Field Key to the
Flora of
Yellowstone
National Park

by Don G. Despain

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FOREWORD

On a wall in my home hangs a framed specimen of Allium textile Nels. & Macbr. This specimen gained such prominence more from the limitations of married student budgets than for its graceful beauty. My wife needed a picture to frame for a class she was taking, and we couldn't afford a picture worthy of both the money and effort that would go into such a project. A search through my embryonic collection of pressed plants produced one of proper size and line. Since then A. textile has graced a wall in each of our many homes.

Just after we came to Yellowstone in late 1971 John Stockert, a naturalist with a botanical bent, brought a specimen to me for identification. I immediately recognized it as A. textile. No such species was listed in the key then in use for the park, nor was there a specimen under that name in the herbarium. John assured me that plants like his specimen were quite common around Mammoth Hot Springs so I checked published keys and descriptions and verified my first determination.

A thorough evaluation of both the key and the herbarium in 1973 indicated a revision of both was in order. Eventually all sheets of the Yellowstone Herbarium were sent to the University of Wyoming, where I checked the determinations against the holdings of the Rocky Mountain Herbarium. This effort revealed a few first records for the park, one first record for Wyoming, and brought to light the existence of several other species in the park's herbarium that had masqueraded under other names, including three specimens of A. textile.

An excellent regional flora, The Vascular Plants of the Pacific Northwest (Hitchcock et al. 1955-1969) now summarizes the nomenclature of plants of the area bordering Yellowstone National Park and the nomenclature of the park flora has been updated. With these changes and additions it seemed advisable to construct a new manual.

The first section of this book contains basic botanical information that will help beginning students better understand the uses and peculiarities of plant taxonomy. This is

followed by the keys which were, for the most part, condensed from other works. Species included are those represented in the Yellowstone Herbarium or are shown on spot maps for Wyoming collections at the Rocky Mountain Herbarium. The keys do not include many species which occur around Yellowstone Park but have not been collected within its boundaries. If you should find a species in the park which is not included in this key, make a collection and send a duplicate to the Yellowstone Herbarium. But remember, A COLLECTING PERMIT IS REQUIRED to collect specimens within Yellowstone Park. Be considerate of both the plant population and the visiting public.

Hopefully this book will be of use to those seriously interested in botany and plant names: the serious amateur botanist, beginning botany students, and researchers working in Yellowstone. For those interested in a simpler treatment a very fine book with color photographs arranged by flower colors, Flowers of Yellowstone and Grand Teton National Parks (Shaw 1974), is available.

The keys in this book are a condensation of those from other authors. The key for *Salix* was condensed from The Willows of Montana (Dorn 1970); for *Carex* from Manual of the Carices of the Rocky Mountains and Colorado Basin (Hermann 1970); for *Cirsium* from A Biosystematic Study of Cirsium (Compositae) in Wyoming (Gardner 1972). The rest of the keys come from Vascular Plants of the Pacific Northwest (Hitchcock, Cronquist, Ownbey and Thompson 1955-1969). I have modified the keys slightly and worked in species we have that were not treated in the other works. However, I take full responsibility for errors encountered in this work. My appreciation goes to John Stockert whose interest in our flora rekindled my taxonomic interests, and to Judy O'Neale who did most of the typing and made comments on the manuscript and to Don Shute who did a meticulous job of proofreading. I also thank Dr. John Reeder, curator of the Rocky Mountain Herbarium, for space in and the use of that herbarium. He, Mrs. Reeder, and Bob Dorn were of much assistance. I also owe Dr. C. L. Porter for teaching me herbarium techniques and the fundamentals of plant taxonomy.

PLANT NAMES

A common complaint about botanists is that their field is very esoteric. Why must they call the common dandelion Taraxacum officianalis and argue about whether a cottonwood tree should be called Populus balsamifera or Populus tricarpa?

My sister once heard that "pigweeds" were good to eat. She got a book about common weeds, looked up pigweed, compared the picture in the book with the weeds in our garden, cooked a potful, tasted them, and pronounced them barely fit for consumption. She had collected plants belonging to the genus Amaranthus. The pigweed which is a delicious green is a member of the genus Chenopodium.

Because "pigweed" encompasses so many unrelated species, communication using that name is difficult and confused. Chenopodium refers to a specific group of related plants. The scientific or Latin name of a plant unlocks all the experiences and knowledge acquired and recorded by others regarding that species of plant. Without any name you are reduced to only your own experiences. The more precise the definition employed, the more useful the term as a container of information.

Although Latin names may be difficult to pronounce and remember, many of the common names applied to plants come from Old English and are just as strange to us. I have often identified a yellow flower for nonbotanical friends by its common name, groundsel, only to have them ask what the common name is. We have also adapted many Latin names as common names. Geranium, rhododendron, and gailardia are quite familiar to us.

We feel more at home in a community where we know most peoples' names and some of their background and relationships. Th same applies to the natural communities around us. For this reason I have included the common name following the Latin name in the index.

There are problems with Latin names too. Early collectors sometimes named plants which, unknown to them, had already been named. A choice then had to be

made as to which name was to be used. Botanists have agreed upon a set of rules known as the International Rules of Botanical Nomenclature. These rules reduce confusion and help to keep the definition of a species name fairly precise. Occasionally someone discovers that the name of a plant known and used for a long time is invalid and must be supplanted by another. Thus Douglas-fir, known as Pseudotsuga taxifolia for many years and memorized by countless forestry students, must now be called Pseudotsuga menziesii according to the Rules.

Sometimes taxonomists disagree on what should be called a species and be worthy of a separate specific name. A species is commonly defined as a population of organisms reproductively isolated from other populations. Unfortunately, there are a few cases where it is difficult to apply this definition. In the genus Lupinus is a group of species that apparently at one time were reproductively isolated and morphologically dissimilar. Some of the normally sterile hybrids became polyploid (acquired multiple sets of the normal number of chromosomes) and were thus able to reproduce. These now fertile hybrids were able to cross with the parent species, producing morphological variation grading among several species. What this group or member of this group is called becomes a matter of opinion which varies between taxonomic "splitters" and "lumpers". There will always be need for taxonomists and revisions. For a more extensive discussion of plant names read How Plants Get Their Names (Bailey 1963).

PLANT PARTS

The seemingly infinite variety of combinations of plant parts and the ways in which they are modified and ornamented provides a means of distinguishing species. Describing this variation requires precisely defined terms which are usually unfamiliar to nonbotanists.

Technical plant descriptions resemble a foreign language. There are new terms such as inflorescence, and redefined words (like "fruit") which have a precise botanical meaning different from the definition used by menu planners. Once these new terms are mastered it is possible to use them to follow a key to the plant name and compare a written species description with the plant in hand to see if they are the same.

Seed bearing plants normally consist of roots, stems, leaves, and flowers. Characteristics of the flowers are used for classification purposes. It is assumed that flowers, which are present during only a small portion of the life of the plants, are less subject to modifying stresses than are the vegetative parts. However, vegetative parts are useful to distinguish individual species and often used in keys.

Flowers

Flowers are primarily reproductive organs housing the pollen producing androecium and the egg and seed producing gynoecium (Fig. 1). The pollen is produced in a sac termed an anther usually supported by a filament. Together these form a stamen. The egg is contained in an ovule which is housed in an ovary. A structure called a stigma receives the pollen and provides entry for a tube produced by the pollen. This tube grows until it contacts the egg and releases the sperm nuclei into the egg cell, accomplishing fertilization. There is often a structure between the stigma and the ovary called a style. These three structures comprise the pistil. The ovary matures or ripens into the fruit. Flowers with both stamens and pistils are called perfect; those with only stamens (staminate flowers) or pistils (pistilate flowers) are imperfect.

Most flowers also have several auxiliary structures. Most conspicuous are the brightly colored petals which attract pollinators. The petals of a flower collectively

are called the corolla. The corolla may have separate petals (polypetalous) or the petals may be united (sympetalous or gamopetalous). Less conspicuous, smaller, and usually greenish in color are the sepals, collectively known as the calyx. These too may be separate or united. All of these structures arise from the receptacle.

Flowers are modified in various ways. Some parts may be lacking or greatly reduced. The parts are often altered in shape and may have various ornamentations such as hairs, glands, or other structures. These alterations usually aid the species in adapting to specific pollinating agents. This is especially apparent in the orchid family where the petals often are shaped like the reproductive parts of certain insects. The flowers of the grass family are so greatly modified that a special terminology is used. The basic unit is a floret diagramed in expanded view in Fig. 2. These are grouped together into spikelets. The spikelets are then arranged into various inflorescences. The calyx and corolla are reduced to the minute lodicules but the essential organs are well developed. The main protective envelope (palea, lemma and glumes) are modified bracts from the inflorescence. The First Book of Grasses (Chase 1959) would be well worth reading for those interested in this fascinating group of plants.

The arrangement of flowers on a stem is called an inflorescence. The names of the parts and various types of inflorescences are given in Fig. 3. The development of these different types can be envisioned as a gradual reduction in the length of the pedicels and peduncle starting with a panicle and ending with a head.

Stems

Plants usually have stems that bear leaves and flowers. If the stems are elongated with leaves spread out along the stem the plant is called caulescent. If the stem is just a mass of tissue at the soil surface with the leaves all bunched together (basal) it is called acaulescent. Sometimes stems are modified to aid in vegetative reproduction. An example is the runners on strawberries. These are known as stolons. If stems grow underground they are called rhizomes. Sometimes the stems swell underground and store starch. These are called tubers (ex. potato). The eyes on a potato are buds on the stem. The places

on the stem where the leaves and buds originate are called nodes (Fig. 4) and the stem tissue between nodes is the internode.

The stems of many perennial species die back to the soil surface each year and originate again in the spring from a structure called a caudex. Annuals, biennials, and perennials can be distinguished by examining the plant between the root and stem for evidence of previous year's leaves. Perennials will have several sets of old leaves or leaf bases and biennials only one set. Annuals, of course, will have none from the previous year although there may be remnants of leaves that were produced early in the spring and have since died.

Leaves

Leaves are the main sites of photosynthesis, the food-making process. They are also the structures where oxygen and carbon dioxide are exchanged with the atmosphere and water is lost to the air.

Leaves usually consist of a stem called a petiole and a blade (Fig. 5). At the base of the leaf where the petiole attaches to the stem of the plant there is always a bud. There may also be some smaller leaflike structures called stipules. If only one leaf arises from a node the leaf arrangement is alternate; if two leaves arise opposite each other at each node the arrangement is opposite. Sometimes more than two leaves arise from each node. This is called a whorled arrangement.

Leaves are often greatly modified. The blades are shaped variously. The blade margin is either smooth (entire) or variously indented (toothed or lobed). The blade itself may be subdivided into leaflets in which case the leaf is compound as opposed to simple. The leaflets are arranged palmately or pinnately.

The leaves and stems are usually ornamented with hairs (pubescence). These hairs vary in both shape and amount. If plants have no hairs they are termed glabrous. Diagrams of variations pertaining to leaves are found on Page xxxi --as part of the glossary.

Fig. 1 Typical Flower

Fig. 2 Grass Flower

Fig.3 Inflorescences

Fig.4 Leaf Structure

Keys are used to unlock something--in this case, to determine the name of a plant about which you may be curious. This is done by making a series of choices, deciding whether your specimen fits this description or that. This is a dichotomous key, meaning that only two choices are given at a time and the plant should fit one of the two. Each of the two choices has the same number in the key. Thus, if your plant does not fit the first number 1, then it should fit the second. You decide which it fits best. This is an indented key which means that the next two choices are indented under the one you have just made.

You will find keys highly stylized and at first a little difficult, but as you gain more practice you will begin to appreciate the style and learn to let it work for you.

Always read both choices. If you are not familiar with the terminology, don't guess--look it up in the glossary. With difficult choices, follow both to see which takes you to the most logical end point. The sequence of families follows that of Hitchcock et al. (1955-1969). Within the families genera are arranged alphabetically. In those instances where we have only one species in a genus, family, or even higher level, that species will be listed where it keys out at the highest level. Thus some species names will be found in the key to genera of a family, some in the key to families, etc. This should cause no difficulty with the combined checklist-index for those looking to see if a particular species is treated in the key. The number following the families in the key to the families refers to the page on which the key to the genera of that family are found.

A word of caution. Because this key was made from a checklist of collected specimens in two herbaria only, you may find a plant not yet listed. In that case it could easily key out to an erroneous name, especially if it is closely related to one in the key. Also there are a number of plants that have been collected around Yellowstone but not in the park itself. These do not appear in the key, so be careful. There are several regional keys for surrounding areas which you may also want to consult. See Vascular Plants of the Pacific Northwest by Hitchcock et al. (1955-1969); Flora of Montana by Booth and Wright (1959); Flora of

Idaho by Davis (1952); Manual of the Plants of Colorado
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GLOSSARY

- Abaxial. On the side away from the axis. Fig. 4
- Acaulescent. Without a stem, but may have a scape.
- Accrescent. Increasing in size with age.
- Acerose. Needle-shaped or with a needle-like tip.
- Achene. Type of fruit that is indehiscent, dry with a tight thin pericarp.
- Acicular. Needle-shaped.
- Acuminate. Gradually and concavely tapered to a narrow tip or sharp point. Fig. H
- Acute. Sharp-pointed. Fig. H
- Adaxial. On the side toward the axis. Fig. 4
- Adnate. Grown together or attached.
- Adventitious. Introduced but not naturalized.
- Alternate. With leaves arising singly at the node; with stamens rising between petals. Fig. 4
- Alveolate. Honeycombed.
- Ament. Dense, braceate spike or raceme with a non-fleshy axis bearing numerous small, naked or apetalous flowers; catkin. Fig. 3
- Amplexicaul. Clasping the stem.
- Ampliate. Enlarged, dilated.
- Anastomosing. Rejoining to form a network.
- Androecium. The stamens, collectively. Fig. 1
- Androgynous. Having both staminate and pistillate flowers, the staminate above the pistillate.
- Annual. A plant which germinates flowers and seeds in a single season.
- Annular. Ring shaped or marked transversely by rings.
- Anther. Pollen bearing part of stamen. Fig. 1
- Anthesis. The period during which a flower is fully expanded.
- Anthocyanin. Water-soluble pigments ranging from blue or violet through purple to crimson.
- Apiculate. Ending abruptly in a small usually sharp point.
- Apiculus. Small usually sharp point.
- Appendiculate. Appendage bearing.
- Appressed. Pressed flat against another organ.
- Arachnoid. With cobwebby, usually sparse pubescence of relatively long, soft, tangled hairs.
- Arborescent. Treelike.
- Arcuate. Curved into an arc.
- Aristate. Tipped with an awn or bristle.

Articulate. Jointed.
 Ascending. Growing obliquely upwards.
 Attenuate. Tapering very gradually to a very slender tip; more extreme than acute or acuminate. Fig. H
 Auriculate. Having auricles (small projecting lobes or appendages).
 Awn. Slender, usually terminal bristle.
 Axil. The point of the angle formed by the leaf or petiole with the stem. Fig. 4
 Axillary. Located in or arising from an axil.
 Baccate. Berrylike and pulpy.
 Banner. The upper, generally enlarged petal of a leguminous flower. Fig. B
 Barbellate. Diminutive of barbed. Fig. F
 Basafixed. Attached by the base.
 Basiscopical. Toward the basal end.
 Bi-. A prefix meaning two or double.
 Biennial. Completing its life history in two years.
 Bifid. Two parted.
 Bifurcate. Two forked.
 Bilabiate. Two-lipped.
 Blade. The expanded portion of a leaf or petal.
 Bract. A specialized leaf from the axil of which a flower arises; a more or less reduced or modified leaf in an inflorescence. Fig. 3.
 Bracteate. With bract.
 Bracteole, bractlet. Diminutive of bract.
 Bulbils. Diminutive of bulb.
 Caespitose, cespitose. Matted; growing in dense little clumps.
 Callosity. A thickened raised area usually paler in color.
 Callus. A firm thickening; the firm, thickened base of the lemma in many grasses. Fig. 2.
 Calyculate. With a set of small bracts around the calyx.
 Calyx. All the sepals of a flower collectively. Fig. 1.
 Campanulate. Bell shaped. Fig. D.
 Canescent. Pale or gray, because of fine, close whitish pubescence.
 Capillary. Hair-like. Fig. F.
 Capitata. In a head.
 Capsule. A dry, dehiscent fruit composed of more than one carpel.
 Carinate. Keeled.
 Carpel. The fertile leaf (megasporeophyll) of an angiosperm, which bears the ovule.

