FLORA OF THE BLACK HILLS

Keys to Genera, Species, Subspecies, and Varieties

Robert D. Dorn

Update of January 2021
Flora of the Black Hills

It is always desirable to have identification keys available for the smallest area one is working in rather than to have to labor through keys covering a larger area, whether a state, region, or nation. My keys for the Black Hills which appeared in 1977 are long out of date. This update has eliminated about 70 species which were reported earlier for the Black Hills but have never been documented with a specimen or reliable literature source. About 180 species have been added to the Black Hills flora since 1977. A high percentage of recent new reports for which specimens could be examined turned out to be misidentified. There are other reports for which I was unable to examine specimens. Some of these may be valid but are not included here (see Appendix). For this update I have chose not to include any descriptions, habitats, nor locations to keep the treatment compact and easily available to all who wish to use it. Detailed descriptions can be found in “Flora of the Great Plains” and in “Flora North America” which is online. I have not attempted to evaluate name changes that appear in “Flora North America”. These are mostly followed but some are not for various reasons which may include nomenclatural problems or a differing use of ranks. The latter names can usually be easily cross-referenced. In addition, I may recognize varieties that these treatments do not. There are plenty of examples of varieties being very distinct in one area and totally and hopelessly intergradient in other areas. If I thought they might be useful, I have included them. If they are not relevant or significant for your purposes, they can simply be ignored. Normally I use the rank of variety for infraspecific taxa and occasionally the rank of subspecies for a related group of varieties. A few species lack a validly published name for their varieties, but have valid subspecies names. Rather than validate new varietal names, I have simply used the subspecies names in these few cases. Collection locations can often be found in herbaria databases online such as that for the Rocky Mountain Herbarium at the University of Wyoming.

Traditionally, keys have used the Family for the base unit or rank, with keys to genera and species under the respective families. Recent genetic work has recircumscribed many traditional families and more of these changes can be expected in the future. I have therefore eliminated all use of families although some of the group keys may correspond to families. Genera and species are a lot simpler to update than are families.

The actual area covered is shown on the map below.

R. Dorn
January 2017
(Updated January 2021, thanks to Ernie Nelson, Mark Gabel, Cheryl Mayer, and Beth Burkhart for searching for or providing specimens, and to Jeff Hansen for bringing records and corrections to my attention.)
Key to the Major Groups

1. Disseminules spores; plants never having flowers or seeds; ferns, horsetails, club mosses, and other pteridophytes **PTERIDOPHYTES** below
2. Ovules and seeds mostly borne on the surface of scales, the scales aggregated into a cone, occasionally the cone is fleshy and berry-like; evergreen trees and shrubs with needle-like or scale-like leaves; conifers **GYMNOSPERM**s page 2
2. Ovules and seeds enclosed in an ovary or fruit; trees, shrubs, vines, and herbs; leaves only rarely as above **ANGIOSPERMS** page 2

**Keys to Genera**

**PTERIDOPHYTES**


1. Stems jointed and grooved lengthwise, each joint covered by a sheath which surrounds the stem, the sheath and its terminal teeth, if any, representing the leaves *Equisetum*
1. Stems not jointed or grooved lengthwise, sheaths lacking, leaves usually well developed
2. Leaves like a four-leaf clover, the 4 leaflets on a petiole to 15cm long from a creeping rhizome *Marsilea*
2. Leaves not as above
3. Leaves simple, sessile, often scale-like, less than 2cm long; plants mostly moss-like or like young conifers
4. Strobili 4 sided; leaves usually with ligules *Selaginella*
4. Strobili cylindrical; leaves without ligules
5. Leaves of branches mostly in 6-8 longitudinal rows, all alike; upper vegetative branches round *Lycopodium*
5. Leaves of branches in 4 longitudinal rows, those of the upper and lower surfaces of branch mostly unlike the marginal; upper vegetative branches usually flattened or wing-margined *Diphasiastrum*
3. Leaves not as above; mostly fern-like plants
6. Sporangia lacking an annulus, on a specialized branch appearing to be continuous with the main stalk or appearing to arise from near the base of a vegetative leaf; roots thick, fleshy, and radially spreading; stems and petioles lacking scales *Botrychium*
6. Sporangia with an annulus, usually on the underside of vegetative-like leaves, the leaves sometimes slightly modified, rarely on a different-appearing specialized leaf arising directly from the rhizome; roots not thick, fleshy, and radially spreading; stems and petioles often bearing scales
7. Leaves with 1-5 linear leaflets at tip and appearing grass-like *Asplenium*
7. Leaves not as above
8. Leaves of 2 kinds, the vegetative wider than the fertile, the fertile with bead-like or rolled segments
9. Vegetative leaves widest at or near base
10. Fertile leaves with rolled segments, longer than the vegetative, the vegetative twice compound *Cryptogramma*
9. Vegetative leaves widest at middle *Matteuccia*
8. Leaves usually all similar or nearly so
11. Sorus near the leaflet margins, appearing elongate, usually at least partly covered by the rolled or reflexed leaflet margins (lower leaf surface rarely obscured by woolly hairs)
12. Leaves scattered along a horizontal rhizome, petioles green or yellow, sori mostly continuous around rolled leaflet margin; plants mostly in damp or well-drained soil and over 25cm high, often in large colonies *Pteridium*
12. Leaves densely clustered, or if scattered along a rhizome, then petioles reddish-brown or purplish and sori discontinuous and covered by reflexed tips of leaflet lobes; plants mainly in rock crevices and mostly less than 25cm high, seldom in large colonies
13. Sori discontinuous and covered by reflexed tips of leaflet lobes; leaflets glabrous *Adiantum*
13. Sori appearing continuous around the leaflet margin, covered by the rolled margin; leaflets often hairy
14. Ultimate segments of leaves mostly over 5mm long; leaves glabrous or sparsely hairy beneath *Pellaea*
14. Ultimate segments of leaves much less than 5mm long; leaves woolly-hairy beneath Cheilanthes
11. Sori on or along veins between leaflet or segment margin and its midrib, mostly round in outline but sometimes elongate; leaflet margins usually flat, rarely rolled
15. Sori round in outline, indusia lacking; leaves simply pinnatifid or once compound with leaflets broadest at very base and nearly confluent Polypodium
15. Sori elongate in outline, or if round, then either indusia present or the leaves at least nearly twice compound or both
16. Sori elongate in outline (sometimes curved)
17. Leaves once compound, mostly less than 3cm wide Asplenium
17. Leaves at least twice compound, mostly 8cm or more wide Athyrium
16. Sori round in outline
18. Indusia present
19. Indusia mostly under the sori and divided into hair-like segments, or else covering sori like hoods from below
20. Indusia attached at center of sori, split into narrow, spreading segments; leaves clustered with persistent, old petiole bases; veins of lowest primary leaflet usually not prominent to margin Woodsia
20. Indusia attached toward the side of sori, covering sori like hoods which bend back at maturity; leaves scattered or in small clusters without persisting petiole bases; veins of lowest primary leaflet usually prominent to margin Cystopteris
19. Indusia mostly above sori, round or kidney-shaped in outline or nearly so, sometimes with a cleft on one side
21. Indusia with a cleft on one side; leaves at least nearly twice compound, elliptic or lanceolate
22. Leaves densely clustered, glabrous Dryopteris
22. Leaves scattered along a creeping rhizome, usually at least slightly hairy beneath Thelypteris
21. Indusia without a cleft; leaves once or occasionally twice compound, narrowly elongate Polystichum
18. Indusia lacking
23. Leaf blades broadly triangular; leaves scattered, without persisting petiole bases Gymnocarpium
23. Leaf blades elliptic to lanceolate; leaves usually crowded, sometimes with clustered, persistent petiole bases
24. Leaves clustered with persistent, old petiole bases; veins of lowest primary leaflet usually not prominent to margin Woodsia
24. Leaves scattered or in small clusters without persisting petiole bases; veins of lowest primary leaflet usually prominent to margin Cystopteris

GYMNOSPERMS

A. Pinus ponderosa, B. Picea glauca, C. Juniperus communis at left, Juniperus scopulorum at right.

1. Leaves scale-like and opposite, or needle-like and whorled; seed-bearing cones berry-like; trees or shrubs Juniperus
1. Leaves linear or needle-like, spirally arranged or in clusters of 2-5; seed-bearing cones woody or subwoody; trees
2. Leaves 3cm or more long, borne in clusters of 2-5 Pinus
2. Leaves 2.5cm or less long, borne singly
3. Leaves sharp-pointed, somewhat 4 sided; twigs rough with short pegs where leaves have fallen off; ovulate cones without protruding bracts from between scales Picea
3. Leaves blunt at tip, flattened; twigs relatively smooth where leaves have fallen off; ovulate cones with 3 lobed bracts protruding from between scales Pseudotsuga

ANGIOSPERMS

Lilium philadelphicum left, Helianthus annuus right
1. Plants submerged or floating-leaved aquatics, usually limp out of water (avoid temporarily flooded terrestrial or emergent plants) GROUP I below

2. Leaves mostly parallel-veined, simple, usually entire, rarely reduced to sheaths; flower parts in 3’s or 6’s (rarely 2’s or 4’s); vascular bundles scattered in stem; root system usually fibrous, rhizomatous, or bulbous; monocotyledonous herbs (rarely shrubby) GROUP II below

3. Plants trees, shrubs, or woody vines, woody throughout GROUP III p. 4

4. Leaves about 1mm wide or less, mostly over 25mm long; stamens 1-9

5. Leaves mostly wider or shorter or both; stamens 1-9

6. Leaves often 3 at lower nodes or flower nodes, linear; flowers peduncled or in peduncled spathes Elodea

7. Flowers irregular; stamens 1 or 2

8. Flowers not as above; pistils several per flower

9. Flowers in globose heads Sparganium

10. Flowers in cylindrical spikes; cattails Typha

11. Flowers in globose heads Sparganium

12. Flowers not as above

13. Flowers in axes of 1-4 chaffy bracts; perianth of bristles, minute scales, or none; leaves alternate, linear, sheathing stem, rarely reduced to sheath; grasses, sedges, and bulrushes

14. Flower subduced by 2 or more bracts; stem round or flat; leaf sheaths often split lengthwise Grasses p. 18

15. Flowers not split lengthwise Sedge Group p. 27

16. Flowers inferior; stamens 1-3; perianth evident

17. Flowers irregular; stamens 1 or 2 Orchids p. 24

18. Flowers regular; stamens 3

19. Leaves whorled at least in part; corolla white or greenish-white (rarely yellowish), mostly less than 5mm long Galium

20. Leaves equitant near base of stem; corolla at least partly of some shade of blue or purple, mostly over 6mm long

21. Flowers 5cm or more long Iris

22. Flowers much less than 5cm long Sisyrinchium

23. Ovary superior; stamens 1 to many; perianth sometimes lacking

GROUP I, aquatics

1. Plants thallus-like, free floating at water surface or below, mostly less than 10mm long but rarely to 25mm; stems and leaves not differentiated; duckweeds Lemma

2. Leaves opposite or whorled on an elongate stem

3. Leaves whorled

4. Leaves compound or dichotomously divided Myriophyllum

5. Leaves simple

6. Leaves mostly 2-4 per node; flowers on peduncles usually in axillary spathes Elodea

7. Leaves 2 per node; flowers sessile or nearly so, rarely pedicled if with subhicular leaves

8. Submerged leaves linear; floating leaves, if any, club-shaped to oval; fruit 2-4 seeded; stamen 1 Callitriche

9. Leaf blades 4

10. Leaves without bladders

11. Leaves bearing scattered bladders, bladders rarely on leafless branches; corolla irregular Utricularia

12. Leaves not as above

13. Leaves alternate on elongate stem

14. Leaves 3-5 parted, or entire and oval to lanceolate Heteranthera

15. Leaves entire; pistils solitary Polygonum

16. Stipules lacking; leaves sheathing stem; staminate and pistillate flowers in separate globose heads Sparganium

17. Flowers usually more than 2 per spike; stamens 4; fruits sessile or nearly so; leaves often over 1mm wide

18. Stipules sheaths of submerged leaves free from base of leaf blade, or if adnate, then adnate less than 1/2 the length of stipule; leaves linear or broader, (1)3 to many nerved Potamogeton

19. Flowers in cylindrical spikes; cattails Typha

20. Flowers in globose heads Sparganium

21. Flowers unisexual, either in dense cylindrical spikes at tip of stem, or in dense globose heads, the staminate spike or heads well differentiated from and above pistillate; perianth of bristles or 3-6 membranous scales

22. Flowers in cylindrical spikes; cattails Typha

23. Flowers in globose heads Sparganium

24. Flowers not as above

25. Flowers in axes of 1-4 chaffy bracts; perianth of bristles, minute scales, or none; leaves alternate, linear, sheathing stem, rarely reduced to sheath; grasses, sedges, and bulrushes

26. Flower subduced by 2 or more bracts; stem round or flat; leaf sheaths often split lengthwise Grasses p. 18

27. Flowers subduced by 1 bract (rarely 2), pistillate flowers sometimes also enclosed in a perigynium; stem often triangular; leaf sheaths normally not split lengthwise Sedge Group p. 27

28. Flowers not as above; perianth of 6 scales or not of scales or bristles; leaves various

29. Ovary inferior; stamens 1-3; perianth evident

30. Flowers irregular; stamens 1 or 2 Orchids p. 24

31. Flowers regular; stamens 3

32. Leaves whorled at least in part; corolla white or greenish-white (rarely yellowish), mostly less than 5mm long Galium

33. Leaves equitant near base of stem; corolla at least partly of some shade of blue or purple, mostly over 6mm long

34. Flowers 5cm or more long Iris

35. Flowers much less than 5cm long Sisyrinchium

36. Ovary superior; stamens 1 to many; perianth sometimes lacking

GROUP II, monocots

1. Plants usually not free floating except when fragmented, usually over 10mm long; stems and leaves usually well differentiated

2. Leaves alternate or basal (rarely clustered and appearing opposite)

3. Leaves compound with thread-like divisions, lace-like

4. Leaves about 1mm wide or less, mostly over 25mm long; stamen 1 Zannichellia

5. Leaves mostly wider or shorter or both; stamens 1-9

6. Leaves often 3 at lower nodes or flower nodes, linear; flowers peduncled or in peduncled spathes Elodea

7. Leaves 2 per node; flowers sessile or nearly so, rarely pedicled if with subhicular leaves

8. Submerged leaves linear; floating leaves, if any, club-shaped to oval; fruit 2-4 seeded; stamen 1 Callitriche

9. Leaves 10mm or less long, linear to spatulate or suborbicular; fruit many seeded; stamens 3-8

10. Submerged leaves linear; floating leaves, if any, club-shaped to oval; fruit 2-4 seeded; stamen 1 Callitriche

11. Leaves whorled or clustered (rarely opposite)

12. Leaves simple

13. Leaves not as above; pistils several per flower

14. Leaves 3-5 parted, or entire and oval to lanceolate Heteranthera

15. Leaves entire; pistils solitary Polygonum

16. Stipules lacking; leaves sheathing stem; staminate and pistillate flowers in separate globose heads Sparganium

17. Flowers usually more than 2 per spike; stamens 4; fruits sessile or nearly so; leaves often over 1mm wide

18. Stipules sheaths of submerged leaves free from base of leaf blade, or if adnate, then adnate less than 1/2 the length of stipule; leaves linear or broader, (1)3 to many nerved Potamogeton

19. Flowers in cylindrical spikes; cattails Typha

20. Flowers in globose heads Sparganium

21. Flowers unisexual, either in dense cylindrical spikes at tip of stem, or in dense globose heads, the staminate spike or heads well differentiated from and above pistillate; perianth of bristles or 3-6 membranous scales

22. Flowers in cylindrical spikes; cattails Typha

23. Flowers in globose heads Sparganium
9. Leaves opposite, 25mm or less long; flowers axillary; annuals
10. Sepals and petals 3; stamens 3 or 6; fruit a capsule with many seeds Elatine
11. Sepals and petals none (sometimes 1 or 2 bracts); stamens solitary; fruit a schizocarp splitting into 2 or 4 segments with 1 seed each Callitriche

9. Leaves mostly basal or alternate, rarely whorled or opposite, often over 25mm long; flowers axillary or not; annuals or perennials
11. Leaves along stem, not parallel-veined; styles 0, 1, or 3; ovules often 3 or more per ovary; fruit an achene; either leaves with sheathing stipules or flowers subtended by an involucre of united bracts Buckwheat Group p. 15
11. Leaves along stem or basal, parallel-veined; styles 0, 1, or 3; ovules often 3 or more per ovary; fruit usually a capsule, berry, or follicle; sheathing stipules and involucres of united bracts lacking

12. Perianth parts united well over half their length
13. Flowers in clusters from below ground, 5cm or more long; leaves all basal Leucocrinum
13. Flowers axillary, 4cm or less long; leaves alternate on stems
14. Leaves with long petioles; flowers solitary in leaf axils, subtended by a spathe-like bract; stamens 3 Heteranthera
14. Leaves sessile; flowers 1-3 in leaf axils, spathe-like bract lacking; stamens 6 Polygonatum

12. Perianth parts free or nearly so
15. Perianth with sepals and petals very different in size, shape, and/or color, the sepals usually green, the petals white to blue, purplish, or rose; the petals sometimes deciduous
16. Pistils mostly 10 to many, in a ring or globose head; flowers sometimes unisexual
17. Flowers bisexual; ovaries in a circle on a flattened receptacle; leaves not sagittate Alisma
17. Flowers often unisexual; ovaries in a spherical head on a rounded receptacle; leaves usually sagittate Sagittaria
16. Pistils solitary; flowers bisexual
18. Petals white (purplish) with a fringed circular or lunate gland on inner surface toward base; bulbous Calochortus
18. Petals blue or purplish to rose (white), lacking glands; fibrous rooted Tradescantia

15. Perianth with parts all similar or nearly so
19. Flowers in terminal or axillary umbels, sometimes crowded into a head, especially if most flowers are replaced by bulblets
20. Plants climbing or trailing herbaceous vines bearing tendrils; flowers unisexual; leaves oblong-ovate to suborbicular Smilax
20. Plants mostly erect, without tendrils; flowers of

GROUP III, woody plants

1. Plants vines or twining shrubs
2. Leaves and branches alternate (ignore tendrils and flower stalks)
3. Tendrils present; leaves lobed or compound
4. Leaves simple, palmately lobed Vitis
4. Leaves palmately compound with 5-7 leaflets Parthenocissus
3. Tendrils lacking; leaves toothed Celastris
2. Leaves and branches opposite or whorled
5. Leaves compound Clematis
5. Leaves simple
6. Leaves lobed or toothed, long petioled Humulus
6. Leaves entire and sessile, or nearly so Lonicera

1. Plants trees or shrubs, not twining although sometimes prostrate or scrambling
7. Leaves palmatifid with mostly 3-5 linear, spinulose-tipped segments, also with axillary clusters of often simple linear leaves Linanthus
7. Leaves not as above
8. Leaves and branches opposite (rarely subopposite) Series III-A
8. Leaves and branches alternate (rarely in fascicles or densely clustered at base)
9. Leaves compound Series III-B
9. Leaves simple (rarely with a pair of nearly distinct basal lobes)
10. Leaves scale-like, mostly about 1mm long and overlapping, resembling a juniper Tamarix
10. Leaves not as above
11. Plants with spines, thorns, prickles, or spine-tipped branches Series III-C
11. Plants lacking spines, thorns, prickles, or spine-tipped branches
12. Leaves or their much divided segments mostly 3mm or less wide, 5-20 times as long as wide Series III-D
12. Leaves mostly over 3mm wide, less than 10 times as long as wide
13. Leaf margins entire or nearly so Series III-E
13. Leaf margins toothed or lobed, sometimes slightly so Series III-F

1. Leaves compound
2. Pith of older (and often younger) stems over half the diameter of stem; leaves pinnately compound; fruit a berry; shrub Sambucus
2. Pith of older stems usually less than half the diameter of stem; leaves pinnately or palmately compound; fruit a samara or achene; tree or shrub
3. Plants shrubs to 3dm high; sepals blue, 15-50mm long; fruit an achene **Clematis**
4. Leaflets mostly 3 or 5, margins usually lobed or with a few large teeth; bundle scars 3; fruit an asymmetrical samara, usually paired **Acer**
5. Leaves simple
6. Leaves toothed
7. Leaves conspicuously hairy on both sides, usually more so beneath
8. Hairs of leaves simple **Philadephbus**
9. Hairs of leaves stellate **Viburnum**
10. Leaves glabrous or with a few scattered hairs especially on margins
11. Leaves mostly over 4cm long, acuminate at tip **Viburnum**
12. Leaves mostly less than 4cm long, not acuminate at tip, rarely short cuspidate
13. Branchlets glabrous or glabrate; plants often upright; flowers axillary **Rhamnus**
14. Plants shrubs to 3dm high; sepals blue, 15mm long; fruit orange or reddish-orange with several seeds **Lonicera**

**Series III-B, Woody plants, leaves alternate, compound**

1. Leaflets with spiny-toothed margins, the spines often about 1mm or more long **Mahonia**
2. Leaflets lacking spiny-toothed margins
3. Leaflets divided into many mostly linear segments **Artemisia**
4. Leaves not as above, often with rather broad leaflets
5. Plants with spines or prickles, these sometimes small near base of buds
6. Leaflets lobed or toothed **Rose Group** p. 26
7. Leaflets entire (rarely minutely glandular-toothed) **Pea Group** p. 25
8. Plants lacking spines or prickles
9. Leaflets mostly 3-7
10. Plants trees with 5 or rarely 7 leaflets; fruit a nut **Carya**
11. Plants shrubs with 3-7 leaflets; fruit a drupe or achene
12. Leaflets 3-7, toothed or lobed or with wavy margins; fruit a drupe
13. Leaflets 3 or rarely 5, the lateral ones mostly over 3.5cm long and 2.5cm wide; mature fruits whitish, glabrous; Poison Ivy **Toxicodendron**
14. Leaflets more than 5, or if 3 or 5, the lateral ones mostly less than 3cm long and 2.5cm wide; mature fruits usually red or orange and hairy **Rhus**
15. Leaflets mostly 5, entire; fruit an achene **Dasiphora**
16. Leaflets mostly 9 or more
17. Leaflets entire, midrib usually prolonged to a short bristle **Amorpha**
18. Leaflets toothed, midrib usually not prolonged
19. Plants trees; leaflets minutely glandular-toothed **Gleditsia**
20. Plants shrubs; leaflets more conspicuously toothed
21. Stems somewhat soft, pith 1/2 to 2/3 their diameter; fruit covered with reddish or stellate hairs; leaflets somewhat glaucous beneath; stamens 10 or fewer **Rhus**
22. Stems hard, pith less than 1/3 their diameter; fruit not covered with reddish or stellate hairs; leaflets usually not glaucous beneath; stamens mostly (8)15-20(40)
23. Plants large shrubs; young twigs pubescent becoming glabrous; petals 5; fruit pomaceous **Sorbus**
24. Plants large trees; young twigs glandular-pubescent; petals none; fruit a nut **Juglans**

**Series III-C, Woody plants, spiny, leaves alternate, simple**

1. Leaves entire
2. Leaves silvery or gray on 1 or both sides from scales or scale-like hairs
3. Leaves about the same color on both sides; shrubs mostly less than 1m high **Atriplex**
4. Leaves greenish above, silvery beneath; trees mostly well over 1m high **Elaeagnus**
5. Leaves not silvery or gray from scales, sometimes so from definite hairs
6. Leaves prominently pinnately veined, lighter beneath than above, hairy **Ceanothus**
7. Leaves obscurely veined, about the same color on both sides or lighter beneath, hairy or glabrous
8. Leaves much lighter beneath than on upper side, oblongate to obovate; spines present at base of branches or buds **Berberis**
9. Leaves about the same color on both sides, linear to obovate; spines variable
10. Bundle scars prominent, usually 3; leaves mostly elliptic to obovate; fruit a red berry **Lycium**
11. Bundle scars usually obscure; leaves linear to obovate; fruit a utricle
12. Leaves linear, less than 4mm wide, subterete, fleshy **Sarcobatus**
13. Leaves flattened or wider, fleshy or not **Atriplex**

1. Leaves toothed or lobed
2. Leaves 3-5 palmately lobed; venation palmate **Ribes**
3. Leaves usually not lobed (rarely pinnately lobed); venation pinnate
4. Leaves often doubly toothed or lobed, at least near tip; styles 2-5; spines usually not bearing leaves, buds, or flowers; fruit a pome **Crataegus**
5. Leaves simply toothed; styles solitary; spines usually bearing leaves, buds, or flowers; fruit a drupe **Prunus**

**Series III-D, Woody plants, leaves alternate, simple, leaves or their segments very narrow**

1. Leaves, or many of them, with 3 lobes at tip, silvery or gray hairy on both sides **Artemisia**
2. Leaves not as above
2. Crushed leaves with a sage odor; mostly wet areas; willows Salix
3. Leaves usually entire or lobed (or margins scabrous or ciliate); flowers terminal or axillary
4. Leaves and stems with long spreading hairs along with short, usually stellate hairs; flowers axillary Krascheninnikovia
5. Leaves gray or silverly on both sides from minute scales Atriplex
6. Leaves not gray or silvery, or if so, then from distinct hairs
   6. Leaves somewhat green above, silvery or gray beneath, not filiform; venation on upper leaf surface obscure; flowers pedicelled; ovary superior Erigonum
7. Leaves equally green, silvery, or gray on both sides, or venation on upper leaf surface prominent, or both, sometimes filiform; flowers sessile; ovary inferior Sunflower Group p. 28

Series III-E, woody plants, leaves alternate, simple, entire

1. Leaf margins usually rolled, hairy beneath
2. Stems and leaves with many distinct stellate hairs Krascheninnikovia
3. Stems and leaves without stellate hairs, the hairs often dense and tangled especially on underside of leaves
4. Hairs on underside of leaves white; petioles lacking or nearly so Erigonum
5. Hairs on underside of leaves rusty; petioles 2-5mm long Ledum

1. Leaf margins usually flat, often not hairy beneath
4. Crushed leaves with a sage odor Artemisia
5. Crushed leaves lacking a sage odor
   5. Bud scales solitary; flowers unisexual, in catkins; mostly wet areas; willows Salix
6. Plants mostly woody near base only; stems and leaves covered with minute gray-mealy scales Atriplex
7. Plants not as above
8. Leaves with 3 prominent, somewhat parallel veins arising from nearly the same point near base of blade
9. Leaves sharper at tip; plains and foothills, rarely higher
10. Leaves white-tomentose beneath, less so and greenish above, mostly lanceolate to oblanceolate, rarely linear Erigonum
11. Leaf blades broadly elliptic to ovate, lighter and hairy on underside; stamens usually about 20; fruit a pome with usually 2 nutlets Cotoneaster
12. Leaves and/or twigs canescent or tomentose, or if not, the leaves 1-3mm wide; fruit an achene Sunflower Group p. 28
13. Leaves and twigs glabrous, the leaves 5mm or more wide; fruit a red berry Lycium
9. Leaves often obtuse or rounded at tip; often at higher elevations
10. Leaves either glandular-puberulent, or canescent or tomentose, about equally green (or silvery) on both sides Sunflower Group p. 28
11. Leaves not glandular-puberulent nor canescent or tomentose, or if so, distinctly lighter beneath
12. Leaves white-tomentose beneath, less so and greenish above; plains Erigonum
13. Leaves not as above; often in the hills
14. Plants with linear-lanceolate to elliptic leaves which are silver-scyal on both sides but sometimes more so beneath; calyx 4 parted; fruit fleshy or drupe-like, 1 seeded Elaeagnus
15. Plants not as above
16. Leaf blades mostly 3cm or less long; fruit a capsule or berry Blueberry Group p. 14
17. Leaf blades mostly well over 3cm long; fruit a drupe Frangula

Series III-F, woody plants, leaves alternate, simple, toothed or lobed

1. Crushed leaves with a sage odor; many leaves with 3 lobes or teeth at tip Artemisia
1. Crushed leaves lacking a sage odor; leaves lobed or not
2. Leaves with 3 prominent, somewhat parallel veins arising from nearly the same point near base, not lobed, longer than wide Ceanothus
2. Leaves not veined as above or else lobed or the blades as wide as or wider than long
3. Plants trees with whitish bark; petioles hairy; leaves usually double-toothed; branches usually as long as wide; flowers borne in catkins Betula
3. Plants not as above
4. Plants mostly of wet areas (rarely in upland forests); bud scales solitary; flowers unisexual, in catkins; willows Salix
4. Plants not as above
5. Plants upright shrubs 0.5-3m high; leaves finely toothed, the teeth terminated by, or reduced to, short bristles (not sessile glands) which may be gland-tipped; leaves lighter beneath than above; young twigs glandular-pubescent Blueberry Group p. 14
5. Plants not as above
6. Plants often in moist areas; twigs usually roughened with blister-like resinous bumps; leaves often glandular-dotted; flowers in catkins Betula
6. Plants not as above
7. Leaf blades, or many of them, asymmetrical at base, 1 side extending lower than the other; twigs of year often hairy; petioles usually hairy; fruit a samara or drupe
8. Leaves usually with 9 or more pair of prominent lateral veins; flowers bisexual; fruit a samara Ulmus
8. Leaves usually with less than 5 pair of prominent lateral veins; some or all flowers unisexual; fruit a drupe Celtis
9. Leaves cordate or subcordate at base, usually acute at tip, definitely longer than wide, not lobed but often doubly toothed; twigs often hairy; fruit a nut or nutlet
10. Plants usually tree-like; fruit a nutlet 6mm or less long, enclosed in a bladdery involucrum; pistillate inflorescence elongate, bearing several to many nutlets Ostrea
11. Plants usually shrub-like; fruit a nut usually over 6mm long, enclosed in a tightly appressed, beaked involucre; pistillate inflorescence bearing usually only 1 or 2 nuts Corylus
9. Leaves usually not as above; twigs and fruits various
10. Trees bearing catkins; buds often sticky with resin; leaves elliptic or lanceolate to deltoid or suborbicular, not lobed unless white or gray tomentose beneath; aspen and cottonwoods Populus
11. Trees or shrubs with or without catkins; buds usually not sticky; leaves never deltoid unless lobed
12. Leaves 5cm or more long, pinnately lobed or parted, not toothed or with broad rounded teeth; fruit an acorn; oaks Quercus
12. Leaves often shorter, mostly palmately lobed or not lobed (rarely with a single pair of basal lobes), toothed or not; fruit not an acorn
13. Petals none; fruit a samara; leaves elliptic to lanceolate, doubly toothed; trees Ulmus
14. Stamens usually 5; ovary 1 celled; ovules or seeds several to many; fruit a berry; leaves usually 3-5 palmately lobed
15. Leaves either not 5 or plants without above combination of characteristics
16. Leaves sessile or nearly so, linear to lanceolate, less than 8mm wide, mostly serrulate, usually hairy; flowers solitary, axillary; ovary inferior; plants of rather dry, open areas Oenothera
17. Leaves and flowers not as above
18. Plants with leaf blades mostly ovate to obovate, some usually over 4cm long, toothed to near base, not lobed; flowers in axillary inflorescences; fruit usually a drupe or capsule; spur shoots never present; bud scales hairy
19. Leaves with 3 prominent, longitudinally running veins arising from nearly the same point at base of leaf blade (palmately veined), sometimes with lateral veins also; fruit a capsule Ceanothus
20. Leaves with a prominent midrib and the other prominent veins lateral ascending from all along midrib (palmately veined); fruit a drupe Rhamnus
21. Plants not as above
22. Plants with leaves shorter, mostly palmately lobed or not lobed (rarely with a single pair of basal lobes), toothed or not; fruit a berry
23. Plants introduced trees; some leaves often lobed and cordate or subcordate at base, crenate-serrate; flowers unisexual in catkins or a dense spike Morus
24. Plants not as above Rose Group p. 26

GROUP IV, calyx or corolla or both lacking
1. Leaves compound
2. Sepals blue, 15-50mm long; shrubs to 3dm high Clematis
3. Sepals not blue, less than 15mm long; trees or shrubs mostly over 3dm high
4. Leaves alternate
5. Leaflets 5 or rarely 7 Carya
6. Leaflets 11 or more Juglans
7. Leaves opposite
8. Leaflets mostly 3 or 5; bundle scars 3 Acer
9. Leaflets mostly 5 or 7; bundle scars more than 3 Fraxinus
10. Leaves simple
11. Middle and lower leaves opposite or whorled Series IV-B
12. Middle and lower leaves alternate or leaves all basal or nearly so Series IV-C

Series IV-A, calyx or corolla or both lacking, woody trees or shrubs
13. Leaves palmately compound with 5-7 leaflets Parthenocissus
14. Plants not as above (herbaceous and some other vines run here)
15. Plants usually with milk juice; inflorescence appearing like a flower, consisting of a cup-shaped involucre with 4 teeth or lobes, each involucre subtending a stalked pistil and several to many stamens (see figure under species key); involucres solitary, or clustered and axillary, or in cymes Euphorbia
16. Plants not as above
17. Middle and lower leaves alternate or leaves all basal or nearly so
18. Plants not as above
19. Plants as above
20. Plants not as above

Series IV, calyx or corolla or both lacking
1. Flowers not in heads or lacking the other characteristics
2. Plants woody trees or shrubs Series IV-A
3. Plants herbs, or semi-shrubs woody only at base, or vines
4. Plants woody vines with alternate, either palmately compound or cordate simple leaves and tendrils
5. Leaves simple, palmately lobed Vitis
6. Leaves palmately compound with 5-7 leaflets Parthenocissus
7. Plants not as above (herbaceous and some other vines run here)
8. Plants usually with milk juice; inflorescence appearing like a flower, consisting of a cup-shaped involucre with 4 teeth or lobes, each involucre subtending a stalked pistil and several to many stamens (see figure under species key); involucres solitary, or clustered and axillary, or in cymes Euphorbia
9. Plants not as above
10. Middle and lower leaves opposite or rarely subopposite
11. Perianth 4 lobed; stamens usually 8 Shepherdia
12. Perianth lobes and stamens mostly 5 Atriplex
13. Leaves and branches alternate
14. Leaves pinnately lobed; staminate flowers in catkins, pistillate solitary or few in a cluster Quercus
15. Leaves not pinnately lobed (rarely some appearing so); flowers various
16. Flowers in catkins or dense spikes
17. Branches spine-tipped; leaves less than 4mm wide, fleshy Sarcobatus
18. Branches not spine-tipped; leaves mostly over 4mm wide, not fleshy
19. Ovary becoming a many-seeded capsule; seeds bearing long hairs
20. Bud scale 1; bracts subtending flowers usually entire; catkins mostly erect to spreading; stamens 2-8; trees or shrubs Salix
21. Bud scales more than 1; bracts subtending flowers usually fringed (often deciduous); catkins mostly pendulous; stamens 6 to many Populus
22. Ovary becoming a 1 seeded achene (sometimes aggregated), nut, nutlet, or samara; seeds without hairs
23. Fruit an aggregation of fleshy achenes; some leaves often lobed Morus
24. Fruit a nut, nutlet, or samara; leaves not lobed
25. Leaves usually cordate or subcordate at base; fruit a nut or nutlet enclosed by an involucre; staminate flowers lacking a calyx
26. Plants usually tree-like; fruit a nutlet 6mm or less long, enclosed in a bladdery involucre; pistillate inflorescence elongate, bearing several to many nutlets Ostrya
27. Plants usually shrub-like; fruit a nut usually over 6mm long, enclosed in a tightly appressed, beaked involucre; pistillate inflorescence bearing usually only 1 or 2 nuts Corylus
28. Leaves cordate or not at base; fruit a samara, not enclosed by an involucre; staminate flowers with a 2-4 parted calyx Betula
29. Flowers not in catkins or dense spikes
30. Leaf blades, or some of them, very asymmetrical at base, 1 side extending lower than the other, toothed; fruit a drupe or a samara which is winged all around
31. Leaves usually with 9 or more pair of prominent lateral veins; flowers bisexual; fruit a samara Ulmus
32. Leaves usually with less than 8 pair of prominent lateral veins; some or all flowers unisexual; fruit a drupe Celtis
33. Leaf blades symmetrical at base or nearly so, toothed or not; fruit various
34. Fruit a nut enclosed by a beaked involucre; leaves cordate or subcordate at base, serrate Corylus
35. Fruit and leaves not as above
1. Plants not as above
2. Plants dioecious annuals; leaves palmately compound

Salicornia

1. Plants succulent annuals, stems jointed, branches opposite or whorled; leaves scale-like, pairs connate; flowers sunken in depressions of spikes

2. Plants not as above

Series IV-B, calyx or corolla or both lacking, lower leaves opposite or whorled

1. Plants succulent annuals, stems jointed, branches opposite or whorled; leaves scale-like, pairs connate; flowers sunken in depressions of spikes

2. Plants not as above

3. Leaves entire, often silvery or gray

4. Flowers sessile in leaf axils

5. Plants dioecious, either vines with 3-5 lobed leaves, or annuals with palmately compound leaves

6. Leaves palmately compound; stems erect; perennial

7. Leaf margins mostly entire or wavy, rarely lobed or divided; plants lacking stinging hairs

8. Flowers unisexual

9. Flowers not as above, annual or perennial

10. Fruit a samara which is winged all around; some leaves doubly toothed, sometimes obscurely so

11. Fruit not a samara; leaves not doubly toothed

12. Stamens many; style in fruit elongate, twisted, and plumose; leaves toothed at least toward tip

13. Stamens usually about 5 or fewer; style not as above; leaves various

14. Leaves toothed, green

15. Leaves entire, often silvery or gray

16. Sepals and stamens 4; ovary sometimes appearing inferior; leaves silvery-scurfy at least beneath; flowers mostly bisexual

Elaeagnus

17. Sepals and stamens only rarely 4; ovary superior; leaves various; flowers sometimes unisexual

18. Flowers in involucres; sepal petal-like; leaves hairy, hairs not stellate

19. Flowers not in involucres (pistillate sometimes each subtended by 2 at least partly united bracts); sepals not petal-like or lacking; leaves usually scurfy or glabrous or else hairy often with some stellate hairs

20. Leaves flattened or wider, fleshy or not; branches spine-tipped or not

21. Leaves densely stellate-hairy, linear or slightly wider with revolute margins

22. Leaves densely stellate-hairy, linear or slightly wider with revolute margins

23. Leaves not as above

24. Ovary superior; flowers mostly bisexual

25. Ovary inferior; flowers mostly unisexual

26. Ovary partly or wholly inferior; some flowers bisexual or pistillate

27. Plants either with leaves all basal or nearly so with ovate, cordate, or reniform blades, or, stamens 3-10

28. Plants not as above

29. Leaves flattened or wider, fleshy or not; branches spine-tipped or not

30. Leaves densely stellate-hairy, linear or slightly wider with revolute margins

31. Leaves not as above

32. Flowers sessile in leaf axils

33. Flowers not in leaf axils, or if so, distinctly pedicelled

34. Ovary superior or flowers all staminate

35. Ovary partly or wholly inferior; some flowers bisexual or pistillate

36. Plant not as above

37. Flowers not as above

38. Flowers sessile or nearly so

39. Flowers sessile or nearly so

40. Flowers not as above

41. Flowers sessile or nearly so

42. Flowers not as above

43. Flowers sessile or nearly so

44. Flowers not as above

45. Flowers sessile or nearly so

46. Flowers not as above

47. Flowers sessile or nearly so

48. Flowers sessile or nearly so

49. Flowers sessile or nearly so

50. Flowers sessile or nearly so

51. Flowers sessile or nearly so

52. Flowers sessile or nearly so

53. Flowers sessile or nearly so

54. Flowers sessile or nearly so

55. Flowers sessile or nearly so

56. Flowers sessile or nearly so

57. Flowers sessile or nearly so

58. Flowers sessile or nearly so

59. Flowers sessile or nearly so

60. Flowers sessile or nearly so

61. Flowers sessile or nearly so

62. Flowers sessile or nearly so

63. Flowers sessile or nearly so

64. Flowers sessile or nearly so

65. Flowers sessile or nearly so

66. Flowers sessile or nearly so

67. Flowers sessile or nearly so

68. Flowers sessile or nearly so

69. Flowers sessile or nearly so

70. Flowers sessile or nearly so

71. Flowers sessile or nearly so

72. Flowers sessile or nearly so

73. Flowers sessile or nearly so

74. Flowers sessile or nearly so

75. Flowers sessile or nearly so

76. Flowers sessile or nearly so

77. Flowers sessile or nearly so

78. Flowers sessile or nearly so

79. Flowers sessile or nearly so

80. Flowers sessile or nearly so

81. Flowers sessile or nearly so

82. Flowers sessile or nearly so

83. Flowers sessile or nearly so

84. Flowers sessile or nearly so

85. Flowers sessile or nearly so

86. Flowers sessile or nearly so

87. Flowers sessile or nearly so

88. Flowers sessile or nearly so

89. Flowers sessile or nearly so

90. Flowers sessile or nearly so

91. Flowers sessile or nearly so

92. Flowers sessile or nearly so

93. Flowers sessile or nearly so

94. Flowers sessile or nearly so

95. Flowers sessile or nearly so

96. Flowers sessile or nearly so

97. Flowers sessile or nearly so

98. Flowers sessile or nearly so

99. Flowers sessile or nearly so

100. Flowers sessile or nearly so

101. Flowers sessile or nearly so

102. Flowers sessile or nearly so

103. Flowers sessile or nearly so

104. Flowers sessile or nearly so

105. Flowers sessile or nearly so

106. Flowers sessile or nearly so

107. Flowers sessile or nearly so

108. Flowers sessile or nearly so

109. Flowers sessile or nearly so

110. Flowers sessile or nearly so

111. Flowers sessile or nearly so

112. Flowers sessile or nearly so

113. Flowers sessile or nearly so

114. Flowers sessile or nearly so

115. Flowers sessile or nearly so

116. Flowers sessile or nearly so

117. Flowers sessile or nearly so

118. Flowers sessile or nearly so

119. Flowers sessile or nearly so

120. Flowers sessile or nearly so

121. Flowers sessile or nearly so

122. Flowers sessile or nearly so

123. Flowers sessile or nearly so

124. Flowers sessile or nearly so

125. Flowers sessile or nearly so

126. Flowers sessile or nearly so

127. Flowers sessile or nearly so

128. Flowers sessile or nearly so

129. Flowers sessile or nearly so

130. Flowers sessile or nearly so

131. Flowers sessile or nearly so

132. Flowers sessile or nearly so

133. Flowers sessile or nearly so

134. Flowers sessile or nearly so

135. Flowers sessile or nearly so

136. Flowers sessile or nearly so

137. Flowers sessile or nearly so

138. Flowers sessile or nearly so

139. Flowers sessile or nearly so

140. Flowers sessile or nearly so

141. Flowers sessile or nearly so

142. Flowers sessile or nearly so

143. Flowers sessile or nearly so

144. Flowers sessile or nearly so

145. Flowers sessile or nearly so

146. Flowers sessile or nearly so

147. Flowers sessile or nearly so

148. Flowers sessile or nearly so

149. Flowers sessile or nearly so

150. Flowers sessile or nearly so

151. Flowers sessile or nearly so

152. Flowers sessile or nearly so

153. Flowers sessile or nearly so

154. Flowers sessile or nearly so

155. Flowers sessile or nearly so

156. Flowers sessile or nearly so

157. Flowers sessile or nearly so

158. Flowers sessile or nearly so

159. Flowers sessile or nearly so

160. Flowers sessile or nearly so

161. Flowers sessile or nearly so

162. Flowers sessile or nearly so

163. Flowers sessile or nearly so

164. Flowers sessile or nearly so

165. Flowers sessile or nearly so

166. Flowers sessile or nearly so

167. Flowers sessile or nearly so

168. Flowers sessile or nearly so

169. Flowers sessile or nearly so

170. Flowers sessile or nearly so

171. Flowers sessile or nearly so

172. Flowers sessile or nearly so

173. Flowers sessile or nearly so

174. Flowers sessile or nearly so

175. Flowers sessile or nearly so

176. Flowers sessile or nearly so

177. Flowers sessile or nearly so

178. Flowers sessile or nearly so

179. Flowers sessile or nearly so

180. Flowers sessile or nearly so

181. Flowers sessile or nearly so

182. Flowers sessile or nearly so

183. Flowers sessile or nearly so

184. Flowers sessile or nearly so

185. Flowers sessile or nearly so

186. Flowers sessile or nearly so

187. Flowers sessile or nearly so

188. Flowers sessile or nearly so

189. Flowers sessile or nearly so

190. Flowers sessile or nearly so

191. Flowers sessile or nearly so

192. Flowers sessile or nearly so

193. Flowers sessile or nearly so

194. Flowers sessile or nearly so

195. Flowers sessile or nearly so

196. Flowers sessile or nearly so

197. Flowers sessile or nearly so

198. Flowers sessile or nearly so

199. Flowers sessile or nearly so

200. Flowers sessile or nearly so
<table>
<thead>
<tr>
<th>Step</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>11.</td>
<td>Stamens 10</td>
</tr>
<tr>
<td>12.</td>
<td>Leaf blades of at least the lower leaves suborbicular in outline <em>Saxifraga</em></td>
</tr>
<tr>
<td>13.</td>
<td>Leaf blades mostly obviously longer than wide <em>Micranthes</em></td>
</tr>
<tr>
<td>14.</td>
<td>Leaves simple <em>Mitella</em></td>
</tr>
<tr>
<td>16.</td>
<td>Styles and stigmas solitary; calyx 4 lobed or parted</td>
</tr>
<tr>
<td>18.</td>
<td>Styles of stigmas 2 or more (style rarely 1 if stellate-hairy perennial)</td>
</tr>
<tr>
<td>19.</td>
<td>Leaves subtended by small involucres of united bracts; calyx only rarely in 4's</td>
</tr>
<tr>
<td>21.</td>
<td>Perianth (rarely lacking) and usually the bracts scarious at least on margins, often with spinulose tips; annuals; leaves not gray-mealy nor succulent, some usually over 5mm wide, not stellate-hairy <em>Amaranthus</em></td>
</tr>
<tr>
<td>22.</td>
<td>Plants perennial, either stellate-hairy or strigose; flowers bisexual; sepals 3 or 5; style 1, or none with 3 plumeose stigmas; leaves never fleshy</td>
</tr>
<tr>
<td>23.</td>
<td>Plants stellate-hairy; petals 5, yellow, conspicuous but deciduous <em>Crocanthemum</em></td>
</tr>
<tr>
<td>25.</td>
<td>Plants without the above combination of characteristics <em>Goosefoot Group</em> p. 17</td>
</tr>
<tr>
<td>26.</td>
<td>Weekly leaves in outline <em>Saxifraga</em></td>
</tr>
<tr>
<td>27.</td>
<td>Leaflets more than 5, or if 3 or 5, the lateral ones mostly less than 3cm long</td>
</tr>
<tr>
<td>28.</td>
<td>Stamens 8; not spiny</td>
</tr>
<tr>
<td>29.</td>
<td>Stamens 10 or more, or if fewer, plants spiny <em>Rhamnus</em></td>
</tr>
<tr>
<td>30.</td>
<td>Plants shrubby; leaves mostly oblanceolate to obovate; stamens 6 <em>Berberis</em></td>
</tr>
</tbody>
</table>

**Series V**

1.  | Plants woody trees, shrubs, or vines, woody throughout *Series V-A*  |
| 2.  | Plants herbaceous or sometimes woody only at base  |
| 3.  | Corolla irregular (rarely with a single white to ochroleucous or purple to blue petal) *Series V-B*  |
| 4.  | Corolla regular or nearly so  |
| 5.  | Plants dioecious, stellate-hairy annuals; leaves alternate, simple, entire *Croton*  |
| 6.  | Plants not as above  |
| 7.  | Stamens more than 10 (rarely deciduous but then with more than 10 pistils) *Series V-C*  |
| 8.  | Stamens 10 or fewer or flowers all pistillate *Series V-D*  |

**Series V-A,** calyx and corolla present, petals separate, woody plants

1.  | Leaves compound  |
| 2.  | Leaves opposite  |
| 3.  | Plants vines (rarely shrubby and less than 3dm high) *Clematis*  |
| 4.  | Plants trees over 5dm high (unless seedlings) *Acer*  |
| 5.  | Plants with tendrils *Parthenocissus*  |
| 6.  | Plants not with tendrils  |
| 7.  | Leaflets with spine-tipped teeth, the spines mostly over 1mm long *Mahonia*  |
| 8.  | Leaflets without spine-tipped teeth  |
| 9.  | Stamens more than 10 *Rose Group* p. 26  |
| 10. | Stamens 10 or fewer or flowers all pistillate  |
| 11. | Leaflets mostly 5 or more, entire or minutely glandular-toothed *Poa Group* p. 25  |
| 12. | Leaflets 3, or if more, then conspicuously toothed  |
| 13. | Leaflets 3 or rarely 5, the lateral ones mostly over 3.5cm long and 2.5cm wide; mature fruits whitish, glabrous; Poison Ivy *Phemeranthus*  |
| 14. | Leaves more than 5, or if 3 or 5, the lateral ones mostly less than 3cm long and 2.5cm wide; mature fruits usually red or orange and hairy *Rhus*  |

