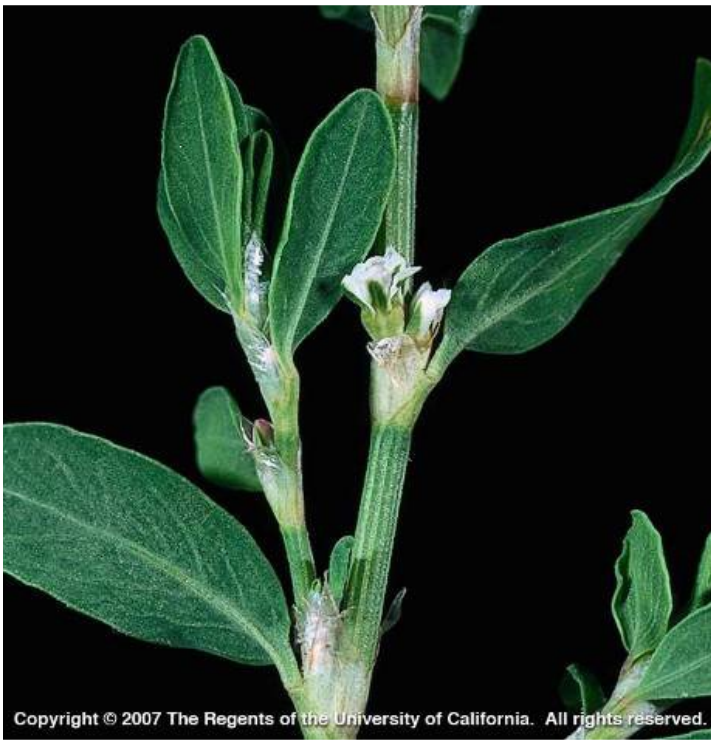
Buckwheat Family (Polygonaceae)

Common characteristics of Polygonaceae genera:

- Membranaceous sheaths where the leaf meets the stem
- Alternate, simple leaves
- Flowers small, perfect and regular
- Flowers borne in spike-like racemes, panicles or axillary clusters
- No petals, but with 3-6 sepals that sometimes resemble petals, referred to as tepals
- Fruit is an achene

Additional characteristics shared by *Fallopia* and *Rumex* species:

- Leafy stems
- Leaves entire
- Flowers without involucral bracts



Differences between *Fallopia* and *Rumex* species:

Fallopia species (knotweeds):

- Perennial or annual
- Mostly terrestrial, few aquatic
- 5 sepals often resemble petals; sepals are the same size and join at the base
- Achenes are lens-shaped or triangular
- Swollen joints

Rumex species (docks, sorrels):

- Mostly perennial
- Some aquatic
- Glabrous
- Flower consists of 6 segments; at maturity, the inner 3 enlarge to form valves enclosing the achene
- Achenes are 3-angled
- Sometimes the achene includes a ‘grain-like’ tubercle

Japanese knotweed • *Fallopia japonica*
syn. *Polygonum cuspidatum*

Invasiveness Rank: 87 points | Species Code: FAJA2

General Information:
Perennial
Up to 2.7 m tall

Description:
Roots
- Long, creeping rhizomes

Stems
- Bamboo-like stems
- Zig-zag pattern

Leaves
- 5-15 cm long
- Leaf base is flat or tapering (unlike *F. sachalinensis*, in which they are heart-shaped)
- Lower leaf with minute hairs along the veins, less than 0.1 mm (unlike *F. sachalinensis*, which has long wavy hairs along veins)
- Hairs are blunt-tipped and scabrous

Inflorescence
- Greenish-white
- In leaf axils and at the end of stems
- 6 tepals, outer 3 winged (unlike *Persicaria wallichii*, in which the tepals are not winged)

Fruit
- 3-sided
- Black, shiny

Habitat: moist habitats, waste places, right-of-ways, old homesites, neglected gardens
Distribution: throughout southeast Alaska, Kodiak

Giant knotweed • *Fallopia sachalinensis*
syn. *Polygonum sachalinense*

Invasiveness Rank: 87 points | Species Code: FASA3

General Information:
Perennial
2-4 m tall

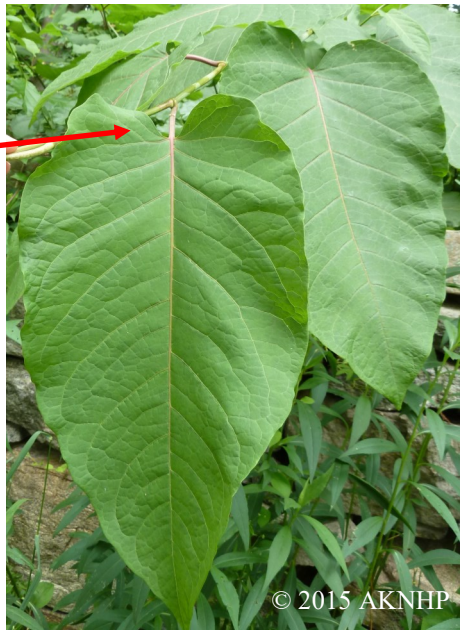
Description:
Roots
- Rhizomes

Stems
- Thick and less mottled relative to *F. japonica* and *F.* x*bohemica*
- Clustered, erect, sparingly branched
- Glabrous, glaucous

Leaves
- Ovate-oblong
- 15-30+ cm long, 7-25 cm wide
- Leaf bases are heart-shaped (unlike *F. japonica*, which are flat or tapering)
- Lower leaf surface has long, wavy hairs along veins, 0.2-0.6 mm (unlike *F. japonica* and *F.* x*bohemica*, which have hairs <0.1 mm)
- Petiole 1-4 cm long

Inflorescence
- In axils, panicle-like, 3-8 cm
- Greenish-white
- Outer 3 tepals winged (unlike *Persicaria wallichii*, which has no wings)

Fruit
- Brown, shiny, smooth



Habitat: disturbed sites
Distribution: only two known occurrences in Alaska; one near Ketchikan and a second in Kodiak

Bohemian knotweed • *Fallopia xbohemica*

syn. *Polygonum xbohemicum*

Invasiveness Rank: 87 points | Species Code: POBO10

General Information:
Perennial
1.5-2.5 m
Hybrid of *F. japonica* and *F. sachalinensis*

Description:
Roots
- Rhizomes

Stems
- Clustered, erect, branched many times
- Glabrous, glaucous

Leaves
- Ovate, bases flat to heart-shaped
- 5-25 cm long, 2-10 cm wide
- Petioles 1-3 cm long
- Lower leaf covered with fine, soft hairs along veins
- Hairs very short (<0.1 mm), with a triangular base and an acute tip (unlike *F. japonica*, in which hairs are blunt-tipped and scabrous; unlike *F. sachalinensis*, in which hairs are long and wavy)

Inflorescence
- At the ends of branches or in axils; erect or spreading, resembling a panicle or raceme, 4-12 cm long
- Greenish-white, white to pink
- Outer 3 tepals are winged (unlike *Persicaria wallichii*, which has no wings)

Fruits
- Dark brown, shiny, smooth
- 2.6-3.2 mm long

Distribution: one population in downtown Anchorage; multiple infestations in and around Juneau

Remarks: This species is distinguished from its parent species most reliably by the hair along veins on the underside of leaves; these are easiest to see on new leaves.

Black bindweed • *Fallopia convolvulus*
syn. *Polygonum convolvulus*

Invasiveness Rank: 50 points | Species Code: FACO

General Information:
Annual
0.5-1 m
Herbaceous and climbing

Description:
Roots
- Thin but deep

Stems
- Sometimes with a reddish tinge

Leaves
- Ovate to arrow-shaped, with heart-shaped base
- Backward-pointing basal lobes
- Long petioles
- 2-6 cm long, 1-4 cm wide

Inflorescence
- Small and white or greenish-white
- In racemes or clustered in axils

Fruits
- Triangular achene, 3-4 mm long

Habitat: common in cultivated fields, gardens, orchards; also found in waste areas, thickets, roadsides; occasionally present on riverbanks and in pastures

Distribution: all three ecogeographic regions, but only one population documented from the arctic-alpine region, in Aniak. The northernmost infestation is on the Steese Highway near Chatanika. There is a remote infestation at the Kantishna Roadhouse in Denali National Park

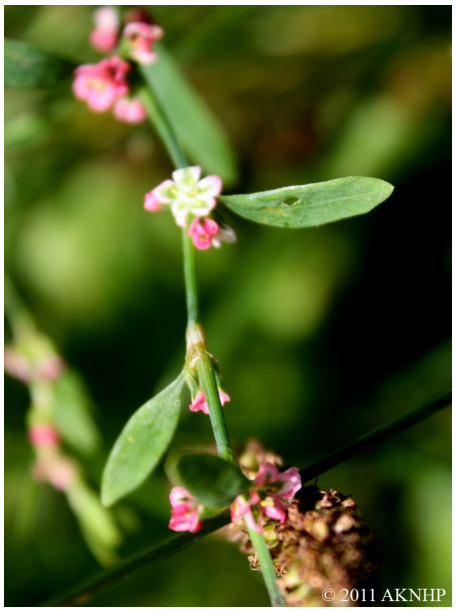
Remarks: When not in flower, *F. convolvulus* may be confused with *Convulvuluis arvensis* (field bindweed); see description in Other Families section.