- Carpophore. The part of the receptacle which in some kinds of flowers is prolonged between the carpels as a central axis.
- Caruncle. An appendage near the hilum of certain seeds.
- Caryopsis. The fruit of grasses, grain. Fig. 2.
- Caudex. A short, more or less vertical, often woody, persistent stem at or just beneath the surface of the ground, serving as the perennating organ.
- Caudiciferous. Caudex bearing.
- Caulescent. With an obvious, leafy stem that has obvious internodes.
- Cauline. On or pertaining to the stem.
- Chartaceous. Papery in texture.
- Chaff. Dry, thin, scales.
- Chlorophyllous. Containing chlorophyll.
- Ciliate. With a fringe of marginal hairs; with scattered long hairs. Fig. G.
- Ciliolate. Diminutive of ciliate.
- Cinereous. Ashy in color usually because of a covering of short hairs.
- Cirrhose. Tendril-like.
- Clavate. Club shaped. Fig. C.
- Claw. The narrow, petiole-like base of some sepals and petals.
- Cleft. Cut about half way to the midrib or base.
- Collar. The outer side of a grass leaf at the juncture of the blade and sheath.
- Coma. A tuft of hairs, especially on a seed.
- Compound. Composed of more than one similar organ.
- Conduplicate. Folded together lengthwise, usually into two equal, more or less appressed halves.
- Connivent. Converging or coming together.
- Cordate. Heart shaped with the notch at the base. Fig. H.
- Coriaceous. Leathery in texture.
- Corniculate. Bearing little horns or crests.
- Corolla. All the petals of a flower collectively. Fig. 1.
- Corymb. A racemose inflorescence with the lower pedicels progressively longer than the upper such that the inflorescence is flat topped. Fig. 3.
- Corymbiform. Having the form but not necessarily the structure of a corymb.
- Corymbose. In a corymb.
- Costa. A prominent rib or vein; in ferns, the midrib or a pinna.

- Crenate. Provided with rounded teeth. Fig. H.
- Crested. With an elevated, often complex appendage or rib on the summit or back.
- Crisped. Irregularly curled or crooked.
- Crown. The persistent base of an herbaceous perennial; the leafy top of a tree; a circle of appendages in the throat of a corolla.
- Cruciate. Cross-shaped.
- Culm. The aerial stem of a grass or sedge.
- Cucullate. Hooded or hood-shaped.
- Cuneate. Wedge-shaped or triangular with the narrow end at the point of attachment.
- Cuspidate. Tipped with a cusp.
- Cyathiform. Cup shaped.
- Cyme. A class of inflorescences having the terminal flower bloom first.
- Cymose. The flowers in a cyme.
- Deciduous. Falling after completion of the normal function.
- Decomound. Repeatedly compound into numerous leaflets.
- Decumbent. With a prostrate or curved base and an erect or ascending tip.
- Decurrent. With an adnate wing or margin extending down the stem or axis below the point of insertion.
- Deflexed. Bent downward.
- Dehiscent. Opening at maturity, releasing or exposing the contents.
- Deltoid. Shaped like an equilateral triangle, with one of the sides at the base. Fig. H.
- Dendritic. Branched like a tree.
- Dentate. With spreading, pointed teeth. Fig. H.
- Denticulate. Diminutive of dentate.
- Depauperate. Small or poorly developed.
- Diadelphous. United in two groups, one of the groups sometimes of a single member.
- Dichotomous. Forking more or less regularly into two branches of about equal size.
- Didymous. Developing in pairs.
- Dimidiate. Halved, as if one half were missing.
- Dimorphic. Of two forms.
- Dioecious. With male and female flowers on separate individuals.
- Diploid. Having two full chromosome complements per cell.
- Disarticulating. Separating at a pre-existing joint.

Disk flowers. Tubular flowers in the center of most compositae heads. Fig. F.
 Distal. Toward the tip or far end.
 Distinct. Not united with similar organs.
 Divaricate. Widely spreading from the axis or rachis.
 Dolabriform. Pick-shaped, attached more or less toward the middle. Fig. G.
 Dorsal. Pertaining to the back.
 Dorsiventral. Flattened, with the two flattened sides unlike.
 E-, ex-. Prefix meaning without.
 Echinate. Provided with prickles.
 Elliptic. In the shape of an ellipse.
 Emarginate. With a small notch at the tip.
 Entire. Smooth margin, not notched or toothed. Fig. H.
 Epidermis. Surface layer of cells in leaves.
 Epigynous. With the perianth and stamens attached to the ovary. Fig. E.
 Equitant. Astride, as if riding.
 Erigeroid. Like Erigeron.
 Erosc. With an irregular margin, as if gnawed.
 Exfoliating. Peeling off in layers.
 Exserted. Projecting beyond an envelope as stamens from a corolla.
 Falcate. Sickle-shaped, or curved like a hawk's beak.
 Farina. Meal-like powder.
 Farinose. Covered with meal-like powder.
 Fascicle. A close bundle or cluster.
 Filament. The stalk of a stamen. Fig. I.
 Filiform. Very slender, threadlike.
 Fimbriate. Fringed.
 Fistulous. Hollow.
 Flabellate. Fan-shaped.
 Floccose. Covered with very long, soft, fine, loosely spreading and more or less tangled hairs.
 Floret. An individual flower of a definite cluster as in the head of a composite or spikelet of grass. Fig. 2.
 Floriferous. Flower bearing.
 Foliaceous. Leafy in texture.
 -foliolate. Suffix indicating the number of leaflets in a compound leaf.
 Follicle. A dry fruit composed of a single carpel which at maturity splits along the ventral (seed bearing) suture only.

Fornix. One of a set of small scales or appendages in the tube or throat of the corolla of some kinds of plants.
 Frond. The "leaf" of a fern. Fig. A.
 Furcate. Forked.
 Fuscous. Gray-brown.
 Fusiform. Spindle shaped; thickest near the middle and tapering to both ends.
 Galea. The strongly concave or helmet-like upper lip of certain bilabiate flowers.
 Gamopetalous. Petals united at least near the base.
 Gamosepalous. Sepals united at least near the base.
 Genuiculate. Abruptly bent or twisted.
 Gibbous. Abruptly swollen on one side commonly near the base.
 Glabrate. Nearly glabrous.
 Glabrescent. Becoming nearly or quite glabrous.
 Glabrous. Smooth, without hairs or glands.
 Gland. An organ on the surface which produces a sticky or greasy viscous substance.
 Glandular. Provided with glands. Fig. G.
 Globose. More or less spherical.
 Glochidiate. Barbed at the tip.
 Glomerate. Densely compacted in clusters or heads.
 Glomerule. A small, compact, headlike cyme; any dense, small cluster.
 Glume. One of the pair of bracts, found at the base of a grass spikelet, which do not subtend flowers. Fig. 2.
 Glutinous. Sticky.
 Gynaecandrous. Having both staminate and pistillate flowers, the staminate below the pistillate.
 Gynobase. An enlargement or prolongation of the receptacle of some flowers.
 Gynoeceium. The carpels of a flower, collectively. Fig. 1.
 Hastate. Shaped like an arrowhead, but with the basal lobes more divergent. Fig. H.
 Head. An inflorescence of sessile or subsessile flowers crowded together at the tip of a peduncle. Fig. 3.
 Helicoid cyme. A sympodial cyme with the apparent main axis curved in more or less of a helix, because the successive lateral branches which make up the axis all arise on the same side.
 Herbaceous. Leaflike in color or texture, or not woody.
 Hermaphrodite. With both sexes together in the same individual, or in the same flower.

- Hirsute. Pubescent with rather coarse or stiff but not pungent, often bent or curved hairs; coarser than villous, but less firm and sharp than hispid.
- Hispid. Pubescent with coarse and firm, often pungent hairs.
- Hypanthium. A ring or cup around the ovary usually formed by the union of the lower parts of the calyx, corolla and androecium.
- Hypogynous. With perianth and stamens attached directly to the receptacle. Fig. E.
- Imbricate. Arranged in a tight spiral so that the outermost member has both edges exposed and at least the innermost member has both edges covered.
- Imparipinnate. Pinnately compound leaf with a single terminal leaflet.
- Incised. Rather deeply and sharply cut.
- Incumbent. Cotyledous with the back of one of them against the radicle.
- Indehiscent. Remaining closed at maturity.
- Inferior ovary. One with the other flower parts attached to a hypanthium which is adnate to the ovary and projects beyond it. Fig. E.
- Inflorescence. A floral cluster of a plant or the arrangement of the flowers on the axis.
- Infra-. A prefix meaning beneath.
- Internode. The tissue between nodes on a stem. Fig. 4.
- Introrse. Turned down toward the inside or facing inward.
- Involucel. Diminutive of involucre, an involucre of the second order.
- Involucre. A set of bracts beneath an inflorescence. Fig. F.
- Keel. A sharp or conspicuous longitudinal ridge; also the two partly united lower petals of many Leguminosae. Fig. B.
- Lacerate. Torn, or with an irregularly jagged margin.
- Laciniate. Cut into narrow and usually jagged margin.
- Laminar. Thin and flat.
- Lanate. Woolly.
- Lanceolate. Lance-shaped. Fig. H.
- Lemma. One of the pair of bracts which subtend the individual flowers in grass spikelets. Fig. 2.
- Lenticular. Shaped like a double-convex lens.
- Lepidote. Covered with small scales.
- Ligulate. Having a ligule. In the composites a ligulate head is composed of only ligulate flowers.

Ligule. The flattened part of the ray corolla in the Compositae (Fig. F.) and to the inner side of the leaf at the junction of blade and sheath in many grasses and some sedges.

Linear. Narrow with nearly parallel sides. Fig. H.

Locule. A seed cavity (chamber) in an ovary or fruit.

Fig. 1.

Lodicule. One of the tiny scales which may represent a vestigial perianth in grasses. Fig. 2.

Lunate. Crescent-shaped.

Malpighiaceous. Dolabriform.

Marcescent. Withering and persistent, as petals and stamens in some kinds of flowers.

Medifixed. Attached near the middle.

Megaspores. A spore which gives rise to a female gametophyte.

Membranous. Thin and flexible, like a membrane.

Mephitic. Bad smelling.

Mericarp. An individual carpel of a schizocarp.

-merous. A suffix referring to the parts in each circle of floral organs, usually with a numerical prefix.

Mesophyte. A plant adapted to growth under ordinary moisture conditions.

Monadelphous stamens. Stamens with the filaments or anthers connected.

Moniliform. Constricted at regular intervals.

Monocephalous. With a single head.

Montane. Pertaining to the mountains.

Mucronate. Tipped with a short, sharp, slender point.

Fig. H.

Multicipital. Many headed.

Muricate. With small, sharp projections.

Nectary. A structure which produces nectar.

Node. A place on a stem where a leaf attaches. Fig. 4.

Nodose. Knobby, used especially in describing roots.

Nutlet. A very thick walled achene; one of the dry, indehiscent, one-seeded half-carpels of the Boraginaceae or Labiatae.

Ob-. A prefix meaning in a reverse direction.

Obsolete. So much reduced as to be scarcely detectable or entirely suppressed.

Obtuse. Blunt, with the sides coming together at an angle of more than 90 degrees. Fig. H.

Ochroleucous. Yellowish white.

- Opposite. Two leaves situated directly across from each other at a node. Fig. 4.
- Orbicular. Circular in outline.
- Orifice. Opening or mouth.
- Ovary. The structure containing the ovules. Fig. 1.
- Ovate. Shaped like a long section through a hen's egg (applied to plane surfaces). Fig. H.
- Ovoid. Shaped like a hen's egg (applied to solid O objects.)
- Ovule. A young or undeveloped seed. Fig. 1.
- Palea. One of the pair of bracts which subtend the flowers in grass spikelets. Fig. 2.
- Palmate. With three or more lobes; nerves, leaflets, or branches arising from a common point.
- Panicle. A branched inflorescence. Fig. 3.
- Paniculate. Adjectival form of panicle.
- Paniculiform. Of the form of a panicle.
- Pannose. Felt-like.
- Papillae. Short rounded, blunt projections.
- Papillate, papillose. Covered with papillae.
- Pappus. Modified calyx crowning the achene of the Compositae. Fig. F.
- Parietal placenta. A placenta along the walls or on the intruded part of a compound unilocular ovary.
- Pectinate. Comb-like, with a single row of narrow spreading appendages or hairs.
- Pedate. Fan-like.
- Pedicel. The stalk of a single flower in an inflorescence. Fig. 1.
- Pedicellate. With a pedicel.
- Peduncle. The stalk of an inflorescence or of a solitary flower.
- Peltate. Attached by the lower surface instead of by the base or margin.
- Pendulous. Hanging or drooping.
- Penicillate. With a tuft of short hairs at the end.
- Perfoliate. With the stem passing through the leaf.
- Perianth. All the sepals and petals of a flower, collectively.
- Pericarp. The wall of the fruit.
- Perigynium. A special bract which encloses the achene of *Carex*.
- Perigynous. With perianth and stamens united into a basal saucer or cup (hypanthium) distinct from the ovary. Fig. E.

- Persistent. Remaining attached after completing its function.
- Petal. A member of the second set of floral leaves, generally colored or white and serving to attract pollinators. Fig. 1.
- Petaloid. Petal-like.
- Petiole. A leaf stalk.
- Petrophilous. Living on rocks.
- Phyllary. An involucre bract of the Compositae.
- Pilose. With long, straight, soft, spreading hairs.
- Pinna. One of the primary divisions of a pinnately compound leaf or frond. Fig. A.
- Pinnate. With two rows of lateral branches or appendages or parts along an axis.
- Pinnatifid. More or less deeply cut in pinnate fashion.
- Pinnatilobate. With pinnately arranged lobes.
- Pistil. The female organ of a flower, composed of 1-more carpels, ordinarily differentiated into ovary, style, stigma. Fig. 1.
- Placenta. The tissue to which ovules are attached.
- Plumose. Feathery. Fig. F.
- Polypetalous. Petals separate from each other.
- Polysepalous. Sepals separate from each other.
- Puberulent. Minutely pubescent; with fine, short, loose, curled hairs. Fig. G.
- Pubescent. Bearing hairs (trichomes) of any sort.
- Pulverulent. Covered with a powder.
- Pulvinate. Cushion-like.
- Puncticulate. Diminutive of punctate.
- Pungent. Firmly sharp pointed; or sharp or acrid odor.
- Pyriform. Pear shaped.
- Raceme. A more or less elongated inflorescence with pedicels arising from the bottom upward on an unbranched axis. Fig. 3.
- Racemiform. Having the form of a raceme.
- Rachilla. Diminutive of rachis; the axis of the spikelet in the grasses and some sedges. Fig. 2.
- Rachis. A main axis, such as that of a compound leaf.
- Radiate. In the Compositae, having ray flowers only along the margin of the head.
- Ray. The ligule or ligulate flower in the Compositae (Fig. F.), or one of the branches of an umbel.
- Receptacle. The end of the stem to which the other flower parts are attached. Fig. F., Fig. 1.

Reflexed. Bent backward.
 Reniform. Kidney-shaped.
 Repent. Creeping.
 Replum. A persistent, septum-like or frame-like placenta which bears ovules on the margins, as in the Cruciferae.
 Reticula. Plural of reticulum--network.
 Reticulate. Forming a network, as the veins of a leaf.
 Retorse. Directed backward or downward.
 Retuse. With a small terminal notch in an otherwise rounded tip. Fig. H.
 Revolute. With the margins rolled or turned under.
 Rhizomatous. Bearing rhizomes.
 Rhizome. Creeping underground stem.
 Rhombic. Having the shape of a rhombus--an equilateral parallelogram with oblique angles.
 Rosulate. In rosettes.
 Rotate. Saucer-shaped. Fig. D.
 Rotund. Round or rounded.
 Rufous. Brownish- or yellowish-red.
 Rugulose. Diminutive of rugose (wrinkled).
 Runcinate. Sharply cleft or pinnatifid with backward-pointing segments.
 Saccate. Furnished with or in the shape of a sac or pouch.
 Sagittate. Arrowshaped. Fig. H.
 Salverform. With a slender tube and an abruptly spreading limb. Fig. D.
 Saprophyte. Living on dead organic matter.
 Scaberulous. Diminutive of scabrous.
 Scabrid. Roughened. Fig. G.
 Scabridulous. Minutely roughened.
 Scabrous. Rough to the touch, due to the structure of the epidermis or to the presence of short, stiff hairs.
 Scandent. Climbing.
 Scape. A leafless peduncle arising from ground level in acaulescent plants.
 Scapose. With the flowers on a scape.
 Scarios. Thin, dry, and chaffy in texture and not green.
 Scorpioid cyme. A sympodial cyme with a zigzag rachis, the successive lateral branches which make up the rachis arising on different sides.
 Scrotiform. Shaped like a scrotum.
 Scurfy. Covered with very small dry scales.
 Secund. With the flowers or branches all on one side of the axis.