**Series V-B,** calyx and corolla present, petals separate, woody plants

1.  | Leaves simple  |
| 2.  | Leaves opposite or subopposite  |
| 3.  | Plants shrubby with scale-like leaves mostly about 1mm long, appearing like a juniper *Tamarix*  |
| 4.  | Plants not as above  |
| 5.  | Plants vines with alternate, cordate leaves and tendrils *Vitis*  |
| 6.  | Plants not as above  |
| 7.  | Leaves opposite or subopposite  |
| 8.  | Stamens 10 or more *Philadelphus*  |
| 9.  | Stamens less than 10  |
| 10. | Leaves entire; year-old twigs red; flowers in a terminal inflorescence *Cornus*  |
| 11. | Leaves toothed; year-old twigs not red; flowers on spur shoots *Rhamnus*  |
| 12. | Leaves alternate (rarely clustered but the branches alternate)  |
| 13. | Stamens 8 or more (rarely as few as 5 if underside of leaves are densely rustily-lanate)  |
| 14. | Leaves simple, entire; never mat forming  |
| 15. | Ovary superior; stamens 5-10; fruit a capsule *Ledum*  |
| 16. | Ovary inferior; stamens usually about 12; fruit a pome with usually 2 nutlets *Cotoneaster*  |
| 17. | Leaves compound, lobed, or toothed, or if entire, then plants forming mats  |
| 18. | Stamens 10 or more, or if fewer, plants spiny *Rose Group* p. 26  |
| 19. | Stamens 8; not spiny *Oenothera*  |
| 20. | Stamens 7 or fewer  |
| 21. | Stamens as many as petals and opposite them  |
| 22. | Plants spiny; leaves mostly oblanceolate to obovate; stamens 6 *Berberis*  |
1. Plants not spiny, or if so, leaves narrowly elliptic to orbicular; stamens 4 or 5
2. Leaves with 3 prominent, longitudinally running veins arising from nearly the same point at base of leaf blade (palmately veined), sometimes with lateral veins also; fruit a capsule Ceanothus
3. Leaves with a prominent midrib and the other prominent veins lateral ascending from all along midrib (pinnately veined); fruit a drupe
   4. Leaves toothed or opposite or subopposite or both Rhamnus
   5. Leaves entire or essentially so, alternate Frangula
18. Sepals not the same number as petals, or if so, alternate with them
22. Stems with thorns, spines, or prickers Ribes
22. Stems without thorns, spines, or prickers
23. Leaf blades mostly 3 or 5 lobed or else cordate-orbicular; fruit a berry Ribes
25. Leaf blades not lobed, usually longer than wide so not cordate-orbicular; fruit a capsule Celastris

Series V-B, calyx and corolla present, petals separate, corolla irregular

1. Ovary inferior, sometimes only partly so
2. Petals 4; stamens 4 or 8 Evening Primrose Group p. 17
3. Petals 5; stamens 5 Heuchera
1. Ovary superior
3. Stamens more than 10; pistils 3-5 or rarely 1 Buttercup Group p. 15
3. Stamens 10 or fewer; pistil 1
  4. Sepals 2-4
5. Leaves finely dissected, alternate or basal Corydalis
5. Leaves entire, opposite Elatine
4. Sepals 5
6. Stamens 5; leaves simple (rarely palmately cleft to base and stamens with broad connectives exceeding anthers in length)
7. Flowers solitary on each peduncle Viola
7. Flowers in racemes, spikes, or panicles Saxifrage Group p. 27
6. Stamens 9 or 10, or if 5, the leaves compound Pea Group p. 25

Series V-C, calyx and corolla present, petals separate, corolla regular, stamens more than 10

1. Pistils more than 1, simple with 1 carpel
2. Flowers hypogynous or nearly so, sepals usually separate; leaves lacking stipules Buttercup Group p. 15
2. Flowers usually obviously perigonous or at least sepals united well up from base; leaves often with stipules Rose Group p. 26
1. Pistils solitary, usually of 2 or more united carpels which may rarely separate in fruit
3. Ovary superior
4. Flowers hypogynous
5. Leaves opposite Hypericum
5. Leaves alternate or basal (rarely whorled)
6. Stamens all united by filaments into a tube which surrounds the style or styles Mallow Group p. 21
6. Stamens not all united as above
7. Leaves simple, basal (rarely a few linear ones on stem); sepals 2-9
8. Leaves lobed, 8cm or more wide Saxiniaria
8. Leaves entire, less than 1cm wide Lewisia
9. Leaves either on stem or compound or both; sepals mostly 3-5
9. Leaves simple and entire
10. Petals 5, yellow, 7-12mm long Crocanthemum
10. Petals 3, red or red-purple, 2mm or less long Lechea
9. Leaves compound, at least below, or simple and lobed
11. Flowers mostly solitary; petals 3-5cm long Argemone
11. Flowers in racemes; petals 1cm or less long
12. Petals 4; annual Polanisia
12. Petals 5 or more; perennial Actaea
4. Flowers perigonous
13. Filaments united into a tube which surrounds the style or styles Mallow Group p. 21
13. Filaments not as above
14. Plants with simple leaves which are entire or nearly so; pistils solitary; petals purple or reddish-purple Lythrum
14. Plants not as above Rose Group p. 26
3. Ovary inferior
15. Stems thick, green, succulent, and spiny; leaves minute or lacking Cacti p. 15
15. Stems not as above; leaves well developed Mentzelia

Series V-D, calyx and corolla present, petals separate, corolla regular, stamens 10 or fewer

1. Flowers epigynous, ovary partly or completely inferior
2. Flowers 2- or 4-merous
3. Flowers subtended by 4 white, petaloid bracts mostly 1-2cm long; fruit a red drupe Cornus
3. Flowers not subtended by white, petaloid bracts; fruit a capsule or nutlet Evening Primrose Group p. 17
2. Flowers 5-merous
4. Inflorescence an umbel or sometimes capitulate; styles 2 or 5
5. Styles and carpels 5; fruit a purple berry Aralia
5. Styles and carpels 2; fruit a schizocarp Carrot Group p. 15
4. Inflorescence not umbellate nor capitulate; styles 0-4
6. Plants perennial; leaves often all or mostly basal
7. Stamens 5 or 10, staminodia none; stigmas mostly 2 or 3 Saxifrage Group p. 27
7. Stamens 5, alternating with staminodia; stigmas 4 Parnassia
6. Plants annual; leaves mostly along stem Mentzelia

1. Flowers hypogynous or perigonous, ovary superior or rarely lacking
8. Sepals 3; flowers sometimes unisexual; stipules of at least some leaves completely sheathing stem, rarely deciduous; perennial or rarely annual; leaves simple, alternate Rumex
8. Sepals not 3 or plants without the other characteristics
9. Flowers perigonous
10. Leaves compound (rarely simple); pistils 2 or more Rose Group p. 26
10. Leaves simple (rarely compound); pistils solitary (carpels sometimes partly separate)
11. Plants scapose or sometimes with 1 to several leaves along scape, or if not, with 2 or more styles; petals often white
1. Flowers not in a head, or if so, lacking the other characteristics stamens united by their anthers (rarely free); flowers sometimes 1. Flowers in dense heads subtended by an involucre, the head usually appearing like a single flower (rarely 1 flower per head). 2. Stamens mostly 5, usually united by the anthers; corolla 5 or rarely 4 lobed; leaves opposite or not. 2. Stamens 4, free; corolla 4 lobed; leaves opposite 3. Plants woody trees, shrubs, or vines 4. Plants vines with tendrils 5. Leaves simple, palmately lobed 5. Leaves palmately compound with 5-7 leaflets 6. Leaves not vines with tendrils 6. Leaves palmatifid with mostly 3-5 linear, spinulose-tipped segments, also with axillary clusters of often simple linear leaves 7. Leaves compound 8. Leaves alternate; leaflets 5cm or less long, entire or nearly so 9. Flowers hypogynous 10. Pistils more than 5 11. Plants not vines with tendrils 12. Plants vines with tendrils 13. Petals usually 4; fibrous-rooted annuals; stamens 4 14. Petals 1-5 or flowers all staminate 15. Sepals usually 2 or 3 16. Petals as many as sepals, flowers usually solitary in leaf axils 17. Sepals separate; petals not divided 18. Petals 4 or 5 19. Lower leaves palmately compound with 3-7 leaflets; ovary 1 celled 20. Stamens 6; plants glabrous or sparsely pilose 21. Leaves alternate or all basal 22. Leaves not as above 23. Sepals separate; petals not divided 24. Leaves 5 or flowers all staminate 25. Plants saprophytic, red or pink to white or yellowish, not green 26. Leaves opposite Chickweed Group p.16 27. Petals 4, color various; fruit a siliqua or silicle 28. Leaves fleshy or not; pistils rarely as above; (or flowers all staminate); flower color various 29. Flowers all staminate or all pistillate 30. Plants saprophytic, red or pink to white or yellowish, not green 31. Leaves alternate, fleshy 32. Petals yellow, occasionally drying pink; most leaves basal along the creeping stems or on sterile shoots 33. Leaves opposite or whorled, not fleshy 34. Placentation not free 35. Leaves opposite or whorled 36. Styles 3, or if 4 or 5, then with 10 or more fertile stamens 37. Leaves alternate or basal Saxifrage Group p. 27 38. Leaves with sessile yellowish glands; placentation parietal; styles 3 Hypericum 39. Styles 1 Blueberry Group p. 14 40. Filaments usually united at least at base, sometimes slightly so; leaves linear or nearly so (rarely narrowly elliptic or lanceolate); styles 5 Linum 41. Stamens 5, alternating with staminodia; stigmas 4 Parnassia

GROUP VI, calyx and corolla present, petals united

1. Flowers in dense heads subtended by an involucre, the head usually appearing like a single flower (rarely 1 flower per head); ovary inferior; stamens united by their anthers (rarely free); flowers sometimes unisexual or neutral 2. Stamens 4, free; corolla 4 lobed; leaves opposite; outer involucral bracts linear or nearly so and spine-tipped Dipsacus 3. Stamens mostly 5, usually united by the anthers; corolla 5 or rarely 4 lobed; leaves opposite or not; involucral bracts variable Sunflower Group p. 28

1. Flowers not in a head, or if so, lacking the other characteristics 2. Leaves simple, palmately lobed Vitis 3. Plants vines with tendrils 4. Plants not vines with tendrils 5. Leaves simple, palmately lobed Vitis 6. Leaves palmatifid with mostly 3-5 linear, spinulose-tipped segments, also with axillary clusters of often simple linear leaves Linanthus 7. Leaves not as above 8. Leaves opposite; leaflets mostly 4-9cm long, serrate Sambucus

GROUP VI, calyx and corolla present, petals united

1. Flowers in dense heads subtended by an involucre, the head usually appearing like a single flower (rarely 1 flower per head); ovary inferior; stamens united by their anthers (rarely free); flowers sometimes unisexual or neutral 2. Stamens 4, free; corolla 4 lobed; leaves opposite; outer involucral bracts linear or nearly so and spine-tipped Dipsacus 3. Stamens mostly 5, usually united by the anthers; corolla 5 or rarely 4 lobed; leaves opposite or not; involucral bracts variable Sunflower Group p. 28

1. Flowers not in a head, or if so, lacking the other characteristics 2. Leaves simple, palmately lobed Vitis 3. Plants vines with tendrils 4. Plants not vines with tendrils 5. Leaves simple, palmately lobed Vitis 6. Leaves palmatifid with mostly 3-5 linear, spinulose-tipped segments, also with axillary clusters of often simple linear leaves Linanthus 7. Leaves not as above 8. Leaves opposite; leaflets mostly 4-9cm long, serrate Sambucus
7. Leaves simple (rarely with a pair of nearly distinct lobes at base)
9. Stamens 8-10 **Blueberry Group** p. 14
9. Stamens 4 or 5
10. Leaves opposite; ovary inferior
   11. Leaf margins entire, rarely sinuate lobed, lacking sharp-pointed teeth; fruit more than 1 seeded
   12. Corolla regular or merely bulged on side near middle, 5-10mm long; fruit with 2 seeds or stones **Symphoricarpos**
   12. Corolla irregular, (8)10-30mm long; fruit with several seeds **Lonicera**
   11. Leaf margins mostly with sharp-pointed teeth or some 3 lobed; fruit 1 seeded **Viburnum**
10. Leaves usually alternate; ovary superior **Lycium**
3. Plants herbs, rarely woody at base, sometimes vine-like but then not woody
13. Plants parasitic or saprophytic, white, yellow, brown, pink, red, or purple, not green
14. Stamens 10 **Pterospora**
14. Stamens 4 or 5
15. Stamens 5; corolla regular **Cuscuta**
15. Stamens 4; corolla irregular **Orobanchce**
13. Plants not parasitic (rarely so but definitely green) nor saprophytic, mostly green
16. Stems thick, green, succulent, and spiny; leaves minute or lacking **Cacti** p. 15
16. Stems not as above; leaves usually well developed
17. Plants with all basal simple leaves (rarely with only 2-3 opposite or whorled linear leaves) and regular flowers with 2 sepals **Purslane Group** p. 26
17. Plants not as above
18. Plants with milky juice (rarely not); ovaries and styles 2, sharing a common stigma to which stamens are adnate; pollen of each anther chamber coalescent in a sac-like mass, the sacs in pairs joined by a slender connective; hood-like structures borne from base of each stamen which often bear a slender horn-like appendage within (see figure under species key) **Asclepias**
18. Plants not as above
19. Perianth subtended by 3 scarious bracts (mistaken for sepals), covered with dense woolly hairs; annual **Froelichia**
19. Perianth not as above; annual to perennial
20. Flowers all unisexual; ovary superior; stamens 10; leaves opposite, entire **Silene**
20. Flowers mostly bisexual, if unisexual, either with whorled or palmately lobed leaves or with 3 stamens and an inferior ovary
21. Stamens (or anthers) more numerous than corolla lobes (or calyx lobes if corolla lobes obscure) **Series VI-A**
21. Stamens not more numerous than corolla lobes or flowers all pistillate
22. Stamens usually as many as corolla lobes (1 rarely vestigial) and opposite them; placmentation free-central or basal with 1 locule; ovary not 4 lobed; corolla regular
23. Sepals 2 **Purslane Group** p. 26
23. Sepals mostly 4-7
24. Leaves all basal or nearly so (bracts sometimes subtend inflorescence)
   25. Corolla lobes mostly 6mm or more long, over twice as long as tube, sharply reflexed **Primula**
   25. Corolla lobes less than twice as long as tube, less than 6mm long, not sharply reflexed **Androsace**
24. Leaves, at least some, on flowering stems
26. Leaves mostly opposite (whorled); rhizomatous perennials **Lysimachia**
26. Leaves mostly alternate; annual **Anagallis**
22. Stamens alternate with corolla lobes (or opposite calyx lobes) or fewer; placmentation various; ovary 4 lobed or not; corolla regular or irregular
27. Ovary inferior **Series VI-B**
27. Ovary superior (rarely lacking)
   28. Corolla of 1 basal larger petal and 4 usually smaller petals alternating with stamens at tip of filament tube **Dalea**
   28. Corolla not as above
   29. Corolla irregular **Series VI-C**
   29. Corolla regular or nearly so
30. Anther bearing stamens 2-4 or rarely lacking, fewer than corolla lobes **Series VI-D**
30. Anther bearing stamens either as many as corolla lobes or else at least 5 **Series VI-E**
**Series VI-A, calyx and corolla present, petals united, stamens more than corolla lobes**

1. Flowers regular or nearly so
2. Leaves compound
   3. Leaflets 3, obcordate, entire **Oxalis**
   3. Leaflets 3 or more, shape various, toothed or lobed
4. Leaves basal and opposite **Adoxa**
4. Leaves alternate
   5. Petals yellow or white inside, sometimes purple outside or at base; annual **Hibiscus**
   5. Petals red or salmon; perennial **Sphaeralcea**
2. Leaves simple
6. Stamens more than 10, all united by filaments into a tube which surrounds the style or styles **Mallow Group** p. 21
6. Stamens 10 or fewer (rarely 12), free or rarely united at very base
7. Plants annual; sepals 2; ovary half inferior **Portulaca**
7. Plants not as above
   8. Leaves opposite; placmentation free-central **Chickweed Group** p. 16
   8. Leaves usually not opposite; placmentation not free-central
9. Pistils (carpels) mostly 5, separate or united at base
   10. Petals yellow, occasionally drying pink; most leaves basal along the creeping stems or on sterile shoots **Sedum**
   10. Petals greenish-white, pink, or purple; most leaves on flowering stems **Rhodiola**
9. Pistils solitary with fully united carpels **Blueberry Group** p. 14
1. Flowers irregular
11. Stamens more than 10 **Buttercup Group** p. 15
11. Stamens 10 or fewer
12. Anthers 10 or rarely 9 **Pea Group** p. 25
12. Anthers 4-8
13. Anthers 6; locule 1; leaves dissected **Corydalis**
13. Anthers 4 or (7)8; locules 2; leaves various
14. Anthers (7)8; filaments united; corolla usually 3 lobed **Polygala**
14. Anthers 4 (or apparently 8); filaments free; corolla usually (2)4 or 5 lobed **Figwort Group** p. 17
1. Leaves opposite or whorled
2. Leaves whorled at least in part *Galium*
3. Leaves opposite
4. Flowers mostly paired at tip of stem *Linnaea*
5. Flowers in a dense head surrounded by an involucre *Dipsacus*
6. Ovary present; leaves various
7. Ovary none

Series VI-B, calyx and corolla present, petals united, ovary inferior

1. Anther bearing stamens 5
2. Corolla yellow, orange, or red (rarely white)
3. Flowers very irregular; annual without basal leaves; calyx of 3 petaloid sepals, the middle one spurred *Impatiens*
4. Flowers slightly irregular; biennial with some basal leaves; calyx deeply 5 parted, not spurred *Verbascum*
5. Corolla usually blue, purple, or white
6. Corolla tube 7mm or less long; calyx 2
7. Corolla tube 8mm or more long; calyx 6-10mm long *Glandularia*
8. Corolla tube 7mm or less long; calyx 2-6mm long *Verbena*
9. Corolla tube 7mm or less long; calyx 2-6mm long *Glandularia*
10. Flowers in dense axillary clusters; stems square

Series VI-C, calyx and corolla present, petals united, ovary superior, corolla irregular

1. Anther bearing stamens 2-4
2. Stamens 3; flowers all stamine *Valeriana*
3. Stamens 2 or 4; flowers not all stamine
4. Stamens 3; flowers all stamine
5. Stamens 3; flowers all stamine
6. Stamens 3; flowers all stamine
7. Stamens 3; flowers all stamine
8. Stamens 3; flowers all stamine
9. Stamens 3; flowers all stamine
10. Stamens 3; flowers all stamine

Series VI-D, calyx and corolla present, petals united, ovary superior, corolla regular, anthers fewer than corolla lobes

1. Anther bearing stamens 4
2. Flowers either solitary in leaf axils, or primarily in a basal rosette on long pedicels, or if in a terminal inflorescence, with a bearded sterile filament (this rarely glabrous) *Figwort Group* p. 17
3. Flowers either densely clustered in leaf axils, or in a terminal inflorescence, usually sessile or nearly so, never with a bearded sterile filament
4. Flowers in loose terminal or axillary racemes or solitary in axils; stems round *Veronica*

Series VI-E, calyx and corolla present, petals united, ovary superior, corolla regular, anthers as many as corolla lobes or at least 5

1. Ovary none, the flowers all stamine; leaves whorled at least in part *Galium*
2. Ovary present; leaves various
3. Leaves mostly 25mm or less long, palmatifid, pinnatifid, or bipinnatifid with narrowly linear, spinulose-tipped segments *Phlox* Group p. 26
4. Leaves not as above
5. Ovaries 2 but with only a single enlarged stigma; juice milky; leaves opposite *Apocynum*
6. Ovaries solitary (sometimes deeply 4 lobed); juice not milky; leaves opposite or not
7. Ovary (or at least fruits except when only 1 or 2 nutlets develop) 4 lobed or prominently 4 grooved (rarely capped by an umbrella-like stigma)
8. Leaves usually alternate, at least in part, rarely opposite; stamens 5; stems round *Borage Group* p. 14
9. Leaves opposite; stamens 4; stems square *Mentha*
10. Ovary not 4 lobed or 4 grooved (sometimes 4 nerves)
11. Ovary 1 celled; placation parietal; leaves either compound with 3 broad leaflets, or, simple, opposite or whorled, and entire or nearly so
12. Leaves simple, opposite or whorled
13. Corolla 4 lobed, with 4 spurs at base of at least some flowers *Halenia*
14. Corolla 4 or 5 lobed, not spurred
15. Corolla lobes at least twice as long as tube
16. Corolla usually purple or blue, the lobes mostly 3-5cm long; style usually at least 8mm long; leaves opposite *Eustoma*
17. Corolla greenish to white or yellowish, the lobes mostly less than 2.5cm long; style much less than 8mm long; leaves whorled *Fraseria*
18. Corolla lobes rarely longer than tube
11. Corolla plicate at sinuses, the folds often extended into teeth or lobes; corolla lobes without fimbriae at base Gentiana
11. Corolla not plicate at sinuses, lacking teeth or lobes between the lobes; corolla lobes with fimbriae at base inside Gentianella
7. Leaves compound with 3 leaflets, alternate or basal Menyanthes
6. Ovary 2-10 celled, placenta various, or if 1 celled, the leaves not as above
12. Stamens 4 or fewer
13. Flowers sessile in a spike; corolla scarious; leaves mostly basal Plantago
13. Flowers pedicelled in a few-flowered cyme; corolla not scarious; many leaves alternate on stem Phacelia
12. Stamens 5 or rarely more
14. Branches of style 3 or stigma 3 lobed, sometimes obscurely so; locules usually 3 Phlox Group p. 26
14. Branches of style 2 or stigma 2 lobed (rarely with 2 styles), or unbranched and unlobed; locules 1-3
15. Ovary 1 celled with 2 parietal placenta which sometimes intrude and meet but do not join (rarely with 1 basal ovule); fruit a capsule
16. Flowers solitary on each peduncle in or opposite the leaf axils, rarely also a few in a lax, terminal inflorescence
17. Calyx lacking auricles at sinuses Ellisia
17. Calyx with reflexed or spreading auricles (very short lobes) at the sinuses Nemophila
18. Flowers somewhat numerous in definite inflorescences (rarely few per peduncle) Phacelia
15. Ovary 2 or more celled (rarely incompletely 2) with axile placenta; fruit a capsule or berry
18. Ovules 4 or fewer
19. Corolla about 0.5-0.6cm long; styles 2, each deeply 2 cleft Evolutus
19. Corolla 1.5-10cm long; style 1
20. Stems not twining or trailing, the plants bushy; leaf blades linear or oblong to narrowly lanceolate or elliptic Ipomoea
20. Stems twining or trailing; leaf blades sagittate or hastate
21. Calyx enclosed by 2 bracts, the bracts cordate or ovate Calystegia
21. Calyx not enclosed by bracts, the bracts linear and borne much below the calyx Convolvulus
18. Ovules usually more than 4
22. Plants stellate-hairy, not spiny; flowers in a dense spike, yellow (rarely white); filaments long-hairy Verbascum
22. Plants not as above
23. Plants perennial, rhizomatous Physalis
23. Plants annual or biennial
24. Flowers sessile or nearly so in 1-sided spikes or racemes; corolla 2-4.5cm long; fruit a capsule Hyoscyamus
24. Flowers pedicelled, in small clusters, cymes, or solitary; corolla usually less than 2cm long, rarely longer (to 5cm); fruit a fleshy or dry berry (rarely spiny) or capsule
25. Ovary annual with twining stems; fruit a capsule with 6 valves and usually 6 seeds about 5mm long Ipomoea
25. Ovary annual or perennial without twining stems; fruit, berry with usually more than 6 seeds less than 3mm long
26. Corolla lobes reduced to teeth about 2mm or less long, the whole corolla usually 10mm or more long, plants not spiny Leuchophyallis
26. Corolla lobes mostly 3mm or more long, or if shorter, the corolla less than 10mm long or the plants spiny Solanum

Note: In the groups which follow, some genera that might be expected in a group are not included because they are taken out separately in the previous keys.

Blueberry Group
1. Plants shrubs; petals united; leaves usually alternate
2. Ovary inferior; anthers often dorsally awned; leaves 3-70mm long, toothed (rarely entire and 3-12mm long), often pointed at tip; fruit a juicy berry Vaccinium
1. Plants herbs; petals not united; leaves 10-35mm long, entire, mostly rounded at tip; fruit a mealy berry Arctostaphylos
2. Plants herbaceous or woody toward base; petals separate; leaves mostly on lower third of stem or most of them whorled
3. Leaves mostly whorled, basal leaves none; style barely if at all apparent Chimaphila
3. Leaves mostly alternate and on lower third of stem or all basal; style conspicuously elongate
4. Flowers solitary and terminal Moneses
4. Flowers several in a raceme
5. Raceme secund; style straight or nearly so Orthilia
5. Raceme not secund; style curved Pyrola

Borage Group
1. Ovary merely 4 grooved; style terminal or nearly so, or lacking; rhizomatous, glabrous perennial Heliotropium
1. Ovary usually deeply 4 parted; style arising from between the nearly distinct lobes; annual to perennial, often hairy
2. Nutlets bearing distinct hooked or barbed prickle at least along margins
3. Prickles completely covering nutlets; corolla purplish-red or blue
4. Stem leafy to the inflorescence; corolla purplish-red; nutlets dorsally flattened, the scar reaching the middle on ventral side Cynoglossum
4. Stem naked above; corolla blue; nutlets obvoid, the scar reaching only about 1/4 or less up ventral side Andersongloussum
3. Prickles mostly along margins of nutlets; corolla blue or white
5. Pedicels erect or ascending in fruit; inflorescence bracteate; styles often surpassing the mature nutlets Lappula
5. Pedicels recurved or deflexed in fruit; inflorescence often bractless or nearly so; styles usually shorter than mature nutlets Hackelia
2. Nutlets without hooked or barbed minute, rarely distantly branched bristles
6. Corolla irregular; stamens and style long-exserted Echium
6. Corolla regular or nearly so; stamens and style exserted or not
7. Plants with greenish-white, white, or rarely yellowish corollas 10-16mm long, hairy on outside; corolla lobes mostly erect; style long-exserted from corolla; nutlets broadly attached at base to a flat gynobase; anthers usually about 2mm long Lithospermum
7. Plants not with the above combination of characteristics
8. Corolla blue or occasionally pinkish, rarely ochroleucous, tubular to funnelform, rarely salverform, 5mm or more long, the tube often much exceeding calyx
9. Plants hirsute throughout with long, glasy, usually pubescent hairs; fornnices hairy or fringed; nutlets basally attached Anchusa
9. Plants glabrous or hairy but without hairs as above; fornnices not hairy or fringed; nutlets mostly laterally attached Mertensia
8. Corolla yellow, orange, or white, or if blue, then usually salverform or rotate and often less than 5mm long, the tube often shorter than, equal to, or little exceeding calyx
10. Corolla yellow or orange; nutlets broadly attached at their base to a flat gynobase Lithospermum
10. Corolla white, blue, pink-purple, or ochroleucous; nutlets usually basilaterally to apically attached, occasionally basally attached
11. Corolla blue or pink-purple
12. Fornices hairy; nutlets rugose and often tuberculate, basally attached Anchusa
12. Fornices glabrous; nutlets smooth, basilaterally to nearly apically attached Myosotis
11. Corolla white or ochroleucous (rarely blue tinged)
13. Nutlets with a grove-scar or slit running most of their length on ventral side (occasionally closed by meeting of edges); annual to perennial Cryptantha
13. Nutlets smooth or keeled on ventral side; mostly annuals
14. Nutlets smooth, winged or keeled around tip and lateral edges Myosotis
14. Nutlets keeled on ventral side and wrinkled or tubercululate, not winged or keeled around tip and lateral edges
15. Nutlets mostly basally attached leaving a tiny scar; nutlets usually finely hairy Plagiobothrys
15. Nutlets broadly attached at base to a flat gynobase leaving a scar nearly as broad as nutlet; nutlets glabrous Buglossoides

**Buckwheat Group**
1. Perianth segments 4; leaf blades reniform to cordate; perennial Oxyria
2. Perianth segments usually 5 or 6, rarely 4; leaf blades usually not reniform to cordate; annual or perennial
3. Perianth segments 6, the 3 outer often turned downward, the 3 inner usually enlarging in fruit; stamens 6 Rumex
4. Perianth segments usually 5, rarely 4 or 6, all erect, rarely enlarging in fruit; stamens often 8 or 9
5. Stems usually confluent, vine
6. Stem simple; leaves basal and on stem; inflorescence a single terminal spike-like raceme with a few bulblets in axils of lower bracts, woods and meadows Bistorta
7. Stem usually branched; leaves all on stem; flowers usually in 1 or 2 terminal or subterminal spike-like inflorescences, bulblets lacking; streams, ponds, and shores Persicaria
8. Flowers in axils of leaves or bracts, conspicuously bracteate if terminal; leaves jointed at base; annuals or perennials Polygonum

**Buttercup Group**
1. Stem leaves opposite or whorled; petals lacking (sepals colored)
2. Stem leaves usually whorled; sepals mostly 5 or more Anemone
3. Stem leaves usually opposite; sepals usually 4, rarely 5 or 6 Clematis
4. Stem leaves alternate or leaves all basal or nearly so; petals present or lacking
5. Flowers irregular
6. Upper sepal hooded, not spurred; petals usually 2, inside hood Aconitum
7. Upper sepal spurred, not hooded; petals 4, usually exposed Delphinium
8. Plants regular or nearly so
9. Petals all prominently spurred; perennials Aquilegia
10. Petals not spurred or lacking; annuals to perennials
11. Pisutis solitary; fruit a red or white berry Actaea
12. Pisutis 2 or more or flowers all staminate; fruit an achene or follicle
13. Plants annual; leaves all basal, mostly linear; sepals spurred (often deciduous) Myosurus
14. Plants not as above
15. Calyx and corolla present (one or both sometimes early deciduous); flowers bisexual; leaves only rarely ternately compound Ranunculus
16. Calyx only present; flowers bisexual or unisexual; leaves 2-3 times ternately compound
17. Ovules 1 per ovary; fruit an achene; sepals mostly green Thalictrum
18. Ovules 2 or more per ovary; fruit a follicle; sepals white or cream colored Enemion

**Cacti**
1. Stems flat or cylindrical and jointed; spines not on tubercles or ridges; clusters of short, minutely barbed bristles usually present near base of larger spines Opuntia
2. Stems globose or oval or rarely cylindrical, not jointed (clusters at ground level may appear jointed); spines on tubercles or ridges; clusters of short bristles lacking near base of larger spines
3. Flowers arising from the sides of the stem, stem usually longitudinally ribbed; ovary and fruit spiny Echinocereus
4. Flowers arising near from near the top of the stem, stem with tubercles, not ribbed; ovary and fruit usually not spiny
5. Flowers arising from near base of the spine-bearing tubercles away from base of spines Coryphantha
6. Flowers arising from near tip of the spine-bearing tubercles near base of the spines Pediocactus

**Carrot Group**
1. Leaves simple and entire Bupleurum
2. Leaves, or some of them, compound, or if simple, then toothed or lobed
3. Basal leaves mostly simple, cordate at base, toothed, 1-6cm wide; stem leaves compound Zizia
4. Basal leaves compound, or if simple, not as above
5. Ovary and fruit armed with relatively stout hooked or barbed bristles (may be obscure on young ovaries), the barbs sometimes none; fruits less than 4 times as long as wide
6. Leaves palmately divided into 3-7 mostly rather broad segments, not much dissected; involucral bracts toothed or irregularly lobed Sanicula
7. Leaves usually much dissected into narrow segments; involucral bracts pinnately divided into narrow segments or linear or lance-linear and entire
8. Involucral bracts pinnately divided into narrow segments Daucus
9. Involucral bracts linear or lance-linear and entire Torilis
10. Ovary and fruit not bristly, sometimes pubescent with stiff hairs; fruits various
11. Plants with mature fruits
12. Fruits flattened dorsally (parallel to commissure), sometimes only slightly so (check cross section) GROUP I
13. Fruits flattened laterally (at right angle to commissure) or the fruits not flattened GROUP II
14. Leaves mostly 1-2(3) times compound, some with definite leaflets 15mm or more wide, or if narrower, the primary or secondary leaflets regularly toothed and few lobed or divided, or not lobed; plants all with leafy stems GROUP III
15. Leaves mostly dissected, often appearing lacy-like or fern-like, the ultimate segments mostly less than 3(10)mm wide, sometimes with leaflets linear or nearly so and some 4cm or more long; plants with leafy stems or the leaves all basal
16. Petals yellow GROUP IV
9. Petals white, purple, pink, or greenish GROUP V

GROUP I
1. Leaves mostly 1-2(3) times compound, some with definite leaflets 15mm or more wide; caulescent plants mostly over 5dm high
2. Leaflets mostly 3, often over 10cm wide (some leaves often simple); petals white (purplish) Heracleum
3. Leaflets usually more than 3, less than 10cm wide; petals yellow (reddish) Pastinaca

GROUP II
1. Leaves mostly dissected, the ultimate segments mostly less than 3mm wide; caulescent or acaulescent, short or tall plants
2. Petals mostly 3, often over 4cm wide; leaflets usually over 3 times as long as wide; plants mostly over 5dm high; calyx teeth evident Lomatium

GROUP III
1. Plants rather low, the leaves all basal or near the base Musineon
2. Plants tall, with stem leaves (these rarely early deciduous)
3. Plants rather low, with stem leaves; leaflets mostly over 3 times as long as wide; some leaves usually simple Saponaria

GROUP IV
1. Inflorescence often glabrous or otherwise hairy, rarely scaberulous; young fruits often flattened parallel to commissure Lomatium
2. Inflorescence scaberulous, sometimes minutely so near base of umbel; young fruits flattened at a right angle to commissure Musineon

GROUP V
1. Stylododium lacking; plants often with a pseudoscape or acaulescent
2. Stylododium lacking; plants often with a pseudoscape or acaulescent
3. Leaf blades, or many of them, typically over 10cm long; some leaves borne well up on the stem; pseudoscape lacking Lomatium
4. Leaves 3-5 Silene
5. Calyx 1-4mm long Gypsophila
6. Flowers immediately subtended by 1-3 pair of long-tapering or acuminate bracts; petals not bilobed nor with appendages Dianthus
7. petals with 2 linear appendages at junction of claw and blade; calyx terete Saponaria
8. Plants with fleshy roots, not taprooted or well developed, subfoliaceous bracts
9. Leaves pinnately compound; leaflets often over 4 times as long as wide; petals white or greenish Cicutia
10. Plants not as above

Chickweed Group
1. Sepals united
2. Flowers all staminate Silene
3. Styles solitary, cleft above; calyx lobes spine-tipped; petals none Paronychia
4. Styles 3-5 Silene
5. Calyx 1-4mm long Gypsophila
6. Flowers immediately subtended by 1-3 pair of long-tapering or acuminate bracts; petals not bilobed nor with appendages Dianthus
7. Petals with 2 linear appendages at junction of claw and blade; calyx terete Saponaria
8. Styles solitary or cleft above, or lacking and with 3 stigmas; calyx lobes spine-tipped; petals lacking or minute

GROUP VI
1. Sepals separate or nearly so
2. Flowers pistillate or bisexual
3. Styles solitary, cleft above; calyx lobes spine-tipped; petals none Paronychia
4. Styles 3-5 Silene
5. Calyx 1-4mm long Gypsophila
6. Flowers immediately subtended by 1-3 pair of long-tapering or acuminate bracts; petals not bilobed nor with appendages Dianthus
7. Petals with 2 linear appendages at junction of claw and blade; calyx terete Saponaria
8. Petals lacking appendages at junction of claw and blade; calyx 5 angled Vaccaria

GROUP VII
1. Flowers not immediately subtended by bracts, the bracts lacking or usually at some distance below calyx (flowers rarely sessile but then with petals bilobed and with very short appendages at junction of claw and blade)
2. Flowers not immediately subtended by bracts, the bracts lacking or usually at some distance below calyx (flowers rarely sessile but then with petals bilobed and with very short appendages at junction of claw and blade)
3. Petals without appendages; calyx not very short; leaves usually basal Musineon
9. Plants perennial; stipules prominent and scarious; fruit a 1 seeded utricle Paronychia
10. Plants annual; stipules inconspicuous or lacking; fruit a several seeded capsule Loeflingia
8. Styles 2 or more; calyx lobes rarely spine-tipped; petals present or not
10. Leaves with distinct scarious stipules Spargularia
10. Leaves lacking stipules (sometimes with secondary leaves in their axils or the bases of opposite pairs connate)
11. Stems usually 5; capsule dehiscent by 10 teeth or valves; petals lobed or notched; calyx 3-8mm long Cerastium
11. Stems mostly less than 5cm long; basal rosette of leaves present; styles usually 5, rarely 4 Sagina
12. Sepals and petals 4 each; fruits without hooked hairs
12. Sepals and petals 2 each; fruits with hooked hairs
13. Sepals and petals inserted under the ovary; capsules 6 valved Stellaria
14. Leaves oblong to elliptic or lanceolate, sometimes 2mm or more wide; rhizomatous perennial Moehringia
15. Leaves linear or awl-shaped and less than 2mm wide, or if wider, the plants annual
16. Leaves lancolate or ovate to oblong, sometimes 2mm or more wide; annuals Arenaria
17. Capsule 6valved; plants mostly over 10cm high with primary leaves often over 10mm long, or if not, either with sepals mostly 6-8mm long and with a head-like inflorescence or an annual with ovate to lanceolate or oblong leaves
18. Flowers and leaves mostly stalked and in a basal rosette; sterile filament a knob or scale on upper lip of corolla; perennial Eremogone
19. Corolla irregular, 2 lipped (rarely nearly regular); flowers and leaves not as above
20. Corolla saucer-shaped or shallowly cup-shaped, 4 lobed Veronica
21. Corolla tubular, 2 lipped Gratiola
22. Corolla issuing from a tuft of long hairs at upper end, hairs usually longer than seed
23. Floral tube not prolonged beyond ovary; petals mostly less than 1cm long; stigma mainly rarely 4 cleft Epilobium
24. Floral tube not prolonged beyond ovary; petals mostly 1-2cm long; stigma 4 cleft Chamerion
25. Seeds without a tuft of long hairs at upper end
26. Fruit not splitting, nut-like, 1-4 seeded; claw of petal often nearly as long as blade, the blade not notched or lobed Oenothera
27. Fruit splitting at maturity, usually many seeded; petals not clavate, the blade sometimes 2 lobed
28. Ovary 2 celled; floral tube not prolonged beyond ovary; petals mostly 2mm or less long Gayophytum
29. Ovary usually 4 celled; floral tube prolonged beyond ovary; petals often over 2mm long
30. Plants annual; petals pink, purplish, or rose, 2-4mm long, bilobed Epilobium
31. Plants perennial, or if annual, petals mostly white or yellow, if rarely pinkish, then over 4mm long or not bilobed Oenothera

Evening Primrose Group
1. Sepals and petals 2 each; fruits with hooked hairs Circaea
2. Sepals and petals 4 each; fruits without hooked hairs
3. Leaves with distinct scarious stipules
4. Calyx lobes 5; leaves pinnatifid to bipinnatifid, basal and cauleine; flowers subtended by green bracts; perennials Pedicularis
5. Calyx lobes 2-4; leaves sometimes entire, all cauleine; flowers often subtended by colored bracts; annual or perennial
6. Upper hooded lip of corolla usually conspicuously surpassing lower lip; perennials Castilleja
7. Upper hooded lip of corolla only slightly or not at all surpassing lower lip; annuals Orthocarpus
8. Corolla either not 2 lipped or 2 lipped with the upper lip not forming a hood or beak (central lobe of lower lip rarely enclosing stamens)
9. Corolla spurred at base on lower side
10. Corolla blue or white to pale lavender (throat may be yellow); annuals
11. Corolla 7-13mm long; spur 6-11mm long Nuttallanthus
12. Corolla 4.5-6mm long; spur 1.7-2.8mm long Chamerion
13. Corolla yellow (brownish in bud); perennials Linaria
14. Corolla spurred although sometimes swollen
15. Sterile filament present, about half as long to as long as the 4 anther bearing filaments Penstemon
16. Sterile filament lacking or reduced to a knob or scale on upper lip of corolla
17. Corolla regular or nearly so; flowers and leaves mostly stalked and in a basal rosette Limosella
18. Corolla irregular, 2 lipped (rarely nearly regular); flowers and leaves not as above
19. Flowers in a terminal panicle-like inflorescence; sterile filament a knob or scale on upper lip of corolla; perennial Scrophularia
20. Flowers mostly axillary; sterile filament lacking; annual to perennial
21. Sepals, or most of them, separate Bacopa
22. Sepals united
23. Corolla blue with whitish upper lip and often yellowish throat; central lobe of lower lip of corolla keeled-saccate and enclosing stamens Collinsia
24. Corolla yellow, red, pink, or purple; central lobe of lower lip of corolla not keeled-saccate nor enclosing stamens
25. Corolla yellow or reddish, often strongly 2 lipped; anther sacs divergent; calyx usually strongly 5 ribbed; leaves variable Erythranthe
26. Corolla pink or purple, not strongly 2 lipped; anther sacs parallel; calyx not strongly 5 ribbed; leaves linear and entire Agalinis

Figwort Group
1. Anther bearing stamens 2
2. Corolla saucer-shaped or shallowly cup-shaped, 4 lobed Veronica
3. Corolla tubular, 2 lipped Gratiola
4. Anther bearing stamens 4
5. Corolla 2.2 lipped with the upper lip forming a hood or beak which encloses the anthers
6. Calyx lobes 5; leaves pinnatifid to bipinnatifid, basal and cauleine; flowers subtended by green bracts; perennials Pedicularis
7. Calyx lobes 2-4; leaves sometimes entire, all cauleine; flowers often subtended by colored bracts; annual or perennial
8. Upper hooded lip of corolla usually conspicuously surpassing lower lip; perennials Castilleja
9. Upper hooded lip of corolla only slightly or not at all surpassing lower lip; annuals Orthocarpus
10. Corolla either not 2 lipped or 2 lipped with the upper lip not forming a hood or beak (central lobe of lower lip rarely enclosing stamens)
11. Corolla spurred at base on lower side
12. Corolla blue or white to pale lavender (throat may be yellow); annuals
13. Corolla 7-13mm long; spur 6-11mm long Nuttallanthus
14. Corolla 4.5-6mm long; spur 1.7-2.8mm long Chamerion
15. Corolla yellow (brownish in bud); perennials Linaria
16. Corolla spurred although sometimes swollen
17. Sterile filament present, about half as long to as long as the 4 anther bearing filaments Penstemon
18. Sterile filament lacking or reduced to a knob or scale on upper lip of corolla
19. Corolla regular or nearly so; flowers and leaves mostly stalked and in a basal rosette Limosella
20. Corolla irregular, 2 lipped (rarely nearly regular); flowers and leaves not as above
21. Flowers in a terminal panicle-like inflorescence; sterile filament a knob or scale on upper lip of corolla; perennial Scrophularia
22. Flowers mostly axillary; sterile filament lacking; annual to perennial
23. Sepals, or most of them, separate Bacopa
24. Sepals united
25. Corolla blue with whitish upper lip and often yellowish throat; central lobe of lower lip of corolla keeled-saccate and enclosing stamens Collinsia
26. Corolla yellow, red, pink, or purple; central lobe of lower lip of corolla not keeled-saccate nor enclosing stamens
27. Corolla yellow or reddish, often strongly 2 lipped; anther sacs divergent; calyx usually strongly 5 ribbed; leaves variable Erythranthe
28. Corolla pink or purple, not strongly 2 lipped; anther sacs parallel; calyx not strongly 5 ribbed; leaves linear and entire Agalinis

Goosefoot Group
1. Plants either shrubs, or subshrubs that are woody below and herbaceous above
2. Leaves densely stellate-hairy, linear or slightly wider with revolute margins Krascheninnikovia
3. Leaves not as above Atriplex
4. Plants herbaceous, mostly annuals
5. Leaves terete to subterete (rarely flattened), usually fleshy, linear or nearly so (some bracts often lanceolate or ovate), entire, glabrous or nearly so or rarely farinose, less than 3mm wide, sometimes tipped with a bristle or spine
6. Leaves with stiff spinulose tips or weak bristle tips, the spines or bristles often 1mm or more long; perianth segments often membranous Salsola
7. Leaves not as above; perianth segments usually fleshy Suaeda
8. Leaves not with the above combination of characteristics
9. Perianth lacking or of 1 or rarely 2 or 3 bract-like segments smaller than and not enclosing the fruit, the fruit laterally flattened and subtended by a single bract or no bract (foe pericarp sometimes encloses seed) Monolepis
5. Perianth 3-5 lobed or sometimes lacking in pistillate flowers; fruit at least partly enclosed by perianth or 2 large subtending bracts, sometimes dorsiventrally flattened

6. Flowers unisexual, the pistillate usually lacking a perianth and enclosed by 2 partly or wholly united bracts, the staminate with a 3-5 lobed perianth and no bracts

7. Mature fruiting bracts 0.5-2mm long, united at tip, entire; leaves usually green, entire, sessile Stutzia

8. Mature fruiting bracts (1)2-1.5mm long, free at least in upper part, entire to toothed or lobed; leaves green or gray-farinose, entire to toothed or lobed, sessile or petioled Atriplex

6. Flowers mostly bisexual (or with some pistillate or sterile) with a regular 3-5 lobed perianth, lacking enclosing bracts

8. Inflorescence usually densely hairy; leaves linear to lanceolate or oblanceolate, 1-8(12)mm wide, hairy, entire Kochia

9. Calyx usually with a broad, horizontal, membranous, circular wing from the middle when mature; leaves with large teeth that are short-spinulose; plants usually hairy and not farinose Cyclocoma

10. Plants glandular and puberulent Dysphania

10. Plants not glandular (except inflorescence of C. simplex), often glabrous or farinose Chenopodium

Grasses

1. Plants dioecious or monoecious, to 20cm high, stoloniferous; pistillate spikelets with the thickened rachis and 2nd glumes forming a rigid, yellow-white, globular structure crowned by green-toothed summits of the glumes; staminate spikelets 2 flowered, sessile, in 2 rows on 1 side of rachis Bouteloua

1. Plants not as above

2. Plants annual but mat forming by branching, to 10cm high; leaves and spikelets in fascicles, the fascicles separated by moss

3. Spikelets enclosed by a bur-like involucre bearing coalescent bristles forming spines; sandbur Cenchrus

3. Spikelets not enclosed by a bur-like involucre, if bristles present, not coalescent to form spines

4. Spikelets sessile, forming terminal or lateral spikes, occasionally with the lower spikelets short-pedicled but then the glumes usually bristle-like or nearly so

5. Spikelets 1 or more, usually lateral or not directly continuous with the main axis; spikelets often on only 1 side of rachis GROUP I

5. Spikelets single and terminal; spikelets usually on opposite sides of rachis GROUP II

4. Spikelets, or most of them, with very short or long pedicels, the inflorescence a raceme or panicle which is sometimes spike-like; rarely with a single spikelet

6. Spikelets of crowded scales subtending bulblets rather than flowers or seeds, the bulblets usually purplish; culms usually bulbous at base, densely tufted; leaf tips boat-shaped Poa

6. Spikelets containing flowers or seeds; culms and leaves various

7. Glumes both lacking; spikelets 1 flowered Leersia

7. Glumes both present or only 1 lacking; spikelets 1 or more flowered

8. Spikelets mostly in pairs, 1 usually sessile and fertile and the other pedicelled and sterile, or staminate, or reduced to only the pedicel (upper spikelets rarely in threes, 1 sessile, 2 pedicelled); pedicel with long hairs

9. Inflorescence of 1 or more spike-like racemes on peduncles

10. Racemes solitary on each peduncle; sheaths strongly keeled Schizachyrium

10. Racemes 2 or more on each peduncle; sheaths not strongly keeled Andropogon

11. Pedicelled spikelet reduced to the hairy pedicel; anthers (2.5)3.2-4.5mm long Sorghastrum

11. Pedicelled spikelet developed but sterile or staminate; anthers 1.9-2.7(3)mm long Sorghum

8. Spikelets not as above; pedicels hairy or not

12. Spikelets usually dorsiventrally flattened and falling entire, with 1 perfect terminal floret and usually 1 sterile lemma (which resembles a glume) or staminate floret below (1st glume sometimes minute) GROUP III

12. Spikelets usually flattened individually from the sides, the florets usually falling from the sides, the florets usually falling individually with the glumes persistent; spikelets with 1 or more perfect florets or the plants rarely dioecious; sterile or staminate florets, if any, above the perfect or with 2 below the perfect

13. Spikelets with 1 perfect terminal floret and 2 sterile lemmas or staminate florets below, the sterile often reduced to linear lemmas with long hairs

14. Lower florets staminate, well developed; spikelets brown and shiny; inflorescence an open panicle Anthoxanthum

14. Lower florets reduced to small scale-like or linear and long-hairy lemmas; spikelets green or yellow and dull; inflorescence a spike-like or contracted panicule Phalaris

15. Spikelets not as above, the sterile florets, if present, above the fertile, or rarely with 1 staminate floret below the 1 perfect floret

15. Spikelets mostly with 1 floret GROUP IV
1. Disjointing above the glumes, the glumes not falling with the florets; ligule hairy or membranous.