A comparison of *Fallopia* species:

	Longevity	Height (m)	Roots	Stems	Leaves	Under leaf hairs	Inflorescence	Fruit
Fallopia japonica (Japanese knotweed)	Perennial	2.7	Rhizomes	• Zig-zagged • Bamboo-like	• 5-15 cm long • Leaf base flat or tapered • Petiole 1-3 cm	• Minute hairs along veins • Blunt-tipped, scabrous, • Short (<0.1 mm)	• Greenish-white • At end of branches or in axils • Erect/spreading • 4-12 cm long • Outer 3 tepals winged	• Dark brown, shiny, smooth • 2-3.5 cm long
Fallopia sachalinensis (Giant knotweed)	Perennial	2-4	Rhizomes	• Somewhat mottled • Clustered, erect • Sparingly branched • Glabrous, glaucous	• 15-30+ cm long • Ovate/oblong • Leaf base heart-shaped • Petiole 1-4 cm long	• Wavy hairs along veins • Long (0.2-0.6 mm)	• Greenish-white • Panicle-like, in axils • 3-8 cm long • Outer 3 tepals winged	• Brown, shiny, smooth
Fallopia xbohemica (Bohemian knotweed)	Perennial	1.5-2.5	Rhizomes	• Clustered, erect • branched many times • Glabrous, glaucous	• 5-25 cm long • Ovate • Leaf base flat to heart-shaped • Petioles 1-3 cm long	• Fine, soft, hairs along veins • Short (<0.1 mm) • Hairs with triangular base and acute tip	• Greenish-white/ pink • At ends of branches or in axils • Erect/spreading • 4-12 cm long • Outer 3 tepals winged	• Dark brown, shiny, smooth, • 3 mm long
Fallopia convolvulus (Black bindweed)	Annual	0.5-1	No rhizomes	• Climbing • Sometimes with reddish tinge	• 2-6 cm long • Ovate to arrow-shaped • Leaf base heart-shaped • Petioles 0.5-5 cm long	• Not hairy	• White to greenish-white • In racemes or clustered in axils	• Triangular

Prostrate knotweed ● *Polygonum aviculare*

Invasiveness Rank: 45 points Species Code: POAV



General Information:
Annual
Stems 6-200 cm long
Mats up to 1.2 m in diameter

Description:
Stems
- Trailing
- <1 m long
- Silvery papery sheaths at leaf bases

Leaves
- Green to bluish-green to gray-green
- Leaves linear to oblong
- Stem leaves 1-4 times longer than branch leaves; largest leaves 2.5-6 cm long
- Sessile or with short petiole

Inflorescence
- 3-6 flowered clustered in the axils of reduced upper leaves
- Tepals reddish brown with white, pink, or red margins
- Tepals resemble petals and are not keeled

Fruits
- Achenes dull and mostly included within the calyx
- 2.2-3 mm long
- Dark brown

Habitat and distribution: human and naturally disturbed sites in all three ecogeographic regions

Leathery knotweed ● *Polygonum achoreum*

Invasiveness Rank: not yet ranked Species Code: POAC3

General Information:
Annual
50-70 cm tall

Description:
Stems
- Prostrate to ascending

Leaves
- Light green or yellowish-green
- Oval, obovate, or elliptic with a rounded tip
- Stem leaves are 1-3 times longer than branch leaves
- Short petiole

Inflorescence
- Clusters in the axils all along the stem
- Tepals yellow-green with a margin that is occasionally pinkish
- Margins appear keeled (unlike *P. aviculare*)

Fruits
- Achenes dull,
- Triangular

Habitat and distribution: only reported at Clam Cove in the Cook Inlet, and in Eagle on the Yukon River

Fowler's knotweed ● *Polygonum fowleri*

General Information:
Perennial
5-50 cm tall

Britton, N.L., and A. Brown. 1913.

Description:
Stems
- Branched from base
- Sometimes zig-zagged
- Prostrate to ascending

Leaves
- Light green or sometimes purple-tinged
- Elliptic to obovate, somewhat succulent
- 8-30 mm long, 4-15 mm wide
- Middle stem leaves are 1-3 times longer than branch leaves
- Petiole 2-7 mm

Inflorescence
- Axillary
- Tepals green with white to pink margins
- Not keeled

Fruits
- Olive-brown to dark brown
- Ovate
- Shiny

Habitat: stream banks, and sandy or gravelly seashores
Distribution: south coastal and western Alaska, including southeast Alaska, near Anchorage, in Kodiak, and on the Alaska and Seward Peninsulas
Remarks: More erect and shrubby than non-native *Polygonum* spp.

Alaska wild rhubarb ● *Polygonum alaskanum*

General Information:
Perennial
<2 m tall
Glabrous

Description:
Roots
- Woody rhizome
- Crown many branched

Stems
- Hollow

Leaves
- Sessile or with very short petiole
- Lanceolate to lanceolate-oval
- 5-20 cm long
- Wavy margins
- Dark green above, pale beneath
- Pale brown stipules 1.5-2 cm long

Inflorescence
- White
- Open panicle with many branches

Fruits
- Achenes ovate, triangular in cross-section
- Light brown

Habitat and distribution: common in the interior boreal region along roadsides, natural meadows, and other early successional sites

A comparison of *Polygonum* species:

	Longevity	Height (cm)	Stems	Leaves	Inflorescence	Achene
Polygonum aviculare **(prostrate knotweed)**	Annual	prostrate	• Trailing • <1 m long	• Bluish to gray green • Linear/oblong • Stem leaves (2.5-6 cm) longer than branch leaves • Sessile or with short petioles	• Clustered in axils of reduced upper leaves • Tepals reddish brown with white/pink/red margins	• Dull, • Dark brown
Polygonum achoreum **(leathery knotweed)**	Annual	50-70	• Prostrate to • ascending	• Light or yellowish-green • Ovate/obovate/elliptic • Rounded tip • 8-30 mm long • Stem leaves longer than branch leaves • Short petiole	• Flowers in axils • Tepals green with white/pink margins • Margins appear keeled	• Dull • Triangular
Polygonum fowleri **(Fowler's knotweed)**	Annual	5-50	• Erect and shrubby relative to non-natives • Sometimes zig-zagged	• Light green to purplish • Obovate/elliptic • 8-30 mm long • Middle stem leaves longer than branch leaves • Somewhat succulent • Petiole 2-7 mm	• Flowers in axils • Tepals green with white to pink margins • Not keeled	• Olive-brown/ dark brown • Ovate
Polygonum alaskanum **(Alaska wild rhubarb)**	Perennial	<200	• Hollow	• Dark green above, pale beneath • Lanceolate • 5-20 cm long • Wavy margins • Stipules 1.5-2 cm • More or less sessile	• Open panicle with many branches • White	• Light brown, • Triangular in cross section; • Ovate

Himalayan knotweed ● *Persicaria wallichii*

syn. *Polygonum polystachyum*

Invasiveness Rank: 80 points | Species Code: PEWA18

General Information:
Perennial
<1.8 m

Description:
Roots
- Creeping rhizomes

Stems
- Ribbed
- Red-brown
- Erect and branching

Leaves
- Alternate
- Lance-shaped
- 9-22 cm long
- Long-tipped (unlike the three non-native *Fallopia* spp., which are indistinctly-tipped)
- Leaf bases flat or heart-shaped
- Membranaceous sheaths are red-brown and 1-4 cm long

Inflorescence
- Wide and spreading
- White-pink (unlike the three non-native *Fallopia* spp., which have greenish-white tepals)
- 6 tepals without wings (unlike the three non-native *Fallopia* spp., which have wings on the outer three tepals)

Habitat: moist sites, disturbed sites, roadsides, fields, waste areas; in the Pacific Northwest it is known to establish in areas disturbed by river action or flooding
Distribution: southeast Alaska in the vicinities of Ketchikan, Metlakatla, and Canada's Queen Charlotte Islands (also known as the Haida Gwaii)

Curlytop knotweed • *Persicaria lapathifolia*
syn. *Polygonum lapathifolium*

Invasiveness Rank: 47 points | Species Code: POLA4

General Information:
Annual
10-20+ cm tall

Description:
Roots
- Rhizomes and stolons absent

Stems
- Ascending or decumbent
- Branch near the base
- Sheath margins are smooth and glabrous

Leaves
- Lanceolate to elliptic
- 2-6+ cm long
- Hairy underneath
- Scabrous margins

Inflorescence
- Arching or nodding, at the ends of branches or in axils
- Tepals greenish to pale pink to whitish

Fruits
- Achenes lens-shaped, light brown, shiny

Habitat: wet lake edges
Distribution: southeast Alaska, Kodiak, Kenai Peninsula, Anchorage, Mat-Su Valley, Talkeetna

Spotted ladysthumb • *Persicaria maculosa*
syn. *Polygonum persicaria*

Invasiveness Rank: 47 points | Species Code: POPE3

General Information:
Annual
30-100 cm tall

Description:
Roots
- Rhizomes and stolons absent

Stems
- Erect to ascending
- Sheath margins with bristly hairs

Leaves
- Often with dark spots on top
- Lanceolate to elliptic to oblong
- 3-15 cm long

Inflorescence
- Erect spikes at the ends of branches or in axils
- Tepals are deep pink to purplish, 2.5 mm long