- Septa. Plural of septum.
- Septate. Having partitions.
- Septum. A partition; in an ovary, a partition formed by the connate walls of adjacent carpels.
- Seriate. In a series.
- Sericeous. Silky from the presence of long soft more or less appressed hairs. Fig. G.
- Serrate. Toothed along the margin with sharp, forward pointing teeth. Fig. H.
- Serrulate. Diminutive of serrate. Fig. H.
- Sessile. Attached directly by the base.
- Seta. A bristle.
- Setose. With bristles.
- Setulose. Diminutive of setose.
- Sheath. An organ which partly or wholly surrounds another organ.
- Silicle. A fruit like a silique, but short, not much longer than wide.
- Silique. An elongate capsule in which the two valves are deciduous from the persistent seed-bearing partition called the replum.
- Sinuate. With a strongly wavy margin.
- Sinus. Cleft or recess between two lobes or segments of an expanded organ such as a leaf.
- Sorus. A cluster of sporangia. Fig. A.
- Spatulate. Shaped like a spatula, rounded above and narrowed to the base. Fig. H.
- Spicate. Arranged in a spike.
- Spiciform. With the form of a spike.
- Spicules. Tiny sharp projections.
- Spike. An elongate inflorescence with sessile or subsessile flowers. Fig. 3.
- Spikelet. A group of flowers of the grass family usually subtended by a set of glumes. Fig. 2.
- Spinulose. With a small spine at the tip.
- Sporangium. A case or container for spores. Fig. A.
- Spur. A hollow appendage of the corolla or calyx usually functioning as a nectary.
- Squarrose. Abruptly spreading or recurved at some point above the base.
- Stamen. The male organ of a flower consisting of a filament and anther. Fig. 1.
- Staminode. A modified stamen which does not produce pollen.

Stellate. Star-shaped; hairs having several to many branches from the base. Fig. G.
 Sterile. Unproductive or infertile.
 Stigma. The part of the pistil which is receptive to pollen. Fig. 1.
 Stipe. The stalk of a structure without regard to its morphological nature.
 Stipitate. Borne on a stipe.
 Stipulate. Having stipules.
 Stipule. One of a pair of basal appendages found on many leaves.
 Stolon. An elongate, creeping stem on the surface of the ground.
 Stoloniferous. Bearing stolons.
 Stolonous. Stolon-like.
 Stomate. A special opening in epidermal tissue for the exchange of gasses.
 Striate. Marked with fine, more or less parallel lines.
 Strigillose. Diminutive of strigose.
 Strigose. With straight, appressed hairs all pointing in more or less the same direction.
 Strophiole. An appendage at the hilum in certain seeds.
 Style. The slender stalk separating the stigma from the ovary. Fig. 1.
 Stylopodium. An enlargement or disklike expansion at the base of the style.
 Sub-. Prefix, meaning under or almost.
 Subtend. To be directly below and close to.
 Subulate. Awl-shaped.
 Sulcate. Marked with longitudinal grooves.
 Superior. Hypogynous.
 Suture. A seam or line of fusion.
 Sympodial. With the apparent main axis actually consisting of a series of short axillary branches.
 Tepal. A sepal or petal, or member of an undifferentiated group.
 Terete. Cylindrical; round in cross-section.
 Ternate. In threes.
 Tetrads. A group of four.
 Thallus. A plant body which is not clearly differentiated into roots, stems and leaves.
 Thyrses. An elongate, narrow, mixed panicle, consisting of a series of racemosely arranged small cymes.
 Tomentose. Covered with tangled or matted, wooly hairs. Fig. G.

- Tomentum. A covering of tangled or matted hairs.
- Torulose. Diminutive of torose--alternately contracted and expanded.
- Trifid. Divided into three parts.
- Trifoliate; trifoliolate. With 3 leaves; with 3 leaflets.
- Trigonous. With 3 angles.
- Truncate. With the apex (or base) transversely straight or nearly so; as if cut off.
- Tuber. A thickened part of a rhizome ususally used for food storage.
- Tubercle. A small swelling or projection.
- Tuberculate. Having tubercles.
- Tuberous. Thickened like a tuber.
- Turbinate. Top-shaped.
- Turion. A small bulblike offset.
- Umbel. A racemose inflorescence with a vary short axis and more elongate pedicels which seem to arise from a common point. Fig. 3.
- Uncinate. Hooked at the tip.
- Uni-. Prefix meaning one.
- Urceolate. Urn-shaped or pitcherlike, contracted at or just below the mouth. Fig. D.
- Valvate. Arranged with the margins of the petals (or sepals) adjacent throughout their length, without overlapping; opening by valves.
- Valve. One of the portions of the ovary wall into which a capsule separates at maturity.
- Ventricose. Inflated or swelling out on one side only or unequally.
- Vernal. Pertaining to the spring season.
- Verticil. A whorl of leaves or flowers.
- Verticillate. Arranged in verticils.
- Verucose. Warty; covered with wartlike projections.
- Vestigial. Much reduced and hardly or not at all functional.
- Villous. With long, soft often bent or curved but not matted hairs.
- Viscid. Sticky or greasy.
- Whorl. A ring of 3 or more similar structures radiating from a node or common point. Fig. 4.
- Wing. A thin flat extension or projection from the side or tip of a structure; one of the two lateral petals of a legume flower. Fig. B.
- Xerophytic. Adapted to like in dry places.

Fig. A Fern structure

Fig. B Legume Flower Structure

Fig. C Roots

Fig. D Shapes of
Sympetalous
Corollas

Fig. E Ovary position

Fig. F Composite flower

Types of
Pappus

Fig. G Types of Pubescence

Fig. H Terms relating to leaves

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SYNOPTICAL KEY TO THE DIVISIONS OF VASCULAR PLANTS

- 1 Plants not producing seeds; spores the typical disseminules
  - 2 Leaves always small or very narrow, simple and with a single, unbranched midvein; sporophylls or sporangiophores often aggregated into a terminal cone
  - 3 Leaves mostly alternate or opposite, distinct; sporangia borne in the axils of vegetative or more or less modified leaves that are often aggregated into a terminal cone; stem not as in the following group
    - LYCOPODIOPHYTA 1
  - 3 Leaves whorled, connate around the stem, only the tips distinct; sporangia borne on highly modified sporangiophores that are aggregated into a characteristic terminal cone; stem longitudinally ribbed and grooved, hollow, jointed, with a persistent meristematic region at the base of each internode
    - EQUISETOPHYTA
    - EQUISETACEAE
  - 2 Leaves in most species larger and with a branching vein system, often cleft or compound
    - POLYPODIOPHYTA 2
- 1 Plants producing seeds; seeds the typical disseminules
  - 4 Ovules naked, not enclosed in an ovary; woody plants
    - PINOPHYTA 2
  - 4 Ovules enclosed in an ovary; herbs and woody plants
    - MAGNOLIOPHYTA 2

Division LYCOPODIOPHYTA

- 1 Plants homosporous, the spores numerous in each sporangium, all about alike; leaves without a ligule (Lycopodiatae)
  - LYCOPODIACEAE
  - LYCOPODIUM ANNOTINUM L.
- 1 Plants heterosporous, the microspores very numerous and tiny, the megaspores much larger and fewer (up to 300); leaves ligulate, i.e., with a small ventral appendage a little above the base (Isoetatae)
  - 2 Leaves small, not more than about 5mm long; stems branched and more or less elongate megaspores 1-4 (Selaginellales)
    - SELAGINELLACEAE
    - SELAGINELLA DENSA Rydb.

- 2 Leaves elongate, generally well over 10mm long; stems very short, unbranched; megaspores numerous commonly 50-300 (Isoetales) ISOETACEAE 35

Division POLYPODIOPHYTA

- 1 Plants eusporangiate, the sporangia thick-walled, 2-valved, without an annulus, borne in a "fertile spike" which projects from the upper side of the leaf, not forming sori, and without an indusium; leaves sometimes bent over in bud, but not circinate (Ophioglossales)
OPHIOGLOSSACEAE
BOTRYCHIUM MULTIFIDUM
(Gmel.) Trevis.
- 1 Plants leptosporangiate, the sporangia thin-walled with a definite annulus, usually forming definite sori on the lower surface or along the margins of the leaf, each sorus often subtended by an indusium; leaves circinate in bud (Polypodiales) POLYPODIACEAE 36

Division PINOPHYTA (Gymnospermae)

- 1 Leaves scale-like or somewhat needle-like, but opposite or whorled; ovulate cones small, woody or often fleshy, the scales few (2-12) opposite or in 3's
CUPRESSACEAE 38
- 1 Leaves needle-like born singly or in small bunches of 2-5; ovulate cones woody, with many scales spirally arranged
PINACEAE 38

Division MAGNOLIOPHYTA

- 1 Embryo mostly with two cotyledons; plants usually with intrafascicular cambium; vascular bundles in herbaceous forms usually borne in a ring which encloses a pith; floral parts, when of definite number, typically borne in sets of 5, less often 4, seldom 3 (carpels often fewer); leaves mostly pinnately or palmately veined; herbs or woody plants, usually with vessels in the stem and leaves as well as in the roots, or a few species wholly without roots
MAGNOLIATAE or 6
Dicotyledons

- 1 Embryo with one cotyledon; plants without intrafascicular cambium; vascular bundles often scattered; floral parts, when of definite number, typically borne in sets of 3, seldom 4, never 5 (carpels often fewer); leaves in most species parallel-veined; ours all herbs; vessels often confined to the roots or even wanting

LILIATAE or Monocotyledons 3

ARTIFICIAL KEY TO THE FAMILIES OF MAGNOLIOPHYTA

LILLIATAE or Monocotyledons

- 1 Flowers naked or merely subtended by much-modified, usually chaffy or bristle-like bracts
  - 2 Plants floating, thallus-like; flowers apparently consisting of 1 or 2 stamens and a naked pistil, borne in small, marginal pockets of the thallus

LEMNACEAE 82
  - 2 Plants rooted and (if aquatic) with only the stems and leaves floating
    - 3 Leaves opposite; plants aquatic, submersed or floating

ZANNICHELLIACEAE
ZANNICHELLIA PALUSTRIS L.
    - 3 Leaves alternate (except sometimes the uppermost), or plants non-aquatic, or both
      - 4 Leaves terete, basal, the plant acaulescent; pistillate flowers of two types, some borne among the sheaths of the basal leaves and with long styles that may reach to the surface of the water

JUNCAGINACEAE 42
      - 4 Leaves usually flattened, the plants caulescent; pistillate flowers (if any) usually all alike
        - 5 Pistils and stamens 4; connective of the anthers broadened and sepal-like; plants with submersed or floating stems and leaves, only the inflorescence emergent

POTAMOGETONACEAE 40
        - 5 Pistils and stamens mostly other than 4; connective of the anthers not broadened and sepal-like; plants mostly partially or wholly out of water
          - 6 Flowers largely imperfect, the staminate and pistillate borne separately in heads or in an

- elongate, terminal spike, the staminate flowers uppermost; plants not grasslike
- 7 Flowers several in globose-capitate clusters, each subtended by 3-5 chaffy bracts
- SPARGANIACEAE 81
- 7 Flowers very numerous in a terminal, terete spike, each naked or subtended merely by slender hairs; fruit neither hardened nor strongly beaked, concealed in the spike by the subtending hairs
- TYPHACEAE 81
- 6 Flowers mostly perfect, if imperfect then usually borne in greatly reduced spikes and the staminate flowers often not uppermost; plants grasses or grasslike
- 8 Leaves in 3 vertical ranks on the often triangular; solid or pithy, not swollen-noded stem; sheaths closed; each flower usually subtended by a single (occasionally 3) bract and often with several inner subtending scales or bristles; ovary sometimes enclosed in a sac-like covering; fruit an achene, usually more or less beaked; styles often 3
- CYPERACEAE 45
- 8 Leaves in 2 vertical ranks on the usually terete, mostly swollen-noded, generally hollow stems; sheaths either open (as commonly) or partially to completely closed; each flower usually subtended by 2 bracts but with no more than 2 (3) inner subtending scales (these usually obscure); ovary never enclosed in a sac; fruit a grain (the ovary wall grown tightly to the seed), rarely at all beaked; styles (in ours) no more than 2
- GRAMINEAE 55
- 1 Flowers with a perianth; perianth segments either all alike or differentiated into a calyx and corolla
- 9 Plants submersed or floating aquatics, only the inflorescence emerged; flowers 4-merous, the perianth of one sepal-like series
- POTAMOGETONACEAE 40
- 9 Plants mostly terrestrial, if aquatic rarely either emerged or floating, but with other than 4-merous flowers
- 10 Flowers imperfect, the staminate and pistillate borne separately in capitate-globose clusters, each subtended by 3-5 chaffy bracts; fruit a hardened, beaked achene
- SPARGANIACEAE 81
- 10 Flowers perfect or if (as rarely) imperfect the staminate and pistillate not borne separately in

capitate-globose clusters and not subtended by 3-5 chaffy bracts; fruit various

- 11 Plants with usually triangular stems and 3-ranked leaves, grasslike; perianth of several bristles or scales, not in two series of (2) 3 each; fruit a lenticular to trigonous achene

CYPERACEAE

45

- 11 Plants with usually terete stems and mostly not 3-ranked leaves, rarely at all grasslike; perianth segments usually in two series of (2) 3 each; fruit various

- 12 Pistils more than one, quite distinct, or the carpels more or less connate, but separating at maturity into 3 or 6 follicles

- 13 Perianth inconspicuous, greenish, the segments all essentially alike; carpels 3-6

JUNCAGINACEAE

40

- 13 Perianth rather showy, the sepals green, the petals white to pink or purplish; carpels 6 or more

ALISMACEAE

SAGITTARIA CUNEATA Sheld.

- 12 Pistil one, compound, 1- or 3-celled, the fruit not follicular

- 14 Plants grasslike; flowers inconspicuous, the perianth mostly greenish to brownish or purplish-green, the segments all essentially like

JUNCACEAE

42

- 14 Plants scarcely or not at all grasslike; perianth usually more or less showy, the corolla often not at all like the calyx in color

- 15 Ovary superior

LILIACEAE

82

- 15 Ovary inferior

- 16 Plants aquatic, usually submersed, mostly dioecious; stamens (1) 3-12

HYDROCHARITACEAE

ELODEA CANADENSIS Rich.

- 16 Plants terrestrial, perfect-flowered; stamens 1-3

- 17 Stamens 3, free of the style; flowers regular

IRIDACEAE

85

- 17 Stamens 1 or 3, joined with the style; flowers very irregular

ORCHIDACEAE

86

- 1 Plants branch-parasites at maturity, without roots, not arising from underground
LORANTHACEAE 96
- 1 Plants not branch-parasites, either rooted (and usually arising from underground) or free-floating (i.e. aquatic)
- 2 Plants non green saprophytic or parasitic herbs with leafless or merely bracteate stems
- 3 Corolla bilabiate, gamopetalous; stamens 4; placentae 2-3; plants root-parasite
OROBANCHACEAE 187
- 3 Corolla not bilabiate, often polypetalous; stamens 6-10; placentae 4-8; plants saprophytes (several genera)
ERICACEAE 165
- 2 Plants chlorophyllous (but sometimes partially parasitic), usually with greenish leaves
- 4 Flowers modified into bulblets and without normal floral parts; herbaceous plants
- 5 Stipules sheathing the stem; leaves entire (Polygonum) POLYGONACEAE 97
- 5 Stipules not sheathing the stem; leaves toothed (Lithophragma, Saxifraga)
SAXIFRAGACEAE 132
- 4 Flowers (mostly or all) normal, not modified into bulblets; herbaceous to arborescent plants
- 6 Plants aquatic, typically with the stems submerged or floating and too flaccid to project out of the water although flowering stems, only, sometimes produced above the water (not including those plants that start their growth under water, but eventually flower on the wet or dried mud of vernal pools and mud banks, where they may produce erect or ascending stems) GROUP I 11
- 6 Plants terrestrial or semi-aquatic but eventually emergent and with erect flowering stems
- 7 Leaves adapted to the trapping of insects, by flat blades covered with long, purplish, gland-tipped hairs; plants of wet places; petals separate DROSERACEAE
DROSERA ANGLICA Huds.
- 7 Leaves not adapted to the trapping of insects as above; plants of various habitats; corolla often either petals united or lacking