GROUP VI

1. Spikelets with 2 or more florets
   2. Glumes, or at least 1 glume, equaling or exceeding the lowest floret, usually equaling the spikelet; lemmas awned from the back or from a bifid tip or awnless
   3. Glumes mostly shorter than the lowest floret; lemmas awned from the tip or from a bifid tip (rarely from back) or awnless

GROUP I

1. Ligules hairy
   2. Spikelets with 1 or more modified florets above the perfect one, these sometimes merely awns; rhizomes none except when spikes pendulous (rarely with short rhizomes) Beckmannia
   3. Glumes membrane
   4. Glumes equal, broad and boat-shaped; leaf blades mostly over 3mm wide Beckmannia
   5. Spikelets 1 flowered; lemmas acuminate Schedonardus
   6. Spikelets with 1 perfect floret below and 1 reduced floret above; lemmas long awned Chloris

GROUP II

1. Spikelets with 1 perfect terminal floret and 2 opposite, sterile lemmas (often linear and hairy) below Phalaris
   2. Plants with spikelets dorsally flattened and falling entire, with 1 perfect terminal floret and 1 sterile lemma (which resembles a glume) or staminate floret below, awnless Setaria
   3. Spikelets with all perfect florets, or with only 1 sterile lemma below, or with sterile lemmas all above the fertile
   4. Spikelets mostly 1 per node
   5. Spikelets placed edgewise to rachis; 1st glume lacking except in terminal spikelet Loliump
   6. Spikelets placed flatwise to rachis; glumes usually both present
   7. Inflorescence 1-1.5cm long Eremopyrum
   8. Inflorescence 3cm or more long Triticum
   9. Glumes ovate, 3 or more nervd Triticum
   10. Glumes linear-subulate, 1 nervd Secale
   11. Plants perennial

GROUP III

1. Spikelets often strongly divergent, much compressed and crowded, same at least 4 times as long as internodes of rachis Agropyron
   2. Spikelets mostly 2 or more, or if 1 flowered, the lemma conspicuously awned
   3. Spikelets placed edgewise to rachis; glumes usually both present
   4. Spikelets 3 per node, mostly 1 flowered, the lateral ones often pedicelled and usually reduced, often to awns Hordeum
   5. Inflorescence appearing like a simple spike; spikelets subtended by long bristles Setaria
   6. Inflorescence compound with obvious branching; spikelets not subtended by bristles
   7. Second glume awn-tipped; sterile lemma awned Echinochloa
   8. Second glume and sterile lemma not awned
   9. Inflorescence of digitate racemes; ligule membranous Digitaria
   10. Inflorescence an open panicle; ligule hairy
   11. Plants annual, or perennial with rhizomes; sterile lemma usually glabrous and acute at tip Panicum
   12. Plants perennial without rhizomes (sometimes appearing annual but with old dried leaves at base); sterile lemma often hairy and obtuse at tip Dichanthelium

GROUP IV

1. Disjointing below the glumes, the entire spikelet falling (most evident on mature plants but joints near tip of pedicels often apparent in younger plants); ligule membranous
   2. Glumes awned
   3. Awn of glumes mostly 3mm or more long; anthers 0.4-0.7mm long Polypogon
   4. Awn of glumes 2mm or less long; anthers 1.1-2.3mm long Phleum
   5. Glumes not awned
   6. Panicule spike-like, cylindrical; keel of glumes long-ciliate Alopecurus
   7. Panicule open; keel or midnerv of glumes glabrous or scabrous
   8. Panicles pendulous; awnless or with a short pointed cusp at tip also Thinopyrum
   9. Creeping rhizomes present
   10. Glumes rigid, usu widest near base, often as long as 1st lemma, usually 3-5 nervd, awn-tipped to short-awned; leaves blue-green Pascopyrum
   11. Creeping rhizomes lacking
   12. Glumes not rigid, widest at or above middle, shorter than 1st lemma, mostly 5-7 nervd, acute to awned; leaves normally green Elymus
   13. Anthers 4-6mm long; spikelets shorter to slightly longer than internodes of rachis; glumes acute or awn-tipped; lemmas often with a divergent awn Pseudoroegneria
   14. Anthers 1-3mm long; spikelets mostly 2-3 times as long as internodes of rachis; glumes and lemmas various Elymus
   15. Creeping rhizomes present, or if not, awns of lemmas usually less than 0.5cm long or lacking Leymus
   16. Creeping rhizomes lacking; awns of lemmas mostly 1cm or more long Elymus

GROUP V

1. Lemma margins strongly overlapping; palea glabrous, less than one third the length of lemma Nassella
   2. Plants not as above
   3. Spikelets 1 flowered, the lemma much shorter than the glumes and awnless Phleum
   4. Spikelets 2 or more flowered, or if 1 flowered, the lemma conspicuously awned
   5. Spikelets mostly 1 per node
   6. Spikelets placed edgewise to rachis; 1st glume lacking except in terminal spikelet Loliump
   7. Spikelets placed flatwise to rachis; glumes usually both present
   8. Inflorescence 1-1.5cm long Eremopyrum
   9. Inflorescence 3cm or more long Triticum
   10. Glumes ovate, 3 or more nervd Triticum
   11. Glumes linear-subulate, 1 nervd Secale
   12. Plants annual

GROUP VI

1. Spikelets with 2 or more florets
   2. Glumes, or at least 1 glume, equaling or exceeding the lowest floret, usually equaling the spikelet; lemmas awned from the back or from a bifid tip or awnless
   3. Glumes mostly shorter than the lowest floret; lemmas awned from the tip or from a bifid tip (rarely from back) or awnless
1. Plants not as above

1. Plants stout reeds to 4m high with plume

1. Ligules hairy

2. Plants with perfect flowers, at least the lower florets; lemmas awned or awnless

2. Plants

3. Spikelets mostly 9mm or more long; rachilla usually not prolonged beyond terminal floret

2. Lemmas bifid at tip, awned from between the lobes

2. Spikelets, excluding awn, 5.5(6)mm long or less; leaf blades 0.3-2mm wide

14. Ligules 0.5mm or less long; lemmas hairy, conspicuously shorter than glumes Achnatherum

14. Ligules mostly 1-4mm long; lemmas usually equaling or exceeding glumes, sometimes slightly shorter especially if lemmas are glabrous or glabrate Piptatheropsis

7. Lemma usually not hardened, loose around grain, usually with 1 or more evident nerves, awned or not, the awns, when present, usually less than 2cm long

15. Glumes (excluding awns) longer than lemma

16. Glumes strongly flattened and keeled, stiff ciliate on keel, short awned; panicle spike-like; lemma awnless Phleum

16. Glumes not as above; panicle open to spike-like; lemma awned or not

17. Floret lacking hairs at base or with very short hairs; palea often small or lacking

18. Lemma with an awn mostly 5-10mm long; palea well developed; annual Apera

18. Lemma awnless or the awn less than 5mm long; palea well developed to lacking; annual or perennial Agrostis

17. Floret with a tuft of hairs at base from callus, the hairs usually 1/4 as long to as long as lemma; palea well developed

19. Ligule of hairs Calamovilfa

19. Ligule membranous

20. Lemma awned from back Calamagrostis

20. Lemma awned from tip Muhlenbergia

15. Glumes (excluding awns) mostly shorter than lemma (rarely equaling)

21. Lemma 1 nerved; ligule of hairs (at least upper half)

22. Floret with a tuft of hairs at base from callus Calamovilfa

22. Floret lacking a tuft of hairs at base Sporobolus

21. Lemma 3 or 5 nerved; ligule membranous

23. Glumes or lemmas or both awned or at least acute at tip Muhlenbergia

23. Glumes and lemmas truncate at tip, awnless Catabrosa

GROUP V

1. Ligules hairy

2. Lemmas bifid at tip, awned from between the lobes Danthonia

2. Lemmas awnless Eragrostis

1. Ligules membranous, rarely with a short fringe of hairs at tip

3. Spikelets mostly 9mm or more long; rachilla usually not prolonged beyond terminal floret Avena

3. Spikelets 8mm long or less; rachilla often prolonged beyond terminal floret Deschampsia

4. Glumes dissimilar, the 2nd much wider than the 1st; spikelets 2-4mm long; lemmas awnless Sphenopholis

4. Glumes usually relatively similar (if not, the lemmas awned or spikelets longer); spikelets (2.5)4-8mm long

5. Lemmas awned from near or below middle Deschampsia

5. Lemmas awnless or awned from above middle

6. Lemmas with an exserted, usually geniculate awn Trisetum

6. Lemmas awnless or with a very short, straight awn Koeleria

7. Pedicels mostly less than 3mm long; upper floret rarely exceeding longest glume by more than 1mm Koeleria

7. Pedicels, or some of them, usually over 3mm long; upper floret usually exceeding longest glume by 1.5mm or more Poa

GROUP VI

1. Plants stout reeds to 4m high with plume-like panicles; at least some leaves 9mm or more wide; rachilla with long silky hairs as long as the lemmas, the hairs often inconspicuous in young flowers; lowest lemmas mostly 9mm or more long; moist areas or in water Phragmites

1. Plants not as above

2. Plants dioecious, sometimes with rudiments of the opposite sex in a normally developed flower; lemmas awnless

3. Plants with long creeping rhizomes; sheaths usually long-hairy near throat; ligules usually with a fringe of hairs at tip; spikelets mostly 7-15 flowered Distichlis

3. Plants with rhizomes or not; sheaths not long-hairy; ligules mostly membranous; spikelets mostly 3-7 flowered Phragmites

4. Panicle narrow and congested; some leaf blades often over 3.5mm wide, often glaucous; short-rhizomatous Leucopoa

4. Panicle often open; leaf blades rarely over 3.5mm wide, not glaucous; rhizomatous or not Poa

2. Plants with perfect flowers, at least the lower florets; lemmas awned or awnless

5. Plants annuals or tufted perennials; ligule membranous; 1st glume much narrower than 2nd; spikelets mostly 2 flowered, 2-4mm long, awnless, falling entire (glumes not persistent) Sphenopholis

5. Plants without the above combination of characteristics

6. Ligule a fringe of hairs Eragrostis

6. Ligule membranous

7. Lemmas with mostly 3 prominent nerves; spikelets less than 5mm long; lemmas truncate Catabrosa

7. Lemmas with 5 or more nerves or appearing nerveless (rarely 3 nerved when spikelets 15-30mm long); lemmas usually obtuse to acuminate

8. Spikelets crowded in 1 sided clusters at ends of stiff, naked panicle branches; glumes usually hispid-ciliate on keel and sometimes on margins and nerves, otherwise mostly glabrous Dactylis

8. Spikelets and glumes not as above

9. Callus of florets bearded with straight hairs (except rarely the lowermost one), the lemmas otherwise glabrous or scabrous

10. Lemmas 7mm or more long, the awn 8-15mm long Schizachne

10. Lemmas (3.5)±5.5mm long, the awn 3-67mm long Trisetum

11. Callus of florets not bearded (lemmas sometimes cobwebby at base), the lemmas sometimes hairy

11. Stems usually bulbous at base in the soil; spikelets often tawny or purplish tinged, glumes and lemmas with scarious margins; upper floret often sterile and lacking a palea; sheaths usually closed most of their length Melica

11. Stems usually not bulbous at base; spikelets often completely green; upper florets perfect, or if not, with paleas, or the floret reduced to a rudiment; sheaths often split most of their length

12. Lemmas mostly obtuse and scarious at tip, not awned, 5-9 nerved; glumes mostly 3mm or less long; leaves not boat-shaped at tip or slightly so in drying

20
1. Mature fruit less than 4 times as long as wide (Exclude Style)
2. Fruits tetere, subterete, or quadrangular in cross section GROUP II
3. Mature fruit over 4 times as long as wide GROUP III
4. Fruit stalked at base, the stalk usually extending 7mm or more beyond the receptacle (Do not confuse this with pedicel); petals yellow Stanleya
5. Plants glandular-hairy Chorispora
1. Styles very short or lacking, not beak
2. Styles beak
3. Hairs more than 2 branched or 2 branched from above and the branches not appressed to plant surface (rarely 2 branched and flowers yellow or rarely reddish or purplish)
4. Hairs 2 branched from near base, the branches appressed to plant surface or nearly so (sometimes with appressed 3 branched hairs also)
5. Hairs simple or lacking
6. Fruits not subglobose or oval in outline; leaves entire or toothed, the upper ones auriculate; rhizomatous
7. Fruits subglobose or oval in outline; leaves entire or toothed, the upper ones auriculate; rhizomatous
8. Fruits definitely flattened
9. Fruits terete or 4 angled, not flattened (rarely with a flattened beak)

GROUP I
1. Fruits flattened at a right angle to the septum
2. Seeds solitary in each of the 2 chambers of fruit
3. Plants glabrous
4. Fruit triangular, widest at top
5. Fruit triangular, widest at top
6. Fruit triangular, widest at top

GROUP II
1. Fruits flattened parallel to septum
2. Seeds 2 or more in each chamber of fruit
3. Plants hairy at least at base
4. Fruit triangular, widest at top
5. Fruit triangular, widest at top
6. Fruit triangular, widest at top

GROUP III
1. Fruits not subglobose or oval
2. Fruits not subglobose or oval
3. Fruits distinctly flattened
4. Fruits distinctly flattened
5. Fruits distinctly flattened
6. Fruits distinctly flattened

GROUP IV
1. Leaves dentate to pinnatifid or pinnate
2. Leaves entire or nearly so
3. Leaves entire or nearly so
4. Leaves entire or nearly so
5. Leaves entire or nearly so
6. Leaves entire or nearly so

GROUP V
1. Plants not glandular-hairy (rarely papillose)
2. Fruits usually broader than linear, rarely as much as 8 times as long as wide
3. Fruits linear, often over 8 times as long as wide
4. Fruits definitely flattened
5. Fruits terete or 4 angled, not flattened (rarely with a flattened beak)

GROUP VI
1. Plants not conspicuously constricted between the seeds, or with a stipe at base, or both
2. Plants not conspicuously constricted between the seeds, without a stipe
3. Plants not conspicuously constricted between the seeds, without a stipe
4. Plants not conspicuously constricted between the seeds, without a stipe
5. Plants not conspicuously constricted between the seeds, without a stipe
6. Plants not conspicuously constricted between the seeds, without a stipe
7. Plants not conspicuously constricted between the seeds, without a stipe
8. Plants not conspicuously constricted between the seeds, without a stipe
9. Plants not conspicuously constricted between the seeds, without a stipe
10. Plants not conspicuously constricted between the seeds, without a stipe
12. Fruiting pedicels mostly erect or nearly so; leaves entire or toothed or rarely slightly lobed *Turritis*
12. Fruiting pedicels ascending to descending, or if erect, the leaves pinnately compound or pinnatifid
13. Leaves entire or nearly so, mostly auriculate *Conringia*
13. Leaves, at least the basal ones, dentate or sinuate to pinnatifid or pinnate, usually not auriculate
14. Seeds in 2 rows in each chamber, at least in part; fruits sometimes less than 15mm long *Nasturtium*
14. Seeds in 1 row in each chamber; fruits over 15mm long
15. Lower leaves mostly reniform and coarsely toothed *Allaria*
15. Lower leaves pinnately lobed to compound
16. Styles in fruit 0.5mm or less wide; petals white, pink, or rose; plants mostly of wet areas *Cardamine*
16. Styles in fruit 0.6mm or more wide or lacking; petals yellowish, sometimes drying white; plants mostly of dry areas *Sisymbrium*

**FLOWER KEY**

1. Hairs branched at least in part
2. Hairs 2 branched, the branches appressed to the plant surface (rarely with a few 3 branched hairs, these also appressed)
3. Petals yellow or rarely reddish or purplish *Erysimum*
3. Petals white or pink, sometimes bluish tinged *Boechera*
2. Hairs not as above
4. Stem leaves, at least the upper ones, auriculate or clasping the stem
5. Plants biennial or perennial
6. Stem leaves well developed, 1.5-7(15)cm long, 0.5-4cm wide
7. Seeds in 1 row in each locale, rarely with 2 imperfect rows *Arabis*
7. Seeds in 2 rows in each locale *Turritis*
6. Stem leaves often poorly developed, 0.4-3.5(8)cm long, mostly 0.1-0.7(1)cm wide *Boechera*
5. Plants annual
8. Basal leaves rostrate and lobed *Capsella*
8. Basal leaves not rostrate, entire or minutely toothed *Camelina*
4. Stem leaves not auriculate or clasping stem
9. Leaves pinnately compound or nearly so *Descurainia*
9. Leaves simple and entire or toothed or rarely a few pinnatifid
10. Petals yellow, rarely tinged with red or purple or drying white
11. Plants annual or biennial, the leaves mostly along the stem; petals 2.5-4mm long
12. Leaves linear to oblanceolate, 1-6mm wide, entire; sepals 1.5-3.5mm long *Alyssum*
12. Leaves ovate to obovate, 1-5mm wide, entire or toothed; sepals 1-2mm long *Draba*
11. Plants perennial, or if not, the leaves mostly basal and roseulate and the petals usually longer
13. Styles of young fruits averaging 1.5mm or less long *Draba*
13. Styles of young fruits averaging over 1.5mm long *Physaria*
10. Petals white, purple, pink, or rose (rarely none)
14. Plants perennial; petals mostly 16-25mm long *Hesperis*
14. Plants not both perennial and with petals 16-25mm long
15. Plants annual or biennial, the leaves mostly along stem and 1-6mm wide, entire; petals 2-4mm long *Alyssum*
15. Plants not as above (basal rosette sometimes deciduous)
16. Plants annual
17. Petals 4-6mm long, often notched at tip; sepals 2-3mm long *Berteroa*
17. Petals 1-4(5)mm long, not notched; sepals 1-2mm long
18. Young fruits linear, essentially terete *Arabidopsis*
18. Young fruits usually linear-elliptic or broader, flattened *Draba*
16. Plants biennial or perennial
19. Young fruits linear; petals and sepals of various length *Boechera*
19. Young fruits usually linear-elliptic or broader; petals 2-5mm long; sepals 1-3mm long *Draba*

1. Hairs all simple or lacking
20. Plants glandular-hairy *Chorispora*
20. Plants not glandular-hairy
21. Petals lacking or less than 0.5mm long *Lepidium*
21. Petals present, 0.5mm or more long
22. Petals about 1mm long, white; annual with stem leaves *Lepidium*
22. Petals, if white, 1(1.5)mm or more long or without stem leaves; annual to perennial
23. Petals yellow (sometimes drying white) GROUP A
23. Petals white, purple, pink, or rose GROUP B

**GROUP A**

1. Upper leaves auriculate or clasping stem
2. Leaves all entire or merely toothed
3. Petals 0.5-4mm long *Rorippa*
3. Petals 5mm or more long *Conringia*
2. Leaves, or some of them, lobed to compound
4. Leaves dimorphic, the lower much divided into linear segments, the upper mostly entire and strongly cordate-clasping or perfoliate; petals about 1.5mm long *Lepidium*
4. Leaves not as above; petal length various
5. Petals 0.5-3mm long; sepals 0.5-2(2.5)mm long *Rorippa*
5. Petals 3-5mm long; sepals 2-4mm long
6. Plants rhizomatous perennials *Rorippa*
6. Plants biennial, without rhizomes *Barbarea*

1. Upper leaves not auriculate or clasping stem
7. Sepals 8-16mm long; ovary and young fruit on a stalk usually 5mm or more long *Stanleya*
7. Sepals less than 8mm long, or if not, the ovary and young fruit without a stalk
8. Petals 0.5-5mm long
9. Leaves all entire or merely toothed
10. Leaves mostly basa *Draba*
10. Leaves mostly along stem *Rorippa*
9. Leaves, or some of them, lobed to compound
11. Petals 4-5mm long; sepals 2-4mm long
12. Plants rhizomatous perennials *Rorippa*
1. Plants annual or biennial, not rhizomatous \textbf{Erucastrum}
2. Petals 0.5-4mm long; sepalas 0.5-2.5mm long
3. Petals mostly 0.5-1.8mm long; plants sometimes prostrate or glabrous \textbf{Rorippa}
4. Petals about 3mm long; plants mostly erect and hirsute at base \textbf{Sisymbrium}

8. Petals 5mm or more long
14. Leaves all entire or merely toothed \textbf{Sinapis}
15. Styles of young fruits lacking or nearly so; petals 5-8mm long \textbf{Sisymbrium}
16. Styles of young fruits usually apparent; petals 4-15mm long
17. Leaves often glabrous or nearly so; petals pale yellow with dark veins \textbf{Brassica}
18. Plants hirsute at least below; petals bright yellow without dark veins \textbf{Sinapis}

\textbf{GROUP B}

1. Upper leaves auriculate or clasping the stem
2. Petals 2-7mm long; sepalas 1-5mm long
3. Sepals 1-2mm long
4. Plants hairy \textbf{Lepidium}
5. Plants glabrous \textbf{Thlaspi}
6. Sepals 2-5mm long

4. Plants hairy, or if glabrous, the sepals 3-5mm long
5. Plants glabrous; sepals 1-3mm long \textbf{Thlaspi}
6. Plants hairy, or if glabrous, the sepals 3-5mm long
7. Plants hairy, or if glabrous, the sepals 3-5mm long
8. Plants hairy, or if glabrous, the sepals 3-5mm long

6. Seeds in 2 rows in each locule, rarely with 2 imperfect rows \textbf{Arabis}
7. Plants not as above
8. Petals 4mm long or less; sepals 0.5-2mm long
9. Young fruits linear; petals at least 2mm long; stamens 6 \textbf{Cardamine}
10. Plants hairy, or if glabrous, the sepals 3-5mm long
11. Plants glabrous perennials with a very thick root; leaves coarsely and irregularly crenate or some divided \textbf{Armoracia}

15. Plants glabrous biennials \textbf{Thelypodium}
16. Plants either perennial or hairy or both \textbf{Boechera}
17. Leaves, or some of them, lobed to compound
18. Petals 2-4mm long \textbf{Conringia}
19. Petals 6-8mm long

\textbf{Orchids}

1. Leaves reduced to sheaths or scales, not greem; plants saprophytic \textbf{Corallorhiza}
2. Leaves well developed, green; plants not saprophytic
3. Leaves along stem, 3 to several; lip usually white or yellow, without an expanded lamina on front \textbf{Cypripedium}
4. Leaves solitary at base; lip usually white, yellow, and pink or purplish in various combinations of spotting and streaking, with an expanded lamina on front \textbf{Calypso}

5. Lip petal 7-30mm long, forming an inflated pouch; flowers 1-4 per stem
6. Leaves along stem, 3 to several; lip usually white or yellow, without an expanded lamina on front \textbf{Cypripedium}
7. Sepals 1-2mm long; leaves mostly 1-2 \textbf{Platanthera}
8. Leaves several along the stem
9. Lip petal 2-3 toothed at tip; bracts much longer than flowers \textbf{Coeloglossum}
10. Lip petal entire; bracts longer or shorter than flowers \textbf{Platanthera}
11. Lip petal not spurred from lower side, sometimes slightly saccate and the sac tipped with an elongate beak
12. Lip petal not spurred from lower side, sometimes slightly saccate and the sac tipped with an elongate beak
13. Leaves along stem, or if basal, mostly over 3 times as long as wide, the midvein sometimes white \textbf{Goodyera}
14. Leaves along stem, or if basal, mostly over 3 times as long as wide and the midvein not white
15. Flowers scattered, the bracts foliaceous; petals brownish-purple to greenish-yellow \textbf{Epipactis}
16. Flowers crowded, the bracts usually not foliaceous; petals white to cream \textbf{Spiranthes}
1. Leaflets 2 or 3, or if more, palmately attached, rarely with leaves apparently simple and linear to oblanceolate
2. Stamens all separate or nearly so; petals yellow Thermopsis
3. Filaments all united at the same level
4. Leaves often glandular-dotted under magnification; ovules and seeds 1
5. Calyx usually 3mm or less long, barely if at all enlarging in fruit; flowers mostly 4-7mm long Psoralidium
6. Leaves not glandular-dotted; ovules and seeds 2 or more Lupinus
7. Petiole not prolonged beyond lateral leaflets, all leaflets attached at same point, short subequal petiolules often present which differ in color and/or width from petiole; terminal leaflet sometimes toothed near base; calyx teeth sometimes unequal and often longer than tube; flowers in heads or short spike-like racemes; petal color variable but not yellow; fruits not curved or coiled Trifolium
8. Plants trees, often with spines or prickles, at least at base of buds; petals blue Psoralidium
9. Plants shrubby with usually toothed only above middle Medicago
10. Fruits curved or coiled; inflorescence a tight raceme or head not over 5cm long, the petals yellow or blue-purple (rarely pink or white); leaflets usually toothed only above middle Millettia
11. Plants caulescent with erect stems; leaflets 3 Lotus
12. Flowers mostly in racemes which are sometimes spike-like structure
13. Leaflets 3, lanceolate or ovate, venation often obscure; fruit a legume; uncinate hairs lacking
14. Flowers mostly 4-7mm long; calyx usually 3mm or less long, barely if at all enlarging in fruit Psoralidium
15. Terminal leaflet normal or rarely lacking
16. Styles flattened, at least the upper 1/4, hairy along 1 side only Lotus
17. Terminal leaflet normal or rarely lacking
18. Plants woody trees or shrubs
19. Plants shrubby without spines or prickles; petals blue-purple Amorpha
20. Plants trees, often with spines or prickles, at least at base of buds; petals white, greenish, or creamy to rose, pink, or lavender
21. Flowers slightly irregular, not papilionaceous, less than 1cm long; leaves even pinnate; leaflets slightly glandular-toothed Gleditsia
22. Flowers very irregular, papilionaceous, over 1cm long; leaves odd pinnate; leaflets entire Robinia
23. Flowers mostly 4-7mm long; calyx usually 3mm or less long, rarely with leaves apparently simple and linear to oblanceolate
24. Fertile stamens 5 (alternating with 4 petals which are sometimes staminode-like) Dalea
25. Fertile stamens 9 or 10
26. Petals solitary, only the banner present, blue-purple; stamens united at very base; mostly subshrubs Amorpha
27. Petals not solitary, blue-purple or not; stamens usually united well above base or nearly so; herbs
28. Stamens all distinct or nearly so; petals yellow or white to ochroleucous
29. Leaves trifoliolate but stipules leaflet-like; petals yellow Thermopsis
30. Leaves pinnately compound; petals white to ochroleucous Sophora
31. Stamens, or most of them, united by their filaments usually well above base; petal color various
32. Filaments united in a group of 9 and 1 solitary, the solitary one united to the rest near or below middle of filament tube or completely free
33. Flowers 3-20 in head-like umbels; plants caulescent
34. Petals yellow, often tinged with red; leaflets mostly 5 Lotus
35. Petals pink to lavender or white; leaflets mostly 9-21 Coronilla
36. Flowers mostly in racemes which are sometimes spike-like or head-like; plants caulescent or acaulescent

A: typical pea flower, cal = calyx, ban = banner, win = wings, kee = keel; B: stamens enclosing pistil
27. Plants caulescent; leaves conspicuously glandular-dotted under magnification; petals white or yellowish; keel shorter than banner and wings; pod with hooked prickles **Glycyrrhiza**

27. Plants not as above

28. Plants twining; keel brownish-red, spirally twisted **Apios**

28. Plants not as above

29. Keel petal narrowed at tip to a definite slender beak; plants acaulescent or nearly so **Oxytropis**

29. Keel petal not beaked (except caulescent *Astragalus miser*); plants caulescent or acaulescent

30. Plants with 1 seeded pods; petals pink to lavender with reddish-purple lines; wings less than half as long as keel; keel equaling or exceeding banner; calyx lobes awl-shaped, longer than tube **Onobrychis**

30. Plants not as above

31. Fruit a loment; keel usually exceeding or equaling banner and wings **Hedysarum**

31. Fruit a legume; usually not exceeding or equaling both banner and wings **Astragalus**

**Phlox Group**

1. Leaves opposite (at least below), simple, and entire (or ciliate-margined), sometimes densely crowded in mat forming species; filaments attached to corolla at different levels

2. Calyx tube of nearly uniform texture; calyx lobes somewhat triangular **Collomia**

2. Calyx tube usually with green costae alternating with hyaline intervals; calyx lobes slender-acicular

3. Plants annual; upper leaves usually alternate **Microstera**

3. Plants perennial; leaves often all opposite or densely crowded **Phlox**

1. Leaves alternate or basal, or if opposite, then lobed or compound; filaments attached to corolla at same level or different levels

4. Plants annual with flowers in leafy-bracted heads; calyx lobes usually unequal in length; leaves mostly pinnatifid to bipinnatifid with spinulose, linear segments that usually gradually taper into the spinulose tips so that the spinulose tips are not abruptly differentiated from rest of segment **Navaretta**

4. Plants not as above (an annual with some trifid or pinnatifid leaves has spinulose tips abruptly set off from leaf proper)

5. Leaves sessile, palmately divided to near base (except some fascicled in axils of main leaves)

6. Plants annual; calyx 2-4mm long; corolla 2.5-6mm long **Leptosiphon**

6. Plants perennial; calyx 7mm or more long; corolla 12mm or more long **Linanthus**

5. Leaves not both sessile and palmately divided to near base

7. Calyx tube of nearly uniform texture (rarely with linear alternating white segments); calyx lobes without needle-like tips (may be sharply acute)

8. Leaves pinnately compound; perennial **Polemonium**

8. Leaves simple and mostly entire; annual **Collomia**

7. Calyx tube with green costae alternating with hyaline intervals, the hyaline intervals often as wide as or wider than the green costae; calyx lobes sometimes with sharp, but short, needle-like tips **Ipomopsis**

**Purslane Group**

1. Petals yellow; capsule circumsessile; annual **Portulaca**

1. Petals white, pink, rose, or lavender; capsule valvate or circumsessile; annual or perennial

2. Plants annual; cauline leaves usually perfoliate **Claytonia**

2. Plants perennial; cauline leaves none or not perfoliate

3. Plants with a subglobose corm; capsule valvate; stem leaves 2 (rarely none), usually lanceolate or oblanceolate or broader **Claytonia**

3. Plants with a taproot; capsule circumsessile or valvate; stem leaves mostly linear or bract-like when present

4. Plants with a thick fleshy taproot; flowers usually 1 per scape; capsule circumsessile **Lewisia**

4. Plants with a slender taproot; flowers usually several in an inflorescence; capsule valvate **Phemeranthus**

**Rose Group**

1. Plants trees or shrubs, not low and mat-forming

2. Leaves compound

3. Stems spiny or prickly, the prickles or spines sometimes rather sparse

4. Stipules attached to petiole most of their length; leaflets mostly 3 or more **Rosa**

4. Stipules lacking or free most of their length; leaflets mostly 3 **Rubus**

5. Stems not spiny or prickly

5. Leaflets 10-30mm wide, toothed; petals white or cream; fruit pomaceous **Sorbus**

5. Leaflets 1-6mm wide, entire; petals yellow; fruit an achene **Dasiphora**

2. Leaves simple

6. Leaves palmately veined, some of them 7cm or more wide **Rubus**

6. Leaves pinnately veined, or if palmately veined, less than 7cm wide

7. Branches with spines or thorns

8. Leaves often doubly toothed or lobed, at least near tip; styles 2-5; spines usually not bearing leaves, buds, or flowers **Crataegus**

8. Leaves simply toothed; styles solitary; spines usually bearing leaves, buds, or flowers **Prunus**

7. Branches without spines or thorns

9. Leaves 3 lobed or parted at tip, otherwise entire, mostly less than 20mm long and wide, tomentose beneath; petals yellow **Purshia**

9. Leaves not 3 lobed or parted at tip, or if so, then larger, toothed or not, usually not tomentose beneath; petals white to pink or red or none

10. Leaves palmately 3-5 lobed **Physocarpus**

10. Leaves not lobed or sometimes shallowly pinnately lobed

11. Leaf blades mostly ovate to orbicular and somewhat rounded at base, or if occasionally broadly elliptic, then with acute to acuminate tips and serrate to serrulate margins throughout (rarely entire); ovary superior or inferior

12. Leaves acute to acuminate at tip, serrate or serrulate throughout, glabrous except sometimes along veins **Prunus**

12. Leaves not as above

13. Leaves with mostly 5-8 pair of prominent lateral veins, glabrous or nearly so; pistils 3 or more; plants rarely over 1m high; ovary superior **Spiraea**

13. Leaves with mostly 8-12 pair of prominent lateral veins, or if fewer, then prominently hairy at least beneath; pistils solitary; plants often over 1m high; ovary inferior

14. Leaf blades mostly rounded at tip (rarely somewhat pointed), not toothed on lower third, glabrous or hairy **Amelanchier**

14. Leaf blades mostly acute at tip, usually toothed throughout (rarely entire), hairy at least beneath **Malus**

11. Leaf blades mostly obovate or narrowly elliptic, rarely ovate, tapering to base, often obtuse to rounded at tip, usually coarsely toothed or lobed or entire, the teeth often not extending to base of leaf; ovary superior

26
1. Ovary and fruit not enclosed in a sac; flowers bisexual (stamens often deciduous) 
1. Ovary and fruit enclosed in a sac (perigynium) 
Sedge 
1. Stamens 10 
Saxifrage 
1. Plants herbaceous, or sometimes woody at base and usually forming low mats 
17. Leaves simple, entire or toothed, rarely with shallow rounded lobes 
18. Leaves mostly 1-1.5mm long, 4mm or less wide; usually forming mats on rocks or in rock crevices Petrophytum 
18. Leaves mostly over 15mm long and 10mm wide; plants not mat-forming Spiraea 
17. Leaves compound, or simple and deeply lobed or cleft into narrow segments 
19. Leaves with 3 broad leaflets 
20. Calyx lobes usually 5 or 6, not alternating with bracteoles; petals white Rubus 
20. Calyx lobes usually 5, alternating with bracteoles; petals yellow or white 
21. Plants with stolons; petals white Fragaria 
21. Plants without stolons; petals yellow or white 
22. Ovary and achene hairy; fruit a hairy achene with elongate plume style; petals none Cercocarpus 
22. Ovary and achene glabrous or nearly so; fruit a follicle; petals white (purple or pinkish tinged) Spiraea 
16. Leaves glabrous or nearly so; fruit a follicle; petals white (purple or pinkish tinged) Spiraea 
15. Leaves either minutely glandular-toothed to near base or conspicuously toothed with the teeth not extending to base (rarely nearly so); pistil and style 1; petals present; fruit a drupe Prunus 
15. Leaves conspicuously toothed, the teeth usually not extending to near base; pistils usually 3 or more, if 1, the petals lacking; fruit an achene or follicle 
16. Leaves conspicuously toothed, the teeth usually not extending to near base; pistils usually 3 or more, if 1, the petals lacking; fruit an achene or follicle

Saxifrage Group 
1. Stamens 10 
2. Styles usually 3; petals deeply 3-7 parted Lithophragma 
2. Styles 1 or 2; petals entire or slightly lobed 
3. Petals reddish or purplish; calyx 9-12mm long Telesonix 
3. Petals white or rarely pinkish; calyx 2-5mm long 
4. Leaf blades of at least the lower leaves suborbicular in outline Saxifraga 
4. Leaf blades mostly obviously longer than wide Micranthes 
1. Stamens 5 
5. Petals divided into linear divisions, the base also linear, often early deciduous; inflorescence an open raceme Mitella 
5. Petals entire, the base sometimes clawed, usually persistent or rarely lacking; inflorescence usually a panicle or thyrsus Heuchera 

Sedge Group 
1. Ovary and fruit enclosed in a sac (perigynium) with a tiny opening at tip; flowers unisexual Carex 
1. Ovary and fruit not enclosed in a sac; flowers bisexual (stamens often deciduous) 
2. Spikelets flattened, the scales in 2 ranks; perianth lacking Cyperus 
2. Spikelets not flattened, the scales spirally arranged; perianth of 1 to several scales or bristles, rarely lacking 
3. Perianth bristles more than 10, long-exserted and cotton-like at maturity Eriophorum 
3. Perianth bristles 0-9, not exserted (except 1 species) nor cotton-like 
4. Base of style often enlarged, forming a cap at tip of ovary; spikelet solitary at tip of a bladeless stem, leaves reduced to sheaths Eleocharis 
4. Base of style not enlarged; spikelets sometimes appearing lateral along stem, usually at least 3, rarely solitary; stems leafy or not 
5. Inflorescence subtended by a single, well developed, green involucral bract, often appearing like a prolongation of stem so the inflorescence appears lateral rather than terminal (other bracts often present but these scale-like and not green); leaves various but rarely over 5mm wide; culms terete to triangular Schoenoplectus 
5. Inflorescence usually subtended by 2 or more green involucral bracts, the inflorescence definitely terminal; leaves flat, some often over 5mm wide; culms triangular, rarely obscurely so 
6. Spikelets usually 10mm or more long, often sessile or nearly so in a crowded cluster, sometimes a few terminal ones on a stalk Bolboschoenus 
6. Spikelets usually less than 8mm long, in an open or branched inflorescence Scirpus
Sunflower Group

Left: disc flower, ach = achene, pap = pappus of scales, cor = corolla, sta = stamens, sty = style; Right: ray flower with pappus of bristles

1. Plants shrubs GROUP I
1. Plants herbs or woody only at base (shrubs with flowers will also run here)
2. Heads of all ray flowers; juice milky
   3. Rays yellow or orange (sometimes drying whitish or purplish, or reddish on outside only) GROUP II
   3. Rays white, blue, purple, pink, or rose GROUP III
2. Heads of both ray and disk flowers or of all disk flowers, the ray flowers, when present, marginal in the head (occasional cultivars may have all ray flowers); juice watery
   4. Ray flowers lacking, only disk flowers present
   5. Pappus of capillary bristles GROUP IV
   5. Pappus either of scales which are sometimes fringed with hairs, 2-8 awns which may be retrorsely barbed, a short crown, small teeth, or lacking GROUP V
   4. Ray flowers and disk flowers both present
   6. Pappus partly or entirely of capillary bristles
   7. Rays yellow or orange when fresh GROUP VI
   7. Rays white, pink, blue, purple, or rose when fresh GROUP VII
   6. Pappus of scales, 2-8 awns (which may be retrorsely barbed), a short crown, small teeth, or entirely lacking
   8. Receptacle with bristles (hairs) or chaffy scales or bracts among the disk flowers, sometimes reduced to a single row of scales between ray and disk flowers GROUP VIII
   8. Receptacle naked GROUP IX

GROUP I
1. Leaves toothed, lobed, or cleft usually from the tip, or else dissected Artemisia
1. Leaves mostly entire or with wavy margins
2. Leaves and stems glabrous, glandular, or puberulent; pappus of scales Gutierrezia
2. Leaves or stems or both somewhat canescent or tomentose, the tomentum sometimes closely appressed to stem and not readily apparent (scrape stem under magnification); pappus of capillary bristles or lacking
3. Leaves and twigs somewhat canescent Artemisia
3. Leaves and twigs not canescent, twigs usually closely tomentose Ericameria
4. Stem leafy, the leaves rarely much reduced
5. Pappus white; leaves lobed Crepis
5. Pappus tawny or brown; leaves entire or minutely toothed Hieracium
6. Stem without leaves, the leaves basal or nearly so (rarely with 1 or 2 much reduced stem leaves)
   6. Outer series of involucral bracts prominently shorter and often spreading or reflexed, the inner series ascending Taraxacum
6. Outer series of involucral bracts about the same size as the inner (rarely shorter), all of them ascending
7. Pappus bristles broader and flattened toward base; achenes not beaked Nothocalais
8. Pappus bristles not flattened or broader toward base; achenes often beaked
9. Achenes often beaked at tip; involucre 10mm or more long Agoseris
8. Achenes not beaked at tip; involucre 5-10mm long Hieracium
9. Pappus none; annual Lapsana
9. Pappus present; annual to perennial
10. Achenes usually flattened; plants sometimes prickly at least on leaf margins or veins
11. Involucres cylindrical, mostly about twice as long as wide or more; either the achenes beaked or the pappus brownish Lactuca
12. Involucres bell-shaped or hemispherical, little if at all longer than wide; achenes not beaked, the pappus white Sonchus
13. Achenes not flattened; plants usually not prickly
14. Pappus white; leaves often lobed or coarsely toothed, or if not, the plants usually glabrous Crepis
15. Pappus often tawny or brown; leaves entire or slightly toothed (rarely slightly lobed); plants usually with long hairs (rarely glabrous or with stellate hairs) Hieracium

GROUP III

1. Pappus bristles plumose, at least above
2. Involucral bracts 2cm or less long; pappus bristles with a narrow scale at base; perennial Microseris
3. Involucral bracts over 2cm long; pappus bristles lacking a scaley base; annual or biennial Tragopogon
4. Pappus of minute scales Cichorium
5. Pappus of capillary bristles
6. Achenes flattened, 1mm or more wide, mostly 4 times or more as wide as deep, often beaked; leaves often pinnatifid and somewhat prickly margined, rarely entire
7. Fruiting involucres 9-15(17)mm long; upper leaves usually clasping stem; flowers normally yellow but often drying blue; achene beak usually filiform and 2mm or more long, lacking or stubby when involucre less than 12 mm long; annual or biennial Lactuca
8. Fruiting involucres mostly 15-20mm long; upper leaves usually not clasping; flowers blue; achene beak less than 2mm long, not filiform; perennial Mulgedium
9. Achenes not flattened, often less than 1mm wide and rarely over twice as wide as deep, usually not beaked; leaves pinnatifid or not, usually not prickly margined
10. Leaves linear or linear-lanceolate, 5mm or less wide, entire, often deciduous
11. Plants perennial; leaves alternate Lygodesmia
12. Plants annual; lowest leaves opposite Shinnersoseris
13. Leaves broader, mostly well over 1cm wide, sometimes toothed, rarely deciduous
14. Stem leaves clasp Prenanthes
15. Stem leaves lacking or not clasping Hieracium

GROUP IV

1. Leaves opposite or whorled
2. Involucral bracts with conspicuous, resinous, yellow or orange dots mostly 0.3-1mm long; leaves mostly dissected Dyssodia
3. Involucral bracts lacking yellow or orange dots or these minute; leaves not dissected
4. Achenes 5 angled; leaves usually whorled Eutrochium
5. Achenes not 5 angled, usually 10 or more ribbed; leaves usually opposite Brickellia
6. Receptacle not fleshy or honeycombed, densely bristly, the bristles much longer than the achenes Carduus
7. Receptacle naked or sometimes fleshy or honeycombed, or if slightly bristly, the bristles shorter than the achenes
8. Corollas 1.5mm or more long, usually purple Onopordum
9. Corollas 5mm long or less, usually yellow or white Xanthisma
4. Leaves without spiny margins or the spines usually less than 1mm long; involucres spiny or not
5. Receptacle densely bristly; involucral bracts spiny or with hooked tips or strongly fimbriate or fringed toward tip (outer ones sometimes merely with broad scarious tips)
6. Involucral bracts with hooked tips forming a bur; leaves ovate, deltoid, or cordate, entire or merely toothed Arctium
7. Involucral bracts without hooked tips, the spines, if present, straight; leaves not as above
8. Pappus mostly 6mm long or more; outer involucral bracts obscurely if at all fimbriate: deep creeping rhizomes present Acroptilon
9. Pappus mostly less than 4(6)mm long or lacking; outer involucral bracts conspicuously fimbriate, at least toward tip; rhizomes usually lacking Centaurea
8. Receptacle naked or rarely short hairy or with a few woolly bracts (very rarely bristly); involucral bracts usually not spiny nor with hooked tips nor strongly fimbriate or fringed
11. Flowers unisexual in separate heads (stamine sometimes with a vestigial ovary and entire style); perennials
12. Involucral bracts in 1 series (excluding a few much reduced ones at base of head); basal leaves cordate or sagittate Petasites
13. Involucral bracts in 2 or more series; basal leaves not cordate or sagittate
14. Basal leaves readily deciduous, not much larger than the well developed and numerous stem leaves which are usually less hairy and greenish on upper surface and white-tomentose beneath; stolons lacking Anaphalis
15. Basal leaves persistent, usually tufted; stem leaves lacking or usually reduced upward, often about equally hairy on both sides; stolons sometimes present Antennaria
11. Flowers perfect, or if unisexual, the pistillate usually marginal and the staminate or perfect central in the same head; annuals to perennials
14. Involucral bracts in 1 series (excluding some occasional short bracts at base)
15. Basal leaves cordate or sagittate, white-tomentose beneath; stem leaves much reduced or lacking; corollas white to purplish or drying yellowish Petasites
16. Basal leaves not cordate or sagittate, or if so, usually not tomentose beneath and corollas usually not white to purplish; stem leaves well developed or not
16. Leaves entire or ciliate margined
17. Leaves all less than 14mm wide
18. Plants white-woolly throughout Logfia
18. Plants not white-woolly Erigeron
17. Leaves, or some of them, 17mm or more wide **Senecio**
16. Leaves toothed or lobed
19. Leaves palmately or ternately divided into mostly linear segments **Erigeron**
19. Leaves not as above **Senecio**

14. Involucral bracts in 2 or more series
20. Involucral bracts entirely scarious and pure white; stems not viscid **Anaphalis**
20. Involucral bracts sometimes scarious but not white (occasionally yellowish or dingy white), or if rarely white, the stems viscid
21. Plants white-woolly at least above, the involucral bracts scarious throughout or sometimes with a green base or midrib; leaves entire
22. Receptacle naked; involucral bracts scarious throughout or sometimes with a green base
23. Heads usually scattered among the leaves through much of plant; involucral bracts brownish or greenish in part; involucre mostly 2-4mm long **Gnaphalium**
23. Heads near top of plant in a definite inflorescence overtopping the leaves; involucral bracts white or yellowish; involucre mostly 4-7mm long **Pseudognaphalium**
22. Receptacle with outer bracts resembling the involucre but with a few pistillate flowers between them and the true involucral bracts, the bracts with a green midrib nearly to tip **Logfia**
21. Plants not as above
24. Plants annual
25. Involucre 2-4mm long, the bracts with scarious margins their entire length and nearly 1/3 their width **Conyza**
25. Involucre 5mm or more long, the bracts mostly herbaceous **Symphyotrichum**
24. Plants perennial or rarely biennial
26. Involucral bracts conspicuously longitudinally striate, greenish and less than 2mm wide **Brickellia**
26. Involucral bracts not conspicuously longitudinally striate, greenish and less than 2mm wide **Erigeron**
27. Corollas purple, pink-purple, or white; heads in a spike-like or head-like inflorescence, or if not, the involucral bracts mostly obovate and not in vertical rows, usually purplish or pink at least at tip
28. Leaves entire or ciliate-margined **Liatris**
28. Leaves toothed **Veronica**
27. Corollas usually yellow; heads in an open inflorescence (rarely raceme-like or cymose), the involucral bracts not obovate, often in vertical rows, usually not purplish
29. Plants biennial or perennial herbs; involucral bracts linear and usually less than 0.6mm wide, or if wider, the leaves with 3 or more linear divisions toward tip **Erigeron**
29. Plants perennial herbs or shrubs; involucral bracts not linear, usually over 0.6mm wide, the leaves entire or toothed
30. Leaves with coarse teeth which are spinulose-tipped **Xanthisma**
30. Leaves entire or wavy-margined **Ericameria**

**GROUP V**

1. Anthers not united or only slightly so; flowers all unisexual; pappus none
2. Staminate and pistillate flowers in the same head, the pistillate few and marginal
3. Plants densely white-woolly throughout, less than 10cm high **Diaperia**
3. Plants not white-woolly, or only partly so (not on upper leaf surface), over 10cm high
4. Leaves all alternate or basal, white-woolly beneath **Adenocaulon**
4. Leaves opposite, at least below, not white-woolly
5. Plants perennial; leaves entire; heads axillary **Iva**
5. Plants annual; leaves toothed; heads in a panicle **Cyclachaena**