Fruits
- Achenes 3-angled or lens-shaped
- 2.5-3 mm long

Habitat: waste places
Distribution: Kodiak, Kenai Peninsula, Anchorage, Mat-Su Valley, north of Talkeetna along the Parks Highway

A comparison of *Persicaria* species:

	Longevity	Height (cm)	Roots	Stems	Leaves	Inflorescence	Achene
Persicaria wallichii (Himalayan knotweed)	Perennial	180	Creeping rhizomes	• Erect and branching • Sheaths red-brown, 1-4 cm long • Ribbed	• Lanceolate • Bases flat or heart-shaped • With a distinctly long tip • 9-22 cm long • hairy underneath	• Wide/spreading • White-pink	• 3-angled, • Brown, dull • 2-2.5 mm long
Persicaria lapathifolia (Curlytop knotweed)	Annual	20	Rhizomes absent	• Ascending to decumbent • Branching at base • Sheaths are smooth and glabrous	• Lanceolate/elliptic • Bases wedge-shaped • 2-6+ cm long • Hairy underneath • Scabrous margins	• Arching/nodding at the ends of branches or in axils • Greenish to pale pink/white	• Lens-shaped • Light brown • Shiny
Persicaria maculosa (Spotted ladysthumb)	Annual	30-100	Rhizomes absent	• Erect/ascending • Sheath margins with bristly hairs	• Lanceolate/elliptic/oblong • Bases tapered or wedge-shaped • 3-15 cm long • Often have dark spots on top • Smooth or with short stiff hairs	• Erect • Spikes at the ends of branches or in axils • Deep pink to purplish	• 3-angled or lens-shaped • 2.5-3 mm long

Common sheep sorrel • *Rumex acetosella*

Invasiveness Rank: 51 points Species Code: RUAC3

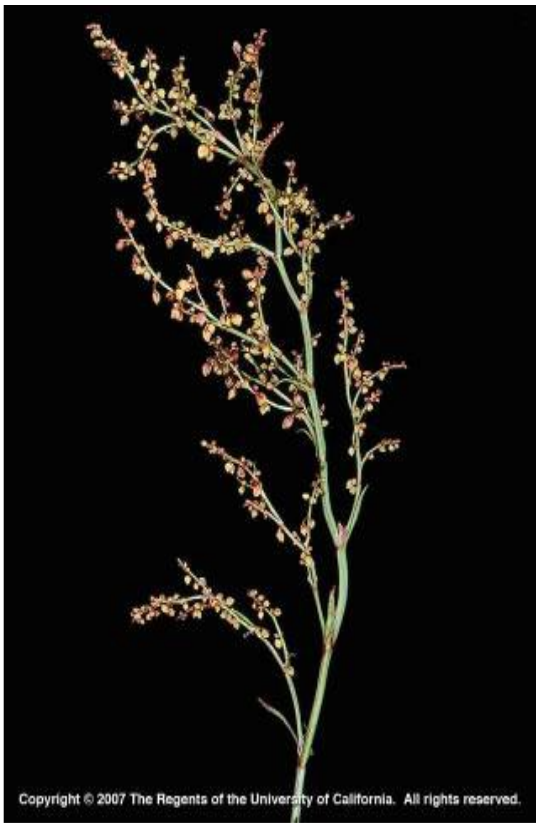
General Information:
Perennial
10-60 cm tall

Description:
Leaves
- Basal leaves arrow-shaped and narrow with lateral lobes pointing upwards or outwards

Inflorescence
- Reddish, loose panicle
- Male and female flowers on separate plants

Fruits
- Three valves surrounding the fruit not longer than the fruit

Habitat: roadsides, cultivated areas, waste places; shows up in relatively remote areas
Distribution: common in Pacific maritime and interior boreal regions; also present in southwest Alaska



Garden sorrel • *Rumex acetosa* ssp. *alpestris*

General Information:
Perennial
0.1-1.0 m tall

Description:
Roots
- Short rhizome

Leaves
- Basal leaves arrow shaped and broad with downward pointing triangular lobes (unlike *R. acetosella*, which has narrow leaves with upward or outward pointing lobes)

Flowers
- Male and female flowers on separate plants

Fruits
- Wine-colored
- Net-like veining
- 2-2.5 mm long

Habitat and distribution: most alpine meadows in western Alaska

Grassleaf sorrel • *Rumex graminifolius*

General Information:
Perennial
5-30+ cm tall

Description:
Leaves
- All leaves narrowly linear, although a few may be faintly arrow-shaped

Fruit
- Valves enclosing the fruit up to twice the length of the fruit

Habitat and distribution: sandy places in tundra in western Alaska; rare

Curly dock • *Rumex crispus*

Invasiveness Rank: 48 points | Species Code: RUCR

General Information:
Perennial
0.4-1.5 m tall

Description:
Leaves
- Lanceolate
- Tapered at the base
- Wavy margins

Inflorescence
- Large terminal clusters

Fruits
- Reddish with white tubercles
- Valves not toothed

Habitat and distribution: disturbed sites; all three ecogeographic regions but mostly in southeast Alaska, Kenai Peninsula, Anchorage

Dooryard dock • *Rumex longifolius*

Invasiveness Rank: 48 points Species Code: RULO2

General Information:
Perennial
0.5-1.5 m tall

Description:
Leaves
- Basal leaves stalked
- Truncated or heart-shaped at the base, broadest at the middle
- Sometimes with wavy margins

Inflorescence
- Large terminal clusters

Fruits
- Tubercles absent
- Valves not toothed

Habitat and distribution: waste places; scattered locations in Pacific maritime and interior boreal regions

Bitter dock • *Rumex obtusifolius*

Invasiveness Rank: 48 points | Species Code: RUBO

General Information:
Perennial
0.6-1.5 m tall

Description:
Leaves
- Heart-shaped base
- Wavy margins

Inflorescence
- Distinct small whorls

Fruits
- Some with tubercles
- Valves distinctly toothed

Habitat and distribution: agricultural areas, disturbed sites, riparian areas; only recorded from the southeast

Arctic dock • *Rumex arcticus*

General Information:
Perennial
<50-100 cm tall
(only 10 cm tall in the Arctic)

Description:
Roots
- Stout rhizome

Stem
- Unbranched or just a few upright branches

Leaves
- Dark green to reddish-purple
- Most leaves basal with long petioles
- Oblong to oval to lanceolate with square or wedge-shaped bases
- 7-30 cm long, 2-5 cm wide

Inflorescence
- Simple or short-branched panicle
- Flowers small, reddish

Fruit
- Achenes 3-4 mm long
- Tubercles absent

Habitat: wet areas, snow beds
Distribution: common in western and northern Alaska

Western dock • *Rumex occidentalis*
syn. *Rumex fenestratus*

General Information:
Perennial
≥ 1 m tall

Description:
Roots
- Taproot

Stems
- Yellowish-green to reddish

Leaves
- Mostly basal with long petioles
- Oblong to lanceolate with heart-shaped bases
- Crisped margins
- 30 cm long

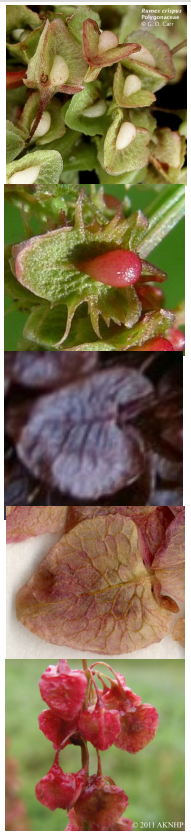
Inflorescence
- Very large panicle with erect branches
- Pedicles 5-7 mm long

Fruits
- Reddish brown
- No tubercles

Habitat: marshy areas; common bordering boreal or alpine areas; not found in the Arctic

A comparison of five large *Rumex* species:

	Basal Leaves	Flower Cluster	Fruit Scale
Rumex crispus **(curly dock)**	Tapered bases Margins strongly wavy	Dense	Margins entire 3 tubercles
Rumex obtusifolius **(bitter dock)**	Broad, flat Heart-shaped bases Margins entire Flat	Usually loose and widely spaced in whorls	Distinctly toothed Usually 1 tubercle
Rumex longifolius **(dooryard dock)**	Rounded to truncate base Margins entire	Usually dense	Margins entire Tubercles usually absent
Rumex arcticus **(arctic dock)**	Often very purple Flat, obtuse tip Tapered base Margins entire	Interrupted	Margins entire Tubercles absent
Rumex occidentalis syn. R. fenestratus **(western dock)**	Acute tip Heart-shaped or rounded base Margins entire	Dense to interrupted	Margins entire Tubercles absent



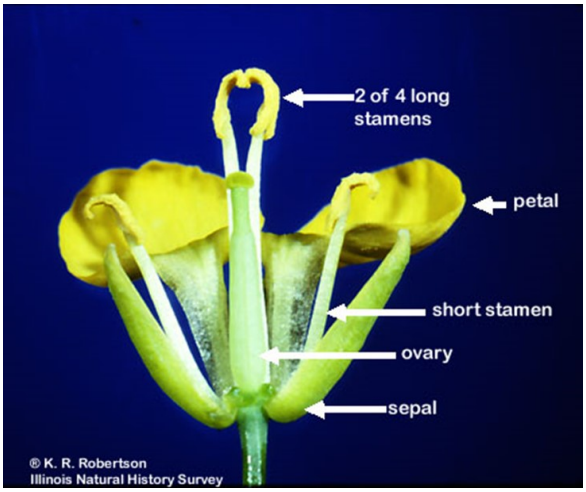
Photos credits
R. crispus: http://www.botany.hawaii.edu, G.D. Carr
R. obtusifolius: http://www.discoverlife.org
R. longiflolius: http://www.plant-identification.co.uk, Carl Farmer
R. arcticus: http://nature.ca
R. occidentalis ©2011 AKNHP

Mustard Family (Brassicaceae)

- Annual or perennial herbs
- Alternate leaves, simple, lobed or divided
- Often with a basal rosette
- Often with simple to complex hairs
- Inflorescence is a raceme
- Fruit pod-like and open from the base toward the apex
- Fruits are siliques (long and narrow) or silicles (length is less than 3 times the width).