- 8 Plants apparently leafless, the stems greatly enlarged and flattened and jointed or globose to cylindric, often ribbed or fluted, armed with stiff spines
 CACTACEAE 157
- 8 Plants usually leafy, if stems succulent and enlarged then not spiny
- 9 Stem woody or at least persistent and perennial above ground; plants mostly trees, shrubs, or woody vines; here are included many matforming species and several plants with herbaceous and greenish but persistent stems, such as the English Ivy, but not included are most plants with more or less erect herbaceous stems arising from only a small woody persistent base
- 10 Plants viny or creeping, erect only when supported
 GROUP II 12
- 10 Plants neither viny nor creeping, although sometimes matted, usually erect
- 11 Leaves and stems silvery to reddish with a close covering of tiny, minutely fringed scales the scales barely visible with a 10-power lens (best seen on the older parts of the stem); entire-leaved shrubs; flowers apetalous, perigynous, with 4 or 8 stamens borne on a 4-lobed calyx
 ELAEAGNACEAE 157
- 11 Leaves and stems not silvery with fringed scales, but otherwise pubescent to glabrous; flowers diverse
- 12 Plants armed with spines, thorns, or prickles along or at the tips of the branches (including those plants with the branches ending in true tapered spines, but not those with rigid, somewhat pointed, untapered branch ends)
 GROUP III 13
- 12 Plants without spines, thorns, or prickles on the stems, but very occasionally spiny or prickly on the margins or segments of the leaves, the branch tips sometimes pungent but not really spinose
- 13 Leaves scalelike, overlapping only 1-5 mm long
- 14 Flowers several in an involucrate head; stamens 5, usually connate around the style, ovary inferior (Stephanomeria)
 COMPOSITAE 193

- 14 Flowers not in involucrate heads; stamens often
other than 5, not connate; ovary usually superior
POLEMONIACEAE 171
- 13 Leaves not truly scalelike and overlapping, although
often longer than the internodes
- 15 Leaves mainly opposite (not including those plants
with internodes so short the leaves are bunched)
GROUP IV 14
- 15 Leaves mainly alternate but occasionally some
approximate or even totally opposite (including
those plants with leaves so close together that
their true arrangement is not apparent)
- 16 Corolla gamopetalous; stigmas 3; stems herba-
ceous or only semi-woody at base; leaves mostly
lobed to compound, the segments often pointed
or sharp POLEMONIACEAE 171
- 16 Corolla polypetalous (lacking) or if gamopetalous
then the stigmas not 3; stems often truly woody;
leaves various
- 17 Leaf blades apically trilobed to dissected or
compound GROUP V 15
- 17 Leaf blades simple, with an entire to lobed
margin GROUP VI 17
- 9 Stems herbaceous (including all annuals and those peren-
nials that usually die back to the crown or to no more than
a small persistent woody base)
- 18 Flowers in capitate clusters surrounded by usually
numerous, often spine-tipped bracts, the spines (if any)
either straight and sharp or sometimes hooked, the
whole inflorescence (head) sometimes forming a dis-
tinct bur; petals united; stamens 5, usually united
around the style; ovary inferior, 1-celled, and 1-seeded
COMPOSITAE 193
- 18 Flowers rarely in involucrate heads, if so either the
corolla (if any) polypetalous, the stamens distinct, or
the ovary not at once inferior, 1-celled, and 1-seeded
- 19 Milky juice present; leaves mostly simple and
opposite but sometimes alternate or more or less
dissected and then either the flowers naked and
borne in a cupulate often perianth like involucre
(the pistil 3-carpellary and 3-celled), or the seeds
hairy GROUP VII 18
- 19 Milky juice lacking; leaves and flowers diverse

- 20 Leaves in considerable part whorled, 3 or more per node
(not including those with the leaves all basal)

GROUP VIII

- 20 Leaves not whorled but alternate, opposite, or all basal;
sometimes the main leaves with axillary fascicles of
secondary leaves
- 21 Flowers polypetalous and very strongly irregular,
generally showy, the petals usually distinct but not
rarely at least 1 pair connate at base, the irregularity
because of one of the following conditions; 1 of the
petals much the largest, 1 or 2 of the petals strongly
spurred or saccate, calyx spurred to saccate or
hooded, or flower with a large lopsided disc; sepals
sometimes only 2 and greatly reduced in size

GROUP IX

21

- 21 Flowers not strongly irregular if petals separate, often
without petals or the petals all jointed into a common
tube at base (gamopetalous); sepals usually more
than 2 or (if 2) not greatly reduced in size
- 22 Leaves opposite, glabrous, entire, sessile, often
covered with tiny translucent or blackish dots;
stamens numerous, hypogynous, sometimes weakly
connate into 3-5 groups; ovary superior, either 3-
celled or 1-celled   HYPERICACEAE   154
- 22 Leaves, stamens, and ovary not at once as above
- 23 Leaves brittle, very rough and gritty, alter-
nate, exstipulate, pubescent with finely bar-
bellate hairs (barbs barely visible with a 10-
power lens); stamens numerous; ovary infer-
ior, 1-celled, the placentation parietal

LOASACEAE

156

- 23 Leaves not brittle and barbellate-pubescent,
sometimes opposite or stipulate; either the
ovary not inferior and 1-celled or the stamens
numerous
- 24 Perianth 4-merous, the corolla polypetalous
or absent; stamens mostly 4 or 8 (rarely 2)
not infrequently 6, when (as rarely) more
than 8 the ovary always superior, 1-celled,
and with 3 parietal placentae

GROUP X

22

- 24 Perianth usually not 4-merous, the corolla
gamopetalous, or plant otherwise not as
above

- 25 Pistil one, 5 (2 to 8) -carpellary, the carpels 1-seeded, weakly connate around an elongate, tapered receptacle extending above the calyx, the fruits separating at maturity; petals 5, distinct; stamens 10 (sometimes only 5 fertile) GERANIACEAE 153
- 25 Pistils sometimes more than 1, if single then not composed of 5 carpels that separate at maturity, receptacle not greatly elongate; petals and stamens various
- 26 Leaf blades pinnately, ternately, or palmately divided to compound
- 27 Flowers clustered in heads surrounded by few to many bracts; ovary inferior; corolla gamopetalous; calyx often lacking or greatly modified COMPOSITAE 193
- 27 Flowers rarely involucrate heads but if so either the corolla polypetalous or the ovary superior
- 28 Corolla polypetalous or lacking GROUP XI 23
- 28 Corolla gamopetalous GROUP XII 24
- 26 Leaf blades mostly entire or toothed to lobed, neither deeply palmatifid or pinnatifid nor compound
- 29 Perianth parts alike, not consisting of 2 dissimilar series (usually the corolla the series that is vestigial or lacking), sometimes represented by 2 or more series of essentially similar bract like members
- 30 Stamens hypogynous, not borne on the perianth GROUP XIII 25
- 30 Stamens perigynous or epigynous, borne on the perianth which may be adnate to the ovary GROUP XIV 27
- 29 Perianth evidently consisting of both the calyx and corolla
- 31 Corolla polypetalous GROUP XV 29
- 31 Corolla gamopetalous GROUP XVI 31

GROUP I

- 1 Leaves generally floating; stipules membranous, usually connate around the stem; pistil 1, usually with 3 stigmas only 1 seed (Polygonum)   POLYGONACEAE   97
- 1 Leaves often submerged; stipules not connate and sheathing; pistil either more than 1 or with other than 3 stigmas but only 1 seed
  - 2 Plants rooted in the mud; leaves with greatly elongate, flaccid petioles and peltate to cordate, subentire, floating blades   NYMPHAEACEAE
NUPHAR POLYSEPALUM Engelm.
  - 2 Plants either floating or with leaves other than as above
    - 3 Leaves trifoliolate or simple and cordate-ovate (the leaflets or blades 3-12 cm long), alternate, long-petiolate, with sheathing bases   MENYANTHACEAE
MENYANTHES TRIFOLIATA L.
    - 3 Leaves neither trifoliolate nor cordate-ovate, often opposite or whorled, the blades or leaf segments mostly less than 3 cm long, the bases rarely sheathing
      - 4 Submerged leaves dissected and bearing small, ovoid, insect-trapping bladders (Utricularia)   LENTIBULARIACEAE   188
      - 4 Submerged leaves not bladder-bearing
        - 5 Leaves whorled; stems submerged or if emergent the leaves linear and entire
          - 6 Leaves entire, mostly linear
            - 7 Whorls usually of at least 5 leaves   HIPPURIDACEAE
HIPPURIS VULGARIS L.
            - 7 Whorls usually of only 3-4 leaves   CALLITRICHACEAE
CALLITRICHE ANCEPS Fern.
          - 6 Leaves dissected
            - 8 Leaf blades once or twice palmately or dichotomously dissected, the ultimate segments usually 2-4   CERATOPHYLLACEAE
CERATOPHYLLUM DEMERSUM L.
            - 8 Leaf blades pectinately dissected to subentire, the ultimate segments usually 7-15   HALORAGIDACEAE
MYRIOPHYLLUM SPICATUM L.

- 5 Leaves alternate, opposite, or all basal; stems often emergent but with other than linear leaves
- 10 Flowers naked, tiny, axillary; leaves opposite, those submerged linear and 1-nerved, those floating or emergent broadened and 3- to 5-nerved
  - CALLITRICHACEAE
  - CALLITRICHE ANCEPS Fern.
- 10 Flowers with a perianth; leaves not as above in all respects
  - 11 Pistils several; leaves often dissected (Ranunculus)
    - RANUNCULACEAE 111
  - 11 Pistil 1; leaves rarely dissected
    - 12 Sepals 2; petals 4-5, distinct (Montia)
      - PORTULACACEAE 105
    - 12 Sepals other than 2, sometimes lacking; petals various
      - 13 Sepals and petals 4, distinct; ovary superior
        - 14 Stamens 8; ovary 4-celled
          - ELATINACEAE
          - ELATINE TRIANDRA Schkuhr.
        - 14 Stamens 2, 4, or 6; ovary (1) 2-celled
          - CRUCIFERAE 119
      - 13 Sepals and petals mostly other than 4, if 4 then connate or the ovary inferior
        - 15 Stems usually square; ovary 4-lobed; fruit 4-nutlets LABIATAE 178
        - 15 Stems not square; ovary not 4-lobed; fruit a (1) 2-celled capsule (Veronica)
          - SCROPHULARIACEAE 180

GROUP II

- 1 Leaves alternate, exstipulate, persistent, pinnately compound, the leaflets leathery, spiny-toothed; stems unarmed
  - BERBERIDACEAE
  - MAHONIA REPENS (Lindl.) G. Don
- 1 Leaves otherwise, often opposite, deciduous, stipulate, or neither pinnate nor spiny-toothed
  - 2 Leaves in greater part opposite or whorled
    - 3 Leaf blades ternately to pinnately compound (Clematis)
      - RANUNCULACEAE 111
    - 3 Leaf blades simple
      - 4 Venation of the leaves prominent, the lateral veins more or less parallel with the midrib; stems erect,

- herbaceous, with a whorl of leaves near the tip;
flowers in heads subtended by white or pink bracts
CORNACEAE 165
- 4 Venation usually not at all parallel; leaves not
whorled; flowers not white- or pink-bracteate
- 5 Ovary inferior; leaves sometimes connate-perfoliate
(Linnaea, Lonicera) CAPRIFOLIACEAE 190
- 5 Ovary superior; leaves not connate-perfoliate
- 6 Plants mostly strongly aromatic; ovary 4-lobed
and 4-seeded (Glechoma, Lamium, Nepeta)
LABIATAE 178
- 6 Plants not aromatic; ovary not 4-lobed, usually
many-seeded SCROPHULARIACEAE 180
- 2 Leaves alternate
- 7 Stamens 8 or 10; anthers opening by terminal pores;
corolla gamopetalous; fruit a 4- or 5-celled capsule
or berry, often persistent through the winter
(Arctostaphylos, Gaultheria, Vaccinium)
ERICACEAE 165
- 7 Stamens often other than 8 or 10, not opening by ter-
minal pores; corolla polypetalous or lacking; fruit
rarely 4- or 5-celled if capsular or baccate
- 8 Leaves 3- to 5-foliolate, deciduous, exstipulate,
the leaflets smooth and shining; plants erect or
clambering ANACARDIACEAE 154
- 8 Leaves often simple, persistent, or stipulate; stems
often trailing; leaflets mostly not shining (Dryas,
Potentilla, Rubus) ROSACEAE 137

GROUP III

- 1 Stems with prickles or spines other than at the branch
ends; leaves palmately lobed; pistil 1; ovary inferior,
5- to many-seeded GROSSULARIACEAE 136
- 1 Stems various, but if prickly either the leaves not
palmately lobed, the pistils more than 1, or the ovary
either superior or with fewer than 5 seeds
- 2 Branches and leaves more or less grayish-villous or
-tomentose; leaves exstipulate, linear, or pedately
3- to 5-parted (Tetradymia)
COMPOSITAE 193
- 2 Branches and leaves seldom if ever grayish-tomentose
but if so the leaves neither linear nor pedately parted

3	Corolla present; stamens usually more than 5; pistils numerous (Rubus)	ROSACEAE	137
3	Corolla lacking; stamens 5 or fewer; ovary 1-celled and 1-seeded; fruit dry (Atriplex, Grayia, Sarcobatus)	CHENOPODIACEAE	101

GROUP IV

1	Plants woody only at the basal portion of the stems, the growth of each season largely nonpersistent		
2	Juice milky; seeds usually hairy	APOCYNACEAE	170
2	Juice not milky; seeds rarely hairy		
3	Corolla gamopetalous; ovary inferior	CAPRIFOLIACEAE	190
3	Corolla sometimes polypetalous (lacking), if gamopetalous the ovary superior		
4	Flowers 4-merous; ovary inferior, usually 4-celled	CORNACEAE	165
4	Flowers mostly not 4-merous; ovary superior		
5	Corolla regular, strongly gamopetalous; stigmas 3; ovary 3-celled or 3- to many-seeded	POLEMONIACEAE	171
5	Corolla irregular if strongly gamopetalous, sometimes lacking; ovary often only 1-seeded if 3-carpellary		
6	Leaves usually succulent or with a mealy covering; corolla lacking; ovary 1-seeded	CHENOPODIACEAE	101
6	Leaves neither succulent nor with a mealy covering; corolla present; ovary more than 1-seeded	SCROPHULARIACEAE	180
1	Plants woody throughout, the growth of each season largely persistent		
7	Leaves palmately lobed to pinnately compound	ACERACEAE	
		ACER GLABRUM Torr.	
7	Leaves simple, usually entire to merely toothed		
8	Stems and leaves often more or less pubescent with appressed, 2-armed hairs; leaves prominently veined, the main lateral veins tending to parallel the midnerve; stems often reddish; flowers sometimes in white-bracteate heads	CORNACEAE	165

- 8 Stems not pubescent with 2-armed hairs; stems mostly not red; flowers never in white-bracteate heads
- 9 Stamens 10, hypogynous, the anthers often opening by terminal pores; flowers complete; ovary 5-celled (Chimaphila, Kalmia) ERICACEAE 165
- 9 Stamens other than 10 if hypogynous, or flowers incomplete or ovary not 5-celled
  - 10 Calyx 4-lobed; stamens 8, borne on the calyx; corolla absent; leaves silvery- or rusty-scurfy beneath (Shepherdia) ELAEAGNACEAE 157
  - 10 Calyx not 4-lobed; if stamens 8; corolla often present; leaves rarely silvery or rusty beneath
    - 11 Plants, at least the leaves, usually mealy-covered, often also somewhat glandular CHENOPODIACEAE 101
    - 11 Plants, even the leaves, never mealy, rarely glandular
      - 12 Leaves coriaceous, persistent, oblong to obovate, 1-2.5 cm long, with persistent, thickened stipules 1-2 mm long; stamens 5, opposite the 5 hooded petals; flowers perigynous (Ceanothus) RHAMNACEAE 154
      - 12 Leaves diverse, mostly inconspicuously stipulate (or exstipulate); either the stamens alternate with the petals (if any) or flowers epigynous CAPRIFOLIACEAE 190

GROUP V

- 1 Leaves apically trilobed to ternately or palmately divided, dissected, or compound (never pinnately compound)
  - 2 Plants stellate-pubescent; stems woody (Physocarpus) ROSACEAE 137
  - 2 Plants not stellate-pubescent
    - 3 Leaf blades obovate-oblongate, 3-toothed at the apex, green above, white-woolly beneath, deciduous from the broadened, membranous base with which the small toothlike stipules remain; branches stiff and rigid (Purshia) ROSACEAE 137