2. Staminate and pistillate flowers in different heads, the pistillate completely enclosed in an often bur-like involucre
6. Involucral bracts of staminate head separate; spines of pistillate head hooked **Xanthium**
6. Involucral bracts of staminate head united; spines of pistillate head, if present, not hooked **Ambrosia**
7. Involucral bracts with conspicuous yellow or orange, resinous dots mostly 0.3-1mm long; leaves mostly opposite and dissected **Dyssodia**
7. Involucral bracts without conspicuous yellow or orange dots; leaves various
8. Involucral bracts mostly 4 in 1 series, each enclosing a marginal flower; annuals **Madia**
8. Involucral bracts usually in 2 or more series (rarely 1), usually more than 4; none enclosing marginal flowers; annuals to perennials
9. Involucral bracts, or some of them, with hooked tips forming a bur **Arctium**
9. Involucral bracts not as above
10. Receptacle with chaffy scales, these sometimes only between marginal and central flowers or rarely densely white-woolly and enclosing entire flower
11. Plants densely white-woolly annuals less than 10cm high **Diaperia**
11. Plants not as above
12. Inner involucral bracts longer than outer, united at least 1/3 their length; perennials **Thelesperma**
12. Inner involucral bracts usually shorter than outer, separate or united only at very base; annuals **Bidentis**
10. Receptacle naked or hairy, rarely glandular or with slender almost hair-like scales
13. Involucral bracts with pectinately filiform processes about 1mm long toward tip or the margins strongly fimbriate; receptacle hairy or bristly **Centaura**
13. Involucral bracts not as above; receptacle naked or hairy
14. Pappus lacking or an obscure crown
15. Leaf blades deltoid-ovate to cordate and white-woolly beneath, entire to very shallowly lobed **Adenocaulon**
15. Leaf blades not as above
16. Heads mostly solitary at ends of branches; plants annual **Matricaria**
16. Heads in a definite inflorescence or solitary on an unbranched stem; plants annual to perennial
17. Heads in a spike, raceme, or panicle **Artemisia**
17. Heads in a corymb **Tanacetum**
14. Pappus of scales
18. Leaf blades entire or essentially so **Tetranurus**
18. Leaf blades mostly pinnately dissected
19. Involucral bracts mostly over 3 times as long as wide, not scarious-margined **Chaenactis**
19. Involucral bracts mostly broader, usually scarious-margined **Hymenopappus**

**GROUP VI**

1. Upper leaves mostly opposite
2. Leaves dissected **Dyssodia**
2. Leaves entire or toothed **Arnica**
1. Upper leaves alternate or leaves all basal
3. Receptacle scaly or naked; involucral bracts not as above
4. Stems leafy, the leaves little if at all reduced upward, basal tuft usually lacking *Senecio*
5. Leaves, at least the upper ones, lobed mostly about halfway or more to midrib *Packera*
6. Stems entire or toothed
7. Receptacle bristly; involucral bracts spiny or with pectinately arranged processes
8. Stems usually several to many from an often branched caudex; leaves usually white, gray, or silver hairy (not cobwebby), basal usually with long petioles; involucres mostly about as long as wide, the involucral bracts not black-tipped; heads mostly 1-15 per stem *Packera*
9. Stems usually 1 from a simple caudex or rhizome, or if more, without the other characteristics above *Senecio*

7. Leaves pinnatifid or bipinnatifid *Xanthisma*
8. Involucres sticky, appearing varnished when dry, the outer bracts hooked at tip *Grindelia*
9. Involucres not as above
10. Pappus in 2 series, the outer small, often inconspicuous scales or bristles, the inner of longer barbellate bristles; perennials

GROUP VII
1. Receptacle bristly; involucral bracts spiny or with pectinately arranged processes about 1mm long toward tip *Centaurea*
2. Basal leaf blades cordate or sagittate, white-tomentose beneath *Petasites*
3. Basal leaves lacking or not as above
4. Stems annual; involucre 2-4mm long *Conyza*
5. Stems biennial or perennial, the involucre often over 4mm long *Erigeron*
6. Stems conspicuous and longer than pappus
7. Involucral bracts often somewhat subequal and in 1 or rarely 2 series, long and narrow, entirely green and often with scarios margins or green at base, usually hairy *Erigeron*
8. Involucral bracts mostly imbricate, the outer definitely shorter than the inner, or if not, then usually foliaceous, usually conspicuously broadened at tip or base, entirely green, green at tip, or not green, often glabrous or glabrate
9. Plants with leaves or leaflets and usually at least the lower involucral bracts spinulose
10. Plants not as above
11. Plants taprooted; pappus bristles stout; leaves entire, rarely over 1cm wide, sometimes mostly all basal with sessile or subsessile heads; hairs of achene, when present, often glabrous or forked at tip *Townsendia*
12. Plants perennial with a taproot or branched caudex; ray and disk flowers both white; leaves less than 1cm wide, some usually over 5cm long, mostly linear to linear-oblancoate, the basal well developed or with old persisting bases; involucral bracts glabrous except for margins, about 1mm wide, broadest at base, tapering to tip *Solidago*
13. Plants not as above
14. Plants taprooted; pappus bristles stout; leaves entire or toothed, sometimes well over 1cm wide; heads not sessile or subsessile; hairs of achene not glabrous or forked at tip
15. Tube of disc corollas shorter than the limb (including lobes); leaves mostly less than 4 times as long as wide, some often over 10mm wide, often toothed mostly in upper half, basal tuft lacking; involucral bracts often chartaceous below and somewhat purple-margined or suffused with purple *Eurybia*
16. Tube of disc corollas equaling or slightly longer than the expanded limb (including lobes); leaves mostly less than 4 times as long as wide, some often over 10mm wide, often toothed mostly in upper half, basal tuft lacking; involucral bracts often chartaceous below and somewhat purple-margined or suffused with purple *Eurybia*
17. Peduncles and involucres glandular
18. Leaves, or some of them, 13mm or more wide
19. Leaves mostly toothed *Eurybia*
20. Leaves entire *Symphyotrichum*
21. Peduncles and involucres not glandular *Symphyotrichum*

GROUP VIII
1. Cauleine leaves, at least the lower (sometimes these deciduous), opposite or subopposite
2. Leaves compound or at least pinnatifid or terebral
3. Involucral bracts with conspicuous, yellow or orange, resinous dots mostly 0.3-1mm long *Dysodia*
4. Involucral bracts not as above
5. Inner series of involucral bracts shorter than or equal to outer; annual *Bidens*
6. Inner series of involucral bracts longer than the outer; annual or perennial
7. Inner involucral bracts united a third to half their length, outer about half as long as inner *Thelesperma*
8. Involucral bracts free or united about a fourth their length, outer sometimes much less than half as long as inner *Coreopsis*
9. Plants annual
10. Plants not as above
11. Stems toothed
12. Plants not as above
13. Leaves entire or toothed, rarely lobed
14. Leaves, except sometimes the basal, mostly linear and much reduced upward, some lower ones usually 5cm or more long *Almutor*
15. Leaves mostly broader or not reduced upward or much shorter *Symphyotrichum*
16. Leaves, or some of them, 13mm or more wide
17. Leaves mostly toothed *Eurybia*
18. Leaves entire *Symphyotrichum*
19. Peduncles and involucres not glandular *Symphyotrichum*
Involucral bracts mostly 4 in 1 series, enclosing achenes of marginal flowers Madia
Involucral bracts mostly more than 4 in more than 1 series or else not enclosing achenes
Involucral bracts in 2 very dissimilar series, the inner usually longitudinally striate Bidens
Ray flowers with achenes; disk achenes corky-winged; leaves usually whitish beneath from pubescence Verbesina
Ray flowers sterile or with aborted achenes; disk achenes not corky-winged; leaves not whitish beneath Helianthus
Plants perennial
Pappus persistent; disk achenes strongly compressed and thin-edged; bracts of receptacle often rounded or flat across tip Helianthella
Pappus deciduous (at least the 2 main awn-scales); disk achenes usually slightly to moderately compressed, often not thin-edged; bracts of receptacle often pointed at tip Helianthus
1. Cauline leaves all alternate or the leaves occasionally all basal
2. Involucral bracts not as above; receptacle bristly or not Centaurea
3. Rays white, purple, pink, rose, or red
4. Plants annual; rays white Anthemis
5. Plants perennial; rays white to pink, reddish, or purplish Achillea
6. Involucral bracts dry and scarious throughout except sometimes for a green midrib; rays white or rarely pink Ratibida
7. Involucral bracts, at least the outer, herbaceous or scarious only on the margins; rays reddish or purplish Ratibida
8. Leaves entire or nearly so, rarely subpinnatifid
9. Receptacle with spine-tipped chaffy bracts; rays drooping Echinacea
10. Receptacle with bristles; rays not drooping Gaillardia
11. Leaves all basal or nearly so Balsamorhiza
12. Leaves well developed along stem
13. Receptacle bristly; pappus of awned scales Gaillardia
14. Receptacle with chafty bracts or scales, these rarely linear; pappus various or lacking
15. Disk flowers dark purple to brown; pappus none Rudbeckia
16. Disk flowers yellow; pappus of 2 deciduous awns Helianthus
17. Leaves compound or at least deeply lobed
18. Receptacle dry and scarious throughout except sometimes for a green midrib Cota
19. Involucral bracts, at least the outer ones, herbaceous or scarious only on the margins
20. Rays subtended by receptacular bracts; heads, excluding rays, about 1cm wide; leaves mostly pinnately divided Ratibida
21. Rays not subtended by bracts; heads, excluding rays, mostly 1.5cm or more wide; leaves pinnatifid or palmatifid Rudbeckia
GROUP IX
1. Rays white, purple, pink, or rose
2. Pappus conspicuous, of scales, awns, or bristles; leaves entire or slightly toothed
3. Stems mostly decumbent or none; plants less than 2dm high, usually hairy Townsendia
4. Stems erect; plants mostly 3-15dm high, glabrous Boltonia
5. Pappus lacking or a minute crown; leaves toothed or lobed to dissected
6. Leaves toothed or coarsely lobed Leucanthemum
7. Leaves dissected or otherwise compound Dyssodia
8. Leaves entire or nearly so Madia
9. Plants annual
10. Plants perennial Picradeniopsis
5. Leaves alternate or basal
6. Plants perennial Picradeniopsis
8. Pappus of scales which may be awned from tip, rarely lacking; involucre rarely sticky, the bracts usually not hooked
9. Rays 5mm or less long; involucre glabrous or nearly so Gutierrezia
9. Rays mostly over 5mm long; involucre usually hairy
10. Pappus of scales; leaves entire; perennial Tetraneuris
11. Pappus none; leaves ternately-pinnately dissected, annual or biennial Amauriopsis
Aconitum columbianum Nutt.  
Acrithium repens (L.) DC.  
Actaea rubra (Alton) Wild.  
Adenocaulon bicolor Hook.  
Agrostis (including awns)  
A. cristatum (L.) Gaertn.  
A. geniculatus  
Adiantum  
1. Petiole continuous with a single rachis; leaf blades over twice as long as wide A. capillus-veneris L.  
1. Petiole giving rise to 2 diverging rachises; leaf blades about as long as wide A. aleuticum (Rupe.) Paris  
Adeoxa moschatellina L.  
Agalinis tenuifolia (Vahl) Raf. var. parviflora (Nutt.) Pennell  
Agastache foeniculum  
Agnostis  
1. Spike usually oblong to ovate; spikelets often diverging at a 45 degree angle or more, usually 4-10 flowered; spikelet usually twice or more as long as glumes (including awns) var. cristatum  
1. Spike narrowly cylindric; spikelets diverging at less than a 45 degree angle, mostly 2 or 3(4) flowered; spikelet less than twice as long as glumes (including awns)  
2. Awn of glumes 1.5-4mm long; body of lemmas mostly 5-6mm long, the awn 1-4mm long var. desertorum (Fisch. ex Link) Dorn  
2. Awn of glumes 1.5mm or less long; body of lemmas mostly (5.5)-6.5mm long, the awn 1mm or less long var. fragile (Roth) Dorn  
Agrostis  
1. Paleo evident, usually 2 nerved, about half as long as lemma or more; usually rhizomatous and/or stoloniferous  
2. Ligules mostly 3-6mm long; panicle branches often spikelet-bearing to base A. stolonifera L.  
2. Ligules mostly 1-2(3)mm long; panicle branches not spikelet-bearing to base A. capillaris L.  
1. Paleo lacking or a minute nerveless scale; rhizomes and stolons usually lacking  
3. Panicle contracted, at least some lower branches spikelet-bearing near base A. exarata Trin.  
3. Panicle open at maturity, the lower branches not spikelet-bearing near base A. desertorum Dorn  
Alcea rosea L.  
Alliaria petiolata (Bieb.) Cavara & Grande  
Allium  
1. Umbel nodding; stamens exerted from perianth A. cernuum Roth  
1. Umbel erect; stamens included in perianth or rarely exerted  
2. Ovary crested with 6 low knobs; bracts of involucr usually 1 nerved  
3. Tips of inner perianth parts spreading; flowers usually white; bulblets lacking A. textile Nels. & Macbr.  
3. Tips of inner perianth parts erect; flowers usually pink, sometimes replaced by bulblets A. geyeri Wats.  
4. Flowers normal var. geyeri  
4. Flowers largely replaced by bulblets, these clustered at base of inflorescence var. tenerum Jones  
2. Ovary crestless; bracts of involucr 1-7 nerved  
5. Flowers replaced by bulblets in whole or part; involucr bracts usually 3-7 nerved A. canadense L. var. fraseri Ownby  
5. Flowers not replaced by bulblets; involucr bracts 1 nerved A. drummondi Regel  
Alopecurus pauciflorus (Nutt.) Löve & Löve  
1. Awn scarcely exceeding glumes, arising from near middle of lemma A. aequalis Sobol.  
1. Awn exerted 2mm or more beyond glumes, arising from near base of lemma  
2. Plants annual; anthers 0.3-0.6mm long; panicle rarely over 5cm long A. carolinianus Walt.  
2. Plants perennial; anthers mostly 0.7-2mm long; panicle sometimes over 5cm long A. geniculatus L.
Alyssum
1. Plants usually over 5cm high; heads generally exceeding the leaves
   1. Plants usually less than 5cm high; heads solitary, barely if at all exceeding the mostly basal leaves

Amaranthus
1. Plants dioecious; pistillate flowers lacking perianth A. tuberculatus (Moq.) Sauer
   1. Plants monoecious, rarely dioecious; perianth present
      2. Inflorescences both terminal and axillary
         3. Plants dioecious; bracts of inflorescence mostly ovate and 3mm long or less; flower clusters somewhat loose in a narrow, elongate inflorescence A. arenicola Johnston
         3. Plants monoecious but the staminate flowers often few; bracts of inflorescence mostly narrowly lanceolate and 4mm or more long; flowers often densely clustered in a somewhat short and stout inflorescence A. retroflexus L.
   2. Inflorescences all axillary clusters
      4. Sepals 4 or 5; seeds 1.3-2mm long; plants prostrate A. bitoides Wats.
      4. Sepals 3 (rarely 1); seeds 0.6-1.4mm long; plants erect or prostrate
      5. Plants prostrate; pistillate perianth of 1 normally developed sepal and 2 reduced sepals A. californicus (Moq.) Wats.
      5. Plants somewhat erect; pistillate perianth with 3 subequal sepals A. albus L.

Amaurotisidissecta (Gray) Rydb.

Ambrosia
1. Plants annual with a taproot
   2. Leaves 3(5) palmately lobed or not at all lobed A. trifida L.
   2. Leaves mostly 1-2 times pinnatifid
      3. Fruiting involucre bearing several series of coarse spines usually over 3mm long; staminate involucral bracts usually connate about half their length, the lobes somewhat regular A. acanthicarpa Hook.
      3. Fruiting involucre bearing 1 series of short spines 0.5mm or less long or spines lacking; staminate involucral bracts usually connate most of their length, the lobes, if present, somewhat irregular A. artemisiifolia L.
   4. Lower surface of leaves usually pubescent; leaves alternate A. tomentosa Nutt.
   4. Lower surface of leaves not tomentose; leaves opposite at least below A. psilostachya DC.

Aneurarchier
1. Plants somewhat erect; creeping rootstocks, these sometimes deep
   2. Sepals 3 (rarely 1); seeds 0.6-1.4mm long; plants prostrate A. crassifolia (Nutt.) Koehne
   2. Sepals 4 or 5; seeds 1.3-2mm long; plants prostrate A. bitoides Wats.
   3. Style usually yellowish or reddish A. alnifolia Koehne
   3. Style usually brownish or reddish A. albus L.

Ammannia robusta Heer & Regel

Amorpha
1. Plants mostly over 1m high; petiole usually longer than width of lowest leaflet; some leaflets 18mm or more long A. fruticosa L.
   1. Plants mostly less than 1m high; petiole often shorter than width of lowest leaflet; leaflets 20mm or less long
      2. Leaves and calyces conspicuously hairy; racemes usually several in axils of upper leaves forming compound cluster A. canescens Pursh
      2. Leaves and calyces glabrous or nearly so; racemes usually solitary at tips of stems and branches A. nana Nutt.

Amphicarpaea bracteata (L.) Fern.

Anagallis minima (L.) Krause

Anaphalis margaritacea (L.) Benth. & Hook.

Anchusa arvensis (L.) Bieb.

Andersonglossum boreale (Fern.) Jim.-Mejias et al.

Andropogon
1. Rhizomes short and slender or none; awns of sessile spikelets mostly 10mm or more long; ligules mostly less than 3mm long A. gerardii Vitman
   1. Rhizomes usually well developed; awns of sessile spikelets mostly less than 8mm long; ligules often more than 3mm long A. hallii Hack.

Androsace
1. Inflorescent bracts lanceolate to linear, usually 4 times or more as long as wide; calyx lobes shorter than tube A. septentrionalis L.
   1. Involucral bracts broadly elliptic to oblanceolate, less than 4 times as long as wide; calyx lobes about equaling tube A. occidentalis Pursh

Anemone
1. Sepals 2-4cm long; style in fruit plumpose, 1.5-3.5cm long A. patens L. var. multifida Pritzel
   1. Sepals mostly less than 2cm long; styles in fruit usually not plumpose, less than 1cm long
      2. Stem or involucral leaves sessile or nearly so; basal leaves often over 6cm wide A. canadensis L.
      2. Stem or involucral leaves usually petiolated, the petiole often quite wide; basal leaves often less than 6cm wide
      3. Receptacle in fruit subglobose, less than twice as long as wide; primary or secondary leaf segments of basal leaves rarely as much as 5mm wide; petioles of involucral leaves rarely over 2cm long A. multifida Poiret
      3. Receptacle in fruit cylindrical, 2 or more times as long as wide; primary or secondary leaf segments of basal leaves often over 5mm wide; petioles of involucral leaves sometimes over 2.5cm long
      4. Primary involucral (3)-5-9 leaved, usually without secondary involucres on the peduncles; styles usually brownish or reddish A. cylindrica Gray
      5. Primary involucral 2-4(-5) leaved, often with secondary involucres on some peduncles; styles usually yellowish except sometimes the very tip A. virginiana L.

Antennaria
1. Plants usually less than 5cm high; heads solitary, bare if at all exceeding the mostly basal leaves A. dimorpha (Nutt.) T.& G.
   1. Plants usually over 5cm high; heads generally exceeding the leaves, usually several to many heads per stem
      2. Basal leaves conspicuously less pubescent than beneath, becoming glabrate and usually green above, white-tomentose beneath
      3. Upper stem leaves with a strap-like, scarious tip mostly 1-3mm long; involucral bracts generally brown in lower half A. neglecta Greene
      3. Upper stem leaves with a sharp, hair-like scarious tip or not scarious; involucral bracts generally greenish in lower half, occasionally brown A. howellii Greene
      4. Basal leaves glabrous on upper side ssp. howellii
      4. Basal leaves pubescent on upper side or glabrescent with age
      5. Basal leaves spatulate to narrowly or broadly obovate and sometimes petiolate; leaves along stolons nearly equal to those in rosettes at their ends ssp. neodioica (Greene) Bayer
      5. Basal leaves cuneate-ob lanceolate, spatulate, or spatulate-obovate without petioles; leaves along stolons smaller than those in rosettes at their ends ssp. petaloidea (Fern.) Bayer
      6. Inflorescences mostly (6)7-11mm long; dry pistillate corollas mostly 5-8mm long A. parvifolia Nutt.

34
6. Involucres mostly 3-7mm long; dry pistillate corollas mostly 2.5-4.5mm long.
7. Terminal portion of involucral bracts mostly whitish; clones about equally staminate and pistillate A. microphylla Rydb.
8. Terminal portion of involucral bracts, or some of them, partly pinkish, sometimes obscurely so, rarely whitish, yellowish, or brownish; clones entirely pistillate or nearly so A. rosea Greene

Anthemis cotula L.
Anthoxanthum hirtum (Schrank) Schouten & Veldkamp
Apera interrumpa (L.) Beauv.
Apis americana Medic.
Apocynum
1. Flowers usually all perfect; shrubs, rarely appearing

Artemisia
1. Stem leaves, excluding basal cluster if present, mostly
2. Heads 2.5-4.5cm wide; involucre and corollas usually glabrous, the middle and inner bracts subequal and surpassing corollas A. lappa L.
3. Heads 1.5-2.7cm wide; involucre often hairy, the hairs usually cobwebby, the middle and inner bracts successively longer and mostly shorter than corollas, the corollas often minutely glandular-puberulent, especially on lobes A. tomentosum Miller

Aristolochia
2. Flowers red at least in part (rarely all yellow) A. canadensis L.
3. Flowers blue or purple at least in part A. brevistyla Hook.

Aralia
1. Terminal inflorescence raceme-like or panicle-like and somewhat elongate, the heads mostly sessile or short peduncled; larger leaves tapering at tip A. minus (Hill) Bernh.
2. Terminal inflorescence corymb-like and compact, the heads long-peduncled; larger leaves broadly rounded at tip A. absinthium L.
3. Heads 2.5-4.5cm wide; involucre and corollas usually glabrous, the middle and inner bracts subequal and surpassing corollas A. lappa L.
4. Heads 1.5-2.7cm wide; involucre often hairy, the hairs usually cobwebby, the middle and inner bracts successively longer and mostly shorter than corollas, the corollas often minutely glandular-puberulent, especially on lobes A. tomentosum Miller

Aruca tanacetae (L.) Spreng.
2. Branchlets with spreading, stipitate, multicellular hairs often 0.5mm or more long var. adenotricha Fern. & Macbr.
3. Branchlets not viscid-villosus, the hairs mostly curled and not spreading nor glandular var. uva-ursi

Arenaria serpyllifolia L.
Argemone polyanthemos (Fedde) Ownbey
1. First glume 17-30mm long; annual A. oligantha Michx.
2. First glume 5-13mm long; annual or perennial A. mexicana (H.B.K.) Bernh.
3. Central awn spirally coiled at base, the lateral awns straight; annual A. dichotoma Michx. var. curtissii Gray
4. Central awn straight like the lateral awns; perennial A. purpurea Nutt.
5. Leaves mostly in a short cluster at base of plant; awns 1.5-5cm long var. fendleriana (Steudel) Vasey
6. Leaves not conspicuously basal; awns mostly 5-9cm long var. longiseta (Steudel) Vasey

Arthrocne rusticana Gaertn. et al.
1. Stem leaves mostly 5-10 pair, only gradually reduced upward, basal leaves none or early deciduous A. chamiissonis Less. var. foliosa (Nutt.) Maguire
2. Stem leaves, excluding basal cluster if present, mostly 2-4 pair, usually conspicuously reduced upward, basal leaves often present
3. Pappus subplumose, somewhat tawny; flowering stems usually without tufts of basal leaves A. mollis Hook.
4. Pappus barbellate, usually white; flowering stems often with tufts of basal leaves A. filiformis (Nutt.) Fern. & Macbr.
5. Widest leaf blades mostly 1-3 times as long as wide, at least some usually toothed
6. Leaves with 3-7 somewhat parallel, primary veins, the middle and upper blades usually broader than lance-ovate A. fulgens Pursh
7. Old leaf bases without tufts of hair, or the hairs few and white; disk corollas glandular, usually not hairy A. sororia Greene

Artemisia
1. Flowers usually all perfect; shrubs, rarely appearing like subshrubs
2. Leaves linear, linear-oblancoate, or linear-elliptic and entire or a few sometimes irregularly once or twice lobed or toothed
3. Leaves all filiform and less than 1mm wide A. filiformis Torrey
4. Leaves linear or broader, 1mm or more wide A. cana Pursh
5. Leaves, or many of them, 3 toothed or 3-6 parted at tip, often cuneate A. filifolia Torrey
6. Leaves mostly deeply cleft into 3-6 leaf divisions, the basal part of leaf usually about as wide as the divisions and not broadened A. filifolia Torrey
7. Old leaf bases with tufts of long brown wool in axils; disk corollas usually hairy at least below, often also glandular A. fulgens Pursh
8. Old leaf bases without tufts of hair, or the hairs few and white; disk corollas glandular, usually not hairy A. sororia Greene

Arthonia
2. Leaves at middle of head fertile, the ovary normal
3. Recipient with long hairs between the flowers
4. Plants mostly 4-12dm high; larger cauline leaf blades 3cm long or more, the ultimate segments (1)1.5-4mm wide A. absinthium L.
8. Plants mostly 1-4dm high; cauline leaf blades mostly less than 3cm long, the ultimate segments often less than 1.5mm wide **A. frigida** Willd.

7. Receptacle not hairy

9. Plants annual or biennial with a taproot; leaves often glabrous or nearly so

10. Inflorescence dense and spike-like or with spike-like branches, the heads crowded, not conspicuously peduncled; involucre 1.5-4mm long **A. biennis** Willd.

11. Inflorescence loose and paniculiform, the heads not particularly crowded, usually conspicuously peduncled; involucre 1-2(2.5)mm long **A. annua** L.

9. Plants perennial from a rhizome or caudex or rarely a taproot; leaves usually hairy at least beneath

11. Plants with deep creeping rhizomes, the stems loosely clustered or solitary; leaves entire to subpinnatifid, only occasionally narrow with a gradually tapering tip **A. ludoviciana** Nutt.

12. Leaves mostly deeply parted or divided; disk flowers mostly 15-45 var. **incompta** (Nutt.) Cronq.

11. Plants lacking creeping rhizomes, the stems clustered from a woody caudex; leaves mostly entire, narrow with a gradually tapering tip, rarely pinnately lobed **A. longifolia** Nutt.

6. Flowers at middle of head sterile; the ovary aborted

13. Plants subshrubs; involucre canescent **A. fiifolia** Torrey

13. Plants herbaceous; involucre often glabrous

14. Leaves mostly entire, the lower rarely with 3-5 narrow segments **A. dracunculus** L.

14. Leaves mostly pinnatifid or dissected except the uppermost ones **A. campestris** L.

15. Plants mostly biennial with 1 stem from root, basal leaves usually none at flowering var. **caudata** (Michx.) Palmer & Steyerm.

15. Plants mostly perennial with often several stems from caudex; basal leaves usually present var. **scouleriana** (Bess.) Cronq.

**Asclepias**

![Flower of Asclepias speciosa, hoods ascending, sepals and petals reflexed.]

1. Corolla usually orange to red when fresh; stems mostly hirsute **A. tuberosa** L.

1. Corolla white, green, light yellow, rose, pink, or purplish; stems rarely hirsute

2. Leaves linear, 4(5)mm wide or less

3. Leaves mostly 4cm or less long, spirally arranged, very crowded; plants mostly less than 2dm high, with several stems from base **A. pumila** (Gray) Vail

3. Leaves sometimes over 4cm long, mostly opposite, alternate, or whorled; plants mostly over 2dm high, with 1 or several stems from base

4. Hoods lacking horns within; leaves opposite or alternate **A. stemophylla** Gray

4. Hoods with horns within; leaves mostly whorled **A. verticillata** L.

2. Leaves not linear, some usually over 4mm wide

5. Hoods lacking horns within; corolla mostly greenish **A. viridiflora** Raf.

5. Hoods with horns within; corolla pink, purple, rose, green, or yellowish

6. Hoods 10mm or more long **A. speciosa** Torrey

6. Hoods 1-8mm long

7. Hoods about equaling anthers and stigma; horns equaling or surpassing hoods; corolla pink **A. incarnata** L.

7. Hoods surpassing anthers and stigma; horns shorter than hoods; corolla greenish-white **A. ovalifolia** Decne.

**Asparagus officinalis** L.

**Asplenium**

1. Leaves with only 1-5 linear leaflets at tip **A. septentrionale** (L.) Hoffm.

1. Leaves with more than 5 non-linear leaflets

2. Rachis reddish-brown; usually on granite **A. trichomanes** L.

2. Rachis green or yellowish; usually on limestone **A. trichomanes-ramosum** L.

**Astragalus**

1. Leaves reduced to linear or oblanceolate phyllodia and apparently simple **A. spatulatus** Sheld.

1. Leaves compound with 3 or more leaflets

2. Most leaves with only 3 leaflets **GROUP I**

2. Most leaves with 5 or more leaflets

3. Hairs of leaflets attached at or toward middle of hair, not at base (1 free end sometimes very short, use magnification) **GROUP II**

3. Hairs of leaflets attached at base of hair (leaves rarely glabrous)

4. Mature pods present

5. Pods with 2 cells or nearly so **GROUP III**

5. Pods with 1 cell **GROUP IV**

4. Mature pods lacking, flowers present

6. Stipules not united on side of stem opposite petiole (rarely a few very nearly united or the plants acaulescent and densely tufted and this difficult to detect)

7. Banner 14.5mm or less long; calyx tube mostly less than 4.5mm long **GROUP V**

7. Banner 15mm or more long; calyx tube mostly 5mm or more long **GROUP VI**

6. Stipules, at least the lower ones, united on side of stem opposite petiole

8. Banners mostly 14mm or more long **GROUP VII**

8. Banners mostly less than 14mm long **GROUP VIII**

**GROUP I**

1. Plants with many of the leaves apparently simple **A. spatulatus** Sheld.

1. Plants with essentially all the leaves with 3 leaflets

2. Banner oblanceolate to spatulate, tapering evenly from tip to base; petals glabrous; leaves 1-10cm long; often loosely matted **A. gilviflorus** Sheld.

2. Banner fiddle-shaped, with an oblanceolate blade superimposed on an oblanceolate claw of the same length and width; petals conspicuously hairy; leaves 0.7-3.5cm long; densely matted **A. hyalinus** Jones

**GROUP II**

1. Stipules, at least the lower ones, connate on side of stem opposite petiole; plants all with leafy stems
2. Pods with 1 locule; calyx tube 2-3.5mm long; keel somewhat beaked A. miser Dougl. var. decumbens (Nutt. ex T.& G.) Cronq.
3. Stems arising many together from a root crown or branching caudex; corolla usually blue or purple, rarely white A. laxmannii Jacq. var. robustior (Hook.) Barneby & Welsh
4. Calyx tube 6.5mm or more long, the teeth half or less as long as tube; corolla pink-purple A. missouriensis Nutt.
5. Calyx tube less than 6.5mm long, the teeth about as long as tube; corolla whitish or cream (purple tinged) A. lotiflorus Hook.

GROUP II
1. Stems not connected to stem opposite petiole or the plants without stems and the leaves all basal
2. Stems arising many together from a root crown or branching caudex; corolla usually blue or purple, rarely white A. laxmannii Jacq. var. robustior (Hook.) Barneby & Welsh
3. Herbage somewhat cinereous with hairs mostly 0.5-1.1mm long; inflorescence somewhat pilose; calyx tube usually 5.5-8mm long var. crassicarpus
4. Calyx tube with a stipe at least as long as calyx tube
5. Pod with a stipe at least as long as calyx tube
6. Pods in a somewhat loose raceme, usually pendulous at maturity A. alpinus L.

GROUP IV
1. Pods with a stipe as long as or longer than calyx tube
2. Pods compressed laterally
3. Pods without a stipe or the stipe shorter than calyx tube A. flexuosus (Hook.) Dougl. ex G. Don

GROUP V
1. Pod without a stipe or stipe shorter than calyx tube
2. Pods considerably shorter than calyx tube
3. Pods compressed laterally, usually pendulous at maturity A. alpinus L.
4. Pods compressed dorsiventrally or trigonously
5. Pods mostly about 5mm wide; leaflets mostly 1cm long A. crassicarpus Nutt.
6. Pods mostly about 2-5mm wide, often over twice as long
7. Pods in a dense subglobose head A. agrestis Dougl. ex G. Don
8. Pods mostly about 2-5mm wide, often over twice as long
9. Pods mostly about 10mm wide or more, about 1.5-2 times as long
10. Pods mostly well over 5mm wide; some leaflets over 25mm long; some stipules usually over 1cm long A. americanus (Hook.) Jones
11. Pods mostly 5mm or less wide; leaflets 25mm or less long; stipules less than 1cm long A. alpinus L.
12. Pods mostly about 2-5mm wide, often over twice as long
13. Pods without a stipe or the stipe shorter than calyx tube A. flexuosus (Hook.) Dougl. ex G. Don
14. Pods not inflated, or if so, then tough-leathery or woody or fleshy, usually elliptic, linear, or oblance and often compressed laterally or dorsiventrally
5. Pod with a stipe as long as or longer than calyx tube
6. Pods compressed laterally
7. Lower stipules lacking a dark band at base; pod lacking a septum; calyx 2.5-5mm long, the tube mostly 2-2.7mm long; ovules 3-9 A. multiflorus (Pursh) Gray
8. Pods compressed dorsiventrally or trigonously
9. Pods compressed trigonously, the 3 sides flat or concave A. racemosus Pursh
10. Pods compressed laterally, usually strongly so
11. Pods terete or subterete or compressed dorsiventrally or trigonously
12. Pods mostly 6-11mm long A. vexilliflexus Sheld. 13. Pods mostly 12-21mm long A. flexuosus (Hook.) Dougl. ex G. Don
14. Pods mostly 12-21mm long; ovules 14-20 A. flexuosus (Hook.) Dougl. ex G. Don
15. Pods 4-9mm long; ovules 5-9 A. gracilis Nutt.
16. Pods mostly 12-21mm long; ovules 14-20 A. flexuosus (Hook.) Dougl. ex G. Don
17. Calyx tube 1.4-4.3mm long; banner 4.5-13mm long
18. Calyx tube 4.5-10mm long; banner usually 13.5mm or more long
19. Calyx tube 1.4-4.3mm long; banner 6-10mm long
20. Calyx tube 1.4-4.3mm long; banner 4.5-13mm long
21. Calyx tube 1.4-4.3mm long; banner 4.5-13mm long
22. Calyx tube 1.4-4.3mm long; banner 4.5-13mm long
23. Calyx tube 1.4-4.3mm long; banner 4.5-13mm long
24. Calyx tube 1.4-4.3mm long; banner 4.5-13mm long
25. Calyx tube 1.4-4.3mm long; banner 4.5-13mm long
26. Calyx tube 1.4-4.3mm long; banner 4.5-13mm long
27. Calyx tube 1.4-4.3mm long; banner 4.5-13mm long
28. Calyx tube 1.4-4.3mm long; banner 4.5-13mm long
29. Calyx tube 1.4-4.3mm long; banner 4.5-13mm long
30. Calyx tube 1.4-4.3mm long; banner 4.5-13mm long
31. Calyx tube 1.4-4.3mm long; banner 4.5-13mm long
32. Calyx tube 1.4-4.3mm long; banner 4.5-13mm long
33. Calyx tube 1.4-4.3mm long; banner 4.5-13mm long
34. Calyx tube 1.4-4.3mm long; banner 4.5-13mm long
35. Calyx tube 1.4-4.3mm long; banner 4.5-13mm long
36. Calyx tube 1.4-4.3mm long; banner 4.5-13mm long
37. Calyx tube 1.4-4.3mm long; banner 4.5-13mm long
4. Ovules 14-26; stems and leaves sometimes glabrous or glabrate A. agrestis Dougl. ex G. Don
3. Flowers mostly 16-80 per raceme, or if fewer, then flowers ochroleucus
5. Flowers erect or ascending, ochroleucus A. cicer L.
5. Flowers soon drooping, white or ochroleucus to purplish
6. Petals purple, rarely white or ochroleucus; calyx tube 2.8-5.7mm long; ovules 5-15 A. bisulcatus (Hook.) Gray
6. Petals white or ochroleucus; calyx tube 4.5-9mm long; ovules 12-22 A. racemosus Pursh

GROUP VIII
1. Stems arising from buried points of renewal on an underground root crown or rhizome-like caudex branches
2. Keel slightly longer and nearly twice as wide as the whitish wings A. alpinus L.
2. Keel not as above
3. Calyx tube 1.5-2.7mm long; banner 5-8.5mm long A. gracilis Nutt.
3. Calyx tube 2.7-6mm long; banner 7.5-14mm long
4. Calyx 3.5-6mm long; leaflets mostly less than 2cm long A. flexuosus (Hook.) Dougl. ex G. Don
4. Calyx 6.5-9mm long; some leaflets usually over 2cm long A. cicer L.
1. Plants herbaceous annuals
5. Calyx tube 1.4-2.2mm long
6. Ovary and young fruit densely hairy, sessile or nearly so; flowers 3-7(11) per raceme A. vexilliflexus Sheld.
6. Ovary and young fruit glabrous or nearly so, conspicuously stipitate; flowers 4-20 per raceme A. multiflorus (Pursh) Gray
5. Calyx tube 2.3-5.7mm long
7. Racemes mostly 25-80 flowered
8. Leaves 3-14cm long; leaflets 11-35; flowers 25-80; stems to 5dm long A. bisulcatus (Hook.) Gray
8. Leaves 1-7cm long; leaflets 7-15; flowers 2-30; stems to 2.5dm long A. australis (L.) Lam. var. glabriusculus (Hook.) Isely
7. Racemes mostly 2-2(25) flowered
9. Keel 6-10.5mm long
10. Petals often whitish or ochroleucus and purple-tipped; ovules 6-19 A. australis (L.) Lam. var. glabriusculus (Hook.) Isely
10. Petals purple to reddish-lilac (very rarely whitish); ovules 2-10 A. alpinus L.
9. Keel 4-6mm long A. multiflorus (Pursh) Gray

Athyrium filicifolia (L.) Roth var. cyclosum Rupr.

Atriplex
1. Plants perennial shrubs or subshrubs
2. Plants mostly shrubs without white bark; tufts of white hairs usually lacking in vein axils on und
3. Outer involucral bracts mostly 5-8(10); disk corollas yellow-orange, 2.5-3mm long B. frondosa L.
1. Plants not as above
   B. dactyloides (Nutt.) Columbus

Bistorta vivipara (L.) Delarbre

1. Stem leaves, or most of them, not auriculate B. pendulocarpa (A. Nels.) Windham & Al-Shehbaz

2. Mature fruits erect to ascending

3. Hairs of lower leaves mostly simple or forked, often rather sparse, rarely lacking B. stricta (Graham) Al-Shehbaz

4. Plants long-lived perennials usually with woody caducous; mature fruits 0.8-1.5(2)mm wide; leaves mostly 4mm or less wide
   B. microphylla (Nutt.) Dorn

4. Plants biennials or short-lived perennials; mature fruits 1-2.5mm wide; some leaves often over 4mm wide
   B. diversicaulescens (Graham) Al-Shehbaz

5. Basal leaves with some hairs with 5 or 6 rays; mature fruits 1.7(2)-2.5mm wide; petals purple to lavender; fruiting pedicels 5-10(12)mm long
   B. divaricarpa (A. Nels.) Löve & Löve

5. Basal leaves with hairs with 2-4 rays; mature fruits 1-1.5(1.8)mm wide; petals usually white; fruiting pedicels (5)8-30mm long
   B. grahamii (Lehm.) Windham & Al-Shehbaz

Boltonia asteroides (L.) Palla var. paludosus (A. Nels.) Dorn

1. Stem leaves auriculate

Boe"nichia

1. Vegetative part of leaf 2

2. Vegetative part of leaf stalked, attached to common petiole near ground level

3. Hairs of lower leaves mostly simple or forked, often rather sparse, rarely lacking B. stricta (Graham) Al-Shehbaz

4. Plants long-lived perennials usually with woody caducous; mature fruits 0.8-1.5(2)mm wide; leaves mostly 4mm or less wide
   B. microphylla (Nutt.) Dorn

4. Plants biennials or short-lived perennials; mature fruits 1-2.5mm wide; some leaves often over 4mm wide
   B. diversicaulescens (Graham) Al-Shehbaz

5. Basal leaves with some hairs with 5 or 6 rays; mature fruits 1.7(2)-2.5mm wide; petals purple to lavender; fruiting pedicels 5-10(12)mm long
   B. divaricarpa (A. Nels.) Löve & Löve

5. Basal leaves with hairs with 2-4 rays; mature fruits 1-1.5(1.8)mm wide; petals usually white; fruiting pedicels (5)8-30mm long
   B. grahamii (Lehm.) Windham & Al-Shehbaz

Botrychium

1. Vegetative part of leaf 2

1. Primary segments of vegetative part of leaf broader, the sides spanning an arc greater than 60 degrees
   B. lineare (A. Nels.) Löve & Löve

2. Primary segments of vegetative part of leaf linear, often deeply cleft into widely spreading lobes, the basal segments usually the largest
   B. lineare Wagner

3. Primary segments of vegetative part of leaf half or more the length of the spore bearing part of leaf; stalk of spore bearing part of leaf usually the pinna width; lower branches of spore bearing part of leaf usually short stalked to sessile, sporangia partly obscuring the archis
   B. pendulocarpa Shehbaz

1. Plants dioecious or monoecious, to 20cm high, stoloniferous; pistillate spikelets with the thickened archis and 2nd glumes forming a rigid, yellow-white, globular structure crowned by green-toothed summits of the glumes; stamine spikelets 2 flowered, sessile, in 2 rows on 1 side of archis
   B. dactyloides (Nutt.) Columbus

1. Plants not as above

2. Spikes of raceme many, to 20mm long, pendulous; rhizomes usually present B. curtipendula (Michx.) Torrey

1. Spikes 1-4(8), often over 20mm long, spreading or ascending; rhizomes none or very short

39
3. Rachis of spikes prolonged beyond the spikelets as a naked point mostly 4-8mm long; largest glume with long, tubercle-based hairs

**B. hirsuta** Lag.

3. Rachis of spikes not prolonged beyond spikelets, or if so, not naked but bearing rudimentary spikelets; largest glume with or without tubercle-based hairs **B. gracilis** (Kunth) Lag. ex Griffiths

**Brassica**

1. Fruits somewhat appressed-ascending, 1-2.5cm long, midnerve strongly raised from surface **B. nigra** (L.) Koch

1. Fruits mostly spreading-ascending, 2-4cm long, midnerve not strongly raised **B. juncea** (L.) Czern.

**Brickelia eupatorioides** (L.) Shinners var. **corymbulosa** (T. & G.) Shinners

**Bromus**

1. Plants perennial

2. Creeping rhizomes present

3. Lemmas awnless or awned, glabrous or sometimes short appressed-hairy; leaf blades, sheaths, and nodes often glabrous or short-hairy **B. inermis** Leyss.

3. Lemmas usually awned, long-hairy especially near margins, the hairs somewhat spreading or ascending, some of them 0.8mm or more long; leaf blades, sheaths, and nodes often long-hairy **B. pumpellanus** Scribn.

2. Creeping rhizomes lacking

4. Spikelets flattened, the lemmas somewhat keeled; 1st glume 3-5nerved, 2nd 5-7nerved **B. carinatus** H. & A. var. **marginatus** (Steudel) Barkw. & Anderton

4. Spikelets terete or somewhat flattened but the lemmas not keeled; 1st glume 1-3nerved, 2nd 3-5nerved

5. Lemmas hairy along margin and sometimes on lower part of back, upper part glabrous or nearly so; glumes usually glabrous except sometimes on midvein **B. ciliatus** L.

5. Lemmas somewhat evenly hairy over back, usually more densely so along lower part of margin, rarely glabrous; glumes usually hairy

6. Fruit glume normally 1nerved; leaf blades 3-15mm wide

6. First glume 3nerved on many or all spikelets; leaf blades 5(8)mm or less wide

7. Plants with usually fewer than 10 nodes, many of them visible; auricles conspicuous **B. latiglumis** (Scribn. ex Shear) Hitchc.

7. Plants with usually 10 or more nodes which are mostly concealed by overlapping sheaths; auricles conspicuous **B. latiglumis** (Scribn. ex Shear) Hitchc.

1. Plants annual

9. Teeth of lemmas 2-3mm long; awns mostly 10-15mm long; 1st glume 1nerved **B. tectorum** L.

9. Teeth of lemmas mostly less than 1mm long; awns often less than 10mm long; 1st glume 3-5nerved

10. Lemmas awnless or with awns mostly less than 1mm long **B. briziformis** Fisch. & Meyer

10. Lemmas with awns mostly over 2mm long

11. Palea subequal to lemma; lemma tending to curl around edges of mature fruit, especially toward base, often exposing rachilla; awn arising within 1.5mm of lemma tip, 2-4(6)mm long **B. sectalis** L.

11. Palea shorter than lemma; lemma usually not curling around edges of mature fruit; awn arising from near tip to over 1.5mm from tip, sometimes over 6mm long

12. Awn usually straight, arising within 1.5mm of lemma tip; panicle branches usually stiffly ascending, usually not flexuous **B. sectalis** L.

12. Awn usually flexuous and divergent when dry, often arising over 1.5mm from lemma tip; panicle branches lax or flexuous

13. Spikelets mostly 5-10mm wide; lemmas 5-7mm wide, rhombic in outline when flattened **B. squarrosus** L.

13. Spikelets mostly less than 6mm wide; lemmas 4-5mm wide, usually elliptic in outline **B. japonicus** Thunb. ex Murray

**Buglossoides arvensis** (L.) Johnst.

**Bupleurum americanum** Coultt. & Rose

**Calamagrostis**

1. Callus hairs rarely over half as long as lemma (hairs of rachilla sometimes longer); awn geniculate or straight

2. Awn exserted 1-4mm beyond glumes; glumes mostly 6-8mm long **C. purpurascens** R. Br.

2. Awn either included or scarcely longer than glumes; glumes mostly shorter **C. montanensis** Scribn. ex Vasey

1. Callus hairs mostly 2/3 as long as long as lemma; awn straight

3. Panicle loose and usually open, mostly over 2cm wide; awn delicate; leaf blades often over 4mm wide, usually flat; callus hairs generally subequal to lemma **C. canadensis** (Michx.) Beauv.

3. Panicle contracted or spike-like, rarely over 3cm wide; awn somewhat stout; leaf blades 1-4mm wide, sometimes involute; callus hairs often shorter than lemma **C. stricta** (Timm) Koeler

4. Ligules of upper leaves 4-8mm long ssp. **inexpansa** (Gray) Greene

4. Ligules of upper leaves 1-3.5mm long ssp. **stricta**

**Calamovilfa longifolia** (L.) Johnst.

**Callitriche**

1. Fruit winged throughout

2. Wing narrower than seed width **C. stenoptera** L.

2. Wing as wide as or wider than seed **C. hermaphroditica** L.

1. Fruit winged only at tip or unwinged

2. Fruit longer than wide; mericarps not divergent at tip **C. palustris** L.

3. Fruit as wide as or wider than long; mericarps divergent at tip **C. heterophylla** Pursh

**Calochortus**

1. Anthers apiculate at tip; gland on petals circular or horizontally elongate with a slight arch

2. Gland on petals horizontally elongate with a slight arch **C. gymnisonii** Wats.

2. Gland on petals circular or nearly so **C. apiculatus** Baker

1. Anthers blunt at tip; gland on petals circular or nearly so **C. nuttallii** T. & G.

**Calypso bulbosa** (L.) Oakes

**Calystegia**

1. Plants glabrous or with a few scattered hairs mostly on petioles; leaf blades, or some of them, usually over 5cm long, the basal lobes usually each with 2 teeth or angles **C. sepium** (L.) R. Br. var. **angulata** (Brum.) Holmgren

1. Plants conspicuously hairy nearly throughout; leaf blades mostly less than 5cm long, the basal lobes usually each with a single tooth or angle or merely rounded **C. macounii** (Greene) Brum.

**Camelina**

1. Stems somewhat densely hairy below; fruits mostly 5-7mm long; pedicels rarely over 17mm long **C. microcarpa** Andrz. ex DC.

1. Stems glabrous or sparsely hairy below; fruits mostly 7-9mm long; pedicels often over 17mm long **C. sativa** (L.) Crantz
Campanula
1. Flowers mostly more than 7, the pedicels mostly half as long or less than the flowers
2. Flowers with short pedicels, forming an erect slender raceme C. rapunculoides L.
3. Flowers sessile in an involucrate terminal glomerule C. glomerata L.
4. Flowers solitary, or if more, the pedicels mostly as long as or longer than the flowers
5. Corolla bright blue, 10-25mm long C. rotundifolia L.