Flowers

- 4 petals
- 4 sepals
- Arranged in a "cross" pattern, but can be variable
- **6 stamens**
  - 4 long stamens, visible
  - 2 short, hidden in the corolla



Seed pods

Siliques - generally longer than broad, often with a "beak or "point" at the tip

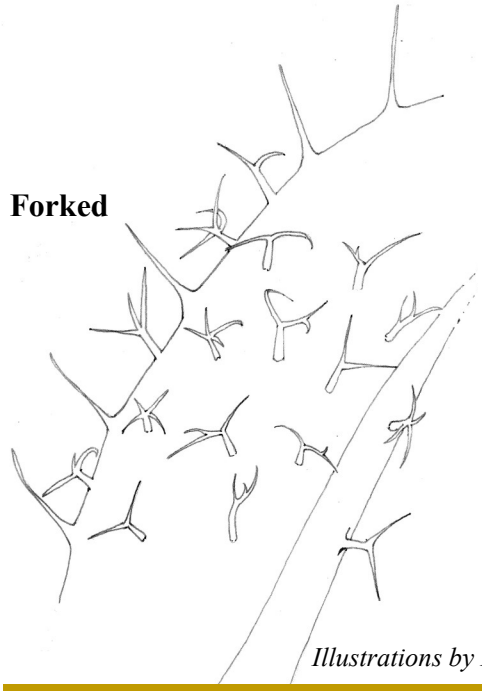
Silicles - length is less than 3 times the width

Types of hairs

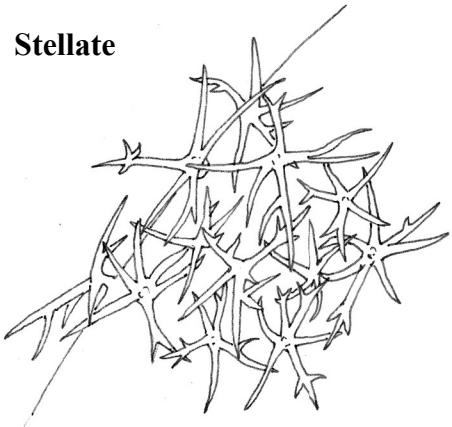
Simple

Glandular

Forked



Stellate



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Shepherd's purse ● *Capsella bursa-pastoris*

Invasiveness Rank: 40 points Species Code: CABU2

General Information:
Annual or winter annual
10-50 cm tall
Mix of simple and other types of hairs

Description:
Leaves
- Slightly to deeply lobed
- Basal rosette composed of entire to dissected leaves
- Stem leaves clasping and arrow-shaped at the base

Inflorescence
- White

Fruits
- Heart-shaped silicles
- Silicles almost as long as they are broad

Habitat: roadsides, cultivated fields, waste areas
Distribution: common in the Pacific maritime and interior boreal regions; northernmost occurrence is in Arctic Village

Field pennycress • *Thlaspi arvense*

Invasiveness Rank: 42 points | Species Code: THAR5

General Information:
Annual
15-45 cm tall
Strong odor
No hairs

Description:
Stem and Leaves
- Yellowish-green
- Basal leaves lanceolate, simple, entire to lobed
- Stem leaves arrow-shaped

Inflorescence
- White
- Clustered in racemes at the end of branches

Fruits
- Silicle with broad wings
- Circular with a notch at the top
- Resembling a penny

Habitat: roadsides, fields, waste places, lawns, gardens, railroad tracks, stream banks, bluffs, thickets, slopes, floodplains, woods
Distribution: somewhat common in the Pacific maritime and interior boreal regions; northernmost records from Denali Park and Delta

Common peppergrass • *Lepidium densiflorum*

Invasiveness Rank: 25 points Species Code: LEDE

General Information:
Annual or winter annual
10-60 cm tall

Description:
Leaves
- Basal rosette
- Stem leaves are toothed or deeply lobed

Inflorescence
- No petals, or petals are shorter than sepals
- Green-white
- Inconspicuous
- <4 mm wide
- 2 stamens

Fruits
- Heart-shaped to round silicles
- Silicles have narrow wings
- About 3 mm long
- Contain two seeds
- Densely arranged along the stem

Habitat: roadsides, cultivated fields, waste areas
Distribution: Interior boreal and Pacific maritime regions; northernmost record is Arctic Village, southernmost is the Kenai Peninsula
Remarks: The nativity of this species is disputed: Hultén 1968 lists it as introduced, while Flora of North America lists it as occurring in Alaska but introduced to Europe and Asia. Cody (Flora of the Yukon Territories) makes no mention of its nativity.

Differences Between *L. densiflorum* and *L. latifolium*

	Height	Inflorescence	No. of Stamens
Common peppergrass *Lepidium densiflorum*	10-60 cm	single raceme or sparsely branched raceme	2
Broadleaved pepperweed *Lepidium latifolium*	50-200 cm	dense pyramid-shaped cluster	6

Broadleaved pepperweed • *Lepidium latifolium*

Invasiveness Rank: 71 points | Species Code: LELA2

General Information:
Perennial
0.5-2 m tall

Description:
Roots
- Widely spreading, thick rhizomes

Stems
- Numerous, simple, erect, branching at the ends

Leaves
- Oblong, elliptic-ovate or lanceolate with wedge-shaped base
- Margins entire or serrated
- 2-30 cm long, 6-8 cm wide
- 1-9 cm petiole on lower leaves; stem leaves smaller and lacking petioles

Inflorescence
- Dense clusters in pyramid-shaped panicles
- White, small (1.5 mm)
- Petals are white and twice the length of sepals (sepals <1 mm)
- 6 stamens

Fruits
- Silicle containing 2 seeds
- Not winged

Habitat: disturbed sites, roadsides, ditch banks; also in a variety of natural habitats ranging from wetlands to dry flats and hillsides
Distribution: Only reported from Anchorage

Garlic mustard • *Alliaria petiolata*

Invasiveness Rank: 70 points Species Code: ALPE4

General Information:
Biennial
< 1 m tall
Strong garlic odor when crushed

Description:
Stems
- Unbranched

Leaves
- Basal leaves are kidney-shaped
- Stem leaves are heart-shaped
- 5-10 cm wide

Inflorescence
- White

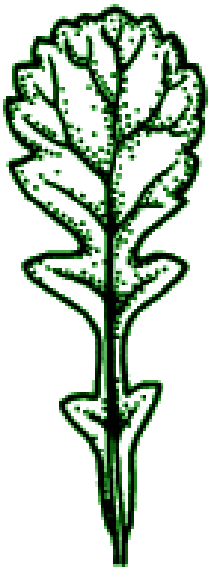
Fruits
- Siliques
- 20-45 mm long, 0.7-2 mm wide

Habitat: roadsides, abandoned fields, open forest, clearcuts
Distribution: Juneau
Remarks: There are other white flowered mustards in Alaska. Unlike *Allaria petiolata*, however, none have large, well-developed and toothed stem leaves, or a garlic scent.

FLOWERS WHITE, FRUIT LONG

Lyrate rockcress • *Arabidopsis lyrata*
syn. *Arabis lyrata*

General Information:
Biennial or perennial
5-50 cm tall



Description:
Leaves
- Basal leaves lyre-shaped and oblong
- Stem leaves not stalked

Fruits
- Siliques slightly flattened
- 20-35 mm long, 1.25-1.5 mm wide

Habitat: sandy and rocky slopes, open areas
Distribution: interior boreal and Pacific maritime regions; common along the coast

Ball mustard • *Neslia paniculata*

Invasiveness Rank: not ranked | Species Code: NEPA3

General Information:
Annual
< 0.8 m tall

Description:
Stems
- Branched many times
- Star-shaped hairs

Leaves
- Arrow-shaped
- Clasping

Inflorescence
- Small, yellow

Fruits
- Silicles a roundish, pitted pod, with a net-work of veins
- One seed per pod (unlike weedy *Rorippa* species found in Alaska, which have more seeds per pod)

Habitat: fields, grassy mountain slopes, plains, roadsides, cultivated fields
Distribution: Anchorage, Kenai Peninsula

Flixweed • *Descurainia sophia*

Invasiveness Rank: 41 points Species Code: DESO2

General Information:
Annual, winter annual, or biennial
< 1 m tall

Description:
Stems
- Numerous branches
- Star-shaped or tree-like hairs
- Hairs never glandular

Leaves
- Grayish-green
- Tripinnate, divided into narrow segments

Inflorescence
- Yellow

Fruits
- Siliques not overtopping developing flowers
- Inside of siliques, the septum with longitudinal bands