3	Leaf blades mostly not 3-toothed apically, but when so either persistent or without a persistent stippular base	
4	Leaf blades palmately lobed; corolla polypetalous	
5	Stipules prominent, not fused lengthwise with the petiole; stamens and pistils numerous (Rubus)	
	ROSACEAE	137
5	Stipules lacking or fused their length with the petiole; stamens 5; pistil 1	
	GROSSULARIACEAE	136
4	Leaf blades not palmately lobed or corolla not polypetalous	
6	Flowers not in involucrate heads; leaves ternate, the segments shallowly to deeply lobed	
7	Stamens 25 or more; pistils several (Rubus)	
	ROSACEAE	137
7	Stamens less than 15; pistil 1	
	ANACARDIACEAE	154
6	Flowers in involucrate heads; leaves rarely ternate	
	COMPOSITAE	193
1	Leaves pinnately compound	
8	Leaflets glossy and shining, pungent-toothed; leaves persistent	
	BERBERIDACEAE	
	MAHONIA REPENS (Lindl.) G. Don	
8	Leaflets usually not glossy, not pungent-toothed; leaves often deciduous	
9	Leaves stipulate (the stipules sometimes deciduous); stamens 15-100 (Potentilla, Rubus, Sorbus)	
	ROSACEAE	137
9	Leaves exstipulate; stamens less than 15	
10	Leaves rarely less than 4 cm long; leaflets elliptic to ovate or obovate, toothed, never tomentose	
	ANACARDIACEAE	154
10	Leaves often less than 4 cm long; leaflets mostly linear, often woolly (Artemisia, Tanacetum)	
	COMPOSITAE	193

GROUP VI

- 1 Plants low, woody-branched, heathlike shrubs having closely crowded, linear, entire, evergreen, often revolute-margined leaves, montane

ERICACEAE

165
- 1 Plants not heathlike, often in large part herbaceous (sometimes cushion-forming), if with linear, revolute-margined leaves then usually of desert or saline areas
- 2 Plants mostly semishrubby, the annual branches tending to die back toward the woody base
- 3 Leaves exstipulate, often narrow, usually strongly excrescent-mealy, but sometimes grayish- or yellow-hairy (sometimes stellate) or glabrous and very succulent; flowers apetalous, inconspicuous, never umbellate, often imperfect; styles 2 (rarely 3 or 4); ovary 1-celled and 1-seeded

CHENOPODIACEAE

101
- 3 Leaves and flowers not at once as above
- 4 Flowers capitate or umbellate, usually involucrate; leaves often linear or woolly (at least beneath)

COMPOSITAE

193
- 4 Flowers not involucrate, rarely borne in umbels or heads; leaves diverse
- 5 Leaves mostly stipulate; stamens usually more than 10; flowers perigynous (epigynous), polypetalous or apetalous; pistil sometimes more than 1, never 2-celled or 1-celled with 2 or 3 parietal placentae

ROSACEAE

137
- 5 Leaves often exstipulate; stamens rarely more than 10; flowers often hypogynous, sometimes gamopetalous; pistil 1, sometimes 2-celled or 1-celled with 2 or 3 parietal placentae
- 6 Fertile stamens 4 (a fifth one sterile); corolla more or less bilabiate (Penstemon)

SCROPHULARIACEAE

180
- 6 Fertile stamens usually 5 or more; corolla mostly regular ERICACEAE

165
- 2 Plants true shrubs or trees (sometimes cushion-forming)
- 7 Corolla gamopetalous; stamens 5, 8 or 10

ERICACEAE

165
- 7 Corolla polypetalous or wanting; stamens diverse

8 Flowers apetalous, imperfect, the staminate (sometimes also the pistillate) borne in crowded bracteate racemes or spikes (aments or catkins)	
9 Leaves usually mealy-scurfy at least beneath; styles 2; ovary 1-seeded, superior (Atriplex)	
CHENOPODIACEAE	101
9 Leaves rarely at all mealy-scurfy; styles often other than 2; ovary sometimes inferior or many-seeded	
SALICACEAE	89
8 Flowers often petaliferous, perfect or imperfect, but neither the staminate nor the pistillate in catkins	
10 Stamens usually more than 10, if 10 or fewer then the plant cushion-forming or the pistil more than 1	
ROSACEAE	137
10 Stamens 4-10; plant never cushion-forming; pistil 1	
11 Ovary 1-celled and 1-seeded; petals lacking; stamens opposite the sepals	
ELAEAGNACEAE	157
11 Ovary 2- to 3-celled or several-seeded; petals often present; stamens sometimes opposite the petals (if any) and thus alternate with the sepals	
12 Stamens opposite the petals; leaves never palmately lobed; ovary superior	
RHAMNACEAE	154
12 Stamens alternate with the petals; leaves sometimes palmately lobed; ovary inferior	
GROSSULARIACEAE	136

GROUP VII

1 Flowers apetalous; ovary 3-carpellary and 3-celled, each cell 1-seeded; seeds not hairy	
EUPHORBIACEAE	153
1 Flowers with a usually more or less showy corolla; ovary 2-carpellary; seeds often hairy	
2 Ovary inferior, 1-celled and 1-seeded (Tribe Cichorieae)	
COMPOSITAE	193
2 Ovary superior, 1- or 2-celled, multiseeded	
3 Corolla lobed well over half its length or the lobes not reflexed; stamens completely fused surrounding and adnate with the style and stigma	
ASCLEPIADACEAE	
ASCLEPIAS SPECIOSA Torr.	

- 3 Corolla ordinarily lobed less than half the length or the lobes not reflexed; stamens free or only partially connate, weakly if at all adnate to the style and stigma
 APOCYNACEAE 170

GROUP VIII

- 1 Corolla gamopetalous, rotate, the segments with large fringed glands near the base; stamens as many as the petals and alternate with them (Frasera)
 GENTIANACEAE 169
- 1 Corolla (if any) often polypetalous, if gamopetalous then not rotate or the segments not gland-bearing near the base; stamens often more numerous than the petals
- 2 Corolla gamopetalous
- 3 Flowers in involucrate heads, the 5 stamens usually connate around the style; ovary inferior, 1-celled and 1-seeded (Eupatorium)
 COMPOSITAE 193
- 3 Flowers not in involucrate heads; stamens and ovary various
- 4 Ovary inferior, 2-seeded; stems often square
 RUBIACEAE 189
- 4 Ovary superior, several-seeded; stems mostly not square
- 5 Ovary usually 4-lobed and 4-ovuled, developing into 4 (or by abortion only 1, 2, or 3) 1-seeded nutlets; plants often harsh-pubescent
- 6 Stamens 4 or 5; corolla only slightly irregular; style terminal on the ovary or nutlets
 VERBENACEAE
 VERBENA BRACTEATA Lag.
- 6 Stamens 2 or 4; corolla usually strongly irregular; style attached toward the base of the nutlets or ovary lobes
 LABIATAE 178
- 5 Ovary not 4-lobed, or at least not developing into 4 nutlets; plants not harsh-pubescent
- 7 Stigmas usually 3 (2); stamens alternate with the corolla lobes; placentation not free-central
 POLEMONIACEAE 171

- 7 Stigma usually capitate and single; stamens opposite the corolla lobes; placentation free-central
PRIMULACEAE 168
- 2 Corolla, if any, polypetalous (rarely some or all of the segments weakly connate at base)
- 8 Stamens usually more than 10; pistils more than 1, simple
RANUNCULACEAE 111
- 8 Stamens mostly 10 or fewer; pistil single, usually compound
- 9 Leaves entire, more or less parallel-veined, lightly pubescent with 2-armed, sessile (malpighiaceus) hairs; flowers clustered and surrounded by 4 large white or pinkish bracts
CORNACEAE 165
- 9 Leaves not both parallel-veined and malpighiaceus-pubescent; flowers not subtended by large white bracts
- 10 Stamens hypogynous, as many as the corolla lobes and opposite them; ovary 1-celled; placentation free-central; style and stigma 1
PRIMULACEAE 168
- 10 Stamens sometimes perigynous or epigynous, usually as many as the corolla lobes and alternate with them, or twice as many; ovary and styles diverse
- 11 Leaves usually not whorled the full length of the stems (often only at 1 node); perianth usually in part other than greenish; pistil 1, compound; ovary 1-celled and 1-seeded or styles or stigmas 3 (2-4) or the sepals either 2 or 5-9
- 12 Seeds numerous; perianth in 2 series, the petals 5-20, usually showy; calyx of either 2 or 5-9 sepals
PORTULACACEAE 105
- 12 Seeds one; perianth scarcely differentiated into 2 unlike series, rarely showy, usually 3-6 (often greenish) segments
POLYGONACEAE 97
- 11 Leaves whorled at most of the nodes or the perianth (if any) greenish; ovary and sepals various

- 13 Leaves linear, sessile; stamens 1, the flowers usually
imperfect HIPPURIDACEAE
HIPPURIS VULGARIS L.
- 13 Leaves often petiolate if linear then the stamens 3 or more
CARYOPHYLLACEAE 107

GROUP IX

- 1 Petals 3, the lower crested; sepals 5, the inner two
petaloid; ovary 2-celled, laterally compressed, 1 seed
per cell POLYGALACEAE
POLYGALA ALBA Nutt.
- 1 Petals 5; sepals and ovaries otherwise
2 Stamens 6, connate into 2 groups of 3 each; sepals 2,
tiny, often quickly deciduous; petals 4, one or both
of the outer pair usually spurred or saccate
FUMARIACEAE 119
- 2 Stamens usually 5, 10, or more, not connate into 2
equal groups; sepals 3 or more; petals 3 or 5, often
not spurred
3 Calyx usually petaloid and more showy than the
corolla, 1 sepal strongly saccate, hooded, or
spurred RANUNCULACEAE 111
- 3 Calyx mostly not petaloid, rarely more showy than
the corolla, usually greenish, rarely spurred and
if so the spur not formed by a single sepal
4 Lowest petal of the corolla the largest; stamens
5, connate around the pistil; ovary with 3
parietal placentae VIOLACEAE 155
- 4 Lowest petal of the corolla usually not the largest
(the lowest pair of petals often partially united and
then sometimes the two larger than the upper
petal); stamens and ovary various
5 Upper petal of the flower much the largest;
stamens often connate; ovary 1-celled with 1
parietal placenta LEGUMINOSAE 143
- 5 Upper petal usually not the largest; stamens
not connate; ovary 2- to 5-celled or with 2
parietal placenta
6 Stamens hypogynous, the anthers dehiscent
by terminal pores; ovary (4) 5-celled (Pyrola)
ERICACEAE 165

- 6 Stamens perigynous or epigynous, the anthers not dehiscent by terminal pores; ovary usually 1- or 2 (3)-celled (Saxifraga) SAXIFRAGACEAE 132

GROUP X

- 1 Ovary partially to wholly inferior; stamens 4 or 8
 2 Flowers clustered, subtended by several large white or pinkish bracts; fruit fleshy
 CORNACEAE 165
 2 Flowers not subtended by large white bracts; fruit a capsule
 ONAGRACEAE 157
 1 Ovary superior
 3 Stipules sheathing the stem above the petiole; stigmas strongly fringed (Oxyria)
 POLYGONACEAE 97
 3 Stipules not sheathing the stem; stigmas entire or lobed
 4 Leaves opposite, stipulate; stamens 8; ovary 4-celled; diminutive, usually prostrate annuals
 ELATINACEAE
 ELATINE TRIANDRA Schkuhr.
 4 Leaves rarely if ever both opposite and stipulate; stamens seldom 8; ovary 1- or 2-celled
 5 Stamens 4; corolla absent or vestigial; calyx unequally (3) 4-lobed; ovary 2-celled, the placentation axile (Besseyia)
 SCROPHULARIACEAE 180
 5 Stamens often other than 4; corolla usually present, polypetalous; calyx usually equally lobed; ovary 1-celled or if 2-celled then with parietal placentation
 6 Ovary 1-celled, nearly always borne on a stalk projecting above the point of insertion of the stamens, when sessile the stamens more than 6; fruit many-seeded
 CAPPARIDACEAE
 CLEOME SERRULATA Pursh.
 6 Ovary usually 2-celled, but when (as rarely) 1-celled then not stalked and usually only 1- or 2-seeded; stamens never more than 6
 CRUCIFERAE 119

GROUP XI

- 1 Stamens more than 10, monadelphous, forming a tube surrounding the pistil; plants often strongly stellate-pubescent MALVACEAE 154
- 1 Stamens not monadelphous if more than 10; plants usually not stellate-pubescent
  - 2 Petals, sepals, and stamens usually 5; pistil 1, the ovary inferior, 2- to 6-celled, with 1 seed per cell; flowers mostly in flat- to round-topped umbels or heads UMBELLIFERAE 160
  - 2 Petals, sepals, or stamens sometimes not 5; pistils sometimes more than 1, if only 1 then ovary superior or with more than 1 seed per cell; flowers rarely umbellate
  - 3 Flowers with more than 1 pistil or with more than 15 stamens; pistils always simple, with only 1 placenta and often with only 1 seed
  - 4 Stamens hypogynous, borne on the receptacle, a disc lacking; sepals often deciduous, frequently petaloid, not leathery; leaves exstipulate RANUNCULACEAE 111
  - 4 Stamens perigynous to epigynous, borne on the calyx or on (or at the edge of) a disc surrounding the pistils; sepals sometimes leathery and persistent; leaves often stipulate
    - 5 Leaves exstipulate, ternately decompound; stamens borne on and at the edge of a prominent lobed disc that is free of the calyx; fruits large, leathery, many-seeded follicles; sepals leathery, persistent PAEONIACEAE
    - 5 Leaves usually strongly stipulate (at least when ternately compound) stamens usually borne on the calyx or on a disc adnate to the calyx; fruits and sepals diverse PAEONIA BROWNII Dougl.
- 3 Flowers with only 1 pistil, usually with less than 15 stamens (if with more than 10 stamens the pistil always compound) ROSACEAE 137

- 6 Pistil 1; ovary usually 1-celled and with 1 parietal placenta, but very rarely with a false partition, and the placentae adjacent on one side of the 2 cavities; stamens either 5 and distinct or 10 and monadelphous or diadelphous; leaves mostly strongly stipulate (Astragalus) LEGUMINOSAE 143
- 6 Pistil rarely only 1 and ovary 1-celled and with 1 parietal placenta, but if so the stamens neither 5 and distinct or 10 and connate (if ovary 2-celled, the placentae not immediately adjacent on one side); leaves sometimes exstipulate
- 7 Flowers perigynous or epigynous; sepals slightly to strongly connate, often alternately bracteate
- 8 Stamens mostly 3, 5, or 10; pistil 2 to 3 (very rarely 4) -carpellary; calyx not bracteate and never with a ring of stiff hooked bristles SAXIFRAGACEAE 132
- 8 Stamens often more than 10; pistil 1-carpellary (with only 1 seed or placenta); calyx often with bracts alternate with the lobes ROSACEAE 137
- 7 Flowers hypogynous; sepals (if any) almost or quite distinct, without alternating bracts LIMNATHACEAE
- FLOERKEA PROSERPINACOIDES Willd.

GROUP XII

- 1 Corolla prominently scaly-hairy; leaves trifoliolate; ovary 1-celled MENYANTHACEAE
- MENYANTHES TRIFOLIATA L.
- 1 Corolla not scaly-hairy, or leaves not trifoliolate, or ovary more than 1-celled
- 2 Ovary partially to completely inferior
- 3 Leaves pinnate; corolla irregular; stamens 1-4 VALERIANACEAE 192
- 3 Leaves ternate; corolla regular; stamens 8-10 ADOXACEAE
- ADOXA MOSCHATELLINA L.

2 Ovary superior		
4 Stigmas 3	POLEMONIACEAE	171
4 Stigmas 1 or 2		
5 Corolla regular; fertile stamens 5; fruit a capsule or berry		
6 Flowers borne in 1-sided helicoid inflorescences	HYDROPHYLLACEAE	174
6 Flowers not borne in helicoid inflorescences		
7 Ovary 1-celled; fruit a nonspiny, valvate capsule	HYDROPHYLLACEAE	174
7 Ovary 2- to 5-celled; fruit a berry or a sometimes spiny or circumscissile capsule	SOLANACEAE	180
5 Corolla irregular; fertile stamens often other than 5; fruit sometimes 1-4 nutlets		
8 Ovary deeply 4-lobed, forming four 1-seeded nutlets; stems usually square; plants (other than the flowers) often strongly aromatic		
9 Style terminal on the ovary or nutlets; corolla only slightly irregular; stamens 4 or 5; flowers in terminal, bracteate spikes	VERBENACEAE	
	VERBENA BRACTEATA Lag.	
9 Style sub-basal on the ovary segments; corolla strongly irregular; stamens 2-4; inflorescence diverse	LABIATAE	178
8 Ovary unlobed or bilobed; fruit a many-seeded capsule; stems rarely square; plant rarely aromatic		
10 Stamens usually 4 or 5, distinct; ovary 2-celled; sepals 4 or 5	SCROPHULARIACEAE	180
10 Stamens often 6 and joined into 2 groups; ovary 1-celled; sepals 2	FUMARIACEAE	119

GROUP XIII

1 Pistils more than 2, simple; stamens often more than 10	RANUNCULACEAE	111
1 Pistil 1, often compound, but sometimes only the lower part of the carpels fused; stamens usually no more than 10		

- 2 Perianth (the calyx) 2-lipped; stamens 2; ovary 2-celled, many-seeded; flowers perfect (Besseyia)

SCROPHULARIACEAE

- 2 Perianth not 2-lipped; stamens rarely 2; ovary mostly either 1-seeded, or with only 1 seed per cell, or 1-celled with free-central placentation

- 3 Perianth parts only 2; stigmas 3; ovary 1-celled, 2- to many-seeded (Montia) PORTULACACEAE

- 3 Perianth parts usually either more than 2 or completely lacking; stigmas rarely 3 if the ovary is 1-celled and several-seeded

- 4 Ovary multiseeded; placentation free-central (at least in the upper part of the ovary); leaves opposite at least on the lower part of the stem, the nodes often swollen

- 5 Style and stigma 1; stamens as many as, and alternate with, the sepals (Glaux)

PRIMULACEAE

- 5 Styles or stigmas (2) 3-5; stamens often twice as many as the sepals (Arenaria, Cerastium, Stellaria)

CARYOPHYLLACEAE

- 4 Ovary 1- to 3-seeded; placentation mostly basal; leaves diverse

- 6 Stipules more or less connate and sheathing the stem above the node POLYGONACEAE

- 6 Stipules, if any, not sheathing

- 7 Leaves opposite, exstipulate; perianth connate, campanulate to funnel-form or tubular; style and stigma 1; ovary 1-seeded, closely surrounded by the base of the calyx, which is usually thickened

NYCTAGINACEAE

ABRONIA FRAGRANS Nutt.