Cannabis sativa L.
Capsella bursa-pastoris (L.) Medic.
Cardamine pensylvanica Mulh. ex Wild.
Carduus
1. Heads mostly 3-4cm wide; involucral bracts lanceolate or ovate, mostly 2-6mm wide C. nutans L.
2. Heads mostly 1-2.5cm wide; involucral bracts linear or lance-linear, about 1mm wide C. acanthoides L.

Carex
1. Spikes solitary at tip of stem (rarely appearing like 2 with only 1-3 perigynia slightly separated from upper staminate portion) GROUP I
2. Spikes more than 1 per stem, sometimes closely aggregated to appear like 1
3. Stigmas more than 2 (rarely a few flowers with 3); achene lenticular
4. Lateral spikes sessile or nearly so, usually not much longer than wide; terminal spike usually with both staminate and pistillate flowers, or the plants rarely dioecious GROUP II
5. Lateral spikes peduncled, or if sessile, then elongate; terminal spike usually staminate, rarely both staminate and pistillate GROUP III
6. Stigmas mostly 3; achenes trigonous or rarely nearly terete
7. Perigynia pubescent, puberulent, or prominently ciliate-scabrous at least on margins (do not mistake for papillate) GROUP IV
8. Perigynia glabrous GROUP V

GROUP I
1. Leaves mostly 2-6mm wide; beak of perigynia (0.5)1-3mm long; lower scales usually leaf-like and partly enveloping perigynia
2. Leaf margins scirrified, the margins conspicuously whitish; perigynium 3.2-4.9mm long, often abruptly tapering to beak, the beak 0.6-1.2mm long, usually minutely serrulate C. saximontana Mack.
3. Leaf margins not scirrified, the margins green; perigynium 4.8-6.6mm long, gradually tapering to beak, the beak 1.9-2.9mm long and smooth
4. Corolla bright blue, 10-25mm long
5. Corolla white or very pale blue, mostly 3
6. Perigynia pointed at tip, usually the result of a beak
7. Perigynium beak about 0.2mm long; leaves mostly 1.5
8. Perigynium beak 0.5mm long; spikes slightly separate; scales greenish
9. Scales acuminate to long
10. Inflorescence 2
11. Spikes in a dense head
12. Scales about half as long as the spreading or reflexed perigynia C. radiata (Wahlenb.) Small
13. Leaf blades 3.5-6(length)9m wide; sheaths tight, inconspicuously or not at all mottled with green and white, usually septate dorsally C. grvida Bailey
14. Perigynia glabrous on margins except sometimes on beak, achene filling the perigynium; leaf blades 0.5-2mm wide C. vallicola Dewey
15. Perigynia serrulate on upper margins, achene not filling upper part of perigynium; leaf blades mostly 1.5-3.5mm wide
16. Mature perigynia widely spreading to descending, the beaks 0.5-2mm long; spikes mostly about as long as wide C. interior Bailey
17. Mature perigynia mostly erect to ascending, the beaks 0.2-0.7(1)mm long (to 2.5mm in C. deveyana); spikes mostly longer than wide
1. Pistillate scales not leaf like; perigynia with mostly 6 or more nerves on each side, the beak 0.2-0.5mm long

C. preceptrorum Mack.

1. Scales strongly brown or chestnut tinged; perigynia with mostly 6 or more nerves on each side, the beak 0.2-0.5mm long

C. xerantica Bailey

1. Pistillate scales not leafy or greenish, often light brownish at maturity; perigynia often with fewer nerves, the beak sometimes over 0.5mm long

1. Bracts sheathing or sheathless, the blades well developed

C. microptera Nutt.

1. Bracts reduced to bladeless sheaths or sometimes with very short, hyaline blades, or rarely spathe-like

C. pratensis Bailey

1. Spikes densely clustered in a somewhat ovoid head, dark brown at maturity

C. microptera Nutt.

1. Spikes loosely clustered and readily apparent, not in a dense head, greenish, light brown, or straw colored at maturity

C. microptera Nutt.
3. Beak of perigynium about as long as or longer than the body, perigynia mostly 5-7mm long, usually strongly 2 nerved or ribbed; rootstocks and base of culms heavily fibrillose C. sprengelli Dewey ex Spreng.

4. Beak of perigynium usually much shorter than body, if as long, perigynia 7mm long or more, or less than 5mm long, or strongly many nerved; rootstocks and base of culms usually not fibrillose

5. Pistillate scales awned, with broad scarious margins sharply contrasting with green midrib; perigynia strongly narrowed at base, closely enveloping achenes C. blanda Dewey

6. Style continuous with achene, indurated, not withering; body of perigynium 3.5-5mm or more long, the beak 1(1.2-6mm long with prominent teeth 0.5mm or more long; pistillate spikes (0.2)-1.2-2.8cm wide

7. Beak of perigynium with teeth about as long as rest of beak; leaf sheaths hairy; ligule longer than wide C. atherodes Spreng.

8. Beak of perigynium shorter; leaf sheaths usually glabrous; ligule often as wide as or wider than long

9. Scales not parted; perigynia 6-17mm long; 2.5-8mm wide

10. Perigynia 6-10mm long, 2.5-3.5mm wide, usually more than 10 per spike C. retrorsa Schwa.

11. Perigynia 10-16mm long, 3.5-8mm wide; usually 5-10 per spike C. intumescens Rudge

12. Beak of perigynium mostly 1-2mm long C. utriculata Boot

13. Plants biennial or perennial, often rooting at nodes C. fontanum L.

14. Beak of achene bent or recurved; perigynia mostly 5.4mm long, the beak (0.5)1-1.2mm long, pericarp readily separable from seed; pericarp tightly adherent to seed C. capitatum (Hartm.) Wyse Jack.

15. Beak of achene usually straight or nearly so, or if not, perigynia and beaks longer or scales different

16. Pistillate spikes usually erect, thigly longer than capsules C. torreyi Tuckerman

17. Perigynia flattened or plano-convex; leaves glabrous or merely scabrous C. parrayana Dewey

**Carum carvi** L.

**Carya glabra** (Mill.) Sweet

**Castilleja**

1. Corolla tube usually 3-4cm long, the entire corolla 3.5-7cm long, arcuate C. sessiliflora Pursh

2. Corolla tube mostly less than 1.5cm long, the entire corolla 1.8-3.5cm long, not strongly arcuate C. sulphurea Rydb.

**Catabrosa aquatica** (L.) Beauv.

**Ceanothus**

1. Leaves mostly less than 2.5cm long, often entire, at least in lower half; branches usually spiny C. fendleri Gray

2. Leaves mostly over 2.5cm long, toothed throughout; branches not spiny

3. Leaves mostly lanceolate or narrowly elliptic and less than 2cm wide, upper surface dull like the lower C. herbaceus Raf.

4. Leaves mostly ovate or oval and over 2cm wide, upper surface shiny as if varnished C. velutinus Doug. ex Hook.

**Celastrus scandens** L.

**Celtis occidentalis** L.

**Cenchrus longispinus** (Hack.) Fern.

**Centarea**

1. Leaves mostly shallowly lobed to entire; annual C. cyanus L.

2. Leaves pinnately compound or pinnatifid at least below; perennial C. stoebe L. ssp. micranthos (Gmel. ex Gugler) Hayek

**Cerastium**

1. Plants annual, sometimes decumbent but not rooting at nodes

2. Pedicels, at least the lower, mostly over 1cm long, usually more than capsules C. nutans Raf.

3. Pedicels 1cm or less long, little if at all longer than capsules C. brachypodum (Engelm. ex Gray) Robins.

1. Plants biennial or perennial, often rooting at nodes

2. Pedals subequal to sepals C. fontanum Baumg. var. vulgare (Hartm.) Wyse Jacks.

3. Petals 1.5 times as long as sepals or more C. arvense L. var. strictum (Gaudin) Koch

**Cercocarpus montanus** Raf.

**Chaenactis douglasii** (Hook.) H. & A.

**Chenaorhinum minus** (L.) Lange

**Chamerion angustifolium** (L.) Holub var. canescens (Wood) Holmgren & Holmgren

**Chellianthes feilii** Moore

**Chenopodium**

1. Fruit usually flattened laterally; perianth usually 3 or 4 parted; leaves often somewhat triangular or hastate, green on both sides

2. Glomerules mostly globose, often over 4mm wide at maturity, mostly in an interrupted terminal spike, upper 3cm or more of inflorescence usually not bracteate; pericarp tightly adherent to seed C. capitatum (L.) Ambrosi

3. Glomerules usually not globose, less than 4mm wide, in many, crowded, axillary, simple or compound spikes, inflorescence usually bracteate to tip; pericarp readily separable from seed C. rubrum L.

4. Primary leaf blades entire or nearly so, usually ovate, lanceolate, oblong, linear, or elliptic, rarely more than 110(13)mm wide, often with 1-3 somewhat parallel veins

5. Leaf blades usually 1-3 times as long as wide, elliptic to ovate or rarely deltoid-ovate; perianth often exposing mature fruit laterally and slightly; fruits maturing unevenly in adjacent parts of inflorescence

6. Mature fruit usually concealed by perianth; pericarp strongly adherent to seed C. watsonii A. Nels.
5. Mature fruit exposed dorsally and laterally; pericarp often readily separable from seed C. atrovirens Rydb.
4. Leaf blades often over 3 times as long as wide, lanceolate to oblong or linear; perianth largely covering mature fruit except sometimes dorsally; fruits maturing evenly
6. Plants mostly branched from near base and bushy; perianth segments usually closely enclosing fruits C. desicatum A. Nels.
6. Plants little if at all branched, erect and slender; perianth segments usually somewhat reflexed and exposing fruits C. pratericola Rydb.
3. Primary leaf blades (sometimes deciduous in fruit) mostly lobed or toothed or else deltoid or deltoid-ovate, or both, often over 10mm wide, usually pinnately veined
7. Leaves white or gray farinose beneath, green above, sinuate-dentate, 12(16)mm or less wide; perianth glabrous C. glaucum L. var. salinum (Standley) Boivin
7. Leaves only rarely as above; perianth usually farinose
8. Perianth lobes not dorsally keeled in fruit; leaves glabrous; seeds usually 1.5mm or more wide C. simplex (Torrey) Raf.
8. Perianth lobes usually dorsally keeled in fruit; some leaves often farinose on at least 1 surface; seeds usually less than 1.5mm wide
9. Leaf blades thin and papery when dry, usually barely if at all longer than wide and hastately lobed, often glabrous or nearly so; pericarp loose C. fremontii Wats.
9. Leaf blades somewhat thick, often about twice or more as long as wide and often toothed throughout, often farinose at least beneath; pericarp various
10. Seed and pericarp pitted, the latter usually tightly adherent to seed; style not cleft to base, often less than 0.5mm long
11. Fruits exposed at maturity; style and stigmas mostly less than 0.7mm long; leaves usually toothed C. berlandieri Moq. var. zschackei (Murr ex Issler) Murr ex Graebner
11. Fruits not exposed at maturity, hidden by perianth; style and stigmas mostly 0.8mm or more long; leaves usually entire except for occasional basal lobes C. watsonii A. Nels.
10. Seed and pericarp smooth or nearly so when mature, the latter usually loose around seed; style essentially cleft to base, often nearly 1mm long
12. Seeds mostly 1.1-1.5mm wide; fruits largely covered by perianth when mature C. album L.
12. Seeds mostly 0.9-1.2mm wide; fruits not covered by perianth when mature C. strictum Roth var. glaucophyllum (Aellen) Wahl

Chimaphila umbellata (L.) Bart. var. occidentalis (Ryd.) Blake
Chloris verticillata Nutt.
Chorispora tenella (Pallas) DC.
Cichorium intybus L.
Claytonia pribramii (Pall.) Cronq.

Cirsium 1. Involucre of largest heads 1-1.8(2.2)cm long, 0.5-1(2)cm wide; heads in loose corymbiform clusters, some heads usually with pappus longer than corolla, some with pappus shorter than corolla; plants with deep creeping rhizomes C. arvense (L.) Scop.
1. Involucre of largest heads usually over 1.8cm long and 1cm or more wide; heads solitary or in compact terminal clusters or axillary; pappus mostly similar; plants often merely taprooted
2. Plants with involucres of mature heads 3.5-5cm long and about as wide; inner involucral bracts dilated and lacerate at tip, often with a glutinous dorsal ridge; achenes with a yellow apical collar 0.4-0.8mm long C. drummondi T.& G.
2. Plants without the above combination of characteristics
3. Leaves somewhat clasping the stem, or if decurrent, the wings mostly less than 12mm long
4. Yellow apical collar of achenes 0.3-0.7mm long, the achenes 3-5mm long; leaves sometimes merely toothed, upper surface usually greenish C. flodmanii (Rydby.) Arthur
4. Yellow apical collar of achenes 0.2mm or less long, the achenes (4)5-7mm long; leaves usually deeply lobed, upper surface usually gray C. undulatum (Nutt.) Spreng.
3. Leaves decurrent along stem, the wings of middle leaves mostly 15mm or more long
5. Upper leaf surface with many short spines, otherwise glabrous or glabrulate; outer involucral bracts reflexed near middle C. vulgare (Savi) Tenore
5. Upper leaf surface lacking spines, glabrous or tomentose; outer involucral bracts not reflexed except sometimes the tips
6. Lower leaves often with some lobes 3.5-5.5 times as long as wide and over 2cm long; upper leaf surface slightly tomentose; involucre 2.5-4cm wide, usually as wide as long or wider C. canescens Nutt.
6. Lower leaves usually with all lobes 3 times as long as wide or less, or if longer, the upper leaf surface glabrous or glabrulate, the lobes often less than all less than 2cm long; involucre 1-2cm wide, usually longer than wide C. pulcherrimum (Rydby.) Schum.

Claytonia 1. Plants with a subglobose corm; stem leaves not perfoliate C. lanceolata Pursh
1. Plants with a taproot; stem leaves usually perfoliate
2. Basal leaf blades predominantly ovate-rhomboid, lower leaves and stems seldom reddish tinged C. perfoliata Donn ex Wild. var. internode (Miller & Chambers) Dorn
2. Basal leaf blades predominantly deltoid, lower leaves and stems usually reddish tinged C. rubra (Howell) Tidestrom

Clematis 1. Plants herbaceous; flowers terminal on main stem C. hirsutissima Pursh
1. Plants usually woody, sometimes vines; flowers axillary or on a naked scape from base of plant
2. Leaves pinnately compound with 3-7 leaflets; sepals white or cream colored, 5-15mm long C. ligusticifolia Nutt.
2. Leaves 3 times ternately compound or essentially so; sepals blue or purple, 15-60mm long C. columbiana (Nutt.) T.& G. var. tenuiloba (Gray) Pringle

Coelogyne viride (L.) Hartm. var. virens (Muhl. ex Wild.) Luer
Collinsia parviflora Lindl.
Collomia linearis Nutt.
Comandra umbellata (L.) Nutt. var. pallida (A. DC.) Jones
Conium maculatum L.
Conringia orientalis (L.) Dumort.
Convolvulus arvensis L.

Conyza 1. Plants erect and simple, or branching above, with a defined central axis; stems usually hirsute with spreading hairs C. canadensis (L.) Cronq.
1. Plants bushy-diffuse with branching from near base; stems with appressed hairs C. ramosissima Cronq.
Coralhizorhiza
1. Sepals and petals usually with 3-5 prominent reddish-purple stripes; lip entire, not spotted; sepals mostly (7)10mm long or more C. striata Lindl.
1. Sepals and petals not prominently striped, often finely red veined; lip entire, lobed, or toothed, sometimes spotted; sepals usually less than 10mm long;
2. Ovaries usually green; lip petal 2.5-5mm long; lateral sepals 1 nerved
3. Petals 4-5.5mm long; lip rarely purple spotted; flowers appearing greenish to yellow C. trifida Chat.
3. Petals 3-4mm long; lip blotched with purple; flowers appearing greenish-purple to purple C. odontorrhiza (Wild.) Poir.
2. Ovaries usually reddish, purplish, or brownish; lip petal usually over 5mm long; lateral sepals usually 3 nerved
4. Lip petal entire or crenulate, not lobed C. wisteriana Conrad
4. Lip petal with 2 lateral lobes near base C. maculata (Raf.) Raf.
5. Floral bracts 0.5-1mm long; middle lobe of lip slightly if at all expanded toward tip var. maculata
5. Floral bracts 1-4.5mm long; middle lobe of lip distinctly expanded toward tip var. occidentalis (Lindl.) Ames

Coreopsis tinctoria Nutt.

Cornus
1. Plants herbaceous or woody only at base, less than 20cm high; flowers in a dense terminal head-like cluster subtended by 4 white petal-like bracts C. canadensis L.
1. Plants shrubby throughout, mostly well over 20cm high; flowers in open cymes without petal-like bracts C. sericea L.

Coronilla varia L.

Corydalis aurea Willd.
1. Racemes usually surmounted by leaves; fruits spreading to reflexed var. aurea
1. Racemes usually slightly surpassing leaves; fruits mostly erect or ascending var. occidentalis Engelm. ex Gray

Corylus cornuta Marsh.

Coryphantha
1. Petals greenish-white or yellowish; spines all white or yellowish, hairy C. missouriensis (Sweet) Britt. & Rose
1. Petals reddish-pink or pink-purple, some spines usually brown or reddish, glabrous C. vivipara (Nutt.) Britt. & Rose

Cota tinctoria (L.) Gay ex Gussone

Cotoneaster acutifolius (L.) Gay ex Gussone

Crocanthemum bicknellii (Fern.) Janch.

Dactylorhiza
1. Plants biennial or perennial; corolla limb usually well over 3mm wide
7. Dorsal surface of nutlets smooth or nearly so; nutlet margins in fruit separated or else the fruits strongly curved dorsally and appearing depressed from the top C. cinerea (Greene) Cronq. var. jamaicensis Cronq.
7. Dorsal surface of nutlets wrinkled, tuberculate, or spiny; nutlet margins in fruit touching each other or only slightly separated, the nutlets usually not appearing depressed
8. Caudex much branched, plants mostly somewhat mat-forming and usually 15cm or less high, leaves mostly near base and usually 6mm or less wide C. cana (A. Nels.) Payson
8. Caudex little if at all branched, stems solitary or few, often well over 15cm high, leaves usually conspicuous along stems and some often over 6mm wide
9. Limb of corolla 4-6(8)mm wide; nutlets with a strong bend near middle of back (hump-backed); inflorescence oval with elongate branches; basal leaves oblanceolate, often deciduous C. thrysiflora (Greene) Payson
9. Limb of corolla 4-6-12mm wide; nutlets slightly rounded across back; inflorescence often elongate with short branches; some basal leaves usually obovate C. celosioideis (Eastw.) Payson

Cryptogramma acrostichoides R. Br.

Cuscuta
1. Stigmas long and narrow C. approximata Bab.

Cyclachaena xanthiifolia (Nutt.) Fresenius

Cycloloma atriplicifolium (Spreng.) Coulter

Cymopterus

1. Involucre present; bracts of involucel scarious or with broad scarious margins or whitish C. montanus T. & G.

1. Involucre lacking or rarely vestigial; bracts foliaceous C. glomeratus (Nutt.) DC.

Cynoglossum officinale L.

Cyperus

1. Culms with bulbs at base or with thickened rhizomes; perennials; stamens 3; plants of sandy uplands

2. Culms lacking bulbs at base; plants annual; stamens 1-3; plants of wet places

3. Stamens 3; leaves 1-10mm wide; scales mostly straight at tip

4. Scales mostly 1.5mm long, 3-5(7) nerved, mostly 1mm wide; scales mostly outcurved at tip

5. Scales 3-5 nerved C. squarrosum L.

Cyperpined

1. Lip yellow C. parviflorum Salisb. var. pubescens (Willd.) Knight

1. Lip white C. montanum Dougl. ex Lindl.

Cystopteris fragilis (L.) Bernh.

Dactylis glomerata L.

Dalea

1. Fertile stamens 9 or 10

2. Stem and leaves glabrous; petals white or cream D. enneandra Nutt.

3. Stem and leaves hairy; petals yellow D. aurea Nutt. ex Pursh

1. Fertile stamens of, alternating with 4 petals which are sometimes staminode-like

2. Calyx tube glabrous or sparsely hairy between the prominent ribs; petals white D. candida Willd. var. oligophylla (Torrey) Shinners

3. Calyx tube densely villous, the hairs concealing the surface or nearly so; petals purple, pink, white, or ochroleucous

4. Stems and leaves densely villous; leaves mostly 11-21 D. villosa (Nutt.) Spreng.

4. Stems and leaves glabrous to sparsely hairy, or if densely hairy, leaves 3-7

5. Corolla purple or pinkish; leaves mostly 3-7 D. purpurea Vent.

5. Corolla white to ochroleucous; leaves mostly 7-11 D. cylindrica Barneby

Danthonia

1. Lemmas pilose on back, sometimes sparsely so D. spicata (L.) Beauv. ex R. & S.

1. Lemmas glabrous on back, pilose on margin only

2. Panicle narrow, the pedicels mostly appressed to rachis; spikelets mostly 4-10 per panicle D. intermedia Vasey

2. Panicle open, the pedicels mostly spreading or reflexed; spikelets mostly 1-3 per panicle

3. Panicle usually with a single spikelet, rarely 2 or 3, the lower petals divergent; plants usually over 3dm tall D. unispicata (Thurb.) Munro ex Macoun

3. Panicle with mostly 2-5 spikelets, the lower usually divergent; plants usually over 3dm tall D. californica Bolander

Dasiphora fruticosa (L.) Rydb.

Daucus carota L.

Delphinium

1. Inflorescence a narrow elongate raceme, the lowest flower with a short pedicel usually shorter than the flower, the spurs ascending to erect and often inflorescence,

1. Inflorescence a somewhat pyramidal raceme, the lowest flower with an elongate pedicel mostly much longer than the flower, the spurs usually more spreading and widely divergent from the flower above, the sepals usually blue or blue-purple

2. Lower sepals longer and larger than the upper; lower petals entire or with a sinus less than 1/4 the length of blade; roots not easily separating from stem, usually loosely branched D. bicolor Nutt.

2. Lower sepals subequal to upper; lower petals usually with a sinus 1/4 to 1/2 the length of blade; roots easily separating from stems, often compactly fascicled D. nuttallianum Pritz. ex Walpers

Deschampsia cespitosa (L.) Beauv.

Descurainia

1. Leaves, at least the lower, 2 or 3 times compound; fruits narrowly linear, mostly 1mm wide or less, some usually 15mm or more long, well free of raceme axis on spreading or ascending pedicels; seeds mostly 20-40, uniseriate; valves 1-3 nerved D. sophia (L.) Webb ex Prantl

1. Leaves mostly once compound, or if not, the fruits not as above

2. Fruits linear, usually long-tapering to tip so somewhat pointed, often somewhat torulose, seeds uniseriate

3. Fruits often strictly appressed to rachis; fruiting pedicels erect or erect-ascending D. incana (Bernh. ex Fisch. & Meyer) Dorn

3. Fruits not appressed to rachis; fruiting pedicels mostly ascending D. longepedicellata (Fournier) Schulz

2. Fruits often clavate or subclavate, usually somewhat abruptly tapering to tip so somewhat blunt, little if at all torulose, seeds often biseriate near middle of fruit D. pinnata (Walt.) Britt. var. brachycarpa (Richardson) Fern.

Desmodium canadense (L.) DC.

Dianthus armeria L.

Diparia prolifera (Nutt. ex DC.) Nutt.

Dichanthelium

1. Spikelets 1-2mm long D. acuminatum (Sw.) Gould & Clark

1. Spikelets 2.5-3.5/4.5mm long

2. Ligules 0.1-0.4mm long, primarily membranaceus; first glume 1.5-2.5mm long D. leibergii (Vasey) Freckmann

2. Ligules 0.4-1.6mm long, primarily a fringe of hairs; first glume 0.6-1.9mm long

3. Leaf blades mostly about 10 times or less than wide, divaricately ascending, some often 6mm or more wide, glabrous to short hairy except sometimes long hairy on margins D. oligosanthes (Schultes) Gould var. scriberianum (Nash) Gould

3. Leaf blades mostly over 10 times as wide, erect to slightly ascending, mostly 5mm or less wide, glabrous to long hairy

4. Spikelets conspicuously hairy; plants rarely over 20cm high; leaves mostly densely clustered toward base, usually exceeding inflorescence, long pilose D. wilcoxianum (Vasey) Freckmann

4. Spikelets glabrous to sparsely hairy; plants often over 20cm high; leaves scattered along stems, often exceeded by inflorescence, glabrous to long pilose

5. Culms in large tufts; spikelets 2.7mm or less long, not turged D. linearifolium (Scribn.) Gould

5. Culms single or few in a tuft; spikelets 2.7-3.2mm long, turged D. perloungum (Nash) Freckmann

46
Dieteria
1. Leaves and stem below inflorescence glabrous to cinerary-hairy or the leaf margins ciliate, rarely with a few small glandular hairs
D. canescens (Pursh) Nutt.
1. Leaves cinerary-hairy, at least on underside var. canescens
2. Leaves mostly glabrous or glabrate except sometimes for margins var. glabra (Gray) Morgan & Hartm.
1. Leaves, especially margins, and stem just below inflorescence with many coarse gland-tipped hairs D. bigelovii (Gray) Morgan & Hartm.

Digitaria
1. Staminate spathes 6mm or more long; styles mostly more than 2mm long; some leaves usually over 1.8mm wide, often somewhat E. nuttallii
1. Staminate spathes 4mm or less long; styles mostly 2mm or less long; leaves usually less than 1.7mm wide, gradually tapering to a slender point E. bifoliata (Planchon) St. John
1. Staminate spathes 6mm or more long; styles mostly more than 2mm long; some leaves usually over 1.8mm wide, often somewhat abruptly tapering to a blunt or acute tip E. nuttallii (Planchon) St. John
2. Middle and upper leaves opposite, the larger often over 17mm long; seeds 4mm or less long; anthers 3.4-5.5mm long, pollen in monads E. bifoliata St. John
2. Middle and upper leaves mostly whorled, the larger usually less than 15mm long; seeds 4.5-6mm long; anthers 3mm or less long, pollen in tetrams E. canadensis Michx.

Dipsaciella
1. Stigmas 2; achenes lenticular E. canadensis (L.) Holub
2. Stigmas 2; achenes ellipsoid or obovoid E. acicularis (L.) L.
3. Petals mostly yellow; leaflets of larger leaves somewhat elliptic to ovate, noticeably longer than wide, the larger mostly E. muricata (L.) DC.

Drymocallis
1. Lateral branches of inflorescence often erect with the flowers densely clustered; sepals mostly 6-8mm long at flowering; leaflets 5-13 D. reptans (Lam.) Fern.
2. Lateral branches of inflorescence usually spreading to ascending, not strictly erect, the flowers not densely clustered; sepals often less than 6mm long; leaflets 5-9 D. arguta (Pursh) Rydb.

Dryopteris
drillosa (L.) Schott

Dysphania
botrys (L.) Mosyakin & Clemants

Dyssoxia
papposa (Vent.) Hitchc.

Echinacea
angustifolia DC.

Echinocereus
viridiflorus Engelm.

Echinoclop
1. Tip of lemma of fertile floret with a gradually differentiated, withering tip E. crusgalli (L.) Beauv.
2. Tip of lemma of fertile floret with a sharply differentiated, withering tip E. muricata (Beauv.) Fern. var. microstachya Wieg.

Echinocystis
lobata (Michx.) T. & G.

Echiurn
vilgare L.

Elaeagnus
angustifolia L.

Elatine
rubella Rydb.

Eleocharis
1. Plants annual with fibrous roots; stigmas 2, or 2 and 3 in same spikelet; anthers 0.2-0.8mm long E. obtusa (Willd.) Schult.
2. Plants perennial usually with rhizomes; stigmas 2 or 3; anthers often longer than 0.8mm E. thymiflorum L.

Elaeagnus
1. Bracts of inflorescence strongly toothed or lobed; calyx tube about equaling lobes D. parviflorum Nutt.
1. Bracts of inflorescence entire or nearly so; calyx tube longer than lobes D. thymiflorum L.

Distichlis
spicata (L.) Greene var. stricta (Torrey) Scribn.

Draba
1. Upper stem and pedicels glabrous or nearly so; petals white or yellow D. albertina Greene
1. Upper stem and usually the pedicels hairy; petals yellow D. aurea Vahl ex Hornem.

Dracocephalum
1. Bracts of inflorescence entire or nearly so; calyx tube about equaling lobes D. parviflorum Nutt.
1. Bracts of inflorescence Strongly toothed or lobed; calyx tube about equaling lobes D. thymiflorum L.

Dryopteris
filix-mas (L.) Schott

Dysphania
botrys (L.) Mosyakin & Clemants

Dyssoxia
papposa (Vent.) Hitchc.

Echinacea
angustifolia DC.

Echinocereus
viridiflorus Engelm.
Elymus
1. Stems usually subulate, 1 nerved at midlength of body or not nerved, the nerve or center usually lying over the side of lowest lemma; spikelets mostly 2 or more per node, at least at middle of spike
2. Rachis disarticulating when mature; awns usually over 3cm long (several hybrids might key here but the awns are usually shorter)

E. elymoides (Raf.) Swartz
3. Awns with a tetrad of long hairs at upper end
4. Awns mostly flexuous-divergent; lemma about 2mm wide across back

E. diversiglumis Scribn. & Ball
1. Glumes usually not subulate, 3–7 nerved at midlength of body, the midvein normally lying over the midvein of lowest lemma; spikelets 1 or more per node
5. Creeping rhizomes present; anthers 3.5–5mm long
6. Leaf blades mostly flat, some 5–10mm wide; awn, if present, straight

E. repens (L.) Gould
7. Leaf blades either involute or less than 5mm wide; awn, if present, often divergent

E. curvatus Buckl.
8. Stems soon withering, without regularly whorled branches; teeth of main stem solid brown at tip

E. hyemale L. var. affine (Engelm.) Eaton

Epipactis gigantea Dougl. ex Hook.
1. Strobili rounded at tip; stems not evergreen, all alike, without regularly whorled branches
2. Stems without a central cavity; teeth usually 3 per node; plants slender with wavy stems

E. scirpoideus Michx.
3. Stems 3–12 ridged; central cavity less than half the diameter of stem; teeth mostly persistent

E. variegatum Schleich. ex Weber & Mohr
4. Middle sheaths of mature stems with an apical black band; sheaths not much longer than wide

E. hyemale L. var. affine (Engelm.) Eaton
5. Middle sheaths of mature stems with only an apical black band; sheaths about twice as long as wide

E. laevigatum A. Br.
6. Stems flesh colored or brownish (with little or no chlorophyll), with strobili

E. sylvaticum (L.) Gould
7. Teeth of main stem united into 2

E. saximontanum (Raf.) Swezey
8. Teeth of main stem brown, rarely more than 2 adjacent teeth united; stems becoming green or not, simple branched or not branched

E. variegatum A. Br.
9. Stems soon withering, without whorled branches; teeth of main stem solid brown at tip

E. arvensis L.
10. Stems becoming green with whorled branches; teeth of main stem with a sharp, brown, lengthwise line to tip

E. pratense Ehrh.

Enemion bitematum
1. Strobili sharp

E. lanceolatus (Scribn. & Sm.) Gould
2. Awns without a tuft of long hairs at upper end

E. laevigatum A. Br.
3. Awns divergently curved when dry, mostly over 3cm long (several hybrids might key here but the awns are usually shorter)

E. sylvaticum (L.) Gould
4. Seeds with a tuft of long hairs at upper end

E. villosus Muhl. ex Willd.
5. Seeds without a tuft of long hairs at upper end; awns mostly 1 or more per node

E. diversiglumis Scribn. & Ball
6. Stems not evergreen, some with regular whorls of branches; some species with strobili 2 or more per node, at least at middle of spike
2. Rachis disarticulating when mature; awns usually over 3cm long (several hybrids might key here but the awns are usually shorter)

E. elymoides (Raf.) Swartz
3. Awns with a tetrad of long hairs at upper end
4. Awns mostly flexuous-divergent; lemma about 2mm wide across back

E. diversiglumis Scribn. & Ball
1. Glumes usually not subulate, 3–7 nerved at midlength of body, the midvein normally lying over the midvein of lowest lemma; spikelets 1 or more per node
5. Creeping rhizomes present; anthers 3.5–5mm long
6. Leaf blades mostly flat, some 5–10mm wide; awn, if present, straight

E. repens (L.) Gould
7. Leaf blades either involute or less than 5mm wide; awn, if present, often divergent

E. curvatus Buckl.
8. Stems soon withering, without regularly whorled branches; teeth of main stem solid brown at tip

E. hyemale L. var. affine (Engelm.) Eaton

Enemion bitematum
1. Strobili sharp

E. lanceolatus (Scribn. & Sm.) Gould
2. Awns without a tuft of long hairs at upper end

E. laevigatum A. Br.
3. Awns divergently curved when dry, mostly over 3cm long (several hybrids might key here but the awns are usually shorter)

E. sylvaticum (L.) Gould
4. Seeds with a tuft of long hairs at upper end; awns mostly 1 or more per node

E. diversiglumis Scribn. & Ball
1. Glumes usually not subulate, 3–7 nerved at midlength of body, the midvein normally lying over the midvein of lowest lemma; spikelets 1 or more per node
5. Creeping rhizomes present; anthers 3.5–5mm long
6. Leaf blades mostly flat, some 5–10mm wide; awn, if present, straight

E. repens (L.) Gould
7. Leaf blades either involute or less than 5mm wide; awn, if present, often divergent

E. curvatus Buckl.
8. Stems soon withering, without regularly whorled branches; teeth of main stem solid brown at tip

E. hyemale L. var. affine (Engelm.) Eaton

Enemion bitematum
1. Strobili sharp

E. lanceolatus (Scribn. & Sm.) Gould
2. Awns without a tuft of long hairs at upper end

E. laevigatum A. Br.
9. Branches again branched; stems upright; teeth of main stem united into 2-5 reddish-brown groups E. sylvaticum L.
10. Teeth of lower sheaths solid brown at tip; teeth of branches cuspidate E. arvense L.
10. Teeth of lower sheaths with a sharp, brown, lengthwise line to tip; teeth of branches acute E. pratense Ehrh.

Eragrostis
1. Plants perennial, erect, sometimes over 5dm tall E. trichodes (Nutt.) Wood
2. Plants annual, sometimes decumbent, usually less than 5dm tall
3. Spikelets mostly 2.5mm or more wide; glands prominent on keel of most lemmas E. ciliatus (All.) Vign. -Lut. ex Janchen
3. Spikelets 2mm wide or less; glands mostly on panicule branches and leaves E. minor Host
4. Plants not glandular or obscurely so E. pectinacea (Michx.) Nees

Eremogone hookeri (Nutt.) Weber
1. Leaves usually all 1.5cm or less long; sepals sometimes about 6mm long; plants forming loose mats var. hookeri
2. Leaves, or many of them, over 1.5cm long; sepals mostly 7mm or more long; plants forming dense cushions var. Eremogone hookeri

Eremopyrum triticeum (Gaertn.) Nevski
Ericameria
1. Heads in a raceme or sometimes a panicle; involucre (6)10-13mm long; some involucral bracts with needle-like tips E. parryi (Gray) Nesom & Baird var. howardii (Parry ex Gray) Nesom & Baird
2. Heads in a cyme or corymb; involucre 6.5-10(11)mm long; involucral bracts obtuse or acute at tip E. nauseosa (Pallas ex Pursh) Nesom & Baird
3. Involucre usually tomentose, at least at base, sometimes sparsely so; stems and/or leaves with a whitish cast from tomentum var. nauseosa
4. Involucre mostly glabrous or nearly so; stems and leaves mostly green or yellow-green var. graveolens (Nutt.) Reveal & Schuyler

Eriogonum
1. Leaves, or some of them, lobed, divided, parted, or occasionally or slightly toothed
2. Leaves mostly all basal, 1-4 times ternately or palmpately lobed or divided, the divisions linear or nearly so E. compositus Pursh
3. Leaves mostly cauline and merely toothed
4. Leaves linear or narrowly oblanceolate, the lower rarely broadly oblanceolate, mostly 15mm or less wide
5. Involucre 3-5mm long; rays 4-6mm long E. bellidiastum Nutt.
6. Involucre 5-9mm long; rays 8-15mm long E. glabellus Nutt.
7. Involucre mostly appressed or ascending var. glabellus
8. Stem hairs appressed or ascending var. pubescens Hook.
9. Leaves much broader than narrowly oblanceolate, some usually well over 15mm wide
11. Pappus of disk and ray flowers similar, of bristles E. philadelphicus L.
12. Leaves entire or rarely slightly toothed

7. Plants annual, biennial, or short lived perennials, lacking rhizomes or a well developed woody caudex
8. Rays mostly erect, white, pink, or lavender, 8mm or less long, 0.4mm or less wide, usually barely if at all exceeding pappus, sometimes none
9. Rayless pistillate flowers present between outer ray and hermaphroditic disk flowers; inflorescence a corymb or panicle, or a racemelike E. acris Lindl. DC.
10. Rayless pistillate flowers lacking; inflorescence a raceme or head solitary; plants hairy but not glandular E. lonchophyllus Hook.
11. Hairs of involucral bracts flattened, 0.5-1mm long; some involucral bracts with needle-like tips E. minor Host
12. Disk corollas mostly 4-5.5mm long; fibrous-rooted E. glabellus Nutt.
13. Stem hairs appressed or ascending var. glabellus
14. Stem hairs spreading var. pubescens Hook.
15. Disk corollas mostly 3.5mm long or less; taprooted
16. Pappus simple, with only bristles; rays mostly 4-6mm long E. bellidiastum Nutt.
17. Pappus double, with long bristles and usually short, inconspicuous, narrow scales; rays often longer
18. Hairs of stem mostly all spreading; stolons lacking E. divergens T. & G.
19. Hairs of stem, or some of them, appressed or closely ascending; leafy stolons often present E. flagellaris Gray
20. Pappus of disk flowers of bristles as well as short outer setae or scales; pappus of ray flowers of only short setae, long bristles lacking E. strigosus Muhl. ex Wild.
21. Hairs of involucral bracts terete, 0.1-0.5mm long; stem hairs appressed to ascending, 0.2-0.5mm long var. strigosus
22. Hairs of involucral bracts flattened, 0.5-1.2mm long; stem hairs ascending to spreading, 0.5-1.5mm long var. septentrionalis (Fern. & Wieg.) Fern.
23. Pappus of disk and ray flowers similar, of long bristles sometimes or also with short setae
24. Disk corollas mostly 4-5.5mm long; fibrous-rooted E. glabellus Nutt.
25. Stem hairs appressed or ascending var. glabellus
26. Stem hairs spreading var. pubescens Hook.
27. Disk corollas mostly 3.5mm long or less; taprooted
28. Pappus simple, with only bristles; rays mostly 4-6mm long E. bellidiastum Nutt.
29. Pappus double, with long bristles and usually short, inconspicuous, narrow scales; rays often longer
30. Hairs of stem mostly all spreading; stolons lacking E. divergens T. & G.
31. Hairs of stem, or some of them, appressed or closely ascending; leafy stolons often present E. flagellaris Gray

7. Plants perennial with a rhizome or well developed caudex
8. Stem leaves usually well developed except sometimes the very uppermost ones, lanceolate or broader, or, plants usually over 3dm high and erect, mostly simple below
9. Upper leaves glabrous or nearly so except for ciliate margins and midrib; stems glabrous or glabrate below
10. Leaves conspicuously reduced upward, the upper mostly linear or lance-linear E. formosissimus Greene
11. Leaves little if at all reduced upward, the upper mostly ovate or lanceolate E. speciosus (Lindl.) DC.
12. Upper leaves hairy; stems hairy below
13. Upper stem not viscid, the leaves, except the very uppermost, only slightly reduced upward E. subtrinervis Rydb. ex Porter & Britt.
14. Upper stem viscid, if not, the leaves conspicuously reduced upward E. formosissimus Greene
15. Stem leaves usually much reduced upward, mostly linear, oblong, or oblanceolate, sometimes broader in a few low species; plants mostly less than 3dm high, often spreading or caespitose
20. Hairs of stem mostly spreading
22. Hairs of leaves mostly spreading or spreading-ascending E. pumilus Nutt.
23. Hairs of leaves mostly appressed or appressed-ascending E. ochroleucus Nutt.
24. Hairs of stems usually several to many and moderately well developed var. ochroleucus
25. Plants mostly (7)10-40cm high; stem leaves few and small var. scribneri (Canby ex Rydb.) Cronq.
26. Plants mostly (7)10-40cm high; stem leaves few and small var. scribneri (Canby ex Rydb.) Cronq.
27. Lower leaves usually 3 nerved, some often 4mm or more wide E. caespitosus Nutt.
28. Lower leaves not 3 nerved, often much narrower than 4mm
26. Involucre sparsely to moderately hairy; lower part of basal leaves usually with long spreading hairs coarser than the other leaf hairs; caudex usually much branched **E. engelmannii** A. Nels.

26. Involucre mostly densely hairy, often nearly white with hairs; lower part of basal leaves with long hairs mostly appressed or ascending, not conspicuously coarser but usually longer than other leaf hairs; caudex often simple **E. ochroleucus** Nutt.

27. Plants mostly (7)10–40cm high; stem leaves usually several to many and moderately well developed var. **ochroleucus**

27. Plants mostly 1–10(12)cm high; stem leaves few and small var. **scribneri** (Canby ex Rydb.) Cronq.

**Eriogonum**

1. Plants annual or biennial with a slender taproot or caudex

2. Plants annual or biennial with a slender taproot

3. Plants perennial with a thick taproot or caudex

4. Plants annual

5. Petals mostly 3.5–5mm long; styles usually over 1.5mm long **E. capitatum** (Willd.) Schulz

6. Petals over 11mm long; style usually over 1.5mm long **E. floribundum** (Lindl.) Nesom

7. Petals mostly less than 5 times as long as wide **E. conspicua** (Lindl.) Nesom

8. Leaves mostly over 5 times as long as wide **E. virgata** L. 

9. Leaves mostly 1–10(12)cm high; stem leaves few and small var. **scribneri** (Canby ex Rydb.) Cronq.

**Eriophorum angustifolium** Honck.

**Erodium cicutarium** (L.) L’Her. ex Aiton

**Ericastrum gallicum** (Willd.) Schulz

**Erysimum**

1. Petals mostly over 11mm long; style usually over 1.5mm long **E. capitatum** (Willd.) Schulz

2. Petals mainly or mostly over 11mm long; style usually over 1.5mm long **E. capitatum** (Willd.) Schulz

3. Corolla throat somewhat open; calyx teeth broadly obtuse **E. virginianum** L.

4. Corolla throat very much as wide as the fruit **E. virginianum** L.

5. Corolla throat somewhat open; calyx teeth subequal **E. virginianum** L.

6. Corolla throat very much as wide as the fruit **E. virginianum** L.

7. Petals mostly less than 5 times as long as wide **E. virgata** L.

8. Leaves mostly over 5 times as long as wide **E. virgata** L.

**Euphorbia**

Euphorbia virgata involucr with 1 pistilate and 3 stamine flowers protruding therefrom.

1. Leaves opposite, asymmetric at base with one side of blade extending lower than the other, or if symmetrical, the blades 25mm or less long and entire and stipules present which are often divided into linear segments at tip

2. Plants perennial **E. fendleri** T.& G.

3. Plants annual

4. Plants hairy

5. Styles slightly notched at most, about 0.2mm long; seeds irregularly mottled or punctate **E. virgata** L.

6. Seeds irregularly mottled or punctate; leaves often toothed **E. virgata** L.

7. Leaves slightly unequal, upper one larger than the others **E. guttata** (DC.) Nesom

8. Leaves mostly over 5 times as long as wide **E. virgata** L.

9. Leaves, at least the lower, alternate

10. Leaves at least the lower, alternate

11. Plants perennial with a thick woody base

12. Plants perennial with a thick woody base **E. engelmannii** A. Nels.

13. Plants taprooted annuals **E. engelmannii** A. Nels.

14. Plants taprooted annuals

15. Plants taprooted annuals **E. davidii** Subils

16. Plants taprooted annuals **E. davidii** Subils

17. Plants taprooted annuals **E. davidii** Subils

18. Plants taprooted annuals **E. davidii** Subils

19. Plants taprooted annuals

20. Plants taprooted annuals **E. davidii** Subils

21. Plants taprooted annuals **E. davidii** Subils

22. Plants taprooted annuals **E. davidii** Subils

23. Plants taprooted annuals **E. davidii** Subils

24. Plants taprooted annuals **E. davidii** Subils

25. Plants taprooted annuals **E. davidii** Subils

26. Plants taprooted annuals **E. davidii** Subils

27. Plants taprooted annuals **E. davidii** Subils

28. Plants taprooted annuals **E. davidii** Subils

29. Plants taprooted annuals **E. davidii** Subils

30. Plants taprooted annuals **E. davidii** Subils

31. Plants taprooted annuals **E. davidii** Subils

32. Plants taprooted annuals **E. davidii** Subils

33. Plants taprooted annuals **E. davidii** Subils

34. Plants taprooted annuals **E. davidii** Subils

35. Plants taprooted annuals **E. davidii** Subils

36. Plants taprooted annuals **E. davidii** Subils

37. Plants taprooted annuals **E. davidii** Subils

38. Plants taprooted annuals **E. davidii** Subils

39. Plants taprooted annuals **E. davidii** Subils

40. Plants taprooted annuals **E. davidii** Subils

41. Plants taprooted annuals **E. davidii** Subils

42. Plants taprooted annuals **E. davidii** Subils

43. Plants taprooted annuals **E. davidii** Subils

44. Plants taprooted annuals **E. davidii** Subils

45. Plants taprooted annuals **E. davidii** Subils

46. Plants taprooted annuals **E. davidii** Subils

47. Plants taprooted annuals **E. davidii** Subils

48. Plants taprooted annuals **E. davidii** Subils

49. Plants taprooted annuals **E. davidii** Subils

50. Plants taprooted annuals **E. davidii** Subils
1. Peduncles and involucres not glandular **E. merita** (A. Nels.) Nesom

**Eustoma grandiflorum** (Raf.) Shinners

**Euthamia graminifolia** (L.) Nutt.

**Eutrochium maculatum** (L.) Lamont var. **brunerl** (Gray) Lamont

**Evolvulus nuttallianus** Schultes

**Fallopia**

1. Outer perianth segments strongly winged in fruit; mature achenes smooth and shiny **F. scandens** (L.) Holub

2. Outer perianth segments merely keeled in fruit; mature achenes somewhat granular and dull **F. convolvulus** (L.) Löve

**Festuca**

1. Leaf blades flat, mostly over 3mm wide **F. subulata** Trin.

2. Leaf blades involute, or if flat, less than 3mm wide

3. Culms either decumbent at the usually red or purple, fibrillose base or from rhizomes **F. rubra** L.

4. Culms erect, without rhizomes, usually not red, purple, or fibrillose at base

5. Culms mostly over 30cm high; panicles 10-20cm long, mostly somewhat open; anthers 2-4mm long **F. idahoensis** Elmer

6. Culms mostly less than 30(40)cm high; panicles mostly less than 10cm long and narrow; anthers 1-1.8mm long **F. saximontana** Rydb.

**Fragaria**

1. Plants annual with a slender taproot **F. virginiana** Miller

2. Plants mostly perennial; rays mostly yellow on upper two-thirds; pappus awns about as long as scaly base **F. vesca** L.

**Gaillardia**

1. Plants mostly annual; rays mostly purple; pappus awns about as long as scaly base **G. pulchella** Foug.

2. Plants mostly perennial; rays mostly yellow on upper two-thirds; pappus awns as long as scaly base **G. aristata** Pursh

**Galaxopsis**

1. Corollas usually 1.5cm or less long, central lobe of lower lip of corolla shallowly notched or cleft **G. bifida** Boenn.

2. Corollas mostly 1.5-2.3cm long, central lobe of lower lip nearly square, not notched or cleft **G. tetrait** L.

**Galium**

1. Plants annual with a slender taproot **G. aparine** L.

2. Mature fruit mostly over 3mm long (excluding prickles); flowers mostly 1.5-2mm or less wide **G. boreale** L.

3. Flowers 1 to several together, axillary or terminal; stems usually scrambling; corollas mostly 2mm or less wide **G. trifidum** L.