Habitat: roadsides, waste places, disturbed sites, railroads, hillsides, mountain slopes, stream banks, fields, lawns, pastures
Distribution: arctic-alpine and interior boreal regions

Northern tansymustard • *Descurainia sophioides*

General Information:
Annual,or biennial
0.1-1.5 m tall

Description:
Very similar to *D. sophia*, but:
- Hairs with or without glands and may or may not be tree-shaped
- Leaves are bipinnate
- Siliques overtop developing flowers
- Septum inside of siliques without longitudinal bands

Habitat: gravel bars, disturbed soil, roadsides
Distribution: arctic-alpine and interior boreal regions

Dog mustard • *Erucastrum gallicum*

syn. *Brassica erucastrum*

Invasiveness Rank: not yet ranked | Species Code: ERGA

General Information:
Annual
0.3-1.2 m tall
Simple hairs

Description:
Leaves
- Deeply pinnately lobed

Inflorescence
- Yellow, sparse
- Lowermost flowers and seed pods in the of small leaves

Fruits
- 2.5-5 cm
- Approximately 4-sided

Habitat: roadsides, waste places, disturbed sites, railroads, fields, gardens
Distribution: Pacific maritime

Field mustard ● *Brassica rapa*

Invasiveness Rank: 50 points Species Code: BRRA

General Information:
Winter annual or biennial
0.3-1.2 m tall

Description:
Stems and leaves

- Smooth and green
- Lower leaves < 30 cm long with a large terminal lobe and smaller lateral lobes
- Upper leaves small, clasping, and not lobed
- Underside of leaves hairy

Inflorescence

- Deep yellow
- 6-11 mm long
- When open, flowers equal or overtop buds

Fruits

- Siliques 3.8-6.4 cm long
- Borne on long pedicles
- Pods without hairs
- Pods with a conspicuous beak 13-19 mm long and round in cross-section

Habitat: cultivated fields, abandoned cabins, roadsides; beaches and other naturally disturbed sites along the coast
Distribution: interior boreal and Pacific maritime regions

Rapeseed • *Brassica napus*

Invasiveness Rank: 47 points | Species Code: BRNA

General Information:
Annual or biennial
Up to 1.5m tall
Similar to *B. rapa*

Description:
Inflorescence

- Gold to cream-to pale yellow
- Petals broadly egg-shaped, 10-16 mm long and 6-9 mm wide
- When open, flowers do not overtop buds

Habitat: abandoned gardens, old home sites, roadsides, waste areas
Distribution: Fairbanks, urban areas in south-central Alaska
Remarks: *Brassica napus* is an important oil (rapeseed or canola oil) and vegetable crop (rutabaga) that easily escapes cultivation. In temperate North America it is a widespread and naturalized weed.

Rorippa species and *Barbarea* species

Description:
Weedy but native species
All hairs are simple and glandular
Stems
- *Barbarea* species have angled edges

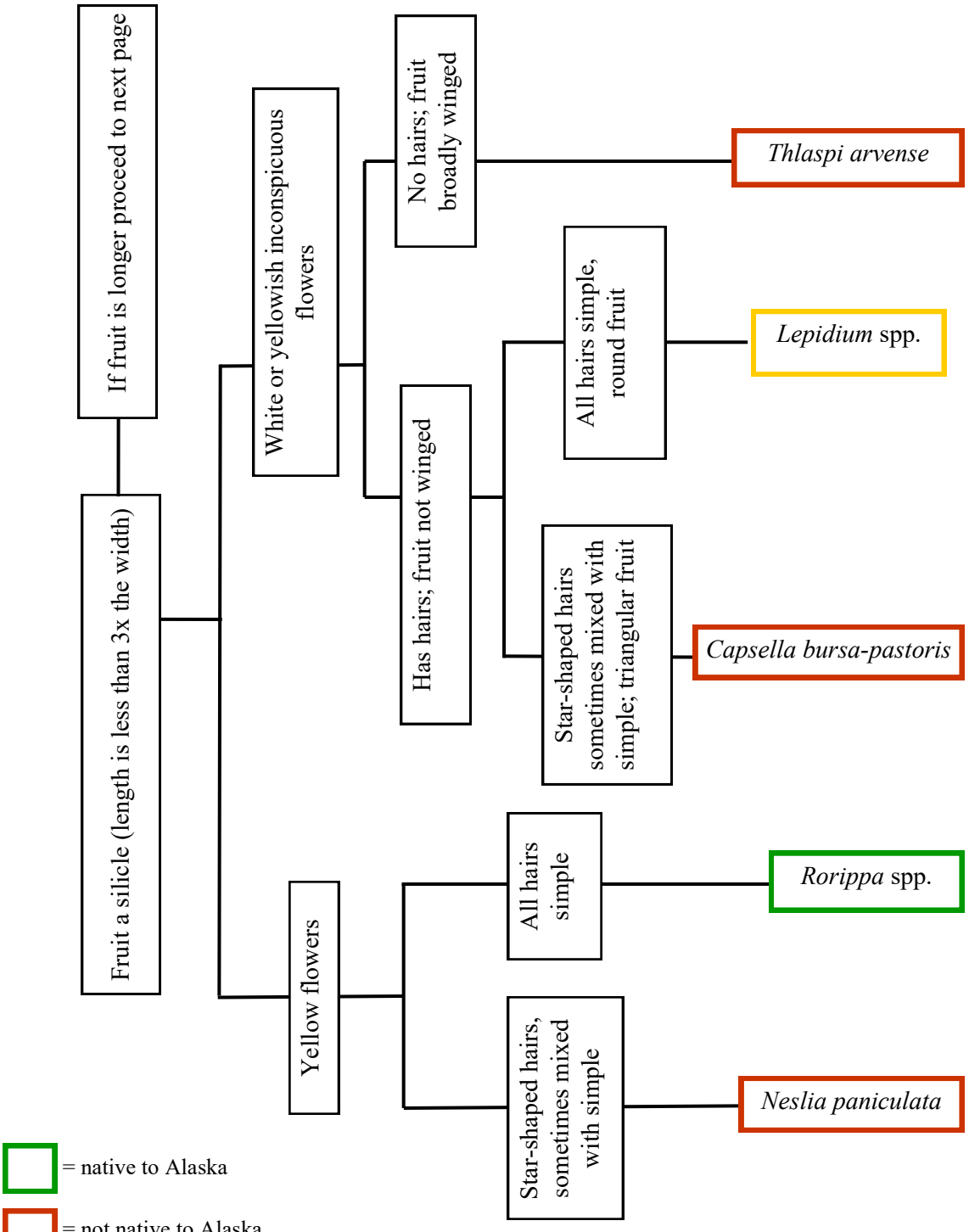
Inflorescence
- Yellow

Fruits
- Silique 3-5 times longer than broad
- *Rorippa* species with siliques shorter than 6 cm

Habitat: roadsides, moist areas; very common
Distribution: arctic-alpine and interior boreal regions