- 7 Leaves often alternate or stipulate; perianth usually not strongly connate; styles, stigmas, or seeds often more than 1

- 8 Ovary 3-lobed, 3-celled, 3-seeded; flowers really naked and imperfect but apparently consisting of several stamens (each stamen a separate flower), 1 pistil (also a separate flower), and a uniseriate perianth (in reality an involucre) EUPHORBIACEAE

- 8 Ovary 1 (2) -celled; flowers mostly with a perianth but without an involucre

- 9 Perianth usually showy, generally in 2 similar or dissimilar series; stamen 3-9; stigma or styles 3
POLYGONACEAE 97
- 9 Perianth not at all showy, rarely colored
- 10 Plant with opposite, stipulate leaves and stinging hairs (*Urtica*) URTICACEAE 96
- 10 Plant often alternate-leaved, mostly without stipules, never with stinging hairs
- 11 Plants stellate-pubescent (at least in the inflorescence) but sometimes tardily glabrate (*Eurotia*)
CHENOPODIACEAE 101
- 11 Plants not stellate-pubescent
- 12 Leaves linear, nearly terete, rigidly pungent-tipped, sometimes pilose at base; ovary wall more or less adherent to the seed (*Salsola*)
CHENOPODIACEAE 101
- 12 Leaves usually expanded, not pilose-based, rarely pungent; fruit a capsule, the wall free of the seed
- 13 Perianth dry and more or less membranous, the segments often sharp-pointed; flowers subtended by scarious, pungent bracts; leaves rarely either succulent, scurfy, or copiously soft-hairy
AMARANTHACEAE 105
- 13 Perianth mostly not dry and membranous, the segments rarely pungent and the flowers not usually pungent-bracteate; leaves usually either succulent, strongly scurfy, or densely soft-pubescent
CHENOPODIACEAE 101

GROUP XIV

- 1 Flowers borne in heads surrounded by a 1- to several-seriate involucre; ovary inferior, 1-celled and 1-seeded; style branches 2; stamens usually (but not always) connate around the style COMPOSITAE 193
- 1 Flowers rarely involucrate heads, if capitate the ovary superior or more than 1-seeded, or the style branches other than 2; stamens not connate around the style
- 2 Perianth irregular, usually spurred at the base; stamens fewer than the perianth lobes; leaves opposite; stigma 2- or 3-lobed VALERIANACEAE 192

- 2 Perianth regular, not spurred; stamens mostly at least as many as the perianth lobes; leaves often alternate; stigmas often simple
- 3 Styles or stigmas 2 or 3; ovary 1-celled and 1-seeded
  - 4 Perianth dry and scarious, the flowers surrounded by sharp-pointed bracts; fruit a circumscissile capsule
AMARANTHACEAE 105
  - 4 Perianth not dry and scarious; flowers not pungent-bracteate; fruit not circumscissile
POLYGONACEAE 97
- 3 Styles or stigmas other than 2 or 3 or the ovary not 1-celled and 1-seeded
  - 5 Leaves opposite (but not all basal), exstipulate
NYCTAGINACEAE
ABRONIA FRANGRANS Nutt.
  - 5 Leaves either alternate (or all basal) or stipulate
    - 6 Flowers umbellate to subcapitate, with or without an involucre; styles 2; ovary 2-celled, each cell 1-seeded
UMBELLIFERAE 160
    - 6 Flowers not umbellate, or ovary 1-celled or more than 2-seeded
      - 7 Pistil 1, the ovary inferior, 1-celled, ultimately 1-seeded; leaves entire, glabrous, exstipulate, somewhat leathery or fleshy; plants root-parasites
SANTALACEAE
COMANDRA UMBELLATA (L.) Nutt.
      - 7 Pistil 1 or more, the ovary either superior or more than 1-seeded if leaves leathery, entire, and exstipulate; plants not root-parasites
      - 8 Pistil one, 2- to 3-carpellary; ovary 2- or 3-celled, or 1-celled with 2-3 parietal placentae, or 1-seeded but styles or stigmas more than 1
      - 9 Ovary several-seeded; leaves multiform, usually neither fleshy nor rigidly pungent
SAXIFRAGACEAE 132
      - 9 Ovary 1-seeded; leaves mostly fleshy, or terete, or rigidly pungent
        - 10 Fruit a circumscissile capsule; flowers subtended by pungent bracts; leaves broadened, usually not succulent
AMARANTHACEAE 105

10 Fruit indehiscent, the ovary wall usually grown to the seed; flowers generally not subtended by sharp-pointed bracts, but if so the leaves narrow and often terete or rigidly pungent

CHENOPODIACEAE 101

8 Pistils sometimes more than 1, simple, 1-carpellary, the ovary 1-celled and with only 1 placenta; style and stigma 1

ROSACEAE 137

GROUP XV

1 Stamens numerous, monadelphous, forming a tube surrounding the pistil; plants often stellate-pubescent

MALVACEAE 154

1 Stamens few or (if numerous) the filaments free or connate only at the base; plants rarely stellate-pubescent

2 Pistils 2 or more, simple

3 Flowers perigynous; leaves usually stipulate

4 Pistils 2 or 3, slightly fused basally; stamens 5-10

SAXIFRAGACEAE 132

4 Pistils more than 3 or stamens more than 10

ROSACEAE 137

3 Flower hypogynous or leaves not stipulate

5 Stamens (4) 5 or 10; pistils (4) 5; fruits follicular; leaves fleshy

CRASSULACEAE 131

5 Stamens either more than 10 or fruits other than 5 follicles; leaves rarely fleshy

RANUNCULACEAE 111

2 Pistil 1, simple or compound

6 Stamens 15-100; leaves opposite, exstipulate; pistil

3- to 5-carpellary, the placentation not free-central

HYPERICACEAE 154

6 Stamens either less than 15 or if that many then either the pistil not 3- to 5-carpellary or the placentation free-central

7 Ovary 1-celled (at least near the tip), often with free-central placentation or with a single seed, never with more than 1 parietal placenta

8 Leaves usually opposite (not all basal), the nodes often swollen; placentation free-central

9 Sepals 2; petals 5-9

PORTULACEAE 105

9 Sepals usually the same number as the petals,

CARYOPHYLLACEAE 107

- 8 Leaves mostly alternate or all basal, the nodes not swollen or the placentation not free-central
  - 10 Stamens more than 10
    - 11 Leaves strongly stipulate; placentation not free-central
ROSACEAE 137
    - 11 Leaves not stipulate or if stipulate the placentation free-central
PORTULACACEAE 105
  - 10 Stamens 10 or fewer
    - 12 Stamens plainly perigynous
ROSACEAE 137
    - 12 Stamens hypogynous
      - 13 Sepals fewer than the petals (if any), usually 2 or 3, (rarely apparently 4 because of a pair of juxtaposed bracts)
PORTULACACEAE 105
      - 13 Sepals mostly more than 2 or 3, usually as many as the petals
        - 14 Ovary 1-seeded
          - 15 Flowers mostly umbellate; perianth parts mostly all alike
POLYGONACEAE 97
          - 15 Flowers rarely umbellate; outer perianth parts unlike the inner
CARYOPHYLLACEAE 107
        - 14 Ovary several-seeded
PORTULACACEAE 105
  - 7 Ovary more than 1-celled or 1-celled but with 2 or more parietal placentae and several seeds
    - 16 Ovary 2-celled, inferior, each cell 1-seeded
UMBELLIFERAE 160
    - 16 Ovary 1- or more-celled, either superior or with more than 1 seed per cell
      - 17 Leaves opposite, entire, the nodes swollen; styles 3-5; stamens 10, hypogynous; calyx strongly gamosepalous (Lychnis, Silene)
CARYOPHYLLACEAE 107
      - 17 Leaves, styles, and stamens not at once as above
        - 18 Flowers hypogynous
          - 19 Plants tiny, growing in moist places; leaves opposite, stipulate
ELATINACEAE
ELATINE TRIANDRA Schkuhr.
          - 19 Plants seldom greatly reduced and mostly not of wet places; leaves often alternate or exstipulate

- 20 Style 1; ovary 4- or 5-celled or 1-celled with 2 parietal placentae; anthers sometimes opening by terminal pores
  - 21 Ovary 4- to 5-celled; anthers often opening by terminal pores   ERICACEAE   165
  - 21 Ovary 1-celled, with 2 (sometimes intruded) parietal placentae; anthers not opening by terminal pores (Frasera)   GENTIANACEAE   169
- 20 Styles 2-5; anthers not opening by terminal pores
  - 22 Leaves opposite; calyx gamosepalous; fertile stamens 10 (Silene)
    - CAROPHYLLACEAE   107
  - 22 Leaves often alternate; calyx not strongly gamosepalous; fertile stamens 5 or fewer
    - LINACEAE
    - LINUM PERENNE L.
- 18 Flowers perigynous or epigynous
  - SAXIFRAGACEAE   132

GROUP XVI

- 1 Ovary partially to wholly inferior; pistil always 1
  - 2 Ovary 1-celled and 1-seeded
    - 3 Stamens mostly 1-3; flowers not borne in involucrate heads   VALERIANACEAE   192
    - 3 Stamens 4 or 5; flowers borne in heads surrounded by an involucre of 1 to several series of bracts
      - COMPOSITAE   193
  - 2 Ovary either more than 1-celled or more than 1-seeded
    - 4 Ovary 2-celled, the cells each 1-seeded, readily separating; leaves opposite, stipulate; corolla (3) 4 (5) -lobed (Kelloggia)
      - RUBIACEAE   189
    - 4 Ovary other than 2-celled and 2-seeded; leaves and corolla various
      - 5 Leaves opposite, mostly cauline; stamens 4 (Linnaea)   CAPRIFOLIACEAE   190
      - 5 Leaves mostly alternate or all basal; stamens usually 5   CAMPANULACEAE   192
  - 1 Ovary superior; pistil very occasionally more than 1
    - 6 Anthers opening by terminal pores; ovary mostly 5-celled, many-seeded ERICACEAE   165

- 6 Anthers not opening by terminal pores; ovary mostly less than 5-celled
- 7 Sepals 2; corolla regular, the petals usually (4) 5 (6), connate only at the base; ovary 1-celled; placentation free-central

PORTULACACEAE 105
- 7 Sepals and petals usually the same number; corolla mostly strongly gamopetalous, often irregular; ovary diverse
- 8 Style branches or stigmas 3; ovary 3-celled

POLEMONIACEAE 171
- 8 Style branches or stigmas 1-2; ovary only rarely 3-celled
- 9 Ovary 2-celled, 4-lobed (at anthesis), usually becoming 4-celled and 4-seeded; fruits ultimately 4 (or by abortion 1, 2, or 3) hardened, 1-seeded nutlets; plants mostly either opposite-leaved and with somewhat squarish stems or harshly pubescent and with the flowers in curled (helicoid) inflorescences
- 10 Corolla usually regular, (4) 5-lobed; stamens (4) 5; flowers often in helicoid inflorescences; pubescence often harsh; stems not square; leaves mostly alternate

BORAGINACEAE 175
- 10 Corolla usually irregular, mostly bilabiate; stamens mostly 3 or 4 (5); inflorescence not helicoid; pubescence rarely harsh; stems often square; leaves generally opposite
- 11 Style terminal on the nutlets; stamens 4 or 5; corolla generally only slightly bilabiate; plants mostly not aromatic

VERBENACEAE
VERBENA BRACTEATA Lag.
- 11 Style sub-basal on the nutlets; stamens 2 or 4; corolla usually strongly bilabiate; plants often strongly aromatic

LABIATAE 178
- 9 Ovary 1- or more-celled but never developing into 4 nutlets; plants various
- 12 Stamens as many as the corolla lobes and opposite them, or twice as many; ovary 1-celled, the placentation free-central; corolla regular
- 13 Style and stigma 1; stamens as many as the petals and opposite them; capsule often circumscissile

PRIMULACEAE 168

- 13 Styles (or stigmas) 2-5; stamens usually twice as many as the petals; capsule not circumscissile
CARYOPHYLLACEAE 107
- 12 Stamens fewer than the corolla lobes or as many and alternate with them; ovary not 1-celled and with free-central placentation; corolla often irregular
- 14 Calyx and corolla 4-lobed regular
- 15 Corolla scarious, persistent; capsule usually circumscissile; flowers spicate, the spikes terminal (the plants scapose) or axillary (such plants oppositely and linearly leaved)
PLANTAGINACEAE 188
- 15 Corolla not scarious, usually deciduous; capsule not circumscissile; flowers rarely spicate; plants seldom scapose
- 16 Ovary 1-celled and with 2 parietal placentae; plants usually glabrous; corolla mostly twisted in the bud GENTIANACEAE 169
- 16 Ovary usually 2-celled; plants often pubescent; corolla not twisted in the bud (Veronica)
SCROPHULARIACEAE 180
- 14 Calyx and corolla other than 4-lobed or flowers irregular
- 17 Corolla usually funnelform, twisted in the bud; leaves alternate, the blades often cordate to hastate; ovary mostly (1-3) 4-seeded, the seeds never hairy; plants often vining
CONVOLVULACEAE
CONVOLVULUS ARVENSIS L.
- 17 Corolla generally not funnelform and twisted in the bud, but if so either the leaves opposite, the ovary many-seeded, or the seeds hairy; plants rarely vines
- 18 Plants usually glabrous; leaves opposite; corolla either rotate and the segments with prominent basal glands or fringed appendages, or the lobes more or less twisted in the bud; ovary 1-celled, with 2 parietal placentae
GENTIANACEAE 169
- 18 Plants often pubescent; leaves frequently alternate; corolla lobes neither bearing a basal gland nor twisted in the bud; ovary often 2-celled

- 19 Ovary 1-celled; placenta 2, parietal, sometimes intrusive and nearly contacting, but never actually joined, stamens as many as the corolla lobes (usually 5)

HYDROPHYLLACEAE 174

- 19 Ovary 2 (rarely 4) -celled (or ovaries apparently 2); placentation often axile

- 20 Fertile stamens usually 2 or 4, if (as rarely) 5 the flower at least slightly irregular

SCROPHULARIACEAE 180

- 20 Fertile stamens 5, the flowers regular

- 21 Leaves opposite, simple, usually entire; seeds hairy; ovaries apparently 2, the union of the 2 carpels occurring mostly above the ovaries

- 22 Corolla lobed well over half its length, the lobes reflexed; stamens connate around the style and stigma and joined with them

ASCLEPIADACEAE

ASCLEPIAS SPECIOSA Torr.