**Gayophytum**

1. Petals 0.5-1.8mm long; plants unbranched or branched only in lower half **G. racemosum** T. & G.

2. Petals 1-3mm long; plants much branched above middle **G. diffusum** T. & G. var. **strictipes** (Hook.) Dorn

**Gentiana**

1. Corolla nearly closed at tip, lobes nearly lacking **G. andrewsii** Griseb.

2. Corolla open at tip, lobes readily apparent

3. Corolla lobes somewhat erose on margins, often well over twice as long as alternating appendages **G. puberulenta** Pringle

4. Corolla lobes entire, rarely as much as twice as long as alternating appendages **G. affinis** Griseb.

**Gentianella amarella** (L.) Boerner

**Geranium**

1. Petals 8mm or less long; usually annual or biennial

2. Fertile stamens 5; sepals not bristle-tipped

3. Fertile stamens 10; sepals bristle-tipped

4. Beak of stylar column, including stigmas, 4-7mm long; fruiting pedicel usually much longer than calyx **G. bicknellii** Britt.

5. Beak of stylar column, including stigmas, mostly under 3mm long; fruiting pedicel usually slightly if at all longer than calyx **G. carolinianum** L.

6. Petals over 8mm long; perennials

7. Petals white with pink or purple veins; inflorescence piseo-glandular with usually purple-tipped hairs **G. richardsonii** Fisch. & Trautv.

8. Petals usually pink or purple; inflorescence not glandular, or glandular with yellow or whitish-tipped hairs **G. viscosissimum** Fisch. & Meyer ex Meyer

9. Petioles of basal leaves and lower stem viscid with at least short glandular hairs var. **viscosissimum**

10. Petioles of basal leaves and lower stem with mostly retrorse non-glandular hairs var. **incisum** (T. & G.) Holmgren

**Geum**

1. Stems mostly subcapsulate, the leaves of the stem all greatly reduced; terminal division of lowest leaves usually not much larger than the lateral divisions, usually less than 3cm wide; styles not conspicuously jointed, the upper part persistent **G. triflorum** Pursh

2. Persistent lower segment of style to 5mm long; leaflets shallowly lobed at tip var. **triflorum**

3. Persistent lower segment of style less than 3.5mm long; leaflets divided more than halfway to midrib var. **ciliumatum** (Pursh) Fassett

4. Petals pinkish, rarely yellow; sepals purplish, erect to ascending **G. rivale** L.

5. Petals yellow or white; sepals usually green, reflexed at least in age

6. Petals white when fresh; lower stem with a few scattered hairs **G. canadense** Jacq.

7. Petals yellow; lower stem usually moderately to densely hirsute

8. Persistent part of style glandular-puberulent; terminal leaf division usually much larger then lateral ones **G. macrophyllum** Willd. var. **pericinum** (Rydby.) Raup

9. Persistent part of style glabrous or pubescent, not glandular; terminal leaf division usually only slightly larger than lateral ones **G. aplepticum** Jacq.

**Glandularia bipinnatifida** (Nutt.) Nutt.

**Glechoma hederacea** L.

**Glechoma triacanthos** L.
Glycyrrhiza lepidota Pursh
1. Stalked glands only on calyx or lacking var. lepidota
1. Stalked glands throughout inflorescence, usually also on petioles and stem var. glutinosa (Nutt.) Wats.

Gnaphalium
1. Leaf blades mostly 6mm or more wide; 1st glume 0.5-1mm long var. subcanescens Gray
1. Leaf blades mostly lanceolate or lance-linear; petioles 0.2-5mm long
1. Leaves usually folded lengthwise at midrib, strictly pinnately veined var. maximilliani Schrad.
1. Leaves usually not folded, some usually somewhat palmately 3 veined at base in addition to pinnately veined
7. Stems usually yellow; petioles not ciliate; underside of leaves hispid to villous or tomentose; anther appendages yellow var. nuttallii T & G.
7. Stems mostly reddish; petioles ciliate; underside of leaves scabrous or somewhat hisrate; anther appendages brown or black var. giganteus L.

Goodyera
1. Planter perennial, usually with several stems from a taproot and branched caudex; corolla limb mostly 6
1. Plants biennial or rarely a short-lived perennial, often with a single stem from a taproot and simple crown; corolla limb mostly 3-6mm wide var. americana (Michx.) Dorn
3. Plants perennial, usually with several stems from a taproot and branched caudex; corolla limb mostly 6-11mm wide var. mircanther (Eastw.) Gentry

Helenium
1. Plants annual
2. Central bracts of receptacle inconspicuously hairy; involucral bracts mostly ovate to ovate-oblong, abruptly contracted above middle with a long filiform tip var. annuus L.
1. Plants perennial
3. Involutral bracts mostly ovate to lance-ovate, abruptly acute or obtuse; lobes of disk corollas red or purple var. pauciflorus Nutt. var. subhomboides (Rydby) Cronq.
3. Involutral bracts mostly lanceolate or lance-linear, usually long-attenuate; lobes of disk corollas yellow
4. Leaf blades mostly broadly lanceolate to ovate; petioles (1)2-8cm long
5. Upper stems hairy; leaves 7-15cm wide; tuberos rhizomes develop later in season var. subcanescens Gray
5. Upper stems usually glabrous; leaves (1.2)4-9cm wide; tubers lacking var. subhomboides (Rydby) Cronq.
4. Leaf blades mostly lanceolate or lance-linear; petioles 0.2-5mm long
6. Leaves usually folded lengthwise at midrib, strictly pinnately veined var. maximilliani Schrad.
6. Leaves usually not folded, some usually somewhat palmately 3 veined at base in addition to pinnately veined
7. Stems usually yellow-brown or greenish; petioles not ciliate; underside of leaves hispid to villous or tomentose; anther appendages yellow var. nuttallii T & G.
7. Stems mostly reddish; petioles ciliate; underside of leaves scabrous or somewhat hisrate; anther appendages brown or black var. giganteus L.

Heliotropium curassavicum L. var. obovatum DC.
Heracleum spondylyum L. var. lanatum (Michx.) Dorn
Hesperis matronalis L.
1. Plants perennials, often over 2dm high; flowers usually near top of plant, inflorescence usually over half the height of plant

Hesperostipa
1. Glumes 30-40mm long; lemmas 16-25mm long H. spartea (Trin.) Barkw.
2. Glumes 14-28mm long; lemmas 7-14mm long

2. Awns mostly with a flexuous or coiled terminal segment, the total length 10-21cm H. comata (Trin. & Rupr.) Barkw.
3. Awns mostly with a relatively straight terminal segment, the total length rarely over 10cm long H. curtiseta (Hitc.h.) Barkw.

Heteranthera limosa (Sw.) Willd.

Heterotheca
1. Peduncles moderately hairy, the surface usually readily visible, sometimes glandular; outer pappus usually conspicuous and scale-like

H. hispida (Hook.) Nesom
1. Peduncles often densely hairy obscuring the peduncle surface, not glandular; outer pappus usually inconspicuous and narrowly filiform

2. Upper leaves usually spreading, the margins toward tip of leaf not long-ciliate H. villosa (Pursh) Shinners
3. Heads sessile or nearly so, subtended by prominent leaves; stem leaves oblong to ovate var. foliosa (Nutt.) Harms
4. Heads peduncled, the upper leaves reduced and grading into the involucral bracts; stem leaves obovateolate or spatulate var. villosa

Heuchera
1. Calyx 2-3.5mm long at anthesis; hypanthium lined with a thin glandular disk that somewhat covers the nearly completely inferior ovary

H. parvifolia Nutt. ex T.& G.
1. Calyx usually 4mm long or more at anthesis; glandular disk lacking or not covering top of ovary H. richardsonii R. Br.

Hibiscus trionum L.

Hieracium
1. Basal and lowest stem leaves large and early deciduous, middle leaves larger, upper ones reduced; involucre with few or no long hairs

H. umbellatum L.
1. Lower stem and leaves with long spreading hairs and sometimes also with short subconic hairs; long spreading hairs often also on involucre var. scabriusculum Farwell
2. Lower stem and leaves lacking long spreading hairs, leaves usually with many short subconic hairs; involucre usually lacking long spreading hairs var. umbellatum

1. Basal and lowest stem leaves larger than the progressively reduced middle and upper leaves, or stem leaves lacking; involucre often with many long hairs

3. Rays white or ochroleucous; stellate hairs lacking; mature achenes about 3mm long H. albiflorum Hook.
4. Rays mostly yellow (sometimes drying whitish or purplish); stellate hairs usually present at least on involucre; achenes 1.5-7mm long

6. Involucre 10mm or more long; pappus 5mm or more long; achenes 5mm or more long H. fendleri Schultz-Bip.
7. Involucre 5-9mm long; pappus 3-5(6)mm long; achenes 1.5-2mm long

8. Involucre 5-7(8)mm long; corollas 6-9mm long; pappus 3-4mm long; leaves glabrous or sparsely pilose-hirsute, rarely with a few stellate hairs H. piloselloides VIII

9. Involucre 7.5-9mm long; corollas 8-12mm or more long; pappus 4-5(6)mm long; leaves, especially the smaller ones, with conspicuous stellate hairs, especially near their margins, also pilose-hirsute H. caespitosum Dumort.

Hippurus vulgaris L.

Hieracleum
1. Plants perennial (hybrids between the following 2 species are not uncommon: H. x caespitosum Scribn. ex Pammel)

2. Awns 1.8-8cm long H. jubatum L.
3. Awns 1.5cm long or less H. brachyantherum Neveski

1. Plants annual

2. Leaf blades mostly 5-12mm wide; awns of lemmas mostly over 4cm long or lacking H. vulgar L.
3. Leaf blades 1-5mm wide; awns of lemmas 0.5-4cm long H. pusillum Nutt.

Humulus lupulus L. var. neomexicanus Nels. & Cock.

Hymenopappus
1. Plants biennial, the roots with a single crown; corollas white or ochroleucous (sometimes drying yellowish) H. tenuifolius Pursh
2. Plants perennial, the roots with usually several crowns; corollas usually yellow H. polycephalus Osterh.

Hyoscyamus niger L.

Hypericum
1. Plants perennial (rarely perennial with stolons); locule 1 H. canadense L.
2. Plants perennial; locule 3 H. perforatum L.

Impatiens capensis Meerb.

Ipomoea
1. Plants perennial with decumbent to erect stems; leaf blades linear or lance-linear, entire I. leptophylla Torrey
2. Plants annual with twining stems; leaf blades ovate, often 3-5 lobed I. purpurea (L.) Roth

Ipomopsis
1. Plants annual (rarely perennial with stolons); locule 1 I. missouriensis Nutt.
2. Plants with a conspicuous basal cluster of elongate, entire leaves usually twice as long or more as other leaves var. pseudotypica (Const. & Rollins) Dorn

Iris
1. Outer tepals glabrous; leaves 10mm or less wide I. missouriensis Nutt.
2. Outer tepals yellow-bearded on median line; leaves 15mm or more wide I. germanica L.

Iva axillaris Pursh
1. Leaves glabrous or nearly so except sometimes on margins; sessile glands usually colorless; involucral bracts of fruiting heads tending to be free most of their length var. axillaris
2. Leaves hairy; sessile glands often glittering yellow when dry; involucral bracts of fruiting heads often united half or more of their length var. robustior Hook.

Juglans nigra L.

Juncus
1. Plants fibrous-rooted annuals mostly less than 2dm high; flowers scattered along the many branches, inflorescence usually over half the height of plant J. bufonius L.
2. Plants perennials, often over 2dm high; flowers usually near top of plant, inflorescence usually less than half the height of plant

3. Flowers each with a pair of small bracteoles at base of perianth segments in addition to the bract subtending the pedicel

4. Leaf blades developed; inflorescence appearing terminal on stem J. compressus Jacq.
5. Leaf blades reduced to bristles; inflorescence appearing lateral on stem J. arcticus Wild. var. balticus (Willd.) Trautv.
6. Creeping rhizomes lacking, the stems densely clustered

5. Capsule 3 celled; anthers 0.3-0.5(0.6)mm long J. confusus Cov.

53
1. Plants annual or biennial; fruits with a notch at tip
   1. Fronds long and narrow, stalked at one end, commonly submersed
      L. trisulca (Sm. & Rydb. ex Rydb.) Dorn
   2. Fronds mostly 1.5-2.5mm long, often reddish on one or both sides, mostly 3-5 nerved (nerves arise above base and merge near tip of frond, light from beneath frond to help see nerves)
      3. Lower surface of fronds often red, more so than upper surface; greatest distance between lateral nerves near or above middle of frond; turions (small dark fronds filled with starch grains) sometimes present
      L. turionifera Landolt
      3. Lower surface of fronds usually not red (or less than upper), upper surface sometimes reddish; greatest distance between lateral nerves below middle of frond; turions lacking
      L. minor (Sm. & Rydb. ex Rydb.) Dorn

2. Stem leaves auriculate to cordate-clasping or perfoliate
   1. Plants annual or biennial; fruits with a notch at tip
      L. densiflorum (Sm. & Rydb. ex Rydb.) Dorn
   2. Stem leaves not auriculate nor cordate-clasping or perfoliate
      L. densiflorum (Sm. & Rydb. ex Rydb.) Dorn
   3. Mature fruits averaging about 2.5mm long, widest near middle
      L. densiflorum (Sm. & Rydb. ex Rydb.) Dorn
3. Mature fruits averaging nearly 3mm or more long, widest above middle var. *macrocarpum* Mulligan
1. Plants rhizomatous perennials; fruits not notchet at tip
4. Mature fruits cordate at base or nearly so, often indented at septum *L. draba* L.
4. Mature fruits not cordate at base, rarely indented at septum *L. chalepense* L.

**Leptosiphon septentrionalis** (Mason) Porter & Johnson
**Leucanthemum vulgare** Lam.
**Leucopoa kingii** (Wats.) Weber

1. Sepals 4 or more; petals 18–35mm long *L. rediviva* Pursh
1. Sepals 2; petals 6–17mm long *L. pygmaea* (Gray) Robins.

**Leymus**
1. Ligules mostly more than 2mm or more long; leaf blades sometimes involute, less than 6mm wide *L. innovatus* (Beal) Pilg.

**Liatris**
1. Petals yellow to orange

**Linum**
1. Leaves linear to elliptic or oblanceolate, not clasping the stem

**Linanthus pungens**
1. Ligules mostly 2mm or more long; leaf blades sometimes involute, less than 6mm wide *L. innovatus* (Beal) Pilg.

**Linosella aquatica** L.
**Linanthus pungens** (Torrey) Porter & Johnson
**Linaria**
1. Ultimate leaf segments few, some usually 1cm or more long, the leaves not appearing lace

**Lolium**

**Lomania borealis** L. var. *longiflora* Torrey

**Linum**
1. Petals blue or rarely white *L. lewisii* Pursh
1. Petals yellow to orange
2. Petals 5–9mm long *L. australis* Heller
2. Petals 10–17mm long
3. Sepals deciduous in fruit; fruit of 5 to 2 seeded segments
4. Styles in fruit mostly 2–5–4mm long; plants less than 3dm high *L. compactum* A. Nels.
3. Sepals persistent; fruit of 10 one seeded segments *L. sulphatum* Riddell

**Listera convallarioides** (Sw.) Nutt. ex Ell.
**Lithospermum**
1. Bulblets lacking; basal leaves usually hairy beneath

**Lithospermum**
1. Bulblets usually present in axil

**Lithospermum**
1. Petals 10

**Lithospermum**
1. Styles in fruit mostly 4

**Lithosperum**
1. Plants with greenish-white, white, or rarely yellowish corollas 10–16mm long, hairy on outside; corolla lobes mostly erect; style long-exserted from corolla; nutlets broadly attached at base to a flat gynobase; anthers usually about 2mm long *L. occidentale* (Mack.) Weakley et al.
1. Plants not with the above combination of characteristics

**Lobelia**
1. Corollas 15–30mm long *L. siphilitica* L. var. *ludoviciana* A. DC.
1. Corollas 6–15mm long
2. Middle stem leaves mostly lanceolate to obovate, some over 10mm wide *L. spicata* Lam.
2. Middle stem leaves mostly linear or nearly so, less than 5mm wide *L. kalmii* L.

**Loeblingia squarrosa** Nutt. var. *texas* (Hook.) Dorn
**Logfia arvensis** (L.) Holub

**Lolium**
1. Glume longer than or as long as spikelet or nearly so; lower lemmas mostly 9–10mm long *L. perenne* L.

**Lomaria**
1. Ultimate leaf segments fewer, some usually 1cm or more long, the leaves not appearing lace-like *L. nuttallii* (Gray) Macbr.
1. Ultimate leaf segments numerous, mostly less than 1cm long, the leaves much dissected and often appearing lace-like
2. Plants mostly over 2.5dm high, the leaf blades mostly 13–35cm long *L. dissectum* (Nutt.) Math. & Const. var. *multifidum* (Nutt.) Math. & Const.
2. Plants mostly less than 2.5dm high, the leaf blades usually less than 13cm long
3. Ovaries and fruits hairy all over *L. foeniculaceum* (Nutt.) Coul. & Rose
3. Ovaries and fruits glabrous *L. orientale* Coul. & Rose

**Loniceria**
1. Terminals leaves usually perfoliate; flowers mostly in terminal clusters; climbing or scrambling shrubs or vines *L. dioica* L. var. *glaucens* (Ryd.) Butters
1. Terminal leaves not perfoliate; flowers axillary, paired; upright shrubs *L. tatarica* L.

**Lotus**
1. Flowers yellow, often tinged with red, 3–15 in head-like umbels; perennial *L. corniculatus* L.
1. Flowers mostly white to pink, solitary or rarely 2 per axil; annual *L. unifolius* (Hook.) Bentham

**Lupinus**
1. Plants annual; ovules 2; cotyledons usually persistent and conspicuous *L. pilulatus* Pursh
2. Peduncles often over 1cm long; inflorescence nearly equaling to exceeding leaves; flowers mostly 9–12mm long var. *pseudolus* Pursh
2. Peduncles rarely over 1cm long; inflorescence exceeded by leaves; flowers mostly 6–10mm long var. *intermontanus* (Heleer) Smith
1. Plants perennial; ovules often more than 2; cotyledons usually early deciduous
3. Most of back surface of banner conspicuously hairy (rarely only beneath calyx) *L. sericeus* Pursh
3. Most of back surface of banner glabrous or inconspicuously hairy
4. Banner only slightly reflexed from wings to form a narrow V opening of less than 45 degrees; flowers 4-12mm long L. argenteus Pursh
5. Flowers mostly (7)9-12mm long; leaflets hairy or rarely glabrous on upper surface var. argenteus
5. Flowers mostly 4-7(10)mm long; leaflets usually glabrous on upper surface
6. Leaflets of lower leaves mostly broadly obovate to oblanceolate, mostly rounded to obtuse at tip var. rubricaulis (Greene) Welsh
6. Leaflets of lower leaves narrowly lanceolate or oblanceolate, mostly acute at tip var. laxiflorus (Doug. ex Lindl.) Dorn
4. Banner greatly reflexed from wings to form a wide V opening of about 45 degrees or more; flowers 10-17mm long L. polyphyllus Lindl. var. humicola (A. Nels.) Barneby

Luza
1. Flowers mostly solitary or paired at ends of branches in an open panicle
2. Branches of inflorescence often compound; perianth 1.7-2.5mm long; seeds not appended L. parviflora (Ehrh.) Desv.
2. Branches of inflorescence mostly simple and 1-flowered; perianth 2.6-4.3mm long; seeds conspicuously appended L. acuminata Raf.
3. Flowers in capitulum or spikelets or spike-like panicles
3. Plants densely caespitose, erect; anthers shorter than or slightly longer than filaments L. multiflora (Ehrh.) Lej.
3. Plants with decumbent crowns on short stolons; anthers 2-5 times as long as filaments L. comosa Meyer

Lycium barbarum
1. Creeping stem usually deeply buried, mostly lacking leaves; upright branches much branched L. dendroideum Michx.
1. Creeping stem above ground or barely buried, often leafy; upright branches little if at all branched L. annotinum L.

Lycopersicum
1. Petals apparently 8 or more
1. Petals 5

Mentha arvensis
1. Corolla yellow; pods mostly obscurely cross-veined with scattered stiff hairs L. nyctaginea (Michx.) MacM.
2. Tube of corolla 1.3-2 times as long as the limb M. oblongifolia (Nutt.) G. Don
2. Tube of corolla shorter than or equal to the limb M. lanceolata (Pursh) DC.

Miconia
1. Plants usually less than 4dm high, often in dry or open areas; cauline leaves usually lacking distinct lateral veins, the middle leaves only rarely over 6cm long
2. Tube of corolla 1.3-2 times as long as the limb M. oblongifolia (Nutt.) G. Don
2. Tube of corolla shorter than or equal to the limb M. lanceolata (Pursh) DC.

Micranthes occidentalis (Wats.) Small
Microseris nutans (Hook.) Schultz-Bip.
Microstegium gracilis (Hook.) Greene var. humilior (Hook.) Cronq.
Mirabilis
1. Leaves ovate, deltoid, or cordate; involucres not glandular-pubescent, with scattered stiff hairs M. nyctaginea (Michx.) MacM.
1. Leaves mostly linear or lanceolate; involucres often glandular-pubescent
2. Stems hirsute below with multicellular hairs, not glaucous *M. albida* (Walt.) Heimerl

*Mitella pentandra* Hook.

*Moehringia lateriflora* (L.) Fenzl

*Monardas fistulosa* L. var. *menthifolia* (Grah.) Fern.

*Moneses uniflora* (L.) Gray

*Monolepis nuttalliana* (Schultes) Greene

*Monotropa hypopitys* L.

*Morus alba* L.

*Muhlenbergia*

1. Plants annual; the culms rarely deciduous and rooting at the nodes and appearing perennial; glumes 1mm long or less
   10. Sepals with mostly appressed, non-glandular hairs var. *villosa* Wagner & Hoch
   2. Floral tube mostly over 2 times as long as ovary, filiform, with spreading hairs; petals white; perennial *M. divaricatum* (Pursh) Nutt. ex T. & G.

*Myosotis*

1. Calyx tube closely strigose, the hairs not spreading nor uncinate
   1. Leaves not all basal, some on flowering stem, the ultimate divisions oblong
   1. Leaves mostly linear or lanceolate; involucres often glandular-pubescent

*Myosurus minimus* L.

*Myriophyllum sibiricum*

1. Corolla limb 4
   3. Corolla blue or white; calyx usually with similar lobes; fruiting pedicels equaling or longer than calyx *M. arvensis* (L.) Hill

*Myosurus richardsonis* (Torrey ex Hook.) Rydb.

1. Stem hirsute below with multicellular hairs, not glaucous
   11. Seeds in 2 rows in each cell; hairs not pitted, in 1 row in each cell

*Myosurus sylvatica* (Hoffm.) Trin.

1. Plants perennial; glumes often over 1mm long
   3. Creeping rhizomes present
   5. Panicle diffuse, spikelets very remote on long pedicels or panicle branches *M. asperifolia* (Nees & Mey. ex Trin.) Parodi

*Myosurus villifolius* (L.) Gray

1. Corolla blue or white; calyx usually with similar lobes; fruiting pedicels equaling or longer than calyx

*Myosurus villosus* (L.) Hill

1. Seed with long awns var. *villosa* Wagner & Hoch

*Myriophyllum sibiricum*

1. Stems elongate

*Myriophyllum sibiricum*
13. Inflorescence glandular-pubescent O. nuttallii Sweet
13. Inflorescence often pubescent but not glandular O. pallida Lindl. var. trichocalyx (Nutt.) Dorn

Onobrychis vicifolia Scop.
Onoclea sensibilis L.
Onopordum acanthium L.
Onopopsis multicaulis (Nutt.) Greene

Opuntia
1. Stem segments oval to cylindric, about half as thick as to as thick as wide, easily detached O. fragilis (Nutt.) Haw.
1. Stem segments flattened, much wider than thick, not easily detached
2. Mature fruit juicy, red, usually spineless or nearly so; spine clusters on largest pads mostly 15-30mm apart O. tortispina Engelm. & Bigel.
2. Mature fruit dry, green or brown, often spiny; spine clusters on largest pads often 12mm or less apart O. polyantha Haw.

Orchidaceae
1. Flowers sessile or some on pedicels to about 2cm long, with 1 or 2 bractlets just below calyx in addition to the subtending bract O. ludoviciana Nutt.
1. Flowers all somewhat long-pedicelated, without bractlets
2. Pedicels 1-3(4); calyx lobes sometimes longer than the tube O. uniflora L. var. occidentalis (Greene) Taylor & MacBryde
2. Pedicels mostly 4-10; calyx lobes equal to or shorter than the tube O. fasciculata Nutt.

Orthilia secunda (L.) House
Orthocarpus luteus (L.) Planch.

Oxalidaceae
1. Plants annual
1. Plants perennial with rhizomes
3. Basal leaves various; inflorescence with a central axis, not forked

Oxalis
1. Leaves on stems from a taproot or rhizome; corolla yellow
1. Leaves all basal from a scaly bulb; corolla usua

Oxyria digyna (L.) Hill

Oxytropis
1. Petals blue, purple, pinkish, or reddish
3. Hairs of leaflets basally attached
4. Calyx usually with a mixture of short blackish hairs and long white hairs; leaves 10cm or less long; leaflets mostly 2-12(15)mm long; peduncles 13cm or less long; bracts usually shaggy-pilose on back

Oxyria digyna (L.) Hill

Ozarkia virginiana (Miller) Koch

Ozalis
1. Leaves all basal from a scaly bulb; corolla usually blue, pink, or lavender O. violacea L.
1. Leaves on stems from a taproot or rhizome; corolla yellow
2. Hairs on stems and petioles relatively sparse, some with cross-partitions and crinkly; stems often solitary; capsules glabrous or nearly so O. stricta L.
2. Hairs on stems and petioles relatively dense, usually lacking cross-partitions and stiff and straight with very sharp tips; stems often several to many; capsules rather densely appressed-hairy O. dillenii Jacq.

Oxypus digynus (L.) Hill

Oxypus
1. Flowers 12(15)-20mm long; leaflets mostly 7-33 per leaf; pod walls somewhat membranous, thin O. campestris (L.) DC. var. spicata Hook.
1. Petals blue, purple, pinkish, or reddish
3. Hairs of leaflets basally attached
4. Calyx usually with a mixture of short blackish hairs and long white hairs; leaves 10cm or less long; leaflets mostly 2-12(15)mm long; peduncles 13cm or less long; bracts usually shaggy-pilose on back O. lagopus Nutt. var. atropurpurea (Rydberg) Barneby
4. Calyx usually with all white hairs; leaves often over 10cm long; leaflets often over 15mm long; peduncles often over 13cm long; bracts often appressed-pilose on back O. besseyi (Rydberg) Blank.

Packera
1. Plants somewhat woolly or tomentose nearly throughout at flowering
2. Leaves mostly all entire or subentire, only the upper ones lobed P. cana (Hook.) Weber & Löve
2. Leaves usually all toothed and lobed P. plattensis (Nutt.) Weber & Löve
1. Plants glabrous or essentially so at flowering, rarely with a few persisting patches of tomentum
3. Basal leaf blades predominantly subtruncate or subcordate at base, mostly toothed P. psuedaurea (Rydberg) Weber & Löve
3. Basal leaf blades predominantly tapering at base, sometimes lobed
4. Basal leaves subentire to coarsely dentate especially above middle, often long-tapering to base, mostly oblanceolate; plants taprooted P. tridenticulata (Rydberg.) Weber & Löve
4. Basal leaves various; plants fibrous rooted or subhitzomatous
5. Basal leaves thickish and subsucculent at least when fresh; stem leaves often entire to coarsely toothed; plants fibrous rooted

Packera

Panicum
1. Plants perennial with rhizomes P. virgatum L.
1. Plants annual
2. Spikelets 3.5-5mm long; 1st glume 2-3.5mm long P. milaceum L.
2. Spikelets 2-3.5mm long; 1st glume 1-1.5(2)mm long P. capillare L.

Parietaria pensylvanica Muhl. ex Willd.
Parnassia
1. Stem leaf (bract) often clasping or the base somewhat rounded or truncate; petals 7 or more veined, often over 7mm long P. palustris L. var. montanensis (Fern. & Rydb. ex Rydb.) Hitchc.
1. Stem leaf not clasping, tapering at base; petals mostly 5 veined, mostly 4-7mm long P. parviflora DC.

Paronychia
1. Plants mostly over 10cm high, not mat forming; some leaves over 10mm long P. jansennii T. & G.
1. Plants mostly 10cm or less high, usually mat forming; leaves mostly all less than 10mm long
2. Flowers usually clustered; some leaves often over 6mm long, often widest at or above middle P. depressa (T. & G.) Nutt. ex A. Nels.
2. Flowers mostly solitary or paired; leaves mostly less than 6mm long, usually widest near base P. sessiliflora Nutt.

Parthenocissus
1. Tendrils with adhesive disks; inflorescence with a central axis, not forked P. quinquefolia (L.) Planch.
1. Tendrils lacking adhesive disks; inflorescence forked P. vitacea (Knerr) Hitchc.

Pascopyrum smithii (Rydb.) Barkw. & Dewey
Pastinaca sativa L.
Patia racemosa (Sm.) Romasch et al.
Pedicularis procera Gray
Pediocactus simpsonii (Engelm.) Britt. & Rose

Pedioum
1. Roots thick and tuberous; flowers mostly over 1cm long; leaves glandular-punctate or not
   2. Stems and petioles with somewhat soft, long, spreading hairs P. esculentum (Pursh) Rydby.
   2. Stems and petioles with stiff, appressed or ascending hairs P. cuspidatum (Pursh) Rydby.
1. Roots generally not thick and tuberous; flowers mostly less than 1cm long; leaves usually glandular-punctate
   1. Leaves and stems somewhat silvery hairy; flowers sessile or subsessile P. argophyllum (Pursh) Grimes
   3. Leaves and stems greenish, hairy but not silvery; flowers sessile or with pedicels to 4mm long P. digitatum (Nutt. ex T.& G.) Isely

Peelaea
1. Lowest primary leaflet usually divided into more than 3 secondary leaflets with a prominent, hairy petiolo which diverges from rachis at more than a 45 degree angle and lacks a deciduous base
   2. Rachis on upperside of leaf with dense, short, curly, appressed hairs; largest ultimate leaf segments usually over 3cm long P. atropurpurea (L.) Link
   2. Rachis on upperside of leaf with sparse, long, divergent hairs; largest ultimate leaf segments usually less than 3cm long P. gastonyi Windham
1. Lowest primary leaflet divided into 3 or fewer secondary leaflets with a very short, often glabrous petiolo, or if with more than 3 secondary leaflets, the lowest petiolo diverges from rachis at less than a 45 degree angle and has a slightly decurrent base P. glabella Mett. ex Kuhn
3. Spores 64 per sporangium; lowest primary leaflet mostly divided into 3 or fewer secondary leaflets on a very short petiolo var. occidentalis (E. Nels.) Butters
3. Spores 32 per sporangium; lowest primary leaflet mostly divided into more than 3 secondary leaflets and/or with a prominent petiolo var. simplex Butters

Penstemon
1. Inflorescence glandular-puberulent, sometimes rather sparsely so
   2. Corolla glabrous or nearly so P. albidus Nutt.
   2. Corolla glandular
3. Ovary and capsule usually glabrous; calyx rarely over 7mm long; corolla often narrower or shorter or both; staminode usually included P. gracilis Nutt.
1. Inflorescence usually glabrous, at least not glandular
4. Anthers conspicuously hairy on side away from dehiscence, the sacs usually not dehiscing their full length P. glaber Pursh
5. Sepals ovate to suborbicular, predominantly broadly rounded and erose at tip, sometimes with a short acute tooth at middle, little if at all longer than wide var. alpinus (Torrey) Gray
5. Sepals lanceolate to ovate, predominantly acute to acuminate at tip, often not erose, usually about 2 or more times as long as wide var. alpinus (Torrey) Gray
4. Anthers glabrous on side away from dehiscence (rarely minutely puberulent), the sacs often dehiscing their full length
6. Leaves conspicuously short-hairy P. erianthus Pursh
6. Leaves glabrous or nearly so
7. Corolla 3.5-5cm long; upper leaves ovate or cordate or suborbicular P. grandiflorus Nutt.
7. Corolla less than 2.5cm long; upper leaves various
8. Leaves all linear to narrowly lanceolate or oblanceolate, many of them over 7 times as long as wide, rarely as much as 1cm wide P. angustifolius Nutt. ex Pursh
8. Leaves mostly broadly lanceolate to ovate at least on stem, rarely as much as 7 times as long as wide, often over 1cm wide P. nitidus Dougl. ex Benth.

Perideridia montana (Blank.) Dorn
Peritoma serrulata (Pursh) DC.

Persicaria
1. Plants annual
2. Stipules mostly terminally fringed with bristly hairs P. maculosa Gray
2. Stipules mostly not bristly fringed
3. Veins of outer perianth segments somewhat prominent, branched and recurved at tip and somewhat resembling an anchor; peduncles without gland-tipped hairs, sometimes with sessile glands P. lapathifolia (L.) Gray
3. Veins of outer perianth segments not especially prominent nor branched and recurved at tip; peduncles with gland-tipped hairs
4. Styles or stamens or both exerted from at least some perianths P. bicorns (Raf.) Nieuwland
4. Styles and stamens included in perianth P. pensylvanica (L.) Gomez

1. Plants perennial with usually rhizomes or stolons
5. Perianth usually greenish or white; styles less than 2mm long
6. Tepals all glandular-punctate P. punctata (Ell.) Small
6. Tepals not glandular or only the inner ones glandular P. hydropiperoides (Michx.) Small
5. Perianth rose or dark pink; styles mostly 2-4mm long P. amphibia (L.) Delarb
7. Inflorescence 1-4(6)cm long, oblong-ovoid; peduncles usually glabrous; leaf blades predominantly oblong-lanceolate with short-pointed or rounded tips var. stipulacea (Coleman) Hara
7. Inflorescence (3)4-15cm long, narrow-cylindric; peduncles mostly glandular-hairy; leaf blades predominantly lanceolate with long-pointed tips var. emersa (Michx.) Hickman

Petasites frigidus (L.) Fries var. sagittatus (Banks ex Pursh) Chern.
Petrosphytum caespitosum (Nutt.) Rydby.
Phacelia
1. Ovules 6 or more per ovary; annual P. linearis (Pursh) Holz.
1. Ovules 4 per ovary; perennial P. hastata Dougl. ex Lehm.

Phalaris
1. Panicle 2-4cm long; annual P. canariensis L.
1. Panicle 6cm or more long; perennial P. arundinacea L.

Phemeranthus parviflorus (Nutt.) Kiger
Philemaphus pubescens Loisel.
Phleum
1. Panicle long-cylindric, usually over 5 times as long as wide; culms usually bulbous at base P. pratense L.
1. Panicle ovoid or oblong, usually not over 4 times as long as wide; culms not bulbous at base P. alpinum L.
Platanthera
1. Leaves mostly linear, lance-linear, oblong, or acicular, often narrower or longer; margins, calyx, and styles variable
2. Corolla usually 10(12)mm or less in diameter; leaves mostly 3-10(13)mm long and averaging about 0.5mm wide near middle, usually stiff and pungent, and often loosely pubescent with somewhat ciliate hairs; mostly mat forming plants P. hoodii Richardson
3. Leaves 1-2.5mm wide, the leaf base and internodes usually not hyaline; calyx and leaves variable, often glabrous or glabrate or glandular

Phragmites australis (Cav.) Trin. ex Steudel

Phryma leptostachya L.

Physalis
1. Plants annual; leaves 7mm or less wide
2. Pedicels in flower mostly 3
3. Pedicels in fruit mostly 4-5
4. Petals 4.5
5. Petals 7

Physaria var.
1. Fruits notched at tip, often appearing like 2 parts grown together P. brassicoides Rydb.
2. Fruits rounded or pointed at tip
3. Pubescence moderate to lacking, not glandular; leaf blades mostly lanceolate or elliptic or rhombic
4. Outer leaves oblanceolate usually with an obovate blade, inner leaves linear
5. Outer leaves linear
6. Rays of hairs on fruit spreading, or none
7. Leaves 1
8. Leaves 2

Physarum
1. Fruits notched at tip, often appearing like 2 parts grown together P. brassicoides Rydb.
2. Pedicels in fruit uniformly recurved, not sigmoid or nearly so
3. Petals 4-5-7(8)mm long; plants mat-forming; mature fruits mostly 5.5-8mm long, the styles 3-6mm long P. montana (Gray) Greene
4. Petals 4.5-5.5mm long, the styles 2-4mm long
5. Stems often over 20cm long; flowering racemes not secund; petals yellow; leaves commonly all narrowly linear and entire P. ludoviciana (Nutt.) O’Kane & Al-Shehbaz
6. Rays of hairs on fruit somewhat spreading var. arenosa
7. Rays of hairs on fruit appressed var. argillosa (Rollins & Shaw) Turner

Physocarpus
1. Plants over 20cm long; fruiting racemes not secund; petals yellow; leaves commonly all narrowly linear and entire P. ludoviciana (Nutt.) O’Kane & Al-Shehbaz
2. Stems few to many
3. Leaves 1
4. Leaves 2
5. Leaves 3
6. Leaves 4
7. Leaves 5

Piperia unalascensis (Spreng.) Romasch et al.
1. Stems usually less than 6cm long, mostly in clusters of 2; cones mostly less than 6cm long P. monogynus (Torrey) Coul.
2. Stems mostly over 20cm long; flowering racemes not secund; petals yellow; leaves commonly all narrowly linear and entire P. ludoviciana (Nutt.) O’Kane & Al-Shehbaz
3. Stems rarely over 20cm long; flowering racemes usually secund; petals sometimes reddish or purplish tinged; leaves, or some of them, usually broader than linear, sometimes toothed P. arenosa (Richardson) O’Kane & Al-Shehbaz
4. Rays of hairs on fruit somewhat spreading var. arenosa
5. Rays of hairs on fruit appressed var. argillosa (Rollins & Shaw) Turner

Pistia
1. Pistils mostly 3-5, united only at base; some leaves usually well over 3cm long P. opulifolius (L.) Maxim. var. intermedium (Ryd.) Robins.
2. Leaves 1, if 2 or 3, united about half or more their length; leaves usually less than 3cm long P. monogynus (Torrey) Coul.

Picea glauca
1. Plants annual; leaves 7mm or less wide
2. Inflorescence glabrate or glandular; leaf blades mostly 5.5-8mm long, the styles 3-6mm long P. monogynus (Torrey) Coul.
3. Petals 4.5-5.5mm long, the styles 2-4mm long
4. Petals 4.5-5
5. Petals 7

Plagiobothrys scouleri (H. & A.) Johnston var. hederifolia (Gray) Greene
1. Plants annual; leaves 7mm or less wide
2. Inflorescence glabrate or glandular; leaf blades mostly 5.5-8mm long, the styles 3-6mm long P. monogynus (Torrey) Coul.
3. Petals 4.5-5.5mm long, the styles 2-4mm long
4. Petals 4.5
5. Petals 7

Platanthera
1. Creeping rhizomes present, sometimes short, the culms often densely tufted also
2. Culms strongly flattened, 2 edged *P. compressa* L.
3. Leaves with tangled cobwebby hairs at base
   4. Panicle open; leaves scattered along stem *P. pratensis* L.
   5. Plants often dioecious, mostly pistillate; lower sheaths minutely retrorsely hairy and usually purplish *P. wheeleri* Vasey
   6. First glume 2.5-3.5mm long, 1 nerved; anthers mostly 1.5mm long; leaves mostly clustered near base *P. arida* Vasey
   7. First glume 3.5-5mm long, usually 3-5 nerved; anthers mostly 1.8-2.3mm long; leaves somewhat scattered along stem *P. glaucifolia* Scribn. & Wms. ex Wms.
5. Leaves usually glabrous or glabrate beneath, margins entire or toothed
6. Plants annual; stems usually solitary
7. Plants perennial; stems usually several to many from base
8. Plants annual but often densely caespitose, lacking remains of old culms, mostly 25cm or less high; anthers 0.7-1.1mm long *P. annua* L.
9. Plants perennial, usually with remains of old culms, often over 25cm high; anthers sometimes longer
10. Plants often dioecious, mostly pistillate; lower sheaths minutely retrorsely hairy and usually purplish *P. wheeleri* Vasey
11. Plants annual; stems usually solitary
12. Plants perennial; stems usually several to many from base
1. Creeping rhizomes normally lacking (culms sometimes decumbent and rooting)
7. Florets usually converted into bulblets with a dark purple base; culms bulbous at base *P. bulbosa* L.
8. Florets normal; culms not bulbous at base
9. Florets normal; culms not bulbous at base
10. Plants averaging less than 3dm high; leaves mostly clustered at base, the lemmas usually short and broad with short obtuse tips
11. Lower leaflets 2 or more times as long as wide
12. Spikes compressed, appearing flattened-oblong or ovate, the glumes and lemmas usually keeled to base, the lemmas usually short and broad with short obtuse tips
13. Leaf blades usually folded or involute, firm, rather stiff; lemma 4-6mm long *P. fendlerianna* (Steudel) Vasey
14. Leaf blades flat, or if involute, rather lax or soft; lemma 2-4(5.5)mm long *P. glauca* Vahl var. *rupicola* (Nash ex Rydb.) Boivin
15. Ligules of middle or upper leaves mostly 3-7mm long *spp. secunda* var. *elongata* (Vasey) Dorn
Polanisia dodecandra (L.) DC. var. *trachysperma* (T. & G.) Ilits
Polemonium brandegeei (Gray) Greene
Polygala
1. Plants annual; stems usually solitary
2. Inflorescence 6-15mm wide; flowers often pink or purple; leaves alternate *P. sanguinea* L.
3. Inflorescence 5mm or less wide; flowers usually white; leaves whorled at least below *P. verticillata* L.
1. Plants perennial; stems usually several to many from base
2. Upper stem puberulent; leaves mostly over 3mm wide *P. senega* L.
3. Upper stem glabrous; leaves rarely over 3mm wide *P. alba* Nutt.
Polygonaum biflorum (Walt.) Ell.
Polygonum
1. Pedicels of oldest flowers recurved or reflexed; plants mostly erect; flowers not crowded
2. Achenes usually well over 2.5mm long; perianth rarely less than 3mm long, usually exceeding achene; plants moderately branched at most
3. Pedicels erect to spreading (rarely a few reflexed); plants sometimes densely tufted
4. Flowers in terminal spike-like racemes, crowded, sometimes also axillary, the subterminal bracts often much longer than the flowers; leaves rarely over 2mm wide, the lateral veins never plainly visible; stems usually sharply angled *P. polygaloides* Meisner *spp. confertiflorum* (Nutt. ex Piper) Hickm. & Ny.
5. Flowers mostly in leaf axils or axils of bracts which are sometimes shorter than the flowers; leaves often over 2mm wide, the lateral veins sometimes visible; stems often terete and longitudinally striate
6. Achenes black, smooth and shiny; perianth usually conuate for 1/4 to 1/3 the length, the segments not yellow-margined *P. sawatchense* Small
7. Achenes greenish to brown, often roughened, not shiny, or if black and shiny, the perianth conuate for half its length or the segments yellow-margined
8. Denticles of oldest flowers recurved or reflexed; plants mostly erect; flowers not crowded
9. Achenes usually well over 2.5mm long; perianth rarely less than 3mm long, usually exceeding achene; plants moderately branched at most
10. Achenes 2-2.5mm long, often exceeding the 1.5-2.5(3)mm perianth; plants usually diffusely branched from near base *P. engelmannii* Greene
11. Pedicels slightly spreading; plants sometimes densely tufted
12. Leaves plicate with 2 longitudinal folds, minutely spinulose-serrulate *P. tenue* Michx.
13. Leaves flat or rolled, entire or nearly so
14. Flowers in terminal spike-like racemes, crowded, sometimes also axillary, the subterminal bracts often much longer than the flowers; leaves rarely over 2mm wide, the lateral veins never plainly visible; stems usually sharply angled *P. polygaloides* Meisner *spp. confertiflorum* (Nutt. ex Piper) Hickm. & Ny.
15. Flowers mostly in leaf axils or axils of bracts which are sometimes shorter than the flowers; leaves often over 2mm wide, the lateral veins sometimes visible; stems often terete and longitudinally striate
6. Achenes black, smooth and shiny; perianth usually conuate for 1/4 to 1/3 the length, the segments not yellow-margined *P. sawatchense* Small
7. Achenes greenish to brown, often roughened, not shiny, or if black and shiny, the perianth conuate for half its length or the segments yellow-margined
8. Denticles of oldest flowers recurved or reflexed; plants mostly erect; flowers not crowded
9. Achenes usually well over 2.5mm long; perianth rarely less than 3mm long, usually exceeding achene; plants moderately branched at most
10. Achenes 2-2.5mm long, often exceeding the 1.5-2.5(3)mm perianth; plants usually diffusely branched from near base *P. engelmannii* Greene
11. Pedicels slightly spreading; plants sometimes densely tufted
12. Leaves plicate with 2 longitudinal folds, minutely spinulose-serrulate *P. tenue* Michx.
13. Leaves flat or rolled, entire or nearly so
14. Flowers in terminal spike-like racemes, crowded, sometimes also axillary, the subterminal bracts often much longer than the flowers; leaves rarely over 2mm wide, the lateral veins never plainly visible; stems usually sharply angled *P. polygaloides* Meisner *spp. confertiflorum* (Nutt. ex Piper) Hickm. & Ny.
15. Flowers mostly in leaf axils or axils of bracts which are sometimes shorter than the flowers; leaves often over 2mm wide, the lateral veins sometimes visible; stems often terete and longitudinally striate
6. Achenes black, smooth and shiny; perianth usually conuate for 1/4 to 1/3 the length, the segments not yellow-margined *P. sawatchense* Small
7. Achenes greenish to brown, often roughened, not shiny, or if black and shiny, the perianth conuate for half its length or the segments yellow-margined
8. Denticles of oldest flowers recurved or reflexed; plants mostly erect; flowers not crowded
9. Achenes usually well over 2.5mm long; perianth rarely less than 3mm long, usually exceeding achene; plants moderately branched at most
10. Achenes 2-2.5mm long, often exceeding the 1.5-2.5(3)mm perianth; plants usually diffusely branched from near base *P. engelmannii* Greene
11. Pedicels slightly spreading; plants sometimes densely tufted
12. Leaves plicate with 2 longitudinal folds, minutely spinulose-serrulate *P. tenue* Michx.
13. Leaves flat or rolled, entire or nearly so
14. Flowers in terminal spike-like racemes, crowded, sometimes also axillary, the subterminal bracts often much longer than the flowers; leaves rarely over 2mm wide, the lateral veins never plainly visible; stems usually sharply angled *P. polygaloides* Meisner *spp. confertiflorum* (Nutt. ex Piper) Hickm. & Ny.
2. Leaf blades suborbicular or cordate to deltoid; petioles strongly laterally flattened below blade
3. Leaf blades suborbicular or cordate; bark smooth, whitish-green P. tremuloides Michx.
4. Leaf blades mostly deltoid; bark rough, usually dark P. deltoides Bartr. ex Marsh. var. occidentalis Rydb.
5. Leaf blades lanceolate or ovate; petioles usually not flattened
6. Plants mostly less than 1/3 the blade length; blades mostly lanceolate P. angustifolia James
7. Petioles mostly over 1/3 the blade length; blades mostly ovate
8. Leaf blades about as green beneath as above, the base usually cuneate; petiole often channeled at end near blade P. acuminata Rydb.
9. Leaf blades much lighter beneath than above, the base usually rounded to subcordate; petiole usually terete or nearly so at end near blade P. balsamifera L.

Portulaca oleracea L.

Potamogeton
1. Leaves, or some of them, over 5mm wide
2. Lower leaves mostly with 3 or rarely 5 leaflets; mature achenes lacking a conspicuous appendage
3. Leaf blades often with a pair of glands at base; usually not undulate-keeled P. pusillus L.
4. Leaves, or some of them, over 5mm wide, these often elliptic or ovate and often floating
5. Basal leaves trifoliolate or palmately compound with more than 3 leaflets
6. Plants with stolons; flowers solitary on naked peduncles
7. Leaf blades suborbicular or cordate to deltoid; petiole usually terete or nearly so at end near blade P. acuminata Rydb.

Prenanthes racemosa Michx. var. multiflora (Cronei.) Dorn

Primula pauciflora (Greene) Mast & Reveal
1. Plants usually glabrous; pollen sacs usually maroon var. pauciflora

62
1. Plants terrestrial, or if aquatic, the leaves not finely dissected as above

1. Plants aquatic, mostly submerged or floating; most leaves finely dissected with the segments less than 1mm wide

Ranunculus
Quercus macrocarpa

1. Petals white or greenish

1. Petals pink to purplish

Pyrola
Hitchc.