Rorippa islandica

Barbarea orthoceras



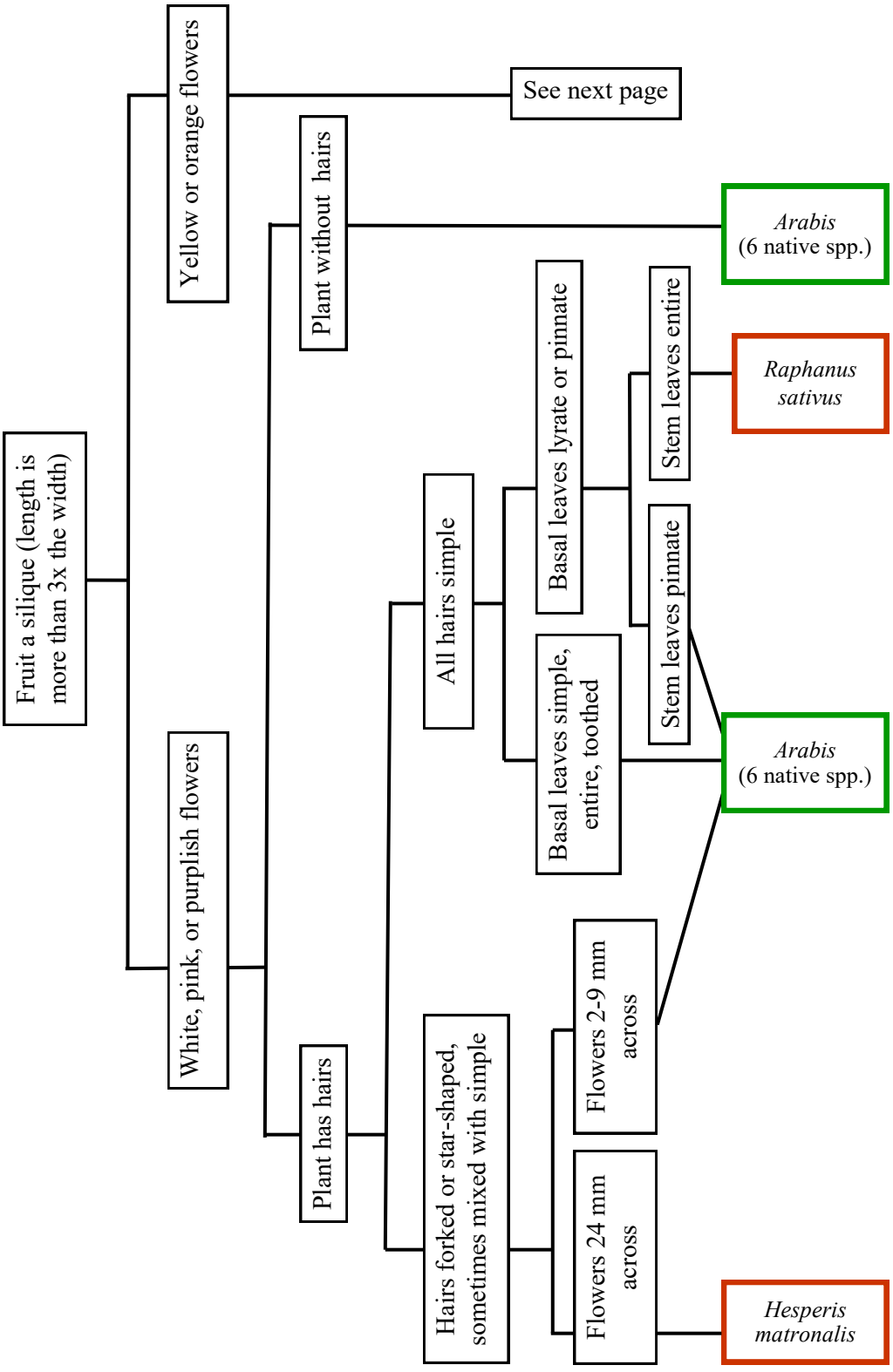
= native to Alaska

= not native to Alaska

= disputed native status OR large genus with some species native and some not native to Alaska

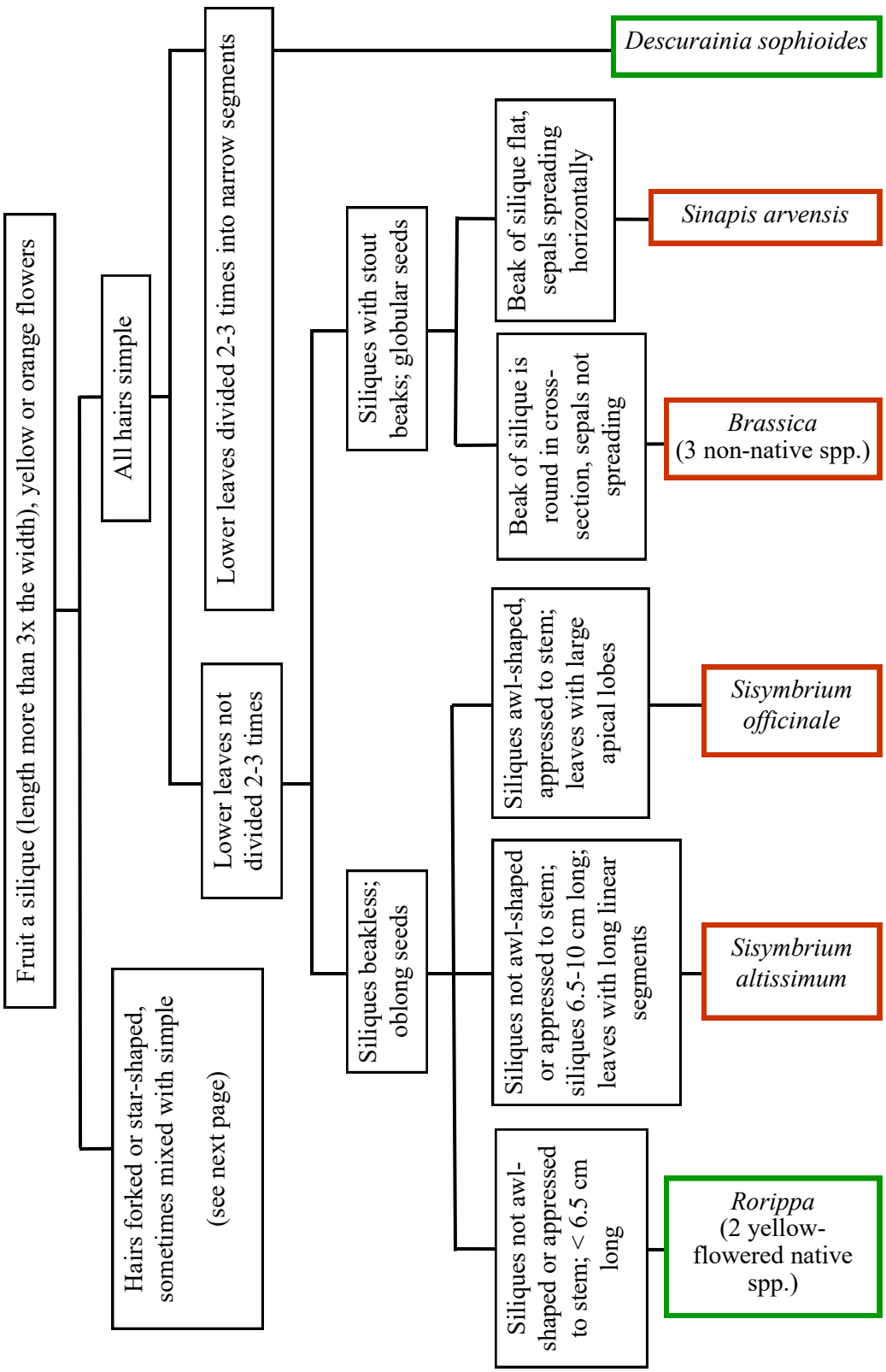
KEY TO MUSTARDS OF DISTURBED HABITATS IN ALASKA

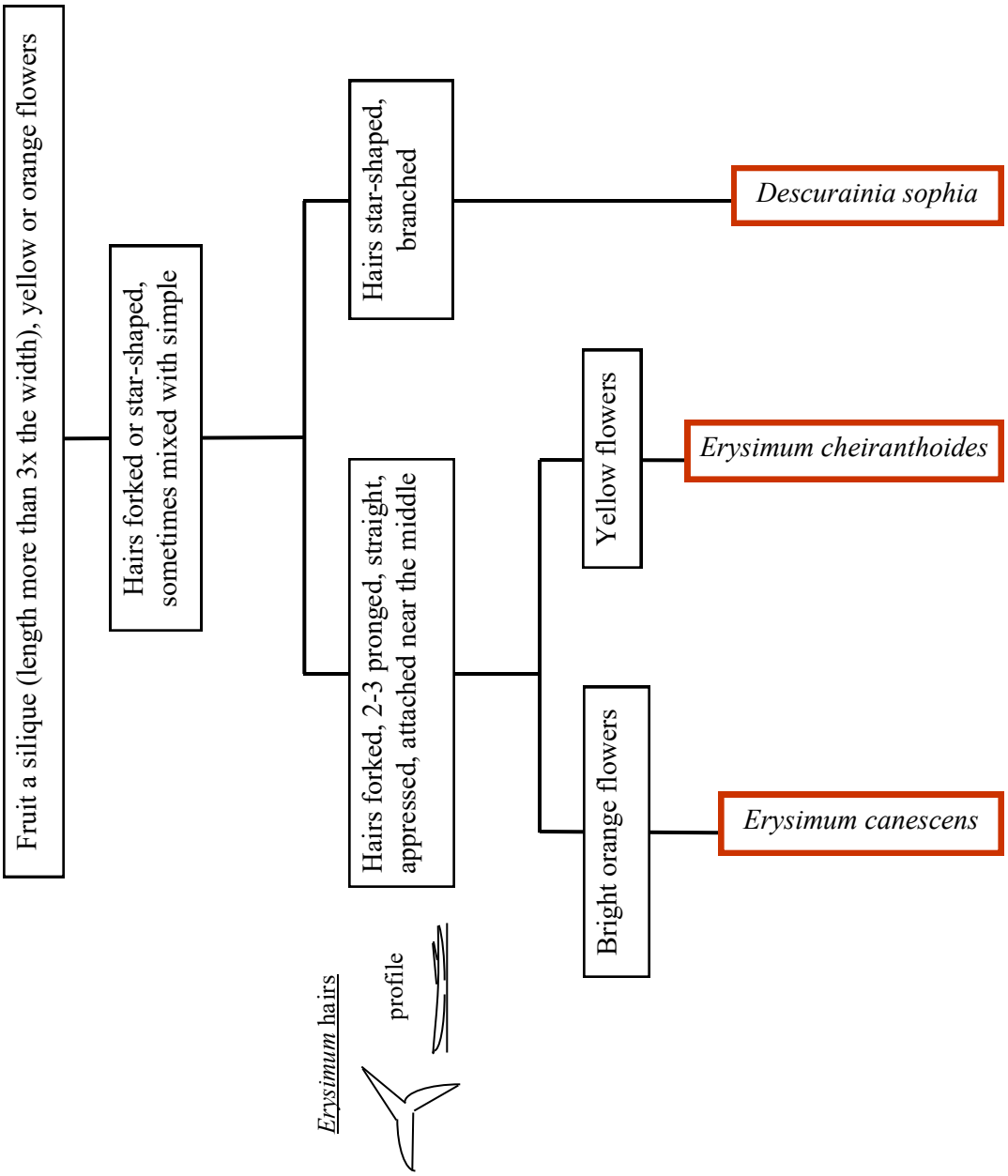
Partial key to mustards of disturbed habitats; consult Hultén (1968) or Welsh (1974) for more info