- 22 Corolla usually lobed less than half the length or else the lobes not reflexed; stamens free or only partially connate, not (or only weakly) joined with the style and stigma

APOCYNACEAE 170

- 21 Leaves mostly alternate (sometimes paired at the nodes but on one side of the stem and thus not truly opposite), usually not entire; seeds never hairy; ovary 1, the 2 or 3 carpels completely fused

SOLANACEAE 180

ISOETACEAE Quillwort Family

Isoetes L. Quillwort

- 1 Megaspores (as seen at 40X) with scattered low tubercles, some of which may be confluent into short, low ridges or wrinkles; megaspores seldom over 0.5 mm wide; plants usually amphibious or in shallow water

I. BOLANDERI Engelm.

- 1 Megaspores (as seen at 40X) more or less densely beset with spines or jagged crests or high ridges; megaspores often more than 0.5 mm wide; plants wholly submerged, often in deep water

I. LACUSTRIS L.

EQUISETACEAE Horsetail Family

Equisetum L. Horsetails and Scouring Rushes

- 1 Aerial stems perennial and evergreen (annual in E. laevigatum), simple, or at least not with regularly whorled branches, never dimorphic; cones spiculate (except often in E. laevigatum); teeth of the sheaths sometimes articulated and deciduous, sometimes persistent; stomates generally sunken below the level of the epidermis; subgenus Hippochaete (Scouring rushes)
- 2 Stems robust, mostly 2-15 dm tall, (14) 16- to 40-ridged; central cavity more than half the diameter of the stem; teeth articulated to the sheath, but not always deciduous
- 3 Aerial stems perennial, evergreen; cones distinctly apiculate; sheaths usually with an inframedial or basal black band as well as an apical one, the teeth deciduous or often more or less persistent

E. HYEMALE L.

- 3 Aerial stems annual; cones blunt or inconspicuously apiculate; sheaths black-banded at the tip only, the teeth promptly deciduous

E. LAEVIGATUM A. Br.

- 2 Stems smaller and more slender, mostly 1-3 (5) dm tall, 3- to 12-ridged; central cavity less than 1/3 the diameter of the stem; teeth of the sheath persistent, not articulated

E. VARIEGATUM Schleich.

- 1 Aerial stems annual often dimorphic, usually at least some of them with regular whorls of branches; cones blunt, not apiculate; teeth of the sheaths persistent, not articulated; stomates not sunken; subgenus Equisetum (Horsetails)

- 4 Fertile and sterile stems alike; ridges of the stem smooth or often minutely cross-wrinkled, but without tubercles or spicules; plants fruiting in summer

E. FLUVIATILE L.

- 4 Fertile and sterile stems unlike, the sterile stems green and branched, the fertile ones at first simple and not green, sometimes later green and branched; ridges of the stem often with tubercles or spicules, or merely papillate or almost smooth, but seldom at all cross-wrinkled; plants fruiting in the spring

E. ARVENSE L.

POLYPODIACEAE Polypody or Common Fern Family

- 1 Rhizome and leaves with hairs only, lacking scales; sori marginal, confluent, protected by the reflexed leaf margin; petiole stout, erect, with several bundles; spores tetrahedral (Hypolepidaceae)

PTERIDIUM AQUILINUM (L.) Kuhn

- 1 Rhizome (and often the leaves) scaly (the scales sometimes narrow, but distinctly flattened), often hairy also; other characters various, but not combined as above

- 2 Petiole with a single bundle, always slender, very often dark and wiry; indusium formed by the reflexed leaf margin, or none; spores tetrahedral (Pteridaceae)

CRYPTOGRAMMA CRISPA (L.) R.Br.

- 2 Petiole with 2 or more bundles (at least toward the base), sometimes slender and dark as in the foregoing group, more often stouter and paler; sori laminar, with or without indusium, the indusium not formed from the reflexed leaf margin; spores bilateral

- 3 Indusium none, the sori naked (Woodsia, with the indusium often wholly concealed and thus easily overlooked, is keyed here as well as in the following group)

- 4 Leaves relatively large, 2-8 dm long, forming a vasselike tuft; persistent petiole-bases closely appressed, coarse, flattened, 3 mm wide or more

ATHYRIUM FELIX-FEMINA (L.) Roth

- 4 Leaves smaller, up to 3.5 dm long, not forming a vasselike tuft; persistent petiole-bases free-standing, more slender and wiry, not more than about 2 mm wide

WOODSIA

- 3 Indusium present, though sometimes inconspicuous or soon deciduous (Aspidiaceae, in main part)
- 5 Indusium elongate, flaplike, sometimes with a curved distal end but not at all reniform, opening toward the midvein   ATHYRIUM FELIX-FEMINA (L.) Roth.
- 5 Indusium otherwise
- 6 Indusium peltate, with a central stalk, opening all around; leaves evergreen, often with pungent teeth
                                         POLYSTICHUM
- 6 Indusium otherwise; leaves variously evergreen or deciduous, but not pungently toothed
- 7 Indusium hoodlike, attached at the basiscopic side of the sorus, its free tip arched over the sorus and commonly thrown back as the sorus expands; leaves scattered or in small clusters, not accompanied by conspicuous, persistent old petiole-bases
                                         CYSTOPTERIS FRAGILIS (L.) Bernh.
- 7 Indusium inferior, platelike, with radiating, commonly hairlike segments, often wholly hidden beneath the sorus; leaves tufted, accompanied by conspicuous, persistent, wiry old petiole-bases
                                         WOODSIA

Polystichum Roth   Sword Fern

- 1 Pinnae undivided (though often oblique at the base and with a projecting basal lobe on the acroscopic side)
                                         P. LONCHITIS (L.) Roth.
- 1 Pinnae, or some of them, conspicuously cleft (more than halfway to the midrib) or again pinnate, at least towards the base   P. SCOPULINUM (D.C.Eat.) Maxon

Woodsia R. Br.

- 1 Blade glabrous or merely glandular
                                         W. OREGANA D.C. Eat.
- 1 Blade glandular and with glandless, septate hairs, at least on the lower side   W. SCOPULINA D.C. Eat.

CUPRESSACEAE Cypress Family

Juniperus L. Juniper

- 1 Leaves in 3's, all linear-lanceolate and more or less needle-like or awl-like, 5-19 mm long, pungent, not glandular on the dorsal surface, jointed at the base of free portion; plants mostly decumbent, ours rarely if ever over 2 m tall J. COMMUNIS L.
- 1 Leaves in 2's or 3's, sacle-like (only the juvenile leaves awl-like, and then only 5-7 mm long), often glandular on the dorsal surface, not jointed at the base of the free portion; plants often erect and over 2 m tall J. SCOPULORUM Sarg.

PINACEAE Pine Family

- 1 Leaves borne in clusters of 2-5 along the main branches, or numerous and in apparent whorls on short lateral spur shoots PINUS
- 1 Leaves borne singly, spirally arranged along the branches
- 2 Young branches smooth where the needles have fallen, the leaves deciduous at the base, the scar itself often in a slight crater; cones either stiffly erect and shed scale by scale; or partly or wholly pendent and with a prominent 3-lobed bract protruding past each ovuliferous scale; needles mostly flat and blunt, retained on the cut branches indefinitely
- 3 Cones erect, shed scale by scale (old whole cones non-existent); leaf scar almost or quite orbicular; dormant terminal buds more or less rounded, not at all sharp; branchlets regularly paired and opposite, on the whole the branching very uniform, only an occasional branch unpaired ABIES LASIOCARPA (Hook.) Nutt.
- 3 Cones in part or entirety pendent, shed whole (old cones usually lying under the tree); leaf scar transversely elliptic-oval; dormant terminal buds sharp-pointed; branchlets in part alternate or imperfectly paired as well as opposite, on the whole the branching somewhat irregular PSEUDOTSUGA MENZIESII (Mirb.) Franco.

- 2 Young branches rough where the needles have been shed, the leaves deciduous above the base which persists as a small protuberance; cones not stiffly erect, shed entire but without a prominent bract extending past each scale; needles often square in section and often pungent, deciduous in a few days from the cut branches

PICEA

Picea A. Dietr.

- 1 Young branches usually pubescent; needles nearly or quite as thick as broad, 4-angled, the white stripes of stomata nearly equally broad on the upper and lower surfaces; cones 4-5 (rarely to 6) cm long, the scales somewhat pointed and more or less rhomboid in shape
- P. ENGELMANNII Parry
- 1 Young branches glabrous; the scales rounded or truncate at the tip
- P. GLAUCA (Moench) Voss

Pinus L. Pine

- 1 Needles 2 per fascicle; tip (umbo) of the ovuliferous cone scales ending in a sharp, hard prickle
- P. CONTORTA Dougl.
- 1 Needles 5 per fascicle; tip (umbo) of the ovuliferous cone scales unarmed
- 2 Cones sessile or subsessile (any stalk not over 1 cm long), (2) 3-25 cm long, the scales thick, woody, sometimes remaining closed; leaves 3-7 cm long; plants alpine or subalpine; seeds much longer than the wing which often adheres to the scale
- 3 Cones mostly (5) 8-25 cm long, light brown, opening at maturity and shedding the seeds, then falling intact; scales gradually becoming thinnish toward the tip
- P. FLEXILIS James
- 3 Cones mostly 5-8 cm long, purple, remaining closed and tardily shedding the seeds at maturity, seldom falling intact from the tree, but usually broken; scales becoming thickened rather than thinnish toward the tip
- P. ALBICAULIS Engelm.
- 2 Cones stalked (the stalk 1-7 cm long), (10) 15-25 cm long, the scales thin, always opening to shed the seeds; leaves 5-10 cm long; seeds much shorter than the wings which remain attached to the seed
- P. MONTICOLA Dougl.

JUNCAGINACEAE Arrow-grass Family

Triglochin L. Arrow-grass

- 1 Carpels and stigmas 3; fruit linear-clavate, the axis 3-winged, the carpels subulate at the base

T. PALUSTRE L.

- 1 Carpels and stigmas usually 6; fruit oblong or ovoid-prismatic, the axis terete, the carpels not subulate at the base

- 2 Ligules entire or only slightly bilobed, (1) 1.5-5 mm long; blades somewhat obcompressed, mostly 1.5-2.5 (4) mm broad; plants usually at least 3 dm tall

T. MARITIMUM L.

- 2 Ligules deeply bilobed 0.5-1 mm long; blades almost terete, 0.5-1 (1.5) mm broad; plants often less than 3 dm tall

T. CONCINNUM Davy

POTAMOGETONACEAE Pondweed Family

Potamogeton L. Pondweed

- 1 Submersed leaves with stipules adnate to the base of the leaf and forming a sheath around the stem, the leaf blades thus not attached directly at the nodes

- 2 Submersed blades 3-8 mm broad, minutely serrulate-spinulose toward the tip, closely crowded on the stem, very finely 20- to 35-nerved

P. ROBBINSII Oaks

- 2 Submersed blades all less than 3 mm broad, entire, usually not crowded on the stem, mostly 1- or 3-nerved

- 3 Stigma sessile, the fruit not beaked; sheaths at least partially closed unless mechanically ruptured, remaining around the subtended stem; stems branching below but largely unbranched above

P. FILIFORMIS Pers.

- 3 Stigma borne on a very short style which persists as a tiny beak on the fruit; sheaths open at the base; stems usually dichotomously branching to near the tips

P. PECTINATUS L.

- 1 Submersed leaves with stipules free of the rest of the leaf, the leaf blades or petioles attached at the nodes of the stem

- 4 Leaves all more or less cordate and clasping at the base, submersed, rarely less than 10 (to 30) mm broad
- 5 Stems often zigzag; stipules usually persistent, mostly at least 3 cm long, whitish; leaves generally no less than 10 cm long, often more than 2 cm broad; peduncles 1-3 dm long; achenes 4-5 mm long
P. PRAELONGUS Wulf.
- 5 Stems rarely at all zigzag; stipules quickly disintegrating into fibers 1-2 cm long; leaves rarely as much as 10 cm long or 2 cm broad; peduncles mostly less than 2 dm long; achenes rarely over 3.5 mm long
P. RICHARDSONII (Bennett) Rydb.
- 4 Leaves not cordate and clasping at the base, often dimorphic, the submersed ones often less than 10 mm broad
- 6 Leaves less than 3 mm broad, all submersed, linear
- 7 Stipules firm, strongly fibrous, the fibers free at the stipule tips as prominent cilia 2-3 mm long, persistent as the rest of the stipule rather quickly disintegrates
P. FIBRILLOSUS Fern.
- 7 Stipules delicate, not notably fibrous, tending to be completely deciduous rather than persistent as fibers
P. FOLIOSUS Raf.
- 6 Leaves in part more than 4 mm broad, often dimorphic, the broader ones generally floating
- 8 Submersed leaves very narrowly linear, mostly less than 2 mm broad and over 10 cm long; floating leaves (if any) rounded to cordate at base
P. NATANS L.
- 8 Submersed leaves either more than 3 mm broad or less than 10 cm long; floating leaves mostly acute at base
- 9 Stipules less than 3 (in P. alpinus sometimes more than 3) cm long; submersed leaves sessile
- 10 Floating leaves (if any) not markedly different from the submersed, the latter (5) 7-20 cm long; plant in general reddish-tinged
P. ALPINUS Balbis
- 10 Floating leaves markedly dissimilar to the submersed, the latter often less than 7 cm long; plant greenish
P. GRAMINEUS L.
- 9 Stipules in part at least 3 cm long; submersed leaves often petiolate
P. NODOSUS Poir.

JUNCACEAE Rush Family

- 1 Seeds 3; leaves with closed sheaths, the blades often with long straight marginal hairs

LUZULA

- 1 Seeds numerous; leaves with mostly open sheaths, the blades rarely at all hairy JUNCUS

Juncus L. Rush

- 1 Inflorescence apparently lateral, the lowest (involucral) bract thereof terete, erect, and seemingly a continuation of the stem
- 2 Flowers usually 1-4 (6-7) per stem; plants alpine (or subalpine); involucral bract rarely as much as 5 cm long
- 3 Uppermost of the basal sheaths of the stem with a well-developed blade mostly 2-7 cm long; capsule sometimes acute
- 4 Capsule retuse; perianth segments acute, 4-5 mm long
J. HALLII Engelm.
- 4 Capsule acute; perianth segments acuminate, 6-7 mm long
J. PARRYI Engelm.
- 3 Uppermost of the basal sheaths bladeless or with a blade scarcely 1 (never as much as 2) cm long; capsule retuse
J. DRUMMONDII E. Meyer
- 2 Flowers seldom fewer than 8 per stem; plants often not alpine or subalpine; involucral bract usually more than 5 cm long
J. BALTICUS Wild.
- 1 Inflorescence terminal, the involucral bract often flattened or conspicuously channeled on the upper (adaxial) side, obviously not a continuation of the stem
- 5 Blades laterally flattened, equitant (one margin turned toward the stem), incompletely septate (the septa not extending all the way across the blade), mostly (2) 3-6 mm broad
- 6 Seeds 0.8-1 mm long, with a distinct appendage at each end; style mostly about 1 mm long, well exerted from the perianth (very easily fractured); stamens 6
J. TRACYI Rydb.
- 6 Seeds scarcely 0.5 mm long, merely apiculate (not appendaged) at each end; style rarely as much as 1 mm long; stamens 3 or 6 J. ENSIFOLIUS Wikst.

- 5 Blades not laterally flattened and equitant, either dorsiventrally flattened or terete, mostly less than 3 mm broad
- 7 Leaves septate, terete
- 8 Capsule tapered almost from the base to a long, slender, tardily dehiscent or nondehiscent beak that exceeds the perianth; perianth greenish-brown or tawny, segments narrowly lanceolate, acuminate-subulate; stems often arising from slender rhizomes at conspicuously swollen, more or less fusiform nodes
- 9 Stamens mostly 3; heads (2-3) 5-30 (50); capsule usually dehiscent to the tip; rhizomes lacking or very short J. TWEEDYI Rydb.
- 9 Stamens 6; heads mostly 1-15; capsule rarely dehiscent through the styler beak; rhizomes often tuberosous J. TORREYI Cov.
- 8 Capsule rather abruptly narrowed above, dehiscent through the styler beak, if any; perianth often deep brownish or brownish-purple, the segments mostly acute to acuminate, but rarely somewhat subulate; rhizomes, if any, never tuberous
- 10 Stamens 3, the anthers much shorter than the filaments; perianth segments acuminate and often subulate, greenish to brown (but never deep brownish-purple); heads 3 to many J. TWEEDYI Rydb.
- 10 Stamens usually 6, the anthers often equalling or longer than the filaments; perianth segments often blunt, or deep brownish-purple; heads sometimes only 1 or 2
- 11 Heads one, or at most (and very rarely) two, more than 12-flowered; perianth deep brown; anthers rarely more than 2/3 as long as the filaments; capsule slightly obovoid, the valves broadened above midlength and then abruptly rounded to almost truncate, the tip often slightly retuse; plants mainly montane to alpine J. MERTENSIANUS Bong.
- 11 Heads (2) 3-many, mostly with less than 12 flowers; perianth sometimes light brown; anthers more than 2/3 as long as the filaments (usually at least as long); capsule usually cylindric or at least not thickened above midlength, the valves

nearly oblong, gradually rounded to acute at the tip;
plants often of the lowlands

J. NEVADENSIS Wats.

- 7 Leaves not septate, either more or less dorsiventrally flattened or semi-terete but with a flat or grooved surface facing the stem
- 12 Seeds appendaged at each end, about 1 mm long or longer
  - 13 Capsule retuse; anthers scarcely 1 mm long
J. HALLII Engelm.
  - 13 Capsule rounded to acute; anthers usually at least 1 mm long
J. REGELII Buch.
- 12 Seeds unappendaged (sometimes because of immaturity) or with only short appendages and less than 1 mm long
- 14 Flowers in heads; perianth segments usually minutely roughened dorsally J. LONGISTYLIS Torr.
- 14 Flowers born singly in panicles or umbels, but not in heads; perianth segments not roughened dorsally
- 15 Flowers 1-10, very short pedicellate; capsule retuse, longer than the perianth
J. HALLII Engelm.
- 15 Flowers often more than 10, or long-pedicellate; capsule not retuse, often shorter than the perianth
J. TENUIS Willd.