Puccinellia

1. Leaflets glandular beneath except sometimes on margins and midrib var. latisulcum (Desv.) Underw. ex Heller

1. Leaflets evenly hairy beneath var. pubescens Underw.

Pteris

Pteridium aquilinum

1. Corolla white or greenish; ovaries ellipsoid, not 3 lobed nor papillose; ovules 1

1. Corolla pink to purplish; ovaries broadly ovoid, obovoid, obconic, or obpyriform, becoming 3 lobed after anthesis, papillose; ovules 6-15; leaf margins pubescent with mostly spreading hairs P. trachycarpa Wats.

1. Ovary broadly ovoid, obovoid, obconic, or obpyriform, becoming 3 lobed after anthesis, papillose; ovules 6-15; leaf margins pubescent with mostly spreading hairs P. trachycarpa Wats.

Prunus

Prunus virginiana var. demissa (Nutt.) Torrey

1. Flowers 1-12 in umbels or corymbs

2. Branches, or some of them, usually spine-tipped; calyx lobes hairy inside; fruit 15mm or more long, the stone usually flattened P. americana Marsh.

2. Branches not spine-tipped; calyx lobes glabrous inside; fruit often less than 15mm long, the stone subglobose

3. Plants low, often prostrate shrubs rarely over 1.5m high; leaves glaucous beneath, entire toward base; petals glabrous; fruit 8mm or more in diameter P. pumila var. besseyi (Bailey) Waugh

3. Plants usually upright shrubs or trees mostly over 1.5m high; leaves usually green on both sides, toothed to base or nearly so; petal hairs outside near base or glabrous; fruit usually 4-7mm in diameter P. pensylvanica L. f.

Pseudognaphalium

1. Plants glandular-hairy, sparsely if at all tomentose below inflorescence P. macounii (Greene) Kartesz

1. Plants not glandular, somewhat tomentose throughout P. strangulatum (H. B. K.) Anderb.

Pseudotoga

Pseudotoga menziesii (Mirb.) Franco var. glauca (Beissn.) Franco

Psoralidium

Psoralidium spinuliferum (Pursh) DC.

Pteridium

Pteridium aquilinum (L.) Kuhn

1. Leaflets glabrous beneath except sometimes on margins and midrib var. latisulcum (Desv.) Underw. ex Heller

1. Leaflets evenly hairy beneath var. pubescens Underw.

Psorotrichum

Psorotrichum andromedea Nutt.

Puccinia

Puccinia inamoenus (Greene) Carter

Pyrola

Pyrola asarifolia Michx.

1. Petals pink to purplish P. asarifolia Michx.

1. Petals white or greenish-white to yellowish

2. Leaves prominently white-mottled or white-streaked along the veins on upper surface P. picta Smith

2. Leaves usually not white-mottled or white-streaked

3. Sepals about as long as wide P. americana Sweet

3. Sepals (free portion) about as long as wide

4. Leaf blades usually less than 3cm long; sepals rounded to acute P. chlorantha Sw.

4. Leaf blades, or some of them, usually over 3cm long; sepals acute to acuminate P. elliptica Nutt.

Quercus

Quercus macrocarpa Michx.

Ranunculus

Ranunculus flammula (L.) Rottb.

1. Plants aquatic, mostly submerged or floating; most leaves finely dissected with the segments less than 1mm wide R. aquatilis L. var. diffusus With.

1. Plants terrestrial, or if aquatic, the leaves not finely dissected as above

2. Stems creeping and rooting at nodes or the plants with stolons

3. Leaves entire or merely rounded to cuneate or acute at base R. cymbalaria Pursh

3. Leaves compound or simple and lobed or divided at least to near middle

4. Leaves 3-5 lobed about halfway to base, the lobes usually round and entire; petals 3-5 R. hyperboreus Rottb.

4. Leaves compound or lobed more than halfway to base, the lobes usually sharply toothed; petals usually more than 5 R. repens L. var. pleniflorus Fern.

2. Stems upright or rarely rooting at lower nodes only; stolons lacking

5. Basal leaves mostly simple and entire or merely toothed or very shallowly lobed (some, but not all, rarely divided or compound)

6. Basal leaf blades mostly cordate or truncate at base

7. Petals 8-15mm long; achene finely puberulent R. cardiophyllum Hook.

7. Petals 1.5-3.5mm long; achene glabrous R. abortivus L.

8. Basal leaf blades mostly rounded to cuneate or acute at base (rarely a few cordate in R. inanomorus)

8. Basal leaf blades usually entire, rarely notched once or twice R. glaberrimus Hook.

9. Basal leaves usually entire, elliptic to oblong-ovate, longer than wide; stem leaves entire to 3-lobed, middle lobe largest var. ellipticus (Greene) Greene

9. Basal leaves often shallowly lobed, usually ovate to obovate, sometimes wider than long; stem leaves often entire var. glaberrimus

8. Basal leaves with large rounded teeth or conspicuously lobed

10. Petals 1.5-3.5mm long; achene beak 0.3mm or less long

11. Leaves and stems glabrous R. abortivus L.

11. Leaves and stems with scattered long hairs R. micranthus Nutt.

10. Petals 2-9mm long; achene beak 0-0.9mm long

12. Fruiting head about as long as wide; achene beak 0.4-0.9mm long R. inanomorus Greene

12. Fruiting head about as long as wide; achene beak 0.3mm or less long R. rhomboideus Goldie

5. Basal leaves either compound or divided usually halfway or more to base

13. Leaves all basal, 0.5-4cm long, the flowers on naked stalks from the base; achenes woolly, the beaks somewhat spiny; annual R. testiculatus Crantz

13. Leaves basal and on stem or at least bracts present on stem; achenes not woolly, the beaks often not spiny; mostly perennials

14. Petals mostly 8-18mm long, usually conspicuously exceeding the sepals

15. Basal leaves 4-5 times cleft but not with leaflets nor petioles; stems not rooting at nodes; petals 5 R. acris L.

15. Basal leaves, or some of them, usually compound and the leaflets with petioles; stems often rooting at lower nodes; petals usually more than 5 R. repens L. var. pleniflorus Fern.

14. Petals mostly 1.5-6(7)mm long, little if at all exceeding the sepals

16. Basal leaf blades, or some of them, compound with usually stalked leaflets
17. Plants glabrous or with sparse appressed or curled hairs *R. abortivus* L.
17. Plants conspicuously long-hairy with spreading hairs
18. Petals shorter than sepals; achene beaks 0.5–0.9mm long; stems erect, not rooting at lower nodes *R. pensylvanicus* L. f.
18. Petals usually subequal to or slightly exceeding the sepals; achene beaks 1–1.5mm long; stems often somewhat decumbent, occasionally rooting at lower nodes *R. macounii* Britt.
19. Basal leaf blades simple although occasionally cleft about to base but without stalked leaflets
20. Basal leaves, or some of them, simple and merely toothed, or lobed about to middle, or rarely compound and the leaflets merely toothed or very shallow lobed; receptacle in fruit 5mm or less long; achene beak 0.1–0.2mm long *R. abortivus* L.
20. Basal leaves usually all simple and deeply 3–5 lobed; receptacle in fruit usually over 5mm long; achene beak about 0.1mm long *R. scleratus* L. var. *multifidus* Nutt.

**Ratibida**
1. Head 2 or more times as long as wide excluding rays, usually well over 5cm above uppermost leaf; rays mostly 7–35mm long *R. columnifera* (Nutt.) Wooton & Standley
1. Head 1–1.5 times as long as wide excluding rays, 1–3(5)cm above uppermost leaf; rays 3–8mm long *R. tagetes* (James) Barnh.

**Rhamnus**
1. Leaves opposite or subopposite; prominent lateral leaf veins mostly 3–5 pair *R. cathartica* L.
1. Leaves alternate; prominent lateral leaf veins mostly 6 or more pair *R. alnifolia* L’Her.

**Rhodiola integrifolia** Raf.

**Rhus**
1. Leaflets more than 5 *R. glabra* L.
1. Leaflets 3 or 5 *R. trioloba* Nutt.

**Ribes**
1. Spines or prickles present at least at nodes
2. Hypanthium shallowly cup-shaped or saucer-shaped; pedicels often jointed below ovary *R. lacustre* (Pers.) Poiret
2. Hypanthium campanulate, tubular-campanulate, or cylindric; pedicels not jointed below ovary
3. Styles about equaling petals *R. oxyacanthoides* L.
4. Hypanthium less than 4mm long, subequal to sepals var. *oxyacanthoides*
4. Hypanthium usually 4–6mm long, longer than sepals var. *setosum* (Lindl.) Dorn
3. Stamens twice or more as long as petals
5. Stamens 4 or more as long as petals
5. Stamens twice as long as petals *R. hirtellum* Michx.
1. Spines or prickles lacking
6. Flowers bright yellow or the petals sometimes reddish, glabrous, not glandular *R. aureum* Pursh
7. Hypanthium usually less than 9(10)mm long, twice or less as long as sepals; largest leaves tending to be 3 lobed with relatively shallow and obtuse teeth var. *aureum*
7. Hypanthium usually (8)10mm or more long, mostly over twice as long as sepals; largest leaves tending to be 5 lobed with relatively prominent and pointed teeth var. *villosum* DC.
6. Flowers, or at least the petals, white, pinkish, or cream, not yellow, often hairy or glandular
8. Leaf lobes sharply pointed; leaf blades with sessile yellow glands beneath *R. americanum* Miller
8. Leaf lobes rounded or blunt; leaf blades usually lacking sessile yellow glands
9. Hypanthium usually 2 or more times as long as calyx lobes; calyx lobes 1.5–3mm long *R. cereum* Dougl. var. *pedicellare* Brewer & Wats.
9. Hypanthium less than twice as long as calyx lobes; calyx lobes 3–7mm long *R. hirtellum* Michx.

**Robinia pseudoacacia** L.

**Rorippa**
1. Plants perennial with rhizomes; petals (2)3.5–5mm long *R. sinuata* (Nutt.) Hitchc.
1. Plants annual or biennial or short-lived perennials without rhizomes; petals mostly 0.5–3.5mm long
2. Pedicels mostly 3–13mm long, usually as long as or longer than fruits; stems mostly erect, (1.5)3–10dm long *R. palustris* (L.) Besser
2. Pedicels mostly 1–5mm long, usually shorter than fruits; stems often spreading to decumbent, rarely over 5dm long
3. Valves of fruit minutely papillose; pedicels spreading to ascending *R. tenerima* Graebn
3. Valves of fruit smooth; pedicels spreading to strongly recurved *R. curvipes* Greene

**Rosa**
1. Stems conspicuously bristly with slender prickles
2. Leaflets mostly 5–7; flowers solitary or rarely 2 on lateral branches of year *R. acicularis* Lindley var. *sayi* (Schwein.) Rehder
2. Leaflets often 9–11; flowers 1 to several at end of main branches of year *R. arkansana* Porter
1. Stems nearly without bristles or with bristles rather sparse
3. Infrastipular prickles present *R. woodsii* Lindl.
3. Infrastipular prickles lacking *R. blandia* Aiton

**Rubus**
1. Leaves simple *R. parviflorus* Nutt.
1. Leaves compound
2. Plants not bristly or prickly *R. pubescens* Raf.
2. Plants bristly or prickly *R. idaeus* L. var. *aculeatissimus* Regel & Tiling

**Rudbeckia**
1. Leaves all or nearly all unisexual, the plants usually dioecious; leaves hastate; perianth in flower about 1.5mm long or less *R. acetosella* L.
1. Flowers all or nearly all bisexual; leaves not hastate; perianth in flower often over 1.5mm long
2. Valves, or some of them, bearing grains or callosities
3. Valves entire or only slightly toothed near base
4. Stems with axillary shoots below the inflorescence
5. Mature valves rarely over 3mm long *R. triangulivalvis* (Danser) Rechinger f.
5. Mature valves 4–7mm long *R. altissimus* Wood
4. Stems without axillary shoots below the inflorescence
6. Grain about half or more as long as valve *R. crispus* L.
6. Grain much less than half as long as valve *R. patens* L.
3. Valves prominently irregularly toothed or dissected
7. Valves coarsely irregularly toothed, about 4mm long in fruit *R. stemophyllus* Ledeb.
7. Valves mostly dissected, the segments very narrow, the valves 3mm long or less R. fucigenus Phil.
8. Valves not bearing grains
9. Plants with well developed, sometimes deep, rhizomes R. venosus Pursh
10. Plants without rhizomes, usually with a well developed taproot or fascicled roots
11. Stems with axillary shoots below the inflorescence R. utahensis Rech. f.
12. Stems without axillary shoots below the inflorescence R. occidentalis Wats.

Ruppia cirrhosa (Petagna) Grande

Sabulina
1. Pedicels usually glandular-hairy S. rubella (Wahl.) Dillenb. & Kadereit
2. Petals 1.3-2 times as long as sepals; capsules shorter than to slightly exceeding sepals; seeds 0.8-0.9mm long S. michauxii (Fenzl) Dillenb. & Kadereit
3. Petal mostly 5-8mm long, mostly on stipes 0.3mm or more long; leaves usually glabrous or glabrate when expanded, regularly serratulate, often spinulose so, prominently veiny, thin ssp. interior (Rowlee) Cronq.
4. Leaves not linear (rarely not expanded in fruit), the width variable, usually less than 6 times as long as wide, or if more, without the other characteristics
5. Plants introduced trees with elongate pendulous branchlets; expanded leaves narrowly lanceolate or lance-linear, 0.9-1.8cm wide, spinulose-serrate; Weeping Willow S. babylonica L.
6. Plants trees or shrubs, branchlets spreading or ascending, not especially elongate; leaves often broader, entire or variously toothed
7. Plants with mature pistillate catkins GROUP I
8. Plants with mature staminate catkins or lacking catkins
9. Plants with mature staminate catkins GROUP II
10. Plants lacking catkins, with mature leaves GROUP III

GROUP I

1. Capsules glabrous
2. Flower bracts yellow, green, or whitish, deciduous in fruit
3. Leaves about equally green on both sides or slightly more pale on underside but not glaucous
4. Capsules mostly (6)7-12 mm long when mature, somewhat shiny, maturing in summer; catkins (1)1-5.5cm long; leaves glabrous even when young (except the first one emerging from the bud); stipules lacking or merely glands; shrub of boggy places S. serissima (Bailey) Fern.
5. Capsules mostly 7mm or less rarely to 11mm, usually dull, maturing in spring; catkins 1.7-10cm long; young leaves often hairy; stipules usually developed, occasionally deciduous, rarely reduced to glands; trees or shrubs often in better drained places or along streams
6. Plants introduced trees; expanded leaves bright shiny green on upperside, pale on underside, usually glabrous from emergence S. pentandra L.
7. Plants native shrubs (small trees); leaves dull green on both sides or slightly paler on underside, often hairy at least when young
8. Expanded leaves mostly lanceolate, usually gradually tapering to the long-attenuate or acute tip, often relatively bluntly serrate or serratulate S. lasiandra Bentham. var. caudata (Nutt.) Sudw.
9. Expanded leaves mostly lance-ovate to ovate, usually somewhat constricted before the long-attenuate tip (cuspitate-acuminate), relatively sharply serrate S. lucida Muhl.
10. Leaves obviously lighter beneath than above from glaucescence
11. Bud scales split down the side toward branchlet with free overlapping margins; leaf tips acuminate S. amygdaloideus Anders.
12. Bud scales cap-like, not split down the side; leaf tips variable
13. Margins of leaves of floriferous branchlets often lacking glands; capsules 4-5.5mm long, maturing in spring; introduced tree S. fragilis L.
14. Margins of leaves of floriferous branchlets usually strongly glandular; capsules 6-12mm long, maturing in summer; shrub S. serissima (Bailey) Fern.

GROUP II

1. Flower bracts usually brown or black, persistent in fruit
2. Styles averaging 0.7mm or less S. ericopehala Michx. var. famellica (Ball) Dorn
3. Styles averaging over 0.7mm long S. pseudomonticola Ball

GROUP III

1. Capsules hairy
2. Leaf blades narrowly elliptic, oblong, or oblanceolate, entire or remotely crenulate, usually white-tomentose beneath, mostly glabrous or glabrate and green above; stipites 1.2mm or less long S. candida Flügge ex Wild.
3. Leaf blades not as above (rarely not expanded in fruit); stipites 0.5mm long
4. Leaf blades mostly 5 or more times as long as wide, usually sharply serrate at least in part; styles 0.1-0.3mm long S. petiolaris Smith
5. Leaf blades, if as much as 5 times as long as wide, not sharply serrate and styles 0.3-1.8mm long
6. Leaf blades mostly 2-5mm long; styles 0.4mm or less long; flower bracts tawny (or greenish-yellow); branchlets of year usually red-purple and appressed-hairy; bark of 2-year old branchlets cracked giving a white-streaking appearance; mature buds with depressed margins S. bebbiana Sarg.
7. Stipes 2mm or less long, or if as long as 3mm, the styles often over 0.4mm long, the flower bracts mostly brown or black, and the branchlets and buds not as above
8. Stipes 0-1mm long; leaves, if present, elliptic or narrowly oblanceolate and often entire; branchlets of previous year often chestnut to red or red-purple and usually shiny; stigma usually less than 0.5mm long; capsules not strongly beaked S. planifolia Pursh
9. Stipes (0.8-1)3mm long; leaves, if present, ovobate to broadly oblanceolate, or if elliptic, then usually with coarsely toothed or undulate margins; branchlets of previous year yellowish to reddish-brown, dull; stigmas usually over 0.5mm long; capsules usually strongly beaked, the beak forming a full curl or more after dehiscence
10. Branchlets of previous year glabrous; leaves, if present, often with undulate or toothed margins, soon becoming glabrous (glabrare), at least beneath; wet habitats S. discolor Muhl.
GROUP II

1. Leaves about
2. Stamens 3
3. Catkins (1)1-5.5cm long; leaves glabrous even when young (except the first one emerging from the bud); stipules lacking or merely glands; shrub of boggy places S. serissima (Bailey) Fern.
4. Plants introduced trees; expanded leaves bright shiny green on upperside, pale on underside, usually glabrous from emergence S. pentandra L.
5. Bud scales split down the side toward branchlet, the free margins overlapping; leaf tips acuminate; trees S. amygdaloides Anderss.
6. Floral bracts yellowish, greenish, whitish, or tawny; catkins on leafy branchlets; branchlets of previous 3 years each ver...
12. Leaf blades mostly 5 or more times as long as wide, usually sharply serrate at least in part, 2(3)cm wide or less; year-old branchlets reddish-brown, brown, or purplish S. petiolaris Smith

12. Leaf blades, if as much as 5 times as long as wide, not sharply serrate, or wider, or year-old branchlets yellow-green or yellowish

13. Peltiodes usually with glands near base of leaf blade; leaves glabrous even when young (except the first one emerging from the bud); stipules lacking or merely glands S. serissima (Bailey) Fern.

13. Peltiodes usually without glands; leaves often hairy at least when young; stipules usually present but sometimes deciduous

14. Mature leaves usually distinctly and sharply serrate, generally acute to long-attenuate at tip, the middle ones on branchlet mostly narrowly elliptic or lance-elliptic to lanceolate; year-old branchlets yellow-green S. eriocephala Michx. var. famelica (Baill) Dorn

14. Mature leaves mostly serrulate to undulate, mostly acute to rounded at tip, often broader; year-old branchlets usually reddish-brown but sometimes yellowish S. discolor Muhl.

Salsola
1. Plants much branched near base; upper flower bracts mostly spreading at greater than a 45 degree angle when mature; perianth segments prominently membranous-winged when mature S. tragus L.

2. Plants mostly branched above with 1 main stem; upper flower bracts mostly erect or spreading at less than a 45 degree angle when mature; perianth segments wingless or obscurely winged S. polystachya Pallás

Salvia
1. Leaf blades mostly somewhat truncate or cordate at base, crenate or crenate-dentate; perennial S. pratensis L.

2. Leaf blades mostly tapering to base, entire to remotely serrate; annual S. reflexa Hornem.

Sanicula
1. Leaf blades mostly tapering to base, entire to remotely serrate; annual S. reflexa Hornem.

Sanguinaria canadensis L.,

Sarcobatus
1. Auricles ciliate

2. Auricles ciliate

Saponaria officinalis
1. Leaves 2

2. Leaves 2

Sanicula
1. Stigmas usually 3; achenes trigonous; sheaths of basal leaves usually not reddish tinged

2. Stigmas usually 2; achenes lenticular; sheaths of basal leaves usually reddish tinged

Scirpus
1. Culms terete, usually about 1m high or more; spikelets in a branching inflorescence which is sometimes compact

2. Culms triangular, usually less than 1m high; spikelets sessile or nearly so, the inflorescence sometimes over 6cm long or 4cm wide S. cernua (Michx.) Nash

3. Culms triangular, usually less than 1m high; spikelets sessile or nearly so, the inflorescence sometimes over 6cm long or 4cm wide S. cernua (Michx.) Nash

4. Stems not leafy or the leaves usually reduced upward, basal tuft usually present

5. Stems leafy, the leaves little if at all reduced upward, basal tuft usually lacking

Schizachne purpurascens (Torrey) Swallen

Schizachyrium scoparium (Michx.) Nash

Schonoplectus
1. Culms triangular, usually less than 1m high; spikelets sessile or nearly so, the inflorescence not branched

2. Bracts 2 or 3, the largest mostly 3-10cm long, the smaller resembling large scales but not subtending flowers; achenes 2.2-3.3mm long, 1.6-2.3mm wide S. pungens (Vahl) Palla var. polyphyllus (Boeckler) Dorn

3. Bracts solitary, mostly 1-3cm long; achenes 1.8-2.5mm long, 1.4-1.7mm wide S. americanus (Pers.) Volk.

4. Middle and lower scales mostly 2.5-3mm long; red-brown striolae usually not prominent on the dark reddish-brown background of many scales; inflorescence sometimes over 6cm long or 4cm wide S. tabernaemontani (Gmelin) Palla

Scirpus
1. Stigmas usually 2; achenes lenticular; sheaths of basal leaves usually reddish tinged S. microcarpus J. & K. Presl

2. Stigmas usually 2; achenes trigonous; sheaths of basal leaves usually not reddish tinged

3. Spikelets sessile or in subbussellose glomerules; scales reddish-brown to dark brown (blackish) S. cyperinus (L.) Kunth

4. Spikelets solitary and pedicelled; scales greenish-black S. atrocinetus Fern.

5. Perianth bristles mostly shorter than scales S. pallidus (Britt.) Fern.

Scrophularia lanceolata Pursh

Scutellaria
1. Flowers 14mm or more long, solitary in leaf axils S. galericulata L.

2. Flowers less than 9mm long, in axillary or terminal racemes S. lateriflora L.

Secale cereale L.

Sedum
1. Leaves of flowering stems 3-5mm long, oval or ovate to obovate or spatulate S. acre L.

2. Leaves of flowering stems 7-20mm long, linear to lanceolate, often deciduous S. lanceolatum Torrey

Sclaginella
1. Vegetative leaves on lower or convex side of branch longer than the others at the same level, the branches thus curved-ascending; broadest sporophylls about 2 times as broad as leaves; megasporos and microspores both normally present, megasporos in lower sporangia S. densa Rydb.

2. Vegetative leaves about equal in length at same level on branch, the branches mostly straight; broadest sporophylls about 3-4 times as broad as leaves; microspores usually lacking, only megasporos present S. rupestris (L.) Spring

Senecio
1. Stems leafy, the leaves little if at all reduced upward, basal tuft usually lacking

2. Plants annual weeds with some pinnately lobed leaves which are little if at all reduced upward S. vulgaris L.

3. Plants native perennials; leaves entire or toothed, usually reduced upward

4. Leaves sharply and irregularly toothed S. rapifolius

5. Leaves entire or nearly so S. hydropilus Nutt.

6. Leaves less than 9mm long, in axillary or terminal racemes S. lateriflora L.

7. Plants annual weeds with some pinnately lobed leaves which are little if at all reduced upward S. vulgaris L.

8. Plants native perennials; leaves entire or toothed, usually reduced upward

9. Leaves sharply and irregularly toothed S. rapifolius

10. Leaves entire or nearly so S. hydropilus Nutt.

11. Plants annual weeds with some pinnately lobed leaves which are little if at all reduced upward S. vulgaris L.

12. Plants native perennials; leaves entire or toothed, usually reduced upward

13. Leaves sharply and irregularly toothed S. rapifolius

14. Leaves entire or nearly so S. hydropilus Nutt.
8. Involutural bracts obscuringly if at all black tipped var. *integerrimus*
9. Plants glabrous or nearly so at flowering time.
10. Heads mostly (15)25 or more per stem *S. hydrophilus* Nutt.
11. Heads less than 15 per stem *S. crassulus* Gray

**Selinaceae**

1. Plants with usually a short, stout rhizome or a caudex, rarely with
2. Plants with well developed, slender, creeping rhizomes; basal leaves not well developed in most species
3. Plants not spiny; pubescence lacking or not stellate
5. Outer bract usually much less than twice the length of inner, united for 2-(4)4mm long *S. montanum* R. & S.
6. Outer bract nearly twice or more the length of inner, usually united basally for no more than 3.5(4)mm; stem often wider than 2.7mm long *S. viridis* (L.) Beauv.

**Shepherdia**

1. Leaves usually somewhat silvery on both surfaces; spiny spur branches present *S. argentea* (Pursh) Nutt.
2. Leaves green above, silvery or brownish dotted beneath; not spiny *S. canadensis* (L.) Nutt.

**Shinnersoseris rostrata** (Gray) Tomb

1. Flowers all staminate
2. Calyx 5-8mm long; perennial *S. menziesii* Hook.
3. Calyx usually 15-30mm long; annual, biennial, or perennial
4. Plants annual; calyx teeth 5-9mm long *S. noctiflora* L.
5. Plants biennial or perennial; calyx teeth mostly 2-5mm long *S. latifolia* Poiret
6. Plants pistillate or bisexual
7. Flowers mostly bisexual; blades of petals less than 5mm long *S. drummondii* Hook.
8. Petals about equaling calyx; seeds about 0.7mm long and wide var. *drummondii*
9. Petals about 1.5 times as long as calyx; seeds about 1mm long and wide var. *striata* (Rydb.) Bocquet
10. Flowers usually 3 (rarely 4 but then the flowers all pistillate or the petal blade shallowly 2-lobed at most without lateral teeth and 1-3mm long); valves of capsule usually 5 or 10
11. Flowers pistillate or bisexual
12. Styles usually 5 (rarely 4 but then the flowers all pistillate or the petal blade shallowly 2-lobed at most without lateral teeth and 1-3mm long); valves of capsule usually 3 or 6
13. Plants annual (or biennial), weedy
14. Plants glabrous above, often glandular in bands beneath nodes; blade of petals 2-4(7)mm long; calyx 4-12mm long
15. Plants with glandular hairs in clusters near middle; calyx 4-10mm long; annual *S. antirrhina* L.
16. Cauline leaves mostly elliptic, lanceolate, or lance-ovate; calyx 9-12mm long; biennial *S. cseresi* Baumg.
17. Plants glabrous-hairy throughout; blade of petals mostly 5-10mm long; calyx 15-30mm long *S. noctiflora* L.
18. Plants perennial, often not weedy
19. Calyx 5-8mm long; petals 6-10mm long *S. menziesii* Hook.
20. Calyx 9-18(20)mm long; petals 12-18mm long
21. Calyx 20 nerved at least below middle *S. vulgaris* (Moench) Garcke
22. Calyx faintly 10 nerved *S. nivea* (Nutt.) Muhl. ex DC.

**Sinapis**

1. Fruiting pedicels 3-7mm long, ascending or erect; body of fruit 1.5-3.5cm long; anthers about 1.7mm or more long *S. arvensis* L.
2. Fruiting pedicels 6-13(18)mm long, widely spreading; body of fruit 0.7-1.5cm long; anthers about 1.5mm long *S. alba* L.

**Sisymbrium**

1. Pedicels nearly as thick as fruits, the fruits mostly 5-10cm long *S. altissimum* L.
2. Pedicels usually much thinner than fruits, the fruits mostly 3.5cm or less long
3. Fruits mostly 2-3.5cm long, on pedicels 2-3mm long, closely appressed to rachis; petals about 3mm long *S. officinale* (L.) Scop.
4. Fruits mostly 2-3.5cm long, on pedicels 5-10mm long, not appressed to rachis; petals 5-8mm long *S. loeselii* L.

**Sisyrinchium**

1. Outer bract nearly twice or more than the length of inner, usually united basally for no more than 3.5(4)mm; stem often wider than leaves *S. montanum* Greene
2. Outer bract usually much less than twice the length of inner, united for (2)-4-7mm; stems usually equal to or narrower than leaves *S. angustifolium* Miller
5. *Solanum* 1. Plants spiny; pubescence of leaves stellate *S. rostratum* Dunal
6. Plants not spiny; pubescence lacking or not stellate
7. Leaves pinnately lobed or divided *S. triflorum* Nutt.
8. Leaves entire, toothed, or wavy-margined *S. ptychanthum* Dunal

**Solidago**

1. Plants with well developed, slender, creeping rhizomes; basal leaves not well developed in most species
2. Stems glabrous below inflorescence (rarely hairy and with a basal cluster of leaves); leaf surfaces usually glabrous
3. Largest leaves at middle of stem, predominantly elliptic or lance-elliptic, sharply acute or acuminate at tip, usually serrate; lower leaves deciduous *S. gigantea* Aiton
4. Largest leaves toward base, predominantly oblanceolate, broadly acute or obtuse at tip, entire to serrulate; lower leaves often persistent
5. Rays mostly 5-8mm long; stems hairy below inflorescence *S. multiradiata* Aiton
6. Rays mostly 3-5mm long; stems rarely hairy below inflorescence *S. missouriensis* Nutt.
7. Stems hairy at least between middle and inflorescence; basal cluster of leaves usually lacking; leaf surfaces hairy to subglabrous
8. Rays usually about 8 or fewer per head, 3-6mm long; largest leaves often 4 times or less as long as wide, obtuse or broadly acute at tip, entire to serrulate
9. Involutural bracts mostly broadest near middle and obtuse at tip; leaves often moderately hairy *S. mollis* Bartl.
10. Involutural bracts mostly broadest at base and acute at tip; leaves often sparsely hairy *S. velutina* DC. var. *nevadensis* (Gray) Taylor & Taylor
11. Rays usually about 13 per head, 1-4mm long; largest leaves mostly over 4 times as long as wide, sharply acute or acuminate at tip, usually sharply serrate
12. Leaves glabrate, especially on upper surface, rarely moderately hairy especially on veins of lower surface and on margins; stems becoming glabrate at lowermost persistent leaves *S. lepida* DC. var. *salebrosa* (Piper) Semple
13. Leaves moderately to densely hairy on both surfaces; stems usually moderately hairy even at lowermost persistent leaves *S. altissima* L. var. *glivocanaesca* (Rydb.) Semple
14. Plants with usually a short, stout rhizome or a caudex, rarely with slender rhizomes; basal leaves usually well developed

68
8. Ray and disk flowers white **S. ptarmicoides** (T. & G.) Boivin
8. Ray and disk flowers yellow
9. Leaves glabrous although sometimes with ciliate margins
10. Achenes glabrous **S. speciosa** Nutt. var. **pallida** Porter
10. Achenes hairy
11. Lower leaves with strongly ciliate-margined petioles; rays mostly about 13 per head **S. multiradiata** Aiton
11. Lower leaves without the petioles ciliate-margined; rays mostly about 8 per head **S. simplex** Kunth
9. Leaves pubescent with short spreading hairs or puberulent
12. Involute bracts somewhat longitudinally striate; achenes glabrous or nearly so; basal leaves mostly 2-8cm wide **S. rigida** L. var. **humilis** Porter
12. Involute bracts not striate; achenes hairy throughout; basal leaves mostly 0.3-2cm wide
13. Disk flowers mostly 5-9 per head, the rays about as many or more; inflorescence elongate, mostly 3 or more times as long as wide **S. normalis** Aiton var. **longipetiolaris** (Mack. & Bush) Palmer & Steyerm.
13. Disk flowers mostly 8-16 per head, the rays usually fewer; inflorescence usually relatively broad, rarely over twice as long as wide **S. nana** Nutt.

**Sonchus**
1. Plants perennial with deep, horizontal, rhizome-like roots; heads mostly 2.5-5cm wide in flower including rays **S. arvensis** L.
1. Plants annual; heads mostly 1.5-2.5cm wide in flower including rays
2. Auricles at base of leaves rounded; mature achenes not rugulose, merely several nerves **S. asper** (L.) Hill
3. Auricles at base of leaves rounded; mature achenes not rugulose, merely several nerves **S. angustifolius** (L.) Börner
4. Auricles at base of leaves acute; mature achenes transversely tuberculate
5. Auricles at base of leaves acute; mature achenes transversely tuberculate
6. Auricles at base of leaves rounded; mature achenes not rugulose, merely several nerves **S. asper** (L.) Hill
7. Auricles at base of leaves rounded; mature achenes not rugulose, merely several nerves **S. angustifolius** (L.) Börner

**Sparganium**
1. Stigmas usually 2; mature achenes somewhat truncate at tip, abruptly narrowed to beak; perianth almost as long as achene body
2. Stigmas mostly single; mature achenes narrowed gradually to beak; perianth usually much shorter than achene body
3. Leaves mostly 5mm or more wide, often scarious-margined near base; achene including stigma over 2mm long; mature pistillate heads sometimes over 2cm wide **S. emersum** Rehm.
4. Leaves Mostly 2-6mm wide, not scarious-margined; achene including stigma about 2mm long; mature pistillate heads usually 2cm or less wide **S. angustifolium** Michx.

**Spartina**
1. Ligules about 1mm long; leaf blades mostly less than 5mm wide; spikelets 6-10mm long; awn of 2nd glume 1mm or less long **S. gracilis** Trin.
2. Ligules 1.5-3mm long; leaf blades mostly 5-15mm wide; spikelets 10-16mm long; awn of 2nd glume 2-7mm long **S. pectinata** Link

**Spergularia**
1. Seeds slightly papillose, wingless; capsules mostly 3-5mm long **S. rubra** (L.) J. & K. Presl
2. Seeds smooth, usually broadly winged; capsules 5.5-7mm long **S. media** (L.) Presl

**Sphaeralcea cocinea** (Nutt.) Rydb.

**Sphenopholis**
1. Panicle dense, usually spike-like; 2nd glume about 1.5 times as long as wide or less **S. obtusata** (Michx.) Scribn.
2. Panicle loose, not spike-like; 2nd glume almost three times as long as wide **S. intermedia** (Rydby.) Rydb.

**Spiraea**
1. Inflorescence elongate **S. alba** DuRoi
2. Inflorescence somewhat flat-topped, broad **S. lucida** Dougl. ex Greene

**Spiranthes romanzoffiana** Cham.

**Sporobolus**
1. Plants annual; inflorescence contracted **S. neglectus** Nash
2. Plants usually perennial; inflorescence open or contracted
2. Spikelets mostly over 3mm long
3. Glumes acuminate; panicle somewhat open **S. heterolepis** (Gray) Gray
2. Spikelets 2.2-3.5mm long
4. Margins of lower sheaths long-hairy or conspicuously ciliate, the collars usually long-hairy also; spikelets tending to be appressed to panicle branches, appearing crowded; not clump-forming, often appearing like an annual **S. cryptandrus** (Torrey) Gray
5. Margins of lower sheaths not long-hairy or conspicuously ciliate except sometimes at very summit, the collars glabrous or hairy only on the margins; spikelets tending to diverge from panicle branches, appearing scattered; usually forming large clumps **S. airoides** (Torrey) Torrey

**Stachys**
1. Plants annual weeds; stems with longitudinal lines of hairs **S. gracilis** Link
2. Plants usually perennial; stems glabrous or the hairs only uniformly distributed
2. Leaf margins finely tuberculate-scorerous under magnification; pedicels spreading or reflexed **S. longifolia** Muhl. ex Willd.
3. Leaf margins mostly smooth; pedicels ascending to erect **S. longipes** Goldie

**Stenotus armeroides** Nutt.

**Streptopus asperifolius** (L.) DC.

**Stuckenia**
1. Stipule sheath of lower leaves inflated and much wider than stem, green, 4cm or more long **S. vaginata** (Turcz.) Holub
2. Stipule sheath of lower leaves not as above
2. Stipule sheaths of lower leaves 20mm or more long, open to base; leaves usually sharp-pointed at tip; achenes usually with a beak about 0.5mm long **S. pectinata** (L.) Börner
3. Stipule sheaths of lower leaves 22mm or less long, usually fused into a tube at base; leaves often blunt at tip; achenes essentially unkeeled **S. filiformis** (Pers.) Börner
3. Plants 2-10dm long; lower stipules inflated, 0.2-5mm wide, disintegrating in age; fruits often lacking var. **occidentalis** (Robbins) Dorn
4. Plants 1-3dm long; lower stipules slightly if at all inflated, 1mm or less wide, persistent; fruits common var. **alpina** (Blytt) Dorn

**Stutzia dioica** (Nutt.) Zacharias

**Suada**
1. Perianth lobes horne at most when mature; branches somewhat stout **S. calceoliformis** (Hook.) Moq.
2. Perianth lobes broadly thin-winged when mature; branches somewhat slender and flexuous **S. occidentalis** (Wats.) Wats.
Symphoricarpos
1. Corolla evidently longer than wide, usually tapering to base, not bulged on one side, the lobes mostly 1/4 to 1/2 as long as tube

S. oreophilus Gray var. utahensis (Rydb.) A. Nels.
1. Corolla little if at all longer than wide, often abruptly tapering to base, the lobes mostly 1/2 as long to exceeding the tube
2. Style over 3mm long, usually hairy near middle, projecting from corolla; anthers mostly 1.5-2mm long S. occidentalis Hook.
2. Style 3mm or less long, glabrous, included; anthers mostly 1-1.5mm long S. albus (L.) Blake

Symphyotrichum
1. Plants annual; rays lacking or rudimentary S. ciliatum (Ledeb.) Nesom
1. Plants perennial; rays well developed
2. Peduncles and involucres glandular
3. Leaves strongly clasping the stem, little if at all reduced upward; plants often over 5dm high S. novae-angliae (L.) Nesom
3. Leaves barely or not at all clasping, usually much reduced upward; plants mostly less than 4dm high but occasionally more
4. Plants hairy throughout with stiff, straight hairs, the outer involucral bracts and some leaves spinulose-tipped, the main leaves 7cm or less long and often with fascicles of smaller leaves in their axils; rays white
5. Involute mostly 4.5mm or more long; heads mostly few at ends of erect or ascending branches; pappus 4.5-6mm long S. falcatus (Lindl.) Nesom
6. Rhizomes very short or none; hairs of stem and branches appressed or appressed-ascending var. falcatum
6. Rhizomes long-creeping; hairs of stem and branches spreading or spreading-ascending var. commutatum (T. & G.) Nesom
5. Involute mostly 2.5-4.5mm long; heads usually many on drooping elongate branches; pappus 3-4mm long S. ericoides (L.) Nesom var. stricticola (T. & G.) Nesom
4. Plants not as above
7. Lower leaves usually ovate to cordate, petioled, usually conspicuously toothed, rarely deciduous S. ciliatulum (Lindl.) Löve & Löve
7. Lower leaves mostly obovate, lanceolate, or linear, sometimes sessile or entire or nearly so
8. Plants with slender rhizomes and stems less than 2mm thick, without a tuft of basal leaves; leaves all linear or lance-linear, usually 8mm or less wide and mostly 6 or more times as long as wide S. boreale (T. & G.) Löve & Löve
8. Plants not as above
9. Leaves with appressed silvery silky hairs on both sides, entire S. sericeum (Vent.) Nesom
9. Leaves glabrous or hairy but not silvery silky, entire or toothed
10. Peduncles glabrous to sparsely hairy, usually glaucous; involucral bracts usually broader, often obtuse; bracts various; achenes often hairy
11. Stems mostly with coarse, stiff, whitish hairs; leaves usually toothed, long-tapering to tip, mostly auriculate-clasping; involucres 5-12mm long S. punicum (L.) Löve & Löve
11. Stems and leaves not as above; involucre often shorter
12. Pubescence of stems mostly in leaf bases; inflorescence usually long, and leafy with many heads S. lanceolatum (Willd.) Nesom var. hesperium (Gray) Nesom
12. Pubescence of stems only rarely in lines, usually somewhat uniform or lacking; inflorescence often compact and sparingly leafy with few heads S. ascends (Lindl.) Nesom

Synchronys wyomingensis (A. Nels.) Heller
Tamarix chinensis Loureiro
Tanacetum
1. Leaves merely crenate-serrate or lobed at very base T. balsamita L.
1. Leaves compound T. vulgare L.
Taraxacum
1. Achenes red, purple, or reddish-brown at maturity; leaves usually deeply cut throughout, without an enlarged terminal segment; inner involucral bracts often corniculate T. laevigatum (Willd.) DC.
1. Achenes olive to brown at maturity; leaves mostly moderately cut, sometimes with an enlarged terminal segment; inner involucral bracts usually not corniculate T. officinale Wiggers
Telesonix heucheriformis (Rydb.) Rydb.
Tetraneris acaulis (Pursh) Greene
Teucrium canadense L. var. occidentale (Gray) McClint. & Epl.
Thalictrum
1. Leaflets leathery or occasionally thin, prominently reticulate-veined and often hairy below, the major veins raised from the surface all or most of their length, mostly acutely 3 lobed, the lobes usually entire at least on upper leaves T. dasypermum Fisch. & Ave-Lall.
1. Leaflets thin, not leathery, often not veined as above, mostly glabrous or glandular-puberulent and more than 3 lobed, if 3 lobed, the lobes usually rounded or toothed
2. Leaf subtending lowest flowering branch with a petiole mostly 2cm or more long; early spring flowering T. dioicum L.
2. Leaf subtending lowest flowering branch with a petiole usually about 2cm or less long; summer flowering
3. Achenes mostly 3-4mm long; veins of leaflets often conspicuously raised on lower surface; leaves often much reduced upward, often lacking in inflorescence; filaments (1.8)3-5.5mm long T. venulosum Trel.
3. Achenes 4-7(9)mm long; veins of leaflets not especially prominent; leaves not much reduced upward; filaments 4-10mm long
4. Mature achenes usually spreading to reflexed, usually over twice as long as wide, slightly if at all laterally compressed; leaflets 1-4cm long T. occidentale Gray
4. Mature achenes, at least some, usually erect or ascending, about twice as long as wide or less, strongly laterally compressed; leaflets mostly 0.5-2.5cm long T. fendleri Engelm. ex Gray
Thelesperma megapotamicum (Spreng.) Kunze
Thelypodium integrifolium (Nutt.) Endl. ex Walpers
Thelypteris palustris Schott
Thermopsis rhombifolia (Nutt. ex Pursh) Richardson
1. Leaflets glabrous or glabrare on upper surface var. rhombifolia
1. Leaflets hairy on upper surface var. annulocarpa (A. Nels.) Wms.
Thinopyrum
1. Lower internodes of rachis 14-30mm long, much longer than upper ones; larger spikelets mostly 17-25mm long, not long-hairy T. ponticum (Podp.) Barkw. & Dewey
1. Lower internodes of rachis usually shorter and often equal to or shorter than upper; spikelets mostly 9-18mm long, sometimes long-hairy T. intermedium (Host) Barkw. & Dewey
**Thlaspi arvense** L.
**Torilis japonica** (Houtt.) DC.
**Torreyochloa pallida** (Torrey) Church var. **pauciflora** [Presl] Davis

**Townsendia**
1. Involucral bracts strongly long-acuminate, lanceolate to ovate, with broad scarious margins; stems often over 5cm long, erect or spreading
   - **T. grandiflora** Nutt.
2. Involucral bracts mostly acute, linear to lanceolate, scarious or not; stems often lacking or prostrate
   - Pappus usually over 8mm long; midveins of leaves usually conspicuous **T. excapa** (Richardson) Porter
3. Pappus usually less than 8mm long; midveins of leaves often obscure **T. hookeri** Beaman

**Toxicodendron rydbergii** (Small ex Rydb.) Greene

**Tradscentia**
1. Plants somewhat glaucous; uppermost leaves without cilia or with obscure cilia on margins; sepals 4-10(12)mm long; petals 7-16(18)mm long; pedicels moderately pubescent to glabrate, the hairs usually much less than 1mm long **T. occidentalis** (Britt.) Smyth
2. Plants not glaucous; uppermost leaves with ciliate margins; sepals mostly (8)10-13mm long; petals mostly 15-20mm long; pedicels densely pubescent, the hairs often 1mm or more long **T. bracteata** Small ex Britt. & Brown

**Tragopogon**
1. Rays yellow
2. Outer ray flowers usually exceeding involucral bracts; achenes mostly 15-25mm long including beak **T. lamottei** Rouy
3. Outer ray flowers exceeded by involucral bracts; achenes mostly 25-36mm long including beak **T. dubius** Scop.

**Trilobus terrestris** L.

**Triticum**
1. Plants annual
2. Leaflets 2 times or less as long as wide; corolla 8mm or more long, usually red **T. incarnatum** L.
3. Leaflets 3 times or more as long as wide; corolla 4-6mm long, white to pinkish (fading brown) **T. arvense** L.
1. Plants perennial
2. Flowers subtended by a false involucre of stipules from a leaf or leaves **T. pratense** L.
3. Flowers not subtended by an involucre
   - 4. Stems creeping and rooting at nodes, the peduncles arising from at or near ground level; calyx usually glabrous **T. repens** L.
   - 4. Stems not creeping, the peduncles, or some of them, arising well above ground level; calyx usually with a few hairs especially near base of teeth **T. hybridum** L.

**Triplolium**
1. Carpels and stigmas 3; mature fruit over 4 times as long as wide **T. palustris** L.
2. Carpels and stigmas usually 6; mature fruit usually 3 times as long as wide or less **T. maritima** L. var. **elata** (Nutt.) Gray

**Triedanis**
1. Bracts of flower lanceolate to linear, mostly over 5 times as long as wide **T. leptocarpa** (Nutt.) Nieuwl.
2. Bracts of flower ovate to orbicular or cordate, mostly less than 4 times as long as wide **T. perfoliata** (L.) Nieuwl.

**Tripleurospermum inodorum** (L.) Schultz-Bip.

**Tripterocalyx micranthus** (Torrey) Hook.

**Trisetum spicatum** (L.) Richt.

**Triticum aestivum** L.

**Turritis glabra** L.

**Typha**
1. Staminate and pistillate parts of spike usually contiguous or nearly so; stigmas ob lanceolate to obovate **T. latifolia** L.
2. Staminate and pistillate parts of spike usually separated by at least 5mm; stigmas linear **T. angustifolia** L.

**Ulmus**
1. Leaf blades mostly subequal at base, the margins simple serrate **U. pumila** L.
2. Leaf blades mostly very unequal at base with 1 side extending down further than the other, the margins doubly serrate
   - 2. Fruit margin hairy; buds lacking long red hairs **U. americana** L.
   - 2. Fruit margin naked; buds with long reddish hairs **U. rubra** Muhl.

**Urtica dioica** L. var. **proceria** (Muhl. ex Willd.) Wedd.

**Utricularia**
1. Leaves mostly 3 parted at base, each segment mostly 1-3 times dichotomously further parted, the segments flat; flowers mostly 4-8(12)mm long
2. Leaves mostly 2 parted or not parted at base, then several to many times further parted, the segments somewhat terete; flowers mostly 10-20mm long **U. vulgaris** L. var. **americana** Gray

**Vaccaria hispanica** (Miller) Kauschert

**Vaccinium membranaceum** (Houtt.) DC.

**Vaccaria macrocarpa** Aiton

**Vaccaria ovoida** to urceolate with very short lobes which may be reflexed; leaves 7-70mm long; anthers dorsally awned
2. Plants usually less than 3dm high; branches numerous and crowded, most of them green; pedicels usually less than 3mm long **V. scoparium** Leiberg ex Cov.
3. Plants usually over 3dm high; branches not very crowded, most of them brown; some pedicels usually over 5mm long **V. membranaceum** Doug. ex Torrey

**Valeriana**
1. Plants with a taproot and short, branched caudex; basal leaf blades gradually tapering to petiole **V. edulis** Nutt. ex T.& G.
2. Plants with a stout rhizome or caudex and often many fibrous roots; basal leaf blades often somewhat abruptly tapering to petiole or compound
3. Corolla mostly 4mm or more long, the lobes about half as long as the tube or shorter **V. acutiflora** Rydb.
   - 3. Plants mostly 1-4dm high; lateral lobes of stem leaves mostly less than 5mm wide; achenes lanceolate to oblong, glabrous **V. dioica** L. var. **sylvatica** Wats.
   - 3. Plants mostly 3-9dm high; lateral lobes of some stem leaves often over 5mm wide; achenes mostly lance-ovate, usually hairy **V. occidentalis** Heller

**Verbascum thapsus** L.

**Verbena**
1. Plants branched at base, branches mostly prostrate or decumbent; leaf blades mostly lobed or divided **V. bracteata** Lag. & Rodr.
2. Leaves mostly about twice as long as wide, the middle and upper leaves sessile or with petioles 5mm or less long; fruiting spike often over 7mm wide **V. stricta** Vent.
2. Leaves, or some of them, usually about 3 or more times as long as wide, some middle and upper ones with petioles 10mm or more long; flowering spike less than 7mm wide *V. hastata* L.