KEY TO MUSTARDS OF DISTURBED HABITATS IN ALASKA

Partial key to mustards of disturbed habitats; consult Hultén (1968) or Welsh (1974) for more info


Fruit a silique (length more than 3x the width), yellow or orange flowers
All hairs simple
Lower leaves divided 2-3 times into narrow segments
Descurainia sophioides
Lower leaves not divided 2-3 times
Siliques with stout beaks; globular seeds
Beak of silique flat, sepals spreading horizontally
Sinapis arvensis
Beak of silique is round in cross-section, sepals not spreading
Brassica (3 non-native spp.)
Siliques beakless; oblong seeds
Siliques awl-shaped, appressed to stem; leaves with large apical lobes
Sisymbrium officinale
Siliques not awl-shaped or appressed to stem; siliques 6.5-10 cm long; leaves with long linear segments
Sisymbrium altissimum
Siliques not awl-shaped or appressed to stem; < 6.5 cm long
Rorippa (2 yellow-flowered native spp.)
Hairs forked or star-shaped, sometimes mixed with simple
(see next page)



Key to mustards of disturbed habitats in Alaska

Partial key to mustards of disturbed habitats; consult Hultén (1968) or Welsh (1974) for more info

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Notes:

Recommended Floras and Field Guides

Regional floras

Hultén, E. 1968. Flora of Alaska and Neighboring Territories.
Good reference; included all non-natives at the time he wrote the book and most natives growing on disturbed sites.

Welsh, S.L. 1974. Anderson's Flora of Alaska and adjacent parts of Canada. Brigham Young University Press, Provo, Utah.
A second Alaska-specific flora. Good for comparison of or keying out on the basis of quantitative traits and measurements.

Cody, W. 1974. Flora of the Yukon Territory.
Keys often use better diagnostic traits to separate genera and species than Hultén.

Douglas, G.W., G.B. Straley, D. Meidinger, and J. Pojar. 1998. Illustrated Flora of British Columbia. Vol. 1-8. British Columbia: Ministry of Environment, Lands and Parks, Ministry of Forests.
Good for weed identification; very good for Asteraceae family.

Skinner, Q., S. Wright, R. Henszey, J. Henszey, and S. Wyman. 2012. A Field Guide to Alaska Grasses. Education Resources Publishing, Cumming, Georgia.
The most comprehensive guide to all grasses occurring in Alaska.

Regional field guides

Pojar, J., and A. MacKinnon. 2013. Alpine plants of the Northwest, Wyoming to Alaska. Lone Pine Publishing, Edmonton, Alberta.
Most up-to-date regional flora but concentrates on native plants. Includes high quality photos.

Johnson, D., L. Kershaw, and A. MacKinnon. 1995. Plants of the Western Boreal Forest and Aspen Parkland.
Includes many exotics with good habitat descriptions and notes about nativity and distribution, good for South-central and Interior Alaska.

Pojar, J. and A. MacKinnon. 1994. Plants of the Pacific Northwest Coast.
Includes many exotics with good habitat descriptions and notes about nativity and distribution. Good for Southeast Alaska.

Guide to botanical terminology

Harris, J.G. and M.W. Harris. 2001. Plant Identification Terminology: An Illustrated Glossary.
Great pictorial explanations of botanical terminology to help you decipher the floras.

Non-native plant field guides

Royer, F. and R. Dickinson. 1999. Weeds of the Northern US and Canada.
Perhaps is the best, especially in combination with Weeds of the West.

Whitson, T.D. (ed), et al. 2005. Weeds of the West.
Botanical descriptions of weeds in the western U.S. with emphasis on agricultural contaminants.

Guide to Weeds in British Columbia. Available online: http://www.weedsbc.ca/pdf/GuidetoWeeds.pdf
Habitat descriptions and notes about nativity and distribution.

[AKEPIC] Alaska Exotic Plants Information Clearinghouse. 2005. Invasive Plants of Alaska.
Alaska-specific, non-native plant guide book. Provides 'user-friendly' plant descriptions including some diagnostic traits, and covers the known or expected ecological impacts of key invasives in Alaska.

DiTomaso, J.M. and E.A. Healy. 2007. Weeds of California and Other Western States. University of California Agriculture and Natural Resources. Oakland, CA. 1808 pp.
A two-volume set with supplemental CD of plant images.

Michael Shephard, M., T. Huette, J.M. Nielsen, C. Lindemuth. 2007. Selected Invasice Plants of Alaska. USDA Forest Service.

Everman, W.A, C.L. Sprague, S.A. Gower and R.J. Richardson. 2010. An IPM Pocket Guide for Weed Identification in Field Crops.
Who doesn't love a pocket guide? Great images of seedlings.

Morgan, V. and M. Sytsma. 2009. Introduction to Common Native & Potential Invasive Freshwater Plants in Alaska. Prepared for the Alaska Department of Fish and Game. Available online: http://aknhp.uaa.alaska.edu/botany/akepic/publications
Field guide for identifying freshwater plants in Alaska.

Online resources - general botany

eFloras
A compilation of floras including, in part, the Flora of North America.
http://www.efloras.org/

USDA PLANTS Database
Standardized information about the vascular plants, mosses, liverworts, hornworts, and lichens of the U.S. and Canada.
http://plants.usda.gov/

ITIS (Integrated Taxonomic Information System)
Taxonomic information on plants, animals, fungi, and microbes of North America and the world.
http://www.itis.gov/

Arctos
A multi-institution database, which includes collections of the University of Alaska Museum Herbarium (ALA). Provides information for most of ALA's plant specimens (includes native and non-native species).
http://arctos.database.museum/home.cfm

Alaska Plant Materials Center
Provides testing, production, development and distribution of materials to resource industries to meet environmental requirements and includes development of a native seed industry.
http://www.plants.alaska.gov/

Consortium of Pacific Northwest Herbaria
Over 3.6 million specimen records and numerous online electronic resources are managed by the region's 60 herbaria. Includes the herbaria at both the museum of the North (ALA) and Alaska Natural Heritage Program (AKNHP-UAAH).
http://www.pnwherbaria.org/

Cooperative Extension Service
The Alaska Integrated Pest Management Program addresses the public need for pest management education within the state. General educational outreach services provided include evaluation and identification of insect, plant and disease specimens, recommendation of control options to reduce pest problems and site visits to examine tree disorders and invasive plants in the field.
http://www.uaf.edu/ces/ipm

Panarctic Flora Checklist
A collaborative and ongoing effort to establish a unified list of accepted names for arctic vascular plants, with annotations to highlight and explain taxonomic disagreements.
http://nhm2.uio.no/paf/

Online resources - non-native specific

AKEPIC (Alaska Exotic Plant Information Clearinghouse)
Includes publications, species biographies, invasiveness ranking documents and the non-native species tracking list for Alaska
http://accs.uaa.alaska.edu/invasive-species/non-native-plants

AKEPIC Data Portal
An interactive, web-based mapping system for over 100,000 record locations of non-native plant species in Alaska and the Yukon Territory
http://aknhp.uaa.alaska.edu/apps/akepic/

CNIPM (Alaska Committee for Noxious and Invasive Plant Management)
Aims to heighten awareness of problems associated with non-native invasive plants and to bring about greater statewide coordination, cooperation and action to halt the introduction and spread of undesirable plants.
http://www.uaf.edu/ces/cnipm/

Invasive.org
Information and images of invasive and exotic species of North America; based at The University of Georgia's Center for Invasive Species and Ecosystem Health.
www.invasive.org

EDDMapS (Early Detection and Distribution Mapping System)
Displays the distribution of invasive species in the U.S., including Alaska.
http://www.eddmaps.org/alaska/

Center for Invasive Plant Management
Promotes ecologically sound management of invasive plants by facilitating collaboration and partnerships among scientists, educators, and land managers; based at Montana State University.
http://www.weedcenter.org/

Invaders Database System
Exotic plant names and weed distribution records for five states in the northwestern United States; based at the University of Montana.
http://invader.dbs.umt.edu/

Online resources - non-native specific (continued)

US Forest Service – Forest Health Protection
Invasive Plants program works to protect Alaska's forest and tree resources from damaging outbreaks of insects, diseases and invasive plants.
http://www.fs.fed.us/r10/spf/fhp/

AACD (Alaska Association of Soil and Water Conservation Districts)
Actively supports 12 statewide Soil and Water Conservation Districts— Anchorage, Southeast, Fairbanks, Homer, Kenai, Kenny Lake, Kodiak, Mid-Yukon Kuskokwim, Palmer, Salcha-Delta, Upper Susitna, and Wasilla. The Invasive Plant Program coordinates the districts efforts to combat invasive weeds.
http://www.alaskaconservationdistricts.org/

Alaska Department of Fish and Game
Information on invasive plant species considered 'high priority threats.'
http://www.adfg.state.ak.us/special/invasive/invasive.php

Cooperative Weed Management Areas
Groups of federal, state, and local land managers, as well as individuals, who work together to protect Alaska from the threat of noxious, invasive weeds.
Anchorage: http://www.weedwar.org/about/CWMA.htm
Fairbanks:http://www.fairbankssoilwater.org/resources_CWMA.html
Kenai Peninsula: http://www.kenaiweeds.org/about-cwma.php
Kodiak: n-icoordinator@ak.net
Juneau: http://www.juneauinvasives.org/
Mat-Su: http://www.alaskaconservationdistricts.org/UpSu/usswcdhome.htm
Salcha/Delta: http://www.salchadeltaswcd.org/

Alaska Weeds ID App
An easy method for identification help. The Alaska Weeds ID mobile app available for smartphones (http://apps.bugwood.org/apps/alaska/). This 'all in one' feature app provides identification help and assists with data collection. Data be automatically submitted to UAF Cooperative Extension Service. The app does not have an extensive list on non-native species, but has many common ones. It includes useful photos and descriptions that can be used when not connected to cell service.