Luzula DC. Woodrush

- 1 Flowers borne singly (sometimes in 2's) at the end of the branches of an open panicle
- 2 Stem leaves mostly 2-3 generally 2-3 mm broad; bracts and bracteoles inflorescence finely lacerate-fimbriate; perianth deep purplish-brown; anthers generally about equalling the filaments; plants strongly caespitose but short-rhizomatous; alpine
L. PIPERI (Cov.) Jones
- 2 Stem leaves 2-4 mostly 3-10 mm broad; bracts and bracteoles mostly erose or only shallowly lacerate and not fimbriate; perianth greenish to purplish-brown; anthers generally shorter than the filaments; plants not rhizomatous
L. PARVIFLORA (Ehrh.) Desv.
- 1 Flowers borne in one or more semicapitate spikes or in a spikelike panicle

- 3 Inflorescence rather stiffly erect, never drooping, the involucrel bract conspicuous, often longer than the inflorescence; seeds 1.4-1.75 mm long, with a whitish, basal, spongy, cellular caruncle up to half as long as the body; anthers from slightly shorter to several times longer than the filaments; plants often of the lowlands
L. CAMPESTRIS (L.) DC.
- 3 Inflorescence tending to droop, much exceeding the involucrel bract; seeds less than 1.4 mm long, the caruncle, if any, much less than half as long as the body; anthers much shorter than the filaments; plants subalpine to alpine
L. SPICATA (L.) DC.

CYPERACEAE Sedge Family

- 1 Achene enclosed or enwrapped in a perigynium, as well as subtended by a scale CAREX
- 1 Achene not enclosed or enwrapped in a perigynium
  - 2 Style thickened toward the base, the thickened part persistent on the achene as a tubercle which is usually sharply differentiated from the body of the achene
ELEOCHARIS
  - 2 Style not thickened, although the achene may have a stylar apiculus
    - 3 Perianth bristles numerous (more than 10), conspicuous and much elongate
ERIOPHORUM
    - 3 Perianth bristles 0-6, in most spp. not exceeding the scales (3 spp. of Eleocharis, with the basal stylar thickening not sharply set off from the body of the achene, might also be sought here)
SCIRPUS

KEY TO THE CARICES

Condensed From Hermann (1970)

KEY TO SECTIONS

- 1 Spikes solitary
- 2 Spikes androgynous   FIRMICULMES
C. GEYERI Boott
- 2 Spikes entirely or very nearly staminate or pistillate
ATRATAE
- 1 Spikes more than 1
- 3 Stigmas mostly 2; achenes lenticular
- 4 Lateral spikes short, sessile; terminal spike andro-
gynous or gynaecandrous
- 5 Perigynia not whitish-punctulate (under a lens)
- 6 Culms arising singly or a few together from
creeping rhizomes
DIVISAE
- 6 Culms cespitose or the rhizomes short-prolonged
and with short internodes but not long-creeping
- 7 Spikes androgynous
- 8 Perigynia abruptly contracted into a beak
- 9 Spikes few (generally 10 or less, often
greenish); sheaths not red dotted ventrally
BRACTEOSAE
- 9 Spikes numerous, usually brownish or
yellowish; leaf sheaths often red dotted at
the mouth ventrally
PANICULATAE
C. DIANDRA Schrank
- 8 Perigynia tapering to a beak
VULPINAE
C. NEUROPHORA Mack.
- 7 Spike gynaecandrous
- 10 Perigynia without winged margins, at most
thin-edged   STELLULATAE
- 10 Perigynia with winged margins
OVALES
- 5 Perigynia whitish-punctulate (under a lens) not
winged margined   HELEONASTES
- 4 Lateral spikes peduncled or, if sessile, elongated;
terminal spike staminate, rarely gynaecandrous or
androgynous

- 11 Achenes-jointed with the style; perigynia not lustrous
  - 12 Lowest bract long-sheathing; perigynia whitish-pulverulent or golden-yellow at maturity
BICOLORES
  - 12 Lowest bract usually sheathless, occasionally short sheathing; perigynia not pulverulent nor golden-yellow at maturity ACUTAE
- 11 Achenes continuous with the style; perigynia lustrous
VESICARIAE
- 3 Stigmas mostly 3; achenes trigonous
  - 13 Perigynia pubescent, puberulent, or ciliate-scabrous
    - 14 Bracts reduced to bladeless sheaths
DIGITATAE
C. CONCIANA R. Br.
    - 14 Bracts sheathing or sheathless, the blades well developed
      - 15 Perigynia closely enveloping the achene, strongly tapering at the base; bracts sheathless or nearly so
MONTANAE
      - 15 Perigynia not as above or if so the lowest bract strongly sheathing
        - 16 Bracts sheathless or very short-sheathing
HIRTAE
C. LANUGINOSA Michx.
        - 16 Bracts, at least the lower ones, long-sheathing
FERRUGINAEAE
C. LUZULINA Olney
- 13 Perigynia glabrous
  - 17 Style jointed with the achene, not indurated, at length withering and deciduous
    - 18 Lower bracts long-sheathing
EXTENSAE
C. VIRIDULA Michx.
    - 18 Lower bracts sheathless or nearly so
ATRATAE
  - 17 Style continuous with the achene, indurated, not withering
VESICARIAE

Divisae

- 1 Plants dioecious or nearly so; perigynium-beak nearly as long as the body C. DOUGLASII Boott
- 1 Plants not dioecious, the spikes mostly androgynous; perigynium-beak shorter C. PRAEGRACILIS W. Boott

Bracteosae

- 1 Beak of perigynium only minutely bidentulate, obliquely cleft dorsally, leaf-blades 1-3 mm wide
C. VALLICOLA Dewey
- 1 Beak of perigynium bidentate; leaf blades 1.5-3.5 mm wide
C. HOODII Boott

Heleonastes

- 1 Spikes androgynous; perigynia unequally biconvex
C. DISPERMA Dewey
- 1 Spikes (at least the uppermost) gynaeandrous, at least the lower remote; perigynia plano-convex, apiculate to very short-beaked (.25 mm or less); scales hyaline with green center
C. CANESCENS L.

Stellulatae

- 1 Perigynium-beak 1/4 to 1/3 the length of the body, shallowly bidentate, its broad teeth very short
C. INTERIOR L. H. Bailey
- 1 Perigynium-beak more than 1/2 to about equal to the length of the body, deeply bidentate
C. ANGUSTIOR Mack.

Ovales

- 1 Bracts not leaflike nor conspicuously exceeding the head (except rarely in C. brevior), usually inconspicuous
- 2 Beak of perigynium slender and terete, sometimes scarcely margined at the tip, the upper 0.25-2 mm of its length little if at all serrulate
- 3 Perigynia 2.5-6 mm long if longer the scales very dark-colored or spikes in a flexuous or moniliform inflorescence

- 4 Scales shorter and narrower than the perigynia, the perigynia conspicuous in the spikes
- 5 Perigynia much flattened, thin and scale-like except where distended by the achene
- 6 Perigynia lightly few-nerved (heavily nerved in a variety of C. microptera) at least at the base ventrally
- 7 Head oblong-ovoid, the spikes distinguishable; perigynia appressed, the tips inconspicuous, widely margined, ovate, rather abruptly narrowed into the beak; scales dark chestnut to blackish-brown; anthers 1.8-3 mm long C. FESTIVELLA Mack.
- 7 Head ovoid to suborbicular, truncate at the base, the spikes congested, often scarcely distinguishable; perigynia spreading-ascending, the tips conspicuous in the head, narrowly margined, lanceolate-ovate, usually gradually tapering into the long, slender beak; scales dull brown; anthers 1.3-1.6 mm long C. MICROPTERA Mack.
- 6 Perigynia nerveless ventrally C. LIMNOPHILA Hermann
- 5 Perigynia plano-convex, not very thin and scale-like
- 8 Perigynia conspicuously nerved ventrally C. STENOPTILA Hermann
- 8 Perigynia nerveless ventrally or very obscurely nerved toward the base C. ILLOTA L. H. Bailey
- 4 Scales about the same length as the perigynia, concealing them above or nearly so
- 9 Culms and head stiff, the culms low, usually 1-3 cm high
- 10 Perigynia oblong-ovate, conspicuously margined, 4-6 mm long; spikes usually 3 or 4; culms more or less roughened above C. PHAEOCEPHALA Piper
- 10 Perigynia linear-ob lanceolate, boat-shaped, very narrowly margined, 3.5-4 mm long; spikes usually 6-8; culms smooth C. LEPARINELLA Mack.
- 9 Culms slender, taller, usually 2-8 cm high, the head not stiff
- 11 Culms in small clumps, not leafy, the leaves mostly clustered near the base, their blades ascending; spikes in a flexuous or moniliform inflorescence, usually not overlapping; perigynia 4.5-6.5 mm long, semi-translucent, glossy C. PRATICOLA Rydb.

- 11 Culms in large clumps, leafy, the leaves covering the lower third of the culms, their blades spreading; spikes, except sometimes the lowest, closely approximate; perigynia 4-4.25 mm long, opaque, dull
C. PLATYLEPIS Mack.
- 3 Perigynia 6-8 mm long, the scales light reddish-brown; spikes more or less aggregated into an erect head
C. PETASATA Dewey
- 2 Beak of perigynium flat and margined at the tip, serrulate to the apex
- 12 Scales shorter than the perigynia, noticeably narrower above and largely exposing them
C. BREVIOR (Dewey) Mack.
- 12 Scales almost equalling the perigynia, nearly the same width above and nearly concealing them above
C. XERANTHIA L.H. Bailey
- 1 Bracts either leaf-like or conspicuously exceeding the head
C. ATHROSTACHYA Olney

Montanae

- 1 Fertile culms all alike, elongated, 5-40 cm long, bearing both staminate and pistillate spikes; basal spikes absent
C. HELIOPHILA Mack.
- 1 Fertile culms of two types some short, 1-5 cm long, partly hidden among the densely tufted leaf-bases and bearing both staminate and pistillate spikes
- 2 Perigynia 2.5-3.5 mm long, plump, the beak 0.25-0.75 mm long, shallowly bidentate
C. BREVIPES W. Boott
- 2 Perigynia 3.5-4.5 mm long, more slender, the beak more than 1 mm long, deeply bidentate
C. ROSSII Boott

Bicolores

- 1 Mature perigynia whitish-pulverulent, elliptic-obovoid, not fleshy nor translucent, rather obscurely ribbed; scales appressed
C. HASSEI Bailey

- 1 Mature perigynia golden-yellow to orange when fully mature or brownish, orbicular obovoid, fleshy, translucent, coarsely ribbed; pistillate scales widely spreading at maturity C. AUREA Nutt

Atratae

- 1 Terminal spike not gynaeandrous, in some pistillate or staminate C. HALLII Olney
- 1 Terminal spike gynaeandrous or staminate
- 2 Terminal spike staminate
- 3 Perigynia strongly flattened
- 4 Leaves of fertile culms widely separate, only the upper 2-4 blade-bearing, the lower sheaths bladeless; culms aphyllipodic and reddish-tinged at the base; leaves of the previous year not persistent or much desiccated at flowering time C. SPECTABILIS Dewey
- 4 Leaves many on the lower third of the culms; culms clothed at the base with dried leaves of the previous year, not reddish-tinged at the base C. PAYSONIS Clokey
- 3 Perigynia plump, nearly round or triangular in cross-section, slightly or not at all flattened C. RAYNOLDSII Dewey
- 2 Terminal spike gynaeandrous, the terminal flowers pistillate
- 5 Perigynia densely papillose, glaucous-green, trigonous-bi-convex, pistillate scales usually aristate (rarely only cuspidate), their tips exceeding the perigynia C. BUXBAUMII Wahl.
- 5 Perigynia otherwise; pistillate scales not aristate
- 6 Perigynia not granular roughened (under a lens), the margins smooth C. HETERONEURA W. Boott
- 6 Perigynia granular roughened (under a lens) especially on the upper margins, or else the margins ciliate-scabrous below the beak
- 7 Spikes contiguous, sessile or short peduncled, forming a dense head; culms stiff, erect C. ALBONIGRA Mack.
- 7 Spikes, at least the lowest, strongly peduncled, often distant

- 8 Upper pistillate scales exceeding the perigynia (usually conspicuously so), copper-brown; lowest peduncle less than half the length of the spike; apex of perigynium-body acute C. HETERONEURA Var.
CHALCIOLEPSIS (Holm) Herm.
- 8 Upper pistillate scales usually exceeded by the perigynia, dark-red to blackish-brown, fading with age; lowest peduncle 1-2 times the length of the spike; apex of perigynium body obtuse C. HETERONEURA Var.
BREVISQUAMA Herm.

Acutae

- 1 Perigynia conspicuously veined or ribbed ventrally
- 2 Perigynia early deciduous, membranaceous, slenderly-nerved, the beak apiculate, entire; lowest bract exceeding the culm C. KELLOGGII Boott
- 2 Perigynia persistent, coriaceous, strongly ribbed, the beak broad, bidentate; lowest bract equalling the inflorescence C. NEBRASKENSIS Dewey
- 1 Perigynia nerveless ventrally, or with obscure, impressed nerves
- 3 Perigynia elliptic, broadest below the apex, less than 3 mm long, 1-1.75 mm wide; culms obtusely angled, smooth; usually 1-4 cm long
- 4 Plants ashy-green; culms 50-100 cm high; leaves rather strongly scabrous; spikes narrowly cylindric; scales obtuse, much narrower and shorter than the perigynia 2.4-2.8 mm long, yellowish-green or straw colored
C. AQUATILIS Wahl.
- 4 Plants light or yellowish-green; culms 10-60 cm high; leaves rather smooth, conduplicate, or a spongy consistency; spikes clavate; scales subacute, as wide and as long as the perigynia or longer; perigynia 2-2.3 mm long, brownish
C. AQUALILIS Var. STANS
(Drej.) Boott
- 3 Perigynia obovate, broadest at the apex, 3 mm or rarely 2.5 mm long, 1.75-2.5 mm wide; culms acutely angled and often scabrous above; spikes 3-10 cm long
C. AQUALILIS Var. ALTIOR
(Rydb.) Fern.

Vesicariae

- 1 Leaves not conspicuously septate nodulose, 1-7 mm wide; culms ascending, rarely spongy-based, sharply triangular and rough below the spikes; perigynia appressed or ascending; teeth of perigynia long or the perigynia gradually long-beaked; lower sheaths fragile, becoming strongly filamentose; ligule much longer than wide; rhizomes without horizontal stolons

C. VESICARIA L.

- 1 Dry leaves conspicuously septate-nodulose, 2-15 mm wide, culms erect, mostly thick and spongy at the base, bluntly triangular below the spikes, smooth; perigynia ascending to squarrose at maturity; teeth of perigynia short or the perigynia abruptly short beaked; lower sheaths not fragile, not becoming filamentose; ligule slightly if at all longer than wide; rhizomes with long, horizontal stolons

C. ROSTRATA Stokes

Eleocharis R. Br. Spike Rush

- 1 Stigmas 3; achenes more or less distinctly trigonous; flowers mostly 2-30 in each spikelet
- 2 Tubercle confluent with the achene, not forming a distinct apical cap
  - 3 Lowest scale, like the others, subtending a flower; stems slender and short, (0.5) 1-3 (4) dm tall, seldom as much as 1 mm wide, not flattened, not proliferous; spikelets 4-8 mm long, with mostly 3-9 flowers
- 3 Lowest scale empty; stems coarser, mostly (2) 4-10 dm tall or more, more or less flattened at least distally commonly 1-2 mm wide, some of them usually proliferous; spikelets (5) 8-13 mm long, with (5) 10-20 (25) flowers
- 2 Tubercle forming a distinct apical cap well differentiated from the body of the achene

E. PAUCIFLORA (Lightf.) Link.

E. ROSTELLATA (Torr.) Torr.

E. ACICULARIS (L.) R. & S.

E. PALUSTRIS (L.) R. & S.

- 4 Achenes mostly 0.5-1.5 mm long; anthers mostly 0.25-1.0 mm long; scales mostly 1.0-2.5 mm long
E. FLAVESCENS (Poir.) Urban

Eriophorum L. Cotton Grass

- 1 Spikelets 2 or more
2 Midrib of