**Verbena**

*V. oregana* Eaton ssp. *laurentiana* Windham

**Vernonia**

1. Plants annual with a slender taproot or fibrous roots
2. Plants perennial with rhizomes
3. Main leaves mostly 1
4. Main leaves mostly 3
5. Corolla 2-4mm wide; flowering pedicels mostly 0.4-1.5cm long *V. biloba* L.
6. Corolla 5-11mm wide; flowering pedicels mostly 1.5-4cm long *V. persica* Poiret

**Viburnum**

1. Leaves, or some of them, 3 lobed
2. Leaves lacking stipules; flowers all perfect and alike *V. edule* (Michx.) Raf.
3. Leaves with linear stipules at base of petioles; marginal flowers neutral and enlarged *V. opulus* L. var. *americanum* Aiton

**Viola**

1. Plants without leaf
2. Plants with leaf
3. Leaf blades predominantly deltoid, ovate, or broadly lance
4. Leaf blades predominantly narrowly lanceolate to elliptic
5. Plants with stolons; leaf blades usu
6. Plants glabrous or appressed hairy
7. Flowers mostly 2
8. Flowers mostly 5

**Vitis riparia** Michx.

**Vulpia octoflora** (Walt.) Rydb.

**Woodia**

1. Leaf blades and petioles glabrous and somewhat glandular *W. oregana* Eaton
2. Margins of leaves with rounded teeth or sometimes lobes; spores averaging less than 45μm across var. *oregana*
3. Margins of leaves with somewhat acute teeth or lobes; spores averaging over 45μm across var. *catachartiana* (Robins.) Morton

1. Leaf blades and petioles with white hairs and glandular *W. scopulina* Eaton ssp. *laurentiana* Windham
Xanthisma
1. Leaves, at least the lower, 1-2 times pinnatifid X. spinulosum (Pursh) Morgan & Hartm.
1. Leaves coarsely spinulose-toothed X. grindelioides (Nutt.) Morgan & Hartm.

Xanthium strumarium L.

Xylorhiza glabriuscula Nutt.

Yucca glauca Nutt.

Zannichellia palustris L.

Zigadenus
1. Perianth segments mostly 6-11mm long, adnate to base of ovary; stamens shorter than perianth segments Z. elegans Pursh
1. Perianth segments mostly 3-5.5mm long, free from ovary; stamens often longer than perianth segments Z. venenosus Wats. var. gramineus (Rydb.) Walsh ex Peck

Zizia
1. Basal leaves mostly simple and crenate Z. aptera (Gray) Fern.
1. Basal leaves usually compound and sharply serrate Z. aurea (L.) Koch
<table>
<thead>
<tr>
<th>Genus</th>
<th>Species</th>
<th>Genus</th>
<th>Species</th>
<th>Genus</th>
<th>Species</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alyssum</td>
<td>alpinus</td>
<td>Actaea</td>
<td>rubra</td>
<td>Acer</td>
<td>negundo</td>
</tr>
<tr>
<td>Almootaster</td>
<td></td>
<td>Agrostis</td>
<td>stolonifera</td>
<td>Acer</td>
<td>pseudoplatanus</td>
</tr>
<tr>
<td>Alliaria</td>
<td></td>
<td>Agropyron</td>
<td>triviale</td>
<td>Acer</td>
<td>saccharinum</td>
</tr>
<tr>
<td>Althaea</td>
<td></td>
<td>Akantherum</td>
<td>petiolata</td>
<td>Acer</td>
<td>saccharum</td>
</tr>
<tr>
<td>Achromo</td>
<td></td>
<td>Ambrosia</td>
<td>tridentata</td>
<td>Acer</td>
<td>saccharum nigrum</td>
</tr>
<tr>
<td>Amaranthus</td>
<td></td>
<td>American</td>
<td>baldwinii</td>
<td>Acer</td>
<td>saccharum strictum</td>
</tr>
<tr>
<td>Anagallis</td>
<td></td>
<td>American</td>
<td>baldwinii</td>
<td>Acer</td>
<td>saccharum strictum var. gracilis</td>
</tr>
<tr>
<td>Andropogon</td>
<td></td>
<td>American</td>
<td>baldwinii</td>
<td>Acer</td>
<td>saccharum var. scoparius</td>
</tr>
<tr>
<td>Andropogon</td>
<td></td>
<td>American</td>
<td>baldwinii</td>
<td>Acer</td>
<td>saccharum var. viridiflorum</td>
</tr>
<tr>
<td>Anemone</td>
<td></td>
<td>American</td>
<td>baldwinii</td>
<td>Acer</td>
<td>saccharum var. yellow</td>
</tr>
</tbody>
</table>
Sparganium
Sorghum
Sorghastrum
Sonchus
Sisyrinchium
Sinapis
Silene
Setaria
Shepherdia
argentea
canadensis
Shinnersoseris
rostrata
Silene
antirhina
cseresi
drummondii
Sisymbrium
oltissimum
loeselii
officinalis
Sisyrinchium
angustifolium
montanum
Sium
suave
Smilax
lasioneura
Solanum
pychanthum
rostratum
triforum
Solidago
altissima
gilvocanescent
Gigantea
lepidii
Salvadora
missouriensis
mollis
multiradiata
nana
memoralis
longipetiolata
ptarmicoideas
rigida
humilis
simpex
speciosa
pallida
velutina
nevdensis
Sonchus
arvensis
asper
oleracea
Sophora
nuttalliana
Sorbus
scopulina
Sorghastrum
nutans
Sorghum
halepense
Sparganium
angustifolium
emersum
eyucarpum
Spartina
gracilis
pectinata
Spergularia
media
rubra
Sphaeralcea
coccinea
Sphenopholis
intermedia
obtusata
Spiraea
alba
lucida
Spiranthes
romanzooffiana
Sporobolus
ainoides
compositus
cryptandrus
heterolepis
neglectus
Stachys
palustris
pilosa
Stanleya
pinnata
Stellaria
longifolia
longipes
Stenotus
armerioides
Streptopus
amplexifolius
Stuckenia
filiformis
alpina
occidentalis
pectinata
vaginata
Stutzia
dioica
Sueda
calceoliformis
occidentalis
Symphoricarpos
albus
occidentalis
oreophila
utahensis
Symphyotrichum
ascendens
boreale
ciliatum
ciliatatum
ericoides
stricticaule
falcatum
commutatum
falcatum
laeve
geyeri
lanceolatum
hesperium
novae-angliae
oblongifolium
punicum
seriecum
Synthyris
wyomingensis
Tamarix
chinensis
Tanacetum
balsamita
vulgar
Taraxacum
laevigatum
officinal
Telesonix
heucheriformis
Tetraneuris
acaulis
Teucrium
canadense
occidentale
Thalictrum
dasyacarpum
dioicum
fendleri
occidentale
venulosum
Thelesperma
megapotamicum
Thelypodium
integriifolium
Thelypteris
palustris
Thermopsis
rhombifolia
annulocarpa
rhombifolia
Thinopyrum
intermedium
ponticum
Thlaspi
arvense
Trollis
japonica
Tortoischloa
pallida
pauciflora
Townsendia
escapa
grandiflora
hookeri
Toxicodendron
rydbergii
Tradescantia
bracteata
occidentalis
Tragopogon
dubius
lamottei
portifolius
 Tribulus
terrestris
Trifolium
arvense
hybridum
incarnatum
pratense
repens
Triglochin
maritima
elata
palustris
Tridens
leptocarpa
perfoliata
Trileuropernum
inodorum
Tripterocalyx
micranthus
Trisetum
spicatum
Triticum
aestivum
Turrutis
glabra
Typha
angustifolia
latifolia
Ulmus
americana
pumila
rubra
Urtica
dioica
prosera
Utricularia
minor
vulgaris
americana
Vaccaria
hispanica
Vaccinium
macrocarpon
membranaceum
scoparium
Valeriana
acutiioba
dioica
sylvatica
edulis
occidentalis
Verbascum
thapsus
Verbena
bracteata
hasstata
stricta
Verbescina
enceloides
Vernonia
fasciculata
Vernonica
americana
anagallis-aquatica
arvensis
biloba
catenata
officinalis
pergirina
xalapensis
persica
serpyllifolia
humifusa
Viburnum
eule
lardana
lentago
opulus
americanum
Vicia
americana
americana
minor
cracca
sativa
villoso
Viola
adunca
canadensis
macloskeyi
pallens
nephrathyilla
nuttallii
palustris
pedatifida
praemorsa
altior
pratincola
pubescens
renifolia
brainerdii
selkirkii
sororia
vallicola
Vitis
riparia
Vulpia
octoflora
Woodsia
oregana
cathcartiana
oregana
scopulina
laurentiana
Xanthisma
grindelioides
spinulosum
Xanthium
strumarium
Yxlorhiza
glabriuscula
Yucca
glauca
Zanzichella
palustris
Zigadenus
elegans
vnenosus
gramineus
Zizia
aperta
aurea
Bracteate. With bracts.

Aborting. Imperfectly formed or a mere rudiment.

Acaulescent. Appearing to lack a leafy stem, the leaves all basal.

Accrescent. Enlarging after flowering.

Achene. A dry, 1-seeded, indehiscent fruit like a sunflower “seed.”

Aciculare. Needle-shaped.

Acuminate. With a long tapering tip and concave sides.

Acute. Tapering to a pointed tip with the sides nearly straight.

Adaxial. The side toward the axis.

Adnate. Union of unlike parts.

Adventitious. In an unusual or unexpected place.

Alkaline. Salty.

Alternate. One leaf, stem, or other structure per node.

Ament. See catkin.

Amphibious. Capable of growing in water or on land but usually not far from surface water.

Anastomosing. Interconnected network.

Androgynous. With staminate flowers at tip and pistillate at base.

Annual. A plant that lives only 1 growing season and usually has a slender taproot or few fibrous roots.

Annulus. A crest on the sporangium of ferns consisting of a single row of cell-walled structure.

Anther. Pollen-bearing, usually terminal part of stamen.

Anthesis. Time of flower opening.

Antorse. Directed forward.

Apex. Tip.

Apical. At the tip or top.

Apiculate. With a short, sharp, flexible point at tip.

Appressed. Lying close and flattened to surface.

Aquatic. Growing in water.

Arachnoid. With cobwebby, tangled hairs.

Arcuate. Curved like a bow.

Aureole. Spine-bearing area on stem of cactus; a small pit or raised spot.

Aristate. With a stiff bristle-like awn; tapered to a very long and narrow tip.

Armed. With spines, thorns, or prickles.

Aromatic. With a strong, usually somewhat pleasant, odor.

Articulation. Natural separation point or joint.

Ascending. Rising gradually upwards.

Attenuate. With a long-tapering tip or base.

Auriculate. Ear-shaped or sometimes pointed lobe or appendage usually at the junction of a leaf sheath and blade or at the base of a leaf blade.

Auriculate. With auricles, usually at base.

Awl-shaped. Gradually tapering from base to a sharp point.

Awn. A slender, stiff bristle.

Axile placenta. Ovules borne along central axis in a 2 or more celled ovary.

Axillary. In axil of leaf, branch, or other structure (between petiole and the stem).

Axis. The central part of a structure or organ, usually running lengthwise.

Banner. The upper, usually largest petal of the flower in legumes (Fabaceae).

Barbellate. With barbs along the main axis.

Basilateral. Midway between base and middle of side.

Beak. A long, slender tip or projection.

Bearded. Hairy with usually stiff hairs.

Berry. Pulpy or fleshy fruit containing more than 1 seed, like a grape or blueberry.

Bl.- Prefix meaning two or twice.

Bracteole. A secondary bract or small bract.

Bud. Growth area at tip of stem or branch or in leaf axils, often dormant and covered with scales; unoopen flower.

Bulb. Underground bud covered with fleshy scales like an onion.

Bulbil. Small bulb-like structure usually in leaf axil or in place of a flower.

Bulbous. See bulbil.

Bundle scar. Dot-like scar on leaf scar representing where vascular bundle passed from stem or branch to petiole.

Caespitose. Growing in tufts.

Callous. A hard projection or raised area.

Callus. Hardened downward extension of base of lemma (actually part of rachilla).

Calyptrate. Cap-like, closed all around.

Calyx. Outermost series of flower parts, often, but not always, green; the sepals collectively.

Campanulate. Bell-shaped.

Canaliculate. With lengthwise channels or grooves (sometimes only 1).

Canescent. With dense, very short, gray or white hairs.

Capillary. Slender and thread-like.

Capillary bristle. Thread-like bristle, often with many very short or very long branches throughout its length; bristles at base of corolla or tip of achene in flowers of the sunflower group.

Capitate. In a dense head-like cluster.

Capsule. Dry dehiscent fruit with more than 1 carpel.

Carpel. Foliar, ovule-bearing unit of an ovary; number of carpels is usually the same as number of locules or number of placenta, whichever is greater.

Carpophore. Prolongation of receptacle above point of perianth attachment; in the carrot group a slender stalk supporting half of the fruit.

Carpogynous. Hard and tough but somewhat flexible.

Carpyopsis. One-seeded, indehiscent fruit (grain) of grasses.

Catkin. Flexible, bracteate, spike or compact raceme of usually unisexual flowers as in willows.

Caudate. With a slender tail-like appendage.

Caudex. The persistent base of an otherwise annual stem from which new stems or leaves arise each year, at or below ground level.

Caulis. With a stem which is leafy.

Cauline. On the stem, not basal.

Cell of ovary. Compartment or chamber of ovary.

Chaffy. With dry membranous scales or bracts.

Chartaceous. With the texture of stiff writing paper.

Chasmogamous flower. Flower which opens normally for fertilization.

Ciliate. Fringed with hairs.

Ciliolate. Slightly ciliate, the hairs minute.

Cineraceous. Light gray or ashy.

Claw. The narrowed base or stalk of some petals.

Clavate. Club-shaped, widest near tip; shaped somewhat like a baseball bat.

Claw. The narrowed base or stalk of some petals.

Cleft. A cut to about the middle.

Cleistogamous flower. Flower which never opens and is self-fertilized, usually borne near ground level.

Cm. Centimeter; about 2.5cm = 1 inch.

Commissure. Surface along which 1 carpel joins another.

Compound leaf. A leaf which is divided into leaflets; a leaf like a cluster.

Cone. An axis bearing closely arranged sporophylls or seed-bearing structures like a pine cone.

Confluent. Continuous or running together without interruption.

Conifer. Cone-bearing tree or shrub usually with evergreen, needle-like or scale-like leaves, including pines, spruces, firs, junipers, etc.

Cominate. A solid structure like a pine cone.

Connective. Structure connecting 2 halves of an anther.

Comnivent. In close contact but not joined.

Convex. With a surface that curves outward like the outer surface of a ball.
Convolute. Rolled up lengthwise.
Cordate. Heart-shaped with the point at the tip; with an indentation and the lobes on each side rounded as the top part of a heart.
Coriaceous. Leathery.
Corn. Bulb-like enlargement of stem base.
Coriaceous. With a terminal, small, horn-like process.
Corolla. Inner series of the perianth; the petals collectively.
Corrugated. With many folds or wrinkles.
Corymb. Short and broad, somewhat flat-topped inflorescence with the outer flowers opening first.
Costa. A rib or raised or thickened area.
Cotyledon. Embryonic leaf in the seed, often persisting in the seedling as lowermost leaves or leaf-like structures (2 in dicots, 1 in monocots, several in conifers).
Crenate. With rounded teeth.
Crenulate. With very small, rounded teeth.
Crisped. Ruffled; curled and wavy.
Crown. Pappus of flower of the sunflower group which is very short, scale-like, and usually continuous around corolla; top of root.
 Cruciform. Cross-shaped; sometimes loosely used for any branched hairs.
Cuculate. Hooded.
Culm. The stem of the grass and sedge families.
Cuneate. Wedge-shaped, the pointed end at base.
Cushion mat. Plants with stems very short and dense forming a carpet-like growth.
Cuspidate. Tapering to an elongate point with the sides concave.
Cyme. Short and broad, somewhat flat-topped inflorescence with the central or terminal flower opening first.
Deciduous. Falling off, especially at end of each growing season.
Decumbent. Lower part on ground, the tip ascending.
Decurrent. Extending downward along stem or branch from the point of insertion.
Deflexed. Bent abruptly downward or backward.
Dichotomous. With similar structures radiating from the same point.
Disarticulate. Separate or break apart.
Disjoint. Separate or break apart.
Disk flower. Flower of the sunflower group with slender tubular corolla, these usually occupying most of head except in heads with only ray flowers.
Dissected. Divided into many segments and lobes.
Disseminule. Spore, seed, fruit, or other detached plant part by dissemination.
Dolabriform. Apparently attached at or toward middle, not at base, the 2 ends free.
Dorsal. The back or outer surface; side away from axis.
Dorsiventral. From dorsally to ventrally as opposed to laterally.
Double toothed. Large teeth alternating with smaller teeth.
Drupel. Fleshy, indehiscent, 1-seeded fruit, the seed enclosed in a stony endocarp (pit) as in a cherry.
Drupes. Small drupes like the individual parts of a raspberry fruit.
Elliptic. Longer than wide, widest at middle and tapered toward both ends.
Emarginate. Tip shallowly notched.
Emergent. Lower part in water, upper extending out of the water.
Endocarp. Innermost part of pericarp.
Entire. With a smooth margin; lacking teeth, lobes, or segments.
Epidermis. Outermost covering or layer of cells.
Epigynous. Floral tube adnate to ovary so that sepals, petals, and stamens appear to arise from top of ovary.
Erectuate. Leaves in 2 ranks with each one folded in half and subtending those to the inside.
Erose. Irregularly fringed or cut; ragged.
Elongate. Remaining green all year or merely folding up and becoming dormant between growing seasons.
Exfoliate. Peel off in thin layers or strips.
Exocarp. Outermost layer of pericarp.
Excised. Projecting beyond the surrounding organ, like stamens exserted from a corolla.
Eye of corolla. Colored or marked center of a corolla usually near or at throat.
Falcate. Flat, curving, and tapering to a point like a sickle.
Farinose. With a mealy, usually whitish covering.
Fascicle. Cluster.
Feathery. Bearing reproductive structures that are normally enveloped, not sterile or aborted.
Fibrillose. Made up of stringy fibers.
Fibrous roots. Roots with several to many branches all about the same size, without a larger central axis.
Filament. The stalk of a stamen which supports the anther.
Filamentose. Thread-like or with thread-like structures.
Filiform. Long, slender, and terete, almost thread-like.
Fimbriate. Fringed.
Fistulose. Hollow and cylindrical.
Flabellate. Fan-shaped.
Flabelliform. Fan-shaped.
Fleshy. Soft, thickened, and juicy.
Flexuose. Bending in a wavy manner.
Floccose. With scattered tufts of woolly hair.
Floral tube. Tube from base or tip of ovary to point of apparent attachment of sepals, petals, and stamens, found only in epigynous and perigynous flowers.
Floret. The grass flower consisting of lemma and palea with included stamens and pistil (if present).
Floriferous. Bearing flowers.
Foliate. Leaf-like.
-Foliate. With leaflets; trifoliate is with 3 leaflets.
Follicle. Dry fruit with 1 carpel and more than 1 seed, splitting down 1 side only.
Fornix. Small crest or bump in throat of corolla, as many present as number of corolla lobes.
Free-central placenta. Ovules borne on a central stalk which is only basally attached in a 1-celled ovary.
Frond. The thallus-like stem of Lemna which functions as a leaf; the leaf of a fern.
Fruit. Mature ovary with enclosed seeds; external structures which are often fleshy are sometimes also attached.
Funiculus. The stalk attaching the ovule to the ovary wall.
Funnelform corolla. With the tube gradually widening upward and grading into the limb.
Fusiform. Widest at middle, tapering gradually to both ends, and round in cross-section.
Galea. Hood formed by part of perianth, usually the upper lip of corolla.
Gculiculate. Bent abruptly.
Gibbose. Swollen on 1 side.
Glabrate. Nearly glabrous or becoming glabrous in age.
Glabrous. Without hairs.
Glandular. Organ secreting tiny droplets, often at tips of hairs.
Glandular. With secreting organs which produce small droplets of secretion, often at tips of hairs.
Glaucous. Slightly glaucous.
Glaucous. With a white or bluish waxy covering that easily rubs off.
Globose. Spherical, shaped like a globe.
Glochidiate. Barbed at tips.
Globose. With a white or bluish covering that easily rubs off.
Globose. Spherical, shaped like a globe.
Globose. Spherical, shaped like a globe.
Globose. Spherical, shaped like a globe.
Globose. Spherical, shaped like a globe.
Globose. Spherical, shaped like a globe.
Globose. Spherical, shaped like a globe.
Globose. Spherical, shaped like a globe.
Globose. Spherical, shaped like a globe.
Globose. Spherical, shaped like a globe.
Globose. Spherical, shaped like a globe.
Globose. Spherical, shaped like a globe.
Globose. Spherical, shaped like a globe.
Globose. Spherical, shaped like a globe.
Globose. Spherical, shaped like a globe.
Globose. Spherical, shaped like a globe.
Globose. Spherical, shaped like a globe.
Globose. Spherical, shaped like a globe.
Globose. Spherical, shaped like a globe.
Globose. Spherical, shaped like a globe.
Globose. Spherical, shaped like a globe.
Globose. Spherical, shaped like a globe.
Globose. Spherical, shaped like a globe.
Globose. Spherical, shaped like a globe.
Globose. Spherical, shaped like a globe.
Globose. Spherical, shaped like a globe.
Globose. Spherical, shaped like a globe.
Globose. Spherical, shaped like a globe.
Globose. Spherical, shaped like a globe.
Globose. Spherical, shaped like a globe.
Globose. Spherical, shaped like a globe.
Globose. Spherical, shaped like a globe.
Globose. Spherical, shaped like a globe.
Globose. Spherical, shaped like a globe.
Globose. Spherical, shaped like a globe.
Globose. Spherical, shaped like a globe.
Globose. Spherical, shaped like a globe.
Globose. Spherical, shaped like a globe.
Globose. Spherical, shaped like a globe.
Globose. Spherical, shaped like a globe.
Globose. Spherical, shaped like a globe.
Globose. Spherical, shaped like a globe.
Globose. Spherical, shaped like a globe.
Globose. Spherical, shaped like a globe.
Globose. Spherical, shaped like a globe.
Globose. Spherical, shaped like a globe.
Globose. Spherical, shaped like a globe.
Globose. Spherical, shaped like a globe.
Globose. Spherical, shaped like a globe.
Globose. Spherical, shaped like a globe.
Globose. Spherical, shaped like a globe.
Globose. Spherical, shaped like a globe.
Globose. Spherical, shaped like a globe.
Globose. Spherical, shaped like a globe.
Globose. Spherical, shaped like a globe.
Globose. Spherical, shaped like a globe.
Globose. Spherical, shaped like a globe.
Globose. Spherical, shaped like a globe.
Globose. Spherical, shaped like a globe.
Globose. Spherical, shaped like a globe.
Globose. Spherical, shaped like a globe.
Globose. Spherical, shaped like a globe.
Globose. Spherical, shaped like a globe.
Globose. Spherical, shaped like a globe.
Globose. Spherical, shaped like a globe.
Globose. Spherical, shaped like a globe.
Globose. Spherical, shaped like a globe.
Globose. Spherical, shaped like a globe.
Globose. Spherical, shaped like a globe.
Globose. Spherical, shaped like a globe.
Globose. Spherical, shaped like a globe.
Globose. Spherical, shaped like a globe.
Globose. Spherical, shaped like a globe.
Globose. Spherical, shaped like a globe.
Globose. Spherical, shaped like a globe.
Globose. Spherical, shaped like a globe.
Globose. Spherical, shaped like a globe.
Globose. Spherical, shaped like a globe.
Globose. Spherical, shaped like a globe.
Globose. Spherical, shaped like a globe.
Globose. Spherical, shaped like a globe.
Globose. Spherical, shaped like a globe.
Globose. Spherical, shaped like a globe.
Globose. Spherical, shaped like a globe.
Globose. Spherical, shaped like a globe.
Globose. Spherical, shaped like a globe.
Head. A dense cluster of sessile or nearly sessile flowers on a very short axis, often nearly spherical in outline.

Helicoid. Coiled in 2 dimensions.

Herb. Plant with above-ground portion non-woody.

Herbaceous. Not woody; leaf-like in color or texture.

Hemiphrapodrtic. Bisexual with stamens and pistil.

Hirsute. With coarse, somewhat stiff hairs which are usually spreading.

Hispid. With stiff, bristly hairs.

Hispidulous. Minute hispid.

Hyaline. Thin, whitish, and easily transmitting light.

Hypapertum. Tube or cup from base or tip of ovary to point of apparent attachment of sepals, petals, and stamens, found only in epigynous and perigynous flowers.

Hypogynous. Without a floral tube so that sepals, petals, and stamens appear to arise beneath ovary.

Imbricate. Overlapping like shingles on a roof.

Incised. Cut sharply, usually irregularly, with sharp-pointed sinuses.

Indehiscent. Not normally splitting or opening or at least not along regular lines.

Indurated. Hard.

Indusium. A thin, membranous outgrowth of a fern leaf which covers a sorus.

Inferior ovary. Ovary that is adnate to floral tube so that sepals, petals, and stamens appear to be attached to top of ovary.

Inflated. Appearing as if pumped full of air.

Inflorescence. Flowering part of plant.

Infrafistular prickle. Prickle just beneath stipule or closest to stipule.

Innovation. Basal shoot of a perennial grass or sedge.

Internode. The part of stem or branch between adjacent joints or points of attachment for leaves or branches.

Involucr. A secondary involucre above the primary one.

Involucral. Whorl of bracts or small leaves subtending a flower or flower cluster (bracts may be completely united with each other).

Involute. Rolled, not flat.

Irregular flower. Flower which can be divided into 2 equal parts in only 1 plane; bilaterally symmetrical; size or shape of similar parts unequal.

Jointed. With well set off nodes or articulation points.

Keel. A raised ridge along the outside of a fold or midrib; the 2 united inner petals in the pea group which are shaped like a boat.

Lacerate. Cut into narrow, pointed segments.

Laciniate. See Lacerate.

Lacuna. A cavity or gap.

Lamellate placentation. With ovules borne on thin plates in the ovary.

Lamina. A flat, expanded, plate-like structure.

Lanate. With tangled, long, woolly hairs.

Lanceolate. Lance-shaped, broadest near base and tapering to a pointed tip.

Leaflet. A division of a leaf blade which is completely separated by a space and the rachis or other major axis from other expanded, herbaceous tissue of the leaf blade.

Leaf scar. Scar left on stem or branch after a leaf drops off, just beneath a bud.

Legume. Dry fruit of pea group formed from 1 carpel but dehiscent on both margins (suture and midrib); member of pea group.

Lemma. Lower of usually 2 bracts which enclose the stamens and pistil in a grass flower; the bract immediately above the pair of glumes.

Lenticular. Lens-shaped with both sides rounded.

Ligulate. With a ligule; with ray flowers in the sunflower group.

Ligule. A short, flat projection from the upper surface of a leaf near its base, or in grasses or sedges and related plants, a fringe of hairs or a membranous projection at the junction of blade and sheath on inner side.

Limb. Expanded and spreading part above the throat in a corolla with united petals.

Linear. Long and narrow with nearly parallel margins.

Lip of corolla. Group of usually 2 or 3 corolla lobes set off from the others by size or a cleft on each side.

Lobe. A part of a leaf blade, leaflet, or other plant part with sinuses on both sides of it; any projection.

Locule. Compartment or chamber of ovary.

Loment. Fruit of pea group with constrictions between the seeds, at maturity breaking into somewhat circular, 1-seeded segments.

Lunate. Crescent-shaped like the first quarter moon.

Lyrate. Pinnatifid with the terminal segment larger than the rest.

M. Meter; 1m = about 39 inches.

Maculate. Mottled or with blotches or spots.

Megaspore. Sporangium containing megaspores.

Microsporangium. Sporangium containing microspores.

Microspore. The smaller of 2 spore sizes produced by some plants.

Membranous. Thin, usually whitish, and transmitting light.

Mericarp. Portion of fruit that splits away as an apparent separate unit.

Mesomorphic. Number of parts; a 5-merous flower would have 5 sepals, 5 petals, 5 or 10 stamens, and usually 5 carpels.

Microsporangium. Sporangium containing microspores.

Monads. Individuals free from each other rather than attached in groups.

Monadelphous. Filaments united all united into a single tube.

Moniliform. With constrictions, so resembling a string of beads.

Monochasium. A cyme with a single flower on each axis.

Monoecious. Flowers unisexual and borne on same plant; in gymnosperms the pollen and seed cones borne on the same plant.

Mucronate. With a short, sharp spine- tip.

Multicellular hair. A hair consisting of 2 or more cells, the cell walls usually readily apparent with slight magnification.

Muricate. Roughened with short, hard, pointed structures.

Nectary. Gland which secretes nectar.

Nerve. Vein.

Net venation. With many veins all interconnected in a net-like manner, or when contrasted with parallel, the main veins not parallel with the midrib.

Neutral flower. Lacking functional stamens and pistil.

Node. A joint or point of attachment for leaves or branches.

Nodulose. With small swellings.

Nut Indehiscent fruit with 1 seed and a hard wall like a walnut.

Nutlet. Hard, small, indehiscent, 1-seeded fruit.

Ob-. Prefix meaning upside-down.

Obcompressed. Dorsiventrally compressed.

Oblanceolate. Lance-shaped, broadest near tip and tapering to a somewhat pointed base.

Oblong. Longer than wide with nearly parallel margins.

Obovate. Egg-shaped, widest near tip.

Obtuse. Blunt or with the sides forming an angle greater than 90 degrees.

Ochroleucous. Cream colored.

Og. Opening by the splitting off of a cap or lid leaving a circular opening at top.

Olive. Round in outline.

Oval. Broadly elliptic and less than twice as long as wide.

Ovary. Part of pistil containing ovules.

Oval. Egg-shaped, widest near base.

Ovoid. Oval in outline.

Ovalate. Bearing ovules.

Ovule. Structure in ovary which develops into a seed.

Palate. Broad rounded hump on inside lower lip of bilabiate corolla at the throat.

Pallate. Uppermost bract which encloses stamens and pistil in grass flower, usually lacking a midnerve.

Palmate. With leaflets, lobes, or veins arising from the same point at tip of petiole (lobes projected to this point).

Palmatifid. Palmately divided halfway or more to base.

Panicle. A compound raceme, that is, with more than 1 flower on each stalk that arises from each node of main axis, the central and terminal flowers the youngest.

Papillate. With small, rounded bumps.

Papillose. Papillate.

Pappus. Modified calyx in flowers of the sunflower group, consisting of bristles, scales, awns, or a short crown at tip of achene.

Parallel venation. With the main veins running parallel or nearly so to the midrib and to each other.

Parasitic. Attached to and obtaining nutrients from another plant; the parasite is usually not green.

Parietal placentation. Ovules borne on the walls or on incomplete partitions of an ovary with 1 chamber.
Parted. Cut halfway or more to base or midrib.

Pecinate. Resembling a comb with very narrow pinnately arranged segments.

Pedicel. Stalk of a single flower or grass spikelet.

Peduncle. Stalk of stróbilus or inflorescence (cluster of flowers); stalk of a flower when only 1 per plant.

Peltate. With stalk attached toward the center rather than on an edge, like a mushroom.

Pendant. Hanging downward.

Pendulous. Hanging downward.

Pepo. Fleshy, indehiscent fruit with a hard or leathery rind like a cucumber or melon.

Perennial. A plant that lives more than 2 years. 

Perfect flower. With both stamens and pistil.

Perfoliate. With base of leaf completely surrounding stem so stem appears to be passing through leaf.

Perianth. Calyx and corolla collectively.

Pericarp. Wall of fruit.

Perigynium. Sheath or sac which encloses ovary and fruit in Carex. 

Perigonous. With a floral tube which is not adnate to ovary so that sepalis, petals, and stamens appear to arise above base of ovary and removed from it.

Petal. One member of the corolla or series of parts inside the outermost series in the flower; petals are usually, but not always, colored.

Petaloid. Appearing like petals.

Petaiole. Stalk of a leaf.

Petiolule. Stalk of a leaflet.

Phyllodium. Broadened petioles which appear like narrow leaf blades.

Plishe. With long, soft hairs.

Pinnate. With leaflets, lobes, or veins arising from several different points along an axis.

Pinnatifid. Pinnately divided halfway or more to base or midrib.

Pinnatilobate. On borderline between pinnately lobed and pinnatifid.

Pistil. Organ of flower containing ovules, consisting of ovary, style, and stigma; female part of flower.

Pistillate. With pistils but lacking stamens.

Pith. Spongy center of a stem.

Ploce. With leaflets, lobes, or veins arising from several different points along an axis. 

Placenta. Part of ovary where ovules are attached.

Placentation. Pattern of attachment of ovules within ovary.

Plait. A flattened fold as in cloth doubled back on itself.

Planoconvex. Flat on 1 side, rounded on the other.

Plicate. Folded into plaits as in a fan.

Plumose. With fine hairs attached along the main axis somewhat like a feather.

Pod. Legume, a fruit of the pea group.

Pollen. Dust-like, spherical, usually yellowish structures produced in anthers, or in microsporangia of gymnosperms.

Polygamoeious. Mostly dioecious but with a few flowers of opposite sex or a few bisexual flowers also present.

Polygamous. With unisexual and bisexual flowers on the same plant.

Pome. A fleshy, indehiscent fruit formed from an inferior ovary with more than 1 locule like an apple.

Pomegranate. Also a group of gymnosperms.

Pome. A fleshy, indehiscent fruit with a hard or leathery rind like a cucumber or melon.

Pith. Spongy center of a stem.

Primary leaflet. Leaflet of a once compound leaf or first division of a twice or more compound leaf.

Procumbent. Creeping or lying on ground but not rooting at nodes.

Prostrate. Lying flat on the ground.

Prunifolose. With a bluish-white bloom on the surface that can be easily rubbed off.

Psedoscape. A false, naked scape between the roots and leaves, usually underground or barely above ground.

Puberulent. With minute hairs.

Pubescent. Bearing hairs.

Pulverulent. Powdery.

Punctate. Dotted with depressions or colored or translucent glands or dots.

Punctulate. Minute punctate.

Pungent. Sharp-pointed; prickly to touch.

Pustulate. With wart-like elevations; hairs with an expanded or wart-like base.

Pyriform. Pear-shaped.

Pyxis. Capsule with circumscisile dehiscence.

Quinate. With 5 similar structures or divisions.

Raceme. Inflorescence with stalked flowers all arising from the main axis individually, the youngest flower at tip.

Rachis. Central axis of inflorescence or central axis or vein of leaf blade.

Ray. A branch or stalk; flower of sunflower group with a strap-shaped corolla, usually on margins of head when disk flowers also are present; length of ray is measured from top of achene to tip of ray.

Receptacle. The expanded or elongated end of the flower stalk which bears all or some of the flower parts.

Recurred. Curved downward or backward.

Reflexed. Bent abruptly downward or backward.

Regular flower. All members of each set of parts alike in shape and size; radially symmetrical; divisible into 2 equal halves in more than 1 plane.


Repand. Wavy.

Replum. Partition in fruit of mustard group.

Resin duct. Minute tube which transports resin.

Resinous. Sticky or appearing varnished.

Reticate. Net-like with many inter-connections.

Retrorse. Directed downward or backward.

Retuse. With a rounded tip which is shallowly notched or indented.

Rholette. Margin rolled toward underside.

Rhizomatus. With rhizomes.

Rhizome. Underground stem or rarely creeping along ground surface; see stem.

Rhombic. Diamond-shaped.

Ribbed. With prominent, raised veins or nerves.

Root. Underground portion of plant lacking nodes, internodes, leaves, and scales.

Rosette. Cluster of leaves radiating out in all directions from stem, usually at base of plant.

Rosulate. With a rosette.

Rotate. With a round, horizontally flattened limb at a right angle to the short tube.

Rotund. Round.

Rugose. Wrinkled.

Rugulose. Slightly wrinkled.

Runcinate. Cleft or pinnatifid with segments directed backward or toward base.

Runner. Slender stem creeping along ground and rooting at nodes.

Saccate. In shape of a sac or pouch.

Sagittate. Arrowhead-shaped with the basal lobes extending downward.

Sariform. With many irregular connections.

Sariform. Long slender tube abruptly expanded into horizontally flattened or saucer-shaped limb.

Samara. Dry, indehiscent, winged fruit as in maple, elm, and ash.

Saciform. In shape of a sac or pouch.

Saprophytic. Living on dead organic matter and usually lacking chlorophyll (green pigment).

Saprophytic. Living on dead organic matter and usually lacking chlorophyll (green pigment).

Scabrous. Slightly scabrous.

Schizocarp. Dry fruit which splits into 2 or more 1-seeded, indehiscent segments at maturity as in the carrot or mallow groups.

Schizocarp. Dry fruit which splits into 2 or more 1-seeded, indehiscent segments at maturity as in the carrot or mallow groups.

Sariform. Long slender tube abruptly expanded into horizontally flattened or saucer-shaped limb.

Sariform. Long slender tube abruptly expanded into horizontally flattened or saucer-shaped limb.

Sariform. Long slender tube abruptly expanded into horizontally flattened or saucer-shaped limb.

Sariform. Long slender tube abruptly expanded into horizontally flattened or saucer-shaped limb.

Sariform. Long slender tube abruptly expanded into horizontally flattened or saucer-shaped limb.

Sariform. Long slender tube abruptly expanded into horizontally flattened or saucer-shaped limb.

Sariform. Long slender tube abruptly expanded into horizontally flattened or saucer-shaped limb.

Sariform. Long slender tube abruptly expanded into horizontally flattened or saucer-shaped limb.

Sariform. Long slender tube abruptly expanded into horizontally flattened or saucer-shaped limb.

Sariform. Long slender tube abruptly expanded into horizontally flattened or saucer-shaped limb.

Sariform. Long slender tube abruptly expanded into horizontally flattened or saucer-shaped limb.

Sariform. Long slender tube abruptly expanded into horizontally flattened or saucer-shaped limb.

Sariform. Long slender tube abruptly expanded into horizontally flattened or saucer-shaped limb.

Sariform. Long slender tube abruptly expanded into horizontally flattened or saucer-shaped limb.

Sariform. Long slender tube abruptly expanded into horizontally flattened or saucer-shaped limb.

Sariform. Long slender tube abruptly expanded into horizontally flattened or saucer-shaped limb.

Sariform. Long slender tube abruptly expanded into horizontally flattened or saucer-shaped limb.

Sariform. Long slender tube abruptly expanded into horizontally flattened or saucer-shaped limb.

Sariform. Long slender tube abruptly expanded into horizontally flattened or saucer-shaped limb.

Sariform. Long slender tube abruptly expanded into horizontally flattened or saucer-shaped limb.

Sariform. Long slender tube abruptly expanded into horizontally flattened or saucer-shaped limb.

Sariform. Long slender tube abruptly expanded into horizontally flattened or saucer-shaped limb.

Sariform. Long slender tube abruptly expanded into horizontally flattened or saucer-shaped limb.

Sariform. Long slender tube abruptly expanded into horizontally flattened or saucer-shaped limb.

Sariform. Long slender tube abruptly expanded into horizontally flattened or saucer-shaped limb.

Sariform. Long slender tube abruptly expanded into horizontally flattened or saucer-shaped limb.

Sariform. Long slender tube abruptly expanded into horizontally flattened or saucer-shaped limb.

Sariform. Long slender tube abruptly expanded into horizontally flattened or saucer-shaped limb.

Sariform. Long slender tube abruptly expanded into horizontally flattened or saucer-shaped limb.

Sariform. Long slender tube abruptly expanded into horizontally flattened or saucer-shaped limb.

Sariform. Long slender tube abruptly expanded into horizontally flattened or saucer-shaped limb.

Sariform. Long slender tube abruptly expanded into horizontally flattened or saucer-shaped limb.

Sariform. Long slender tube abruptly expanded into horizontally flattened or saucer-shaped limb.

Sariform. Long slender tube abruptly expanded into horizontally flattened or saucer-shaped limb.

Sariform. Long slender tube abruptly expanded into horizontally flattened or saucer-shaped limb.

Sariform. Long slender tube abruptly expanded into horizontally flattened or saucer-shaped limb.

Sariform. Long slender tube abruptly expanded into horizontally flattened or saucer-shaped limb.

Sariform. Long slender tube abruptly expanded into horizontally flattened or saucer-shaped limb.

Sariform. Long slender tube abruptly expanded into horizontally flattened or saucer-shaped limb.

Sariform. Long slender tube abruptly expanded into horizontally flattened or saucer-shaped limb.

Sariform. Long slender tube abruptly expanded into horizontally flattened or saucer-shaped limb.

Sariform. Long slender tube abruptly expanded into horizontally flattened or saucer-shaped limb.

Sariform. Long slender tube abruptly expanded into horizontally flattened or saucer-shaped limb.

Sariform. Long slender tube abruptly expanded into horizontally flattened or saucer-shaped limb.

Sariform. Long slender tube abruptly expanded into horizontally flattened or saucer-shaped limb.

Sariform. Long slender tube abruptly expanded into horizontally flattened or saucer-shaped limb.

Sariform. Long slender tube abruptly expanded into horizontally flattened or saucer-shaped limb.

Sariform. Long slender tube abruptly expanded into horizontally flattened or saucer-shaped limb.

Sariform. Long slender tube abruptly expanded into horizontally flattened or saucer-shaped limb.
Sheath. Tubular structure surrounding a plant part; in the grass, rush, and sedge families, the lower part of a leaf which surrounds the stem.

Shrub. Woody plant with usually several stems from the base, or else much-branched and bushy.

Sigmoid. In the shape of the letter S.

Silicle. A short fruit in the mustard group, usually not more than 3 times as long as wide, and usually containing a single, membranous partition with the ovules borne at its points of attachment to the fruit wall.

Silique. Elongate fruit in the mustard group usually containing a single, membranous partition with the ovules borne at its points of attachment to the fruit wall.

Simple leaf. A leaf not divided into leaflets.

Sinuate. Wavy-margined.

Sinus. Depression or space between 2 lobes or segments.

Sorus. Cluster of sporangia.

Spathe. Large bract sheathing or enclosing an inflorescence.

Spadix. Broad and rounded at tip and long tapering to base; often not differentiated from oblanceolate or obovate.

Spicate. With a spike or resembling a spike.

Spiculate. Covered with small, pointed structures.

Spike. A mostly elongate, usually unbranched inflorescence with sessile flowers, the upper flowers the youngest.

Spikelet. The small spike of a grass consisting of glumes and enclosed florets; bracteate inflorescence or portion of inflorescence in the sedge group.

Spinose. With small spines.

Sporangium. Receptacle containing spores.

Spore. Simple, usually 1-celled, reproductive body capable of giving rise to a new individual.

Sporang(ia) containing sporangia.

Sporangial. Sporangium containing sporangia.

Sporophyll. Leaf which bears sporangia and spores.

Spur. A tubular or sac-like extension of a petal or sepal; any long, narrow appendage.

Spur shoot. A very short branch with leaves that appear to be whorled.

Stamen. Organ of flower containing pollen and consisting of filament and anther; male part of flower.

Stamenoid. With stamens but lacking a pistil.

Staminode. A sterile stamen usually without an anther; some may be modified and nearly petal-like.

Stellate. With 3 or more branches radiating out from the center.

Stem. Main axis of plant; it may be upright or prostrate, underground or above ground; it is distinguished from a root by buds, or scales.

Stipule. Appendage at base of petiole, from gland-like to leaf-like, usually paired with one on each lateral side of petiole base.

Stolon. Stem which grows along ground and roots at the nodes.

Stramineous. Straw colored.

Striate. With fine lines, grooves, or streaks parallel to each other.

Strigillose. Strigose but hairs very short.

Strobilus. Cone.

Sub. Prefix meaning almost or nearly.

Subulate. Narrow and gradually tapering to a sharp point.

Suberosa. Thick and fleshy.

Superficial ovary. Ovary with the perianth parts inserted below it.

Sutura. A seam or line of dehiscence.

Talus. Rock slide.

Taproot. Primary root along main axis of plant which is larger than any branches of root system, similar to a carrot.

Teeth. Short, pointed or rounded projections.

Tendril. A slender outgrowth of a leaf or stem usually twisting and clinging to objects it contacts.

Tepal. Unit of perianth when perianth is not clearly differentiated into calyx and corolla.

Terete. Cylindrical, round in cross-section.

Ternate. In threes, or with 3 parts.

Terrestrial. Growing on land.

Tetrad. Group of four.

Thallus. A flat, leaf-like structure not differentiated into stem and leaves.

Throat of corolla. The opening into a corolla with united petals, at junction of tube and limb; the throat is sometimes slightly elongate and a little wider than the tube.

Thyrse. A densely flowered panicle with the terminal flower of main axis the youngest but the terminal flowers of branches older than others of the branch.

Tomentose. With dense, short, usually whitish, wool-like, tangled hairs.

Tomentulose. Sparsely tomentose.

Toothed. Bearing teeth.

Turonic. Alternately swollen and constricted, sometimes irregularly so.

Translucent. Easily transmitting light but not thin enough to see through.

Transverse. Crosswise; horizontal.

Tree. Woody plant with usually 1 or a few stout trunks and usually rather tall.

Tridif. With 2 clefts and 3 lobes or segments.

Trifoliate. With 3 leaflets like a clover.

Trifurcate. With 3 branches.

Trigonous. Three angled.

Triquetrous. Three angled; triangular in cross-section.

Truncate. Horizontal as if cut off.

Tuber. Short, thick, underground stem such as a potato.

Tubercle. Small, rounded bump; nipple-like structure containing reproductive parts.

Stigma. Tip of pistil, receives the pollen and is usually sticky.

Stipe. Stalk of some pistils or fruits above base of perianth; any stalk.

Stipitate. With a stipe.

Stipule. Appendage at base of petiole, from gland-like to leaf-like, usually paired with one on each lateral side of petiole base.

Stolon. Stem which grows along ground and roots at the nodes.

Strianneous. Straw colored.

Striate. With fine lines, grooves, or streaks parallel to each other.

Strigillose. Strigose but hairs very short.

Strobilus. Cone.

Sub. Prefix meaning almost or nearly.

Subulate. Narrow and gradually tapering to a sharp point.

Suberosa. Thick and fleshy.

Superficial ovary. Ovary with the perianth parts inserted below it.

Sutura. A seam or line of dehiscence.

Talus. Rock slide.

Taproot. Primary root along main axis of plant which is larger than any branches of root system, similar to a carrot.

Teeth. Short, pointed or rounded projections.

Tendril. A slender outgrowth of a leaf or stem usually twisting and clinging to objects it contacts.

Tepal. Unit of perianth when perianth is not clearly differentiated into calyx and corolla.

Terete. Cylindrical, round in cross-section.
Appendix

The following have recently been reported for the Black Hills but I have seen no specimens. Some are likely misidentified. Others are likely cultivated and not naturalized. Cultivars are not included in this treatment unless documented as naturalized. Many additional species have been reported but the specimens could not be found in the herbaria where they were supposedly deposited.

Artemisia tridentata vaseyana
Carex athrostachya
Carex cristatella
Centaurium exaltatum (Zeltnera exaltata)
Ceratophyllum demersum
Cyperus bipartitus
Dichanthelium depauperatum
Draba cana
Dryopteris carthusiana
Eleocharis coloradoensis
Eleocharis quinqueflora
Epilobium glaberrimum fastigiatum
Eragrostis spectabilis
Erigeron vetensis
Erysimum repandum
Festuca thurberi
Heterotheca villosa minor
Hieracium aurantiacum
Hypericum majus
Juncus articulatus
Knautia arvensis
Leptochloa fusca
Linanthus watsonii
Lythrum salicaria
Najas guadalupensis
Oenothera rhombipetala
Papaver rhoeas
Poa reflexa
Potamogeton zostericormis
Potentilla ambigens
Potentilla rubricaulis
Ranunculus hispidus
Rorippa curvisiliqua
Rumex pseudonatronatus
Salvia aethiopis
Scirpus atrovirens
Strigosella africana (Malcolmia africana)
Trichostema bractiata
Verbascum blattaria
Vitis vulpina

There have been many segregate genera proposed in recent years but most lack sufficient supporting data to accept and some have no supporting data at all.