Alaska Weeds ID App available for Android and iPhone IOS.

Index of common and scientific names

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Index of common and scientific names

Glossary

Achene	A small, dry, hard, single-seeded fruit, similar in appearance to a seed whose outer covering does not burst when ripe.
Alien	See Non-native.
Alternate	Leaves occurring one at a node.
Annual	A plant that produces seed and dies within one year of germinating from seed.
Anther	The pollen-bearing organ of a flower, situated at the tip of the stamen.
Apical	Situated at the tip.
Appressed	Pressed close or flat against another organ.
Articulate	Jointed; has nodes or joints or places where separation naturally takes place
Attenuate	Gradually tapering to a very slender point.
Auricles	A claw-like appendage at the base of the leaf blade or at the apex of the leaf sheath, especially in grasses.
Auriculate	With a small projecting lobe or appendage at the base of an organ; ear-shaped.
Awn	A stiff, bristle-like appendage, usually at the end of a structure.
Basal	Situated at, or pertaining to the base.
Biennial	A plant requiring two years to complete its life cycle.
Bifid	Deeply two-cleft or two-lobed, usually from the tip.
Blade	The leaf of a plant, especially a grass; the flat or expanded portion of a leaf.
Bract	A modified leaf, growing at the base or on the stalk of a flower; usually differing from other leaves in shape or color.
Calyx	The usually green outer whorl or series of whorls surrounding the flower petals.
Carpel	A simple pistil, or one member of a compound pistil; a modified leaf forming the ovary or, in a compound ovary, part of the ovary.
Cauline	Of or pertaining to the stem.
Ciliate	Fringed with regularly arranged hairs on the margin.
Clasping	Wholly or partially surrounding the stem.
Cleft	Cut or split about half-way to the middle or base.
Compound	Made up of two or more similar parts (e.g. a compound leaf with multiple leaflets).
Corolla	All of the petals of a flower.
Crisped	Irregularly curled.
Culm	The stem of a grass plant.
Cuneate	Wedge-shaped; narrowly triangular.
Decumbent	A plant that has its base lying on the ground and a stem that grows upward.
Decussate	Arranged along the stem in pairs, with each pair at right angles to the pair above or below.
Dehisce	To split or burst open, discharging pollen or seeds.

Dentate	Coarsely toothed.
Disarticulate	Separating at maturity at a joint.
Disc florets	The regular tubular flowers on the heads of the Asteraceae family.
Entire	Not toothed, notched or divided; refers to the continuous, smooth margins of some leaves.
Exotic	See Non-native.
Falcate	Scythe-shaped, curved sideways and flat, tapering upwards, asymmetrical.
Fibrous roots	A root system with all branches of approximately equal thickness, as in the grasses and other monocots.
Filament	The stalk of a stamen that bears the anther.
Floret	A single flower in a head of many flowers.
Geniculate	Bent abruptly at an angle, like a knee.
Glume	A chaffy or membranous bract at the base of a grass inflorescence or spikelet; the first glume refers to the lower bract, the second glume to the upper bract.
Glabrous	Having a smooth, even surface; without hairs.
Glaucous	Having a whitish or blueish waxy coating.
Glandular	Having secreting organs or glands.
Hastate	Arrowhead-shaped.
Hyaline	Thin, dry and transparent or translucent.
Hypanthium	A cup-shaped extension of the floral axis usually formed from the union of the basal parts of the calyx, corolla and the stamens, commonly surrounding or enclosing the pistils.
Internode	The part of the stem that lies between two nodes or joints on a plant.
Invasive	Exotic plants that produce viable offspring in large numbers and have the potential to establish and spread in natural areas.
Involucre	A whorl of leaves or bracts that enclose a flower or inflorescence.
Irregular	Describes a flower in which sets of organs differ in size, shape or structure.
Keel	A central ridge along the back of any organ of a plant; the lowest, fused petals of a pea-like flower.
Lemma	The lower, and larger, of two membranous bracts enclosing the flower in grasses.
Ligule	A strap-shaped plant part. The flattened part of the ray floret in many members of the Asteraceae family. In grasses and sedges, the membranous appendage arising from the inner surface of the leaf at the junction with the leaf sheath.
Margin	The outer edge of the leaf; may be toothed, wavy, entire, etc.
Native	Refers to plants that live or grow naturally in a particular region.
Naturalized	Exotic plants that reproduce consistently in their new environment and sustain populations over many life cycles without direct intervention by humans.

Nerve	A prominent vein or rib of a leaf or other organ.
Node	A knob or joint of a stem from which leaves, roots, shoots or flowers may arise.
Non-native	Plants whose presence in a given area is due to accidental or intentional introduction by humans.
Noxious weed	A plant species that has been defined as undesirable by legal statute.
Obovate	Reversed ovate, having the distal end broader.
Opposite	Leaves or bracts occurring two at a node on opposite sides of the stem. Flower parts that occur one in front of another.
Ovary	The part of the pistil that contains the ovules
Ovule	The structure in the ovary that develops into the seed
Palea	The inner of the two bracts enclosing a grass flower.
Palmate	Leaves divided into lobes arising from a common center. Palmately compound leaves have multiple leaflets arising from a common center.
Panicle	A branched inflorescence
Pappus	A modified calyx seen in the Asteraceae family, forming a crown of awns, scales or bristles at the summit of the achene.
Pedicle	The stalk of a single flower or inflorescence.
Peduncle	A flower stalk supporting a cluster of flowers, or a single flower when the pedicel is very long.
Perennial	A plant that lives three or more years.
Petaloid	Resembling a petal.
Petiole	The slender stalk or stem of a leaf.
Pinnate	Divided in a feathery manner, having leaflets arranged on each side of a central stalk.
Pinnatifid	Pinnately cleft.
Pistil	The female reproductive unit of a flower; situated immediately within the petals and composed of the ovary, style, and stigma
Pubescent	Covered with soft hair or down.
Raceme	An inflorescence with flowers borne along a more or less elongated axis with the younger flowers nearest the top.
Rachis	The main axis of a structure.
Ray floret	The strap-shaped flower in the Asteraceae family; multiple ray florets extend outward from the center of a flower head.
Receptacle	The more or less expanded portion of the flower stalk that bears the organs of a flower or the collected flowers of a head as in Asteraceae.
Recurved	Bent backward in a curve.
Reflexed	Bent or turned abruptly backward or down
Regular	Radially symmetrical.
Rhizome	A subterranean, horizontal root-like stem sending out leaves and shoots from its upper surface and roots from its lower surface.
Rosette	A group of organs, such as leaves, clustered and crowned around a common point of attachment.
Sagittate	Arrowhead-shaped, with the basal lobes directed downward.
Scabrous	Rough to the touch due to the presence of short, stiff hairs.

Scarious	Thin, dry, membranous and more or less translucent; not green.
Sepals	The petal-like structures that subtend the petals of most flowers; any of the leaf divisions of the calyx
Sessile	Attached directly, without a supporting stalk as a leaf without a petiole.
Sheath	A protective covering; the lower part of a leaf enveloping the stem.
Silicle	A short fruit of the mustard family that is not more than twice as long as wide.
Silique	A long, narrow fruit of the mustard family that is more than twice as long as wide.
Simple	Of only one part, not divided into separate segments.
Spike	An elongate inflorescence with stalkless flowers
Spikelet	A subdivision of a spike, as in the spikelets of grasses.
Stamens	The male reproductive organ in a flower; situated immediately within the petals and composed of the filament and the anther.
Standard	Upper petal of a pea-like flower.
Stellate	Star-shaped.
Stigma	The part of the pistil that receives pollen.
Stipules	Appendages at the base of a petiole or leaf.
Stolon	A stem which grows horizontally along the surface of soil and is able to root at the tip and develop a new plant.
Style	The usually stalk-like portion of the pistil connecting the stigma and ovary.
Succulent	Fleshy and full of juice.
Taproot	The main root axis from which smaller root branches arise, as in many dicots (compare fibrous roots).
Tepal	A division of the perianth of a flower that has an indistinguishable calyx and corolla.
Tomentose	A covering of short, matted or tangled, soft, wooly hairs.
Trifoliate	With three leaves or leaflets.
Truncate	The apex or base squared at the end as if cut off.
Tubercle	A small tuber-like swelling or projection.
Tufted	Arranged in a dense cluster.
Villous	With long, soft, somewhat wavy hairs.
Viscid	Glutinous, sticky or gummy to the touch.
Weed	Any plant, native or exotic, whose presence is undesirable to people in a particular time or place.
Whorled	When three or more leaves are arranged at the same level on a stem.
Winter annual	A plant that germinates in the fall, overwinters as a seedling, and in the spring and summer flowers, produces seed and dies.
Wing	Any membranous or thin expansion bordering or surrounding an organ.

Glossary adapted from: Harris, J.G. and M.W. Harris, 2001

Works Cited

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