflets. Leaflets have smooth margins and are up to 1" long (2½ cm). Flowers appear on stalks at leaf axils from spring through early summer. Flowers have 5 green sepals and 5 white or cream petals with salmon-colored markings. The 10 stamens are orangish and extend beyond the petals. Fruits are 5-celled, drooping capsules up to 1½" long (4 cm) that open at maturity to release the small, dark seeds.

REPRODUCTION: By seed, rhizomes, and root fragments. It is unknown how long seeds may remain viable in the soil.



Syrian beancaper: a) plant (Philmarin), b) infestation (Javier Martin)

Syrian beancaper: c) leaflets, flower, and immature fruit (Dell O. Clark, California Department of Food and Agriculture, www.bugwood.org), d) flower, e) split fruits and seeds (d,e Philmarin)

HABITAT: Found in dry, open habitats with well-drained soil including rangeland, roadsides, and desert areas.

Look-alike: common snowberry (Frank Vincentz)

LOOK-ALIKES: The opposite compound leaves, white flowers with exerted orange stamens, hanging capsule fruit, and shrubby growth form are not found in combination on any possible look-alike. Most species resembling Syrian beancaper have two or less of those traits. Various species in the Fabaceae may resemble young and small Syrian beancaper, including alfalfa, sweetclover, and medick. These can be distinguished by having 3 leaflets on alternate leaves and pea-like flowers. Common snowberry (*Symphoricarpos albus*) is a shrub with opposite leaves and whitish flowers; however its leaves are not compound or leathery, its flowers occur in small drooping pairs, its fruits are white berries, and it typically grows in more moist habitats than Syrian beancaper.

NOXIOUS WEED LISTINGS: CA, CO (Watch List), ID (EDRR), NV & OR (A), WA (A, Prohibited)

NOTES: The flowers have a taste and scent similar to caper.

English holly

Ilex aquifolium L.

SYNONYMS: holly, European holly

ORIGIN: Europe, Mediterranean

GROWTH TRAITS: Upright, perennial shrub or tree growing 15-50' tall (4½-15 m) and up to 15' wide from a fleshy, deep, and extensive root system. Plants may have a single trunk or form a multi-branched thicket. Stems touching the ground readily root, leading to plant spread. Stem bark is gray and smooth or nearly smooth. Leaves are alternate, 2-4" long (5–10 cm), dark and evergreen, thick, wavy, and glossy. Leaves on young and lower branches have sharp, spine-tipped margins; leaves on upper branches of older trees have smooth margins. Flowering occurs from spring to early summer. Plants have either male or female flowers; both have 4 dull-white petals. Male flowers have 4 stamens, while female flowers have an obvious green ovary. Female flowers produce red, yellow, or orange berry-like fruits.

REPRODUCTION: By seed and vegetatively via suckering or when stems root after touching the ground. Seeds typically remain viable for at least three years.

English holly: a) plant (H. Zell), b) new and spreading infestation (Forest & Kim Starr)

English holly: c) leaves (Luis Miguel Bugallo Sánchez), d) female flowers (Meneerke Bloem), e) fruits (Jürgen Howaldt)

HABITAT: Prefers moist, cool, forested conditions and undisturbed, well-drained soil. Can tolerate full sun.

LOOK-ALIKES: The thick, glossy, wavy, and sharply spiny leaves differentiate English holly from most potential look-alikes. The native tall Oregon grape (*Berberis aquifolium*) grows in similar habitats and has leaflets which resemble the leaves of English holly. However, tall Oregon grape grows as a much smaller shrub (up to 8' or 2.4 m tall) and has leaves divided into pairs of opposite leaflets, dark blue berries, and flowers with 6 bright yellow sepals and 6 bright yellow petals.

Look-alike: tall Oregon grape (Meggar)

NOXIOUS WEED LISTINGS: Not listed as noxious in any western state or province.

NOTES: Though not listed as noxious anywhere, its ecological impact ranking and potential for distribution are both high. In Washington, the plant appears to be leaving the lag phase and becoming more common. Berries are poisonous to humans, but are readily consumed by birds.

Austrian & Creeping yellow cress

Rorippa austriaca (Crantz) Besser & *R. sylvestris* (L.) Besser

Austrian yellow cress: a) basal leaves, b) flowers, c) fruits (a-c Elizabeth Bella, USDA, bugwood.org)

Creeping yellow cress: d) plant (Joseph DiTomaso, University of California - Davis, www.bugwood.org), e) flowers and leaves (SB Johnny), f) fruits (Robert Mohlenbrock, USDA SCS, USDA PLANTS Database)

SYNONYMS: Austrian yellow cress (AYC): Austrian fieldcress, *Nasturtium austriacum* Crantz; Creeping yellow cress (CYC): creeping fieldcress

ORIGIN: Eurasia (both species)

GROWTH TRAITS: Both species are herbaceous perennials that have taproots and develop rhizomes. Stems are 1-3' tall (0.3-0.9 m). Flowers have 4 petals and 6 stamens, are arranged alternately on short stalks along stem tips, and appear from late spring through summer. **AYC**: Stem leaves are alternate, 1-2" long (2½-5 cm), oblong, hairless, and can have slightly or very toothed margins. Basal leaves are twice as long (up to 4" or 10 cm) and deeply lobed, sometimes appearing dissected. Stems are slightly hairy, and upper leaves clasp the stem. Flowers are yellow and ¼" (⅓ cm) in diameter. Fruits are small and spherical but are rarely produced. **CYC**: Plants often form a dense, creeping mat. Leaves are more finely divided than AYC, growing up to 8" long (20 cm). Flowers are yellow and less than ⅛" (0.6 cm) in diameter. Fruits are long (0.4" or 1 cm), very thin, and somewhat constricted.

REPRODUCTION: Both species spread primarily by rhizomes.

HABITAT: Both species frequent moist and disturbed areas along roadsides, fields, and pastures. **CYC** almost always occurs near water.

LOOK-ALIKES: Many Brassicaceae in the Northwest have similar flowers and leaves. The exact combination of leaf shape, short stature, moist habitat, and small flower size differentiate these species from others. The rounded fruit of **AYC** differentiates it from the long, slender-fruited **CYC**.

NOXIOUS WEED LISTINGS: **AYC**: AK (Prohibited), CA, NV (A), WA (C); **CYC**: CA, OR (B)

NOTES: Both species are considered weedy in portions of Europe; their hybrid is more invasive there than either species alone.

Austrian yellow cress Creeping yellow cress

Yellowtuft

Alyssum corsicum Duby & *A. murale* Waldst. & Kit.

Alyssum corsicum: a) plant, b) leaves (Suzanne Vautier, Oregon Department of Agriculture, c) inflorescences (a,c Ken French, Oregon Department of Agriculture)

Alyssum murale: d) plant, e) leaves (Suzanne Vautier, Oregon Department of Agriculture), f) flowers (d,f © Kyle Strauss, The Nature Conservancy)

SYNONYMS: Not applicable to either species

ORIGIN: *A. corsicum*: Mediterranean; *A. murale*: Mediterranean, Eurasia

GROWTH TRAITS: Both species are herbaceous perennials growing up to 3.2' tall (1 m) from a strong and fibrous root system. They produce hundreds of small, bright yellow flowers on branched umbels in early summer. Flowers have 4 petals and 6 stamens. Most leaves (the distinctive feature) are shed prior to the initiation of flowering, making the two species look nearly identical. Fruits are round and small (less than 0.2" or 5 mm in diameter). They are flattened, papery, and each contains a single seed. *Alyssum corsicum* leaves are alternate and rounded but wider at the tips than the bases. They are densely covered in silver hairs, giving leaves a whitish-green appearance. *Alyssum murale* leaves are alternate, more linear, and up to 1.2" (3 cm) long. They are covered with tiny hairs that give the leaves a dusty appearance, not nearly as silvery as *A. corsicum*.

REPRODUCTION: Both species spread by seed and can re-sprout from root systems left intact in the soil. It is unknown how long seeds remain viable.

HABITAT: Both species are adapted to serpentine soils, as well as variable and harsh conditions. They can be found in pastures, fields, and waste areas in full sun to shaded understory.

LOOK-ALIKES: The symmetric flowers with four petals and six stamens help differentiate these species from non-Brassicaceae look-alikes. Several native and exotic Brassicaceae also have yellow flowers, however these two species can be differentiated by their combination of height (up to 1 m), umbel inflorescences, and deciduous leaves prior to flowering. Leaf shape and coloration help differentiate these species from each other.

NOXIOUS WEED LISTINGS: Both species: OR (A)

NOTES: As hyperaccumulators, both species were intentionally introduced to Oregon to clean up contaminated mining sites, but escaped the project area and spread.

Alyssum corsicum *Alyssum murale*

Garden loosestrife

Lysimachia vulgaris L.

SYNONYMS: yellow loosestrife

ORIGIN: Eurasia, northern Africa

GROWTH TRAITS: Upright, herbaceous perennial typically growing 3-6' tall (1-1.9 m) from rhizomatous roots. Stems are hairy and may be branched near the top. Leaves are opposite or whorled in groups of 3 or 4. Leaves are lance-shaped, up to 5" long (12½ cm), softly hairy, and dotted with black or orange glands. Flowers bloom throughout summer in long clusters at stem tips and in leaf axils. Each flower is ½" (1¼ cm) in diameter and has 5 yellow petals whose bases are fused and often have orange coloring. The 5 sepals are orange-tipped. Fruits are small, round capsules that split apart at maturity to spill seeds.

REPRODUCTION: By seed and rhizomes. Seeds are viable for up to 20 years.

Garden loosestrife: a) plant, b) infestation (a,b King County NWCB)

Garden loosestrife: c) whorled leaves (Bff), d) flower (King County NWCB), e) fruits (Leslie J. Mehrhoff, University of Connecticut, www.bugwood.org)

HABITAT: Found in moist areas, including wetlands, riparian corridors, and shores of lakes and ponds.

LOOK-ALIKES: From afar, several species resemble garden loosestrife, including several goldenrods (*Solidago* spp.). The opposite or whorled leaves and larger, separate flowers help differentiate garden loosestrife from potential look-alikes. A closely related ornamental species that is also called garden or yellow loosestrife (*Lysimachia punctata*) is very similar in appearance. *Lysimachia punctata* typically occurs in drier habitats, is unbranched, and its flowers are clustered in leaf axils rather than at stem tips.

Look-alike: yellow loosestrife (Wendy DesCamp, Washington State Noxious Weed Control Board)

NOXIOUS WEED LISTINGS: WA (B, Prohibited)

NOTES: Appears to outcompete the highly invasive (but unrelated) purple loosestrife (*Lythrum salicaria*).

Sicilian starthistle

Centaurea sulphurea Willd.

SYNONYMS: sulphur knapweed

ORIGIN: Mediterranean

GROWTH TRAITS: Upright, herbaceous winter annual typically growing 1-3' tall (⅓-1 m) from a taproot. Large plants are branched; small plants have a single stem. Stems have wings ~¼" wide (5-6 mm) at their largest. Leaves are alternate, may be lightly toothed or lobed, and become smaller up the plant. Leaves and wings are yellow-green and sparsely covered with stiff hairs. Flowering occurs from May to July when 1" (2½ cm) flower heads develop singly at the ends of stems. Florets are yellow and numerous. Floral bracts are tipped with 3-5 pairs of small spines and a central main spine up to 1" long (2½ cm). Spines are straw-colored at their tips and dark brown at their bases. Seeds are ¼-⅓" long (5-8 mm), glossy, brownish-tan, and with dark brown pappus as long as seeds.

Sicilian starthistle: a) plant with immature capitula, b) senescing infestation (a,b Joseph DiTomaso, University of California - Davis, www.bugwood.org)

Sicilian starthistle: c) leaves and winged stem (Joseph DiTomaso, University of California - Davis, www.bugwood.org), d) flowering capitulum, e) senescing capitulum with seeds, from above (d,e Daniel Montesinos)

REPRODUCTION: By seed. It is unknown how long seeds remain viable in the soil, but seeds of related species are viable for up to three years.

HABITAT: Open, disturbed sites including grasslands, fields, pastures, roadsides, and waste places.

LOOK-ALIKES: The spiny capitula help differentiate this species from non-starthistle species in the Northwest. Yellow florets separate this species from purple-colored starthistles. Malta and yellow starthistle (*Centaurea melitensis* and *C. solstitialis*, both exotic) have yellow florets, but both have gray-green foliage due to numerous white cottony hairs. Flower heads of Sicilian starthistle are larger than Malta and yellow starthistle, and Sicilian starthistle seeds are twice as large and darker than seeds of the other two.

Look-alike: yellow starthistle (Jennifer Andreas, Washington State University Extension)

NOXIOUS WEED LISTINGS: CA

NOTES: Where the species co-occur, Sicilian starthistle often out-competes yellow starthistle.

Smooth & Woolly distaff thistle

Carthamus creticus L. & *C. lanatus* L.

Smooth distaff thistle: a) plants (©2001 CDFA), b) capitula, c) seeds (b,c Zoya Akulova)

Woolly distaff thistle: d) plant (Javier Martin), e) capitulum, f) seeds (e,f Philmarin)

SYNONYMS: Smooth distaff thistle (SDT): *Carthamus baeticus* (Boiss. & Reut.) Pérez Lara, *C. lanatus* L. ssp. *baeticus* (Boiss. & Reut.) Nyman, *C. lanatus* L. ssp. *creticus* (L.) Holmboe; Woolly distaff thistle (WDT): downy safflower, saffron thistle, *C. lanatus* L. ssp. *lanatus*

ORIGIN: SDT: Mediterranean, WDT: Mediterranean, Eurasia

GROWTH TRAITS: Both species are herbaceous winter annuals growing upright to 3.2' tall (1 m) from slender, fibrous taproots. Stems are straw-colored. Stems and leaves are covered in tiny glandular hairs. Stem leaves are alternate, stiff, weakly clasp the stem, and often spread backwards. Leaves have lobes tipped with sharp spines. Basal leaves are larger than stem leaves and are typically absent at flowering. Flower heads appear solitary on stem tips in summer. Each capitulum has several rows of bracts and yellow florets. Outer bracts are stiff, leaf-like, and spread backward; inner bracts are smaller, spiny, and less lobed. Seeds are brown achenes. Outer seeds are rough and lack pappus; inner seeds are smoother with stiff, persistent pappus. **SDT**: Hairs on stems, leaves, and flower heads are only slightly woolly. Seed pappus is 0.3-0.4" long (8-10 mm). **WDT**: Hairs on stems, leaves, and flower heads are very woolly. Seed pappus is 0.4-0.5" long (10-13 mm).

REPRODUCTION: Both species spread by seed only. Most seeds germinate within three years, though some may remain viable in the soil for eight.

HABITAT: Both species are found at disturbed, open sites including agricultural fields (especially grain), grasslands, and pastures.

LOOK-ALIKES: Their spiny nature differentiates these species from non-thistle look-alikes. Most other thistles do not have yellow florets or stiff, thick, backward-spreading leaves. Golden thistle (*Scolymus hispanicus*) is similar but has milky sap and winged stems.

NOXIOUS WEED LISTINGS: **SDT**: CA, OR (A); **WDT**: CA, CO (Watch List), OR (A)

NOTES: Both weeds are sometimes classified as subspecies of *Carthamus lanatus.* Their gene numbers differ, however, and the species do not hybridize.

Smooth distaff thistle Woolly distaff thistle

Stinkwort

Dittrichia graveolens (L.) Greuter

SYNONYMS: stinkweed, camphor inula, cape khakiweed, *Erigeron graveolens* L., *Inula graveolens* (L.) Desf.

ORIGIN: Mediterranean

GROWTH TRAITS: Herbaceous annual typically growing 8-30" tall (20-75 cm) from a taproot with extensive, smaller side roots. Stems are multi-branched. The entire plant is sticky to the touch, being covered in small, white, and slightly glandular hairs with a strong camphor-like odor. Stems and branches are covered in alternate, linear leaves 0.4-1½" long (1-4 cm). Flower heads are produced in leaf axils and stem tips throughout fall. Each capitulum is 0.2-0.3" in diameter (5-7 mm). Outer florets are yellow and larger than inner florets which are yellow to red. Seeds are brown, oval achenes with a hairy pappus.

REPRODUCTION: By seed. Seeds remain viable in the soil for up to three years.

Stinkwort: a) plant, b) infestation (a,b Javier Martin)

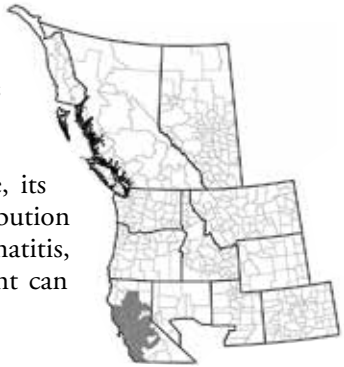
Stinkwort: c) leaf, bud, and stem (Javier Martin), d) flower head, e) mature achenes, still attached (d,e ©2014 Keir Morse)

HABITAT: Primarily invades disturbed, open habitats, such as cultivated land, abandoned fields, overgrazed pastures, roadsides, and tidal margins.

Look-alike: mountain tarweed (Matt Lavin, Bozeman, MT, USA)

LOOK-ALIKES: With its narrow leaves and bushy appearance, stinkwort resembles young Russian thistle (*Salsola tragus*) and kochia (*Bassia scoparia*), though its yellow flower heads and sticky, odorous foliage help differentiate it from these look-alikes. Many tarweeds (*Centromadia*, *Hemizonia* and *Holocarpha* spp.) are sticky, odorous, and have yellow flower heads. However, their foliage often appears more spiny than stinkwort, and their flower heads are typically larger. The native mountain tarweed (*Madia glomerata*) has small yellow flower heads, linear leaves, and is sticky and odorous. However, mountain tarweed grows much smaller and less branched, and its flower heads are typically clumped.

NOXIOUS WEED LISTINGS: Not listed as noxious in any western state or province.



NOTES: Though not listed as noxious anywhere, its ecological impact ranking and potential for distribution are both high. Touching the foliage can cause dermatitis, itchy skin, or blistering. When grazed, this plant can cause milk or meat to be tainted.

Spurge flax

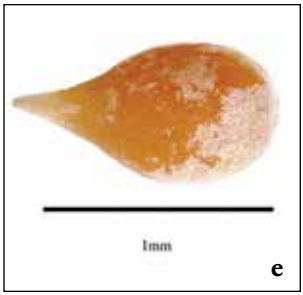
Thymelaea passerina (L.) Coss. & Germ.

SYNONYMS: annual thymelaea, *Stellera passerina* L.

ORIGIN: Eurasia, northern Africa

GROWTH TRAITS: Herbaceous annual growing 2½" to 2' tall (6-60 cm) from a fibrous taproot. It may grow as a single stem, but more commonly the main stem splits into numerous branches in its upper reaches. Stems are slender and wiry. Leaves are alternate, leathery, and narrow with a tapered point. Leaves can be up to 1" long (2½ cm) but gradually become smaller up the stem. Flowers occur in leaf axils in summer. Each flower is yellowish-green, tubular, and small (2-3 mm long). Flowers have 4 sepals, no petals, and 8 stamens that appear in two whorls of 4. Each flower is subtended by 2 small bracts arising from a tuft of tiny white hairs. Fruits enclose single seeds that are 2-3 mm long, teardrop-shaped, and brown to black.

Spurge flax: a) plant, b) multiple branches and stems (a,b Stefan Lefnaer)



Spurge flax: c) leaves, stem and bud (Stefan Lefnaer), d) flowers in leaf axils (John D. Draeger), e) seed (Robert J. Gibbons)

REPRODUCTION: By seed. It is unknown how long seeds remain viable in the soil.

HABITAT: Found in dry areas, including rangeland, pastures, abandoned fields, and roadsides.

LOOK-ALIKES: Several native and exotic species resemble spurge flax by having wiry stems, narrow leaves, and small flowers in leaf axils. Spurge flax can be differentiated by having 4 yellow-green sepals forming a tubular flower with 8 stamens. The look-alike Douglas's knotweed (*Polygonum douglasii*) also has 8 stamens (though not in two whorls of 4). Douglas's knotweed has star-shaped flowers with 5 whitish petals.

Look-alike: Douglas's knotweed (Patrick J. Alexander, USDA-NRCS PLANTS Database)

NOXIOUS WEED LISTINGS:
WA (A, Prohibited)

NOTES: Reportedly not palatable to livestock. The plant's narrow growth form can make it difficult to distinguish from other vegetation. Seeds are frquently spread by ATVs.

Velvetleaf

Abutilon theophrasti Medik.

SYNONYMS: China jute

ORIGIN: Asia

GROWTH TRAITS: Upright, herbaceous annual typically growing 3-7' tall (1-2.1 m) from a taproot. Stems are very stout and stiff. Leaves are alternate, up to 8" long and wide (20 cm), and heart-shaped with slightly scalloped margins. Stems, branches, and both surfaces of leaves are covered in soft, short hairs that give the plant a velvety texture. Flowers occur singly in leaf axils from July through September. Flowers are up to 1" (2 ½ cm) in diameter and have 5 yellow petals and numerous stamens. Petals are narrower at their base. Fruits are round capsules ¾" (2 cm) in diameter that consist of 12-15 clustered seed pods. Each seed pod has a beak curving backwards from the capsule. Capsules are dark brown at maturity. Seeds are small, brown, and kidney-shaped.

REPRODUCTION: By seed. Seeds may remain viable for 20-50 years.

Velvetleaf: a) plant (Jan Samanek, State Phytosanitary Administration), b) infestation on a field edge (Phile Westra, Colorado State University) (a,b www.bugwood.org)

Velvetleaf: c) leaf (Jennifer Andreas, Washington State University Extension), d) flower and fruit (Joseph DiTomaso, University of California, Davis), e) seeds (c,e Bruce Ackley, The Ohio State University) (d-e www.bugwood.org)

HABITAT: Found along roadsides, ditches/ riverbanks, hillsides, crop fields, and disturbed areas.

LOOK-ALIKES: Individual characteristics of velvetleaf may resemble other plants, but the combination of large heart-shaped leaves, an erect growth form, 5-petaled yellow flowers, and velvety texture help differentiate this species. Common sunflower (*Helianthus annuus*) grows in similar habitats and has large, alternate leaves and dark clustered fruits that can resemble those of velvetleaf following flowering. However, common sunflower has a distinctive inflorescence with multiple yellow and brown florets, and the plant is not velvety-soft.

Look-alike: common sunflower (Michael J. Plagens)

NOXIOUS WEED LISTINGS:
BC (Provincial), CO (C), OR (B), WA (B, Prohibited)

NOTES: Introduced to North America as a potential fiber source, but escaped cultivation to become an invasive species of agricultural fields.

Yellow archangel

Lamiastrum galeobdolon (L.) Ehrend. & Polatschek

SYNONYMS: aluminum plant, golden dead-nettle, silverfrost, *Lamium galeobdolon* (L.) L., *Galeopsis galeobdolon* L.

ORIGIN: Eurasia

GROWTH TRAITS: Herbaceous, fast-growing perennial that can form a dense, trailing groundcover. Plants can grow upright to 2' tall (60 cm) if growing over other plants. Roots are dense and fibrous; plants can also root from stem nodes. Stems are square in cross-section. Leaves are typically evergreen, opposite, variegated, oval-shaped, toothed, deeply veined, and hairy. In cold climates, leaves may develop purple coloring on both sides. Flowers bloom in early spring on upright stems and are bilabiate (2-lipped) with the upper lip hooded. Flowers are yellow, have orange to brown markings on the lower lip, and occur in whorls in leaf axils. Each flower produces four 1-seeded nutlets. The leaf arrangement and the shape of the stems and flowers are characteristic of the Lamiaceae family.

Yellow archangel: a) plant (Wouter Hagens), b) upright flowering infestation (Wendy DesCamp, Washington State Noxious Weed Control Board)

Yellow archangel: c) leaves (Alison Halpern), d) leaves with purple winter coloring (Wendy DesCamp), e) flowers (Teun Spaans), f) fruits (Nisa Karimi, Wisconsin Department of Natural Resources, www.bugwood.org (c,d Washington State Noxious Weed Control Board)

REPRODUCTION: Primarily by sprouting/rooting from stem nodes and stem fragments, but also by seed. Seed viability is unknown.

HABITAT: Found from full shade to full sun under moist to dry conditions. The plant is tolerant of frost, but is limited by dry, hot conditions. Frequent in forest understory, riparian areas, and moist hillsides.

Look-alike: white deadnettle (H. Zell)

LOOK-ALIKES: The opposite leaves and square stems differentiate this plant from non-Lamiaceae look-alikes. Within the family, the varietated leaves and yellow flowers help differentiate this species from look-alikes such as the exotic white deadnettle (*Lamium album*).

NOXIOUS WEED LISTINGS: OR & WA (B)

NOTES: This species is a popular ornamental groundcover and is used in decorative hanging baskets but frequently escapes cultivation.

Oriental & Yellow clematis

Clematis orientalis L. & *C. tangutica* (Maxim.) Korsh.

Oriental clematis: a) infestation (Wendy DesCamp, Washington State Noxious Weed Control Board), b) leaf, c) flower, d) mature fruit and vines (b-d Sue Bird, Yakima County NWCB)

Yellow clematis: d) plants (Steve Law, Henfield, England), e) flowers and leaves (Anneli Salo), f) mature fruit and leaf (Anneli Salo)

SYNONYMS: Oriental clematis (OC): Chinese clematis, Oriental virgin's-bower, orange-peel clematis; Yellow clematis (YC): orange-peel clematis

ORIGIN: Eurasia (both species)

GROWTH TRAITS: Both species are perennial climbing vines (typical) or scrambling shrubs (atypical) growing from a fine, branched root system. Vines (stems) are pliable when young, becoming woody with age. Vines are typically ≤13' long (4 m). Vines smother trees, shrubs, walls, utility poles, etc. by climbing with tendril-like petioles. Leaves are compound, green, opposite, and deciduous. Each leaf has 5-7 lance-shaped and lobed leaflets. Both species have drooping flowers with 4 showy, yellow, petal-like sepals. Sepals may be tinged purplish. Flowering occurs in late summer. At maturity, the fruit consists of numerous small seeds, each with a long silky tail ~2" long (5 cm) that give the fruit a pom-pom appearance. **OC**: Vines growing up into trees can be up to 26' long (8 m). Sepals are pale yellow, separate, and often recurved at maturity. Flowers occur singly or in small clusters in leaf axils, on flower stalks up to 4.3" long (11 cm). **YC**: Sepals are lemon yellow and bell-shaped at first but split and spread slightly at maturity. Flowers are typically solitary but sometimes occur in groups of 2-3 at stem tips or in leaf axils. Flower stalks can be longer than those of OC.

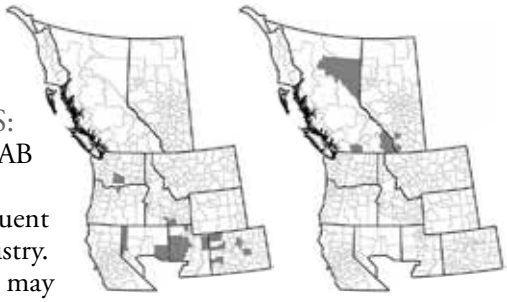
REPRODUCTION: Both species spread by seed, rooting vines, and sprouting from root crowns. It is unknown how long seeds remain viable in the soil.

HABITAT: Both species can be found along open sunny roadsides, riparian corridors, rocky slopes, and even partially shaded woodlands.

LOOK-ALIKES: Several native and exotic *Clematis* spp. occur in the Northwest. The yellow flowers and 5-7 leaflets help differentiate these two species from look-alikes, which typically have white or purple flowers and/or only 3 leaflets per leaf.

NOXIOUS WEED LISTINGS: **OC**: CO (B), WA (A, Prohib.); **YC**: AB

NOTES: Both species are frequent escapees from the horticulture industry. The juice of freshly crushed foliage may cause blisters.



Oriental clematis Yellow clematis

Yellow-flowered brooms

Trait	French *Genista monspessulana*	Portuguese *Cytisus striatus*	Spanish *Spartium junceum*
Preferred Habitat	Disturbed, open; High pH soil; Mesic	Disturbed, open; Mesic habitat	Disturbed, open areas; Dry conditions
Height	3-10' (1-3 m)	3-10' (1-3 m)	5-15' (1½-4½ m)
Leaves	3-parted; Leaflets ⅓-½" (1-1¼ cm); Hairy; Numerous; On plant year-round	Single to 3-parted; Leaflets ⅓-½" (1-1¼ cm); Smooth above, hairy below; Sparse; Deciduous early	Single; ½-1" (1¼-2½ cm); Oval, smooth-margined; Deciduous early
Stems	Young: slender, green, ridged; Mature: brown, round	Young: slender, green; Mature: brown, woody	Young: slender, green, round, rush-like; Mature: woody, round
Flowers	Yellow; ≤½" (1¼ cm); Clusters 4-10 at branch ends; Spring/summer	Pale yellow; ≤1" (2½ cm); Clusters 1-2 in leaf axils; Spring/summer	Yellow; ≤1" (2½ cm); Clusters of several at current-year branch ends; Summer into fall
Pods	½-1" (1¼-2½ cm); Dense hair	½-1½" (1¼-4 cm); Inflated; Dense hair	2-4" (5-10 cm); Slightly flattened; Dense hair

French broom: a) plant (Philipp Weigell), b) flowers (Calibas), c) seed pods and leaves (Xemenendura)

Portuguese broom: d) plant, e) stems and flowers (d,e ©2011 Vernon Smith, f) seed pods and leaves (© 2011 Zoya Akulova)

Spanish broom: g) plant, h) flowers (g,h Jennifer Andreas, Washington State University Extension), i) mature seed pod (Eugene Zelenko)

Yellow-flowered brooms (continued)

NAMES: French broom, *Genista monspessulana* (L.) L.A.S. Johnson (IB)
Portuguese broom, *Cytisus striatus* (Hill) Rothm. (PB)
Spanish broom, *Spartium junceum* Curtis (SB)

SYNONYMS: **FB**: canary broom, cape broom, *Cytisus monspessulanus* L.; **PB**: hairy-fruit broom, striated broom, *Genista striata* Hill; **SB**: weaver's broom, genet

ORIGIN: Mediterranean (all species)

GROWTH TRAITS:

French broom (FB): Upright, perennial shrub growing 3-10' tall (1-3 m) from a taproot. Stems are ridged and green when young, becoming rounded and brown at maturity. Leaves are 3-parted and numerous on stems. Leaflets are ⅓-½" long (1-1¼ cm) and oval-shaped with the tip wider than the base. Leaves remain on the plant year-round. Young stems and leaves are covered in silvery hairs. Yellow flowers occur in clusters of 4-10 at the ends of branches. Flowers are pea-like (having a banner, wing and keel, typical of the pea family), are up to ½" long (1¼ cm), and bloom in spring and early summer. The fruit is a pod ½-1" long (1¼-2½ cm), covered in dense silky hairs, and dark brown or black at maturity.

Portuguese broom (PB): Upright, long-lived perennial shrub growing 3-10' tall (1-3 m) from a taproot. Young plants are dominated by a leading stem; plants become more branched and broaden with age. Stems are slender and green when young, becoming brown and woody at maturity. Stems are only sparsely covered with leaves. Leaves are single to 3-parted. Leaflets are ⅓-½" long (1-1¼ cm) and smooth above while hairy beneath. Leaves fall off early in the season or in times of stress. Pale yellow flowers occur in clusters of 1-2 in leaf and stem axils. Flowers are pea-like (having a banner, wing and keel, typical of the pea family), are up to 1" long (2½ cm), and bloom in spring and early summer. The fruit is a pod ½-1½" long (1¼-4 cm), inflated, and densely covered in long white hairs.

Spanish broom (SB): Upright, perennial shrub growing 5-15' tall (1½-4½ m) from a taproot. Slender stems are erect with few branches, round in cross-section, and rush-like. Stems are green when young, maturing into woody branches with bark. Leaves are ½-1" long (1¼-2½ cm), oval, and smooth-margined. Leaves remain on the plant for 4 months or less, and are typically gone by flowering time. Several yellow flowers occur in long clusters at tips of current-year shoots. Flowers are pea-like (having a banner, wing and keel, typical of the pea family), are up to 1" long (2½ cm), and bloom throughout summer and into fall. The fruit is a pod 2-4" long (5-10 cm) that is slightly flattened and densely covered in long hairs. Fruits are light green initially, turning dark brown with age.

REPRODUCTION: All three species reproduce by seed only. Seeds of most broom species may remain viable in the soil for at least five years, though many are viable longer.

HABITAT: All three species capitalize on disturbance for establishment and can be found in open areas with full sun such as roadsides, trails, vacant lots, and disturbed hillsides. **SB** prefers drier sites, while **FB** can be found in more moist conditions along riverbanks and in meadows or moist hillsides. All three are more common in coastal regions than the interior. Unlike other brooms, **FB** grows fairly well in alkaline soils.

LOOK-ALIKES: These three brooms resemble Scotch broom (*Cytisus scoparius*), another invasive, yellow-flowered broom that is widespread in the Northwest. Scotch broom can be differentiated by its combination of: pods 0.8-2" long (2-5 cm) with hairs only along the pod seams, 3-parted and single leaves that are deciduous early, and young stems that are star-shaped in cross-section. To differentiate these three species from each other, refer to the comparison table three pages previous.

Look-alike: Scotch broom (Jennifer Andreas, Washington State University Extension)

NOXIOUS WEED LISTINGS: **FB**: OR (B), WA (A, Prohibited); **PB**: OR (B); **SB**: CA, OR (B), WA (A, Prohibited)

NOTES: All three species can re-sprout from the root crown following cutting. Stems of all three species are used in photosynthesis.

French broom

Portuguese broom

Spanish broom

Glossary

achene	A small, one-seeded fruit that does not split at maturity
alternate	Where leaves appear singly at stem nodes, on alternate sides of the stem
annual	A plant that completes its life cycle in one year and then dies
awn	A hair- or bristle-like appendage extending from florets of many grasses
axil	The angle between the upper side of a leaf or stem and the stem or branch that supports it.
basal	Located at the base of a plant or plant part
biennial	A plant that lives two years, typically flowering and fruiting its second year
bolting	Plant stage at which the flower stalk begins to grow
bract	A small, leaf-like structure below a flower
capitulum (pl. capitula)	Seed head or flower head of a plant in the sunflower family
compound leaf	A leaf consisting of two or more leaflets borne on the same leaf stalk
deciduous	Sheds its leaves annually
density	Number of individuals per unit area
divided	Synonym for compound leaf
erect	Grows upright and vertical as opposed to prostrate (spreading on the ground)
exotic	Not native
floret	One of the small, closely clustered flowers forming the head of a composite flower in the sunflower family or the flowering unit of a grass spikelet, consisting of the flower and its two enveloping bracts

flower head	A special type of inflorescence consisting of numerous florets that actually look like one flower
forb	Herbaceous plant (does not have woody stems)
herbaceous	Does not have woody stems
hyperaccumulator	A plant capable of growing in soils with very high concentrations of metals, absorbing these metals through their roots, and concentrating extremely high levels of metals in their tissues
inflorescence	The flowering part of a plant
involucre	A circle of bracts under an inflorescence
lag phase	First stage of a typical plant invasion during which populations remain at low levels for several years. Plants ofen become abundant during the next phase
leaflet	A leaf-like part of a compound leaf. Though it resembles an entire leaf, a leaflet is not attached to the main plant stem or branch as a leaf is, but rather on a the leaf stalk
ligule	A thin outgrowth at the junction of leaf and leafstalk of many grasses and sedges
lobed	A leaf with shallow or deep, rounded segments, as in a thistle rosette leaf
native	A plant that originated in the geographic area of discussion
node	Part of the stem of a plant from which a leaf, branch, or root grows
nontarget effect	When control efforts affect a species other than the species they were enacted to control (can be positive or negative)
opposite	Where leaves appear in twos at stem nodes, on opposite sides of the stem

ovate	Shaped like an egg, with the base wider than the tip
pappus	A tuft of hairs, scales, or bristles at the base of an achene in flowers of the sunflower family
perennial	A plant that lives for more than two years
petiole	Leaf stalk that usually attaches it to a plant stem
prostrate	Grows flat along the ground as opposed to growing erect (upright)
receptacle	Part of the stem to which the flower is attached
rhizome	A modified stem of a plant that grows horizontally underground, often sending out roots and shoots from its nodes
rosette	A compact, circular, and normally basal cluster of leaves
scarification	Cutting the seed coat using abrasion, thermal stress, or chemicals to encourage germination
seed head	Synonym for capitulum of a plant in the sunflower family. Consists of a receptacle and florets
senescence	Final stage in a plant's life cycle
sepal	A small, (typically) green petal-like structure beneath petals that protect petals in bud and support petals during open flowering
spadix	Inflorescence with several tiny flowers clustered on a narrow, fleshy stem
spathe	Leaf-like curved bract surrounding a spadix
stamen	The pollen-producing reproductive organ of a flower
stolon	Stem which grows at the soil surface or just below ground that forms adventitious roots at the nodes, and new plants from the buds (also called runner)

succulent	Plants having some parts that are more than normally thickened and fleshy, usually to retain water in arid climates or soil conditions
taxonomy	The classification of organisms in an ordered system that indicates natural relationships. The science, laws, or principles of classification; systematics
toothed	Leaf margin that is regularly incised, such as for a saw
tussock	Tuft or clump of growing bunchgrass
umbel	An inflorescence which consists of a number of short flower stalks which spread from a common point, somewhat like umbrella ribs. They can be simple or compound (the single flowers are replaced by many smaller umbels called umbellets)
variegated	Plant foliage having leaves that are edged or patterned in a second color, especially white as well as green
whorled	Where multiple leaves or flowers radiate outward from a single stem node
winter annual	A plant that germinates in autumn, lives through the winter, and produces seed and dies in the following season

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English to Metric Conversions (Length)				
Symbol	When You Know	Multiply By	To Find	Symbol
in or ”	inches	2.54	centimeters	cm
ft or ’	feet	0.305	meters	m
yd	yards	0.914	meters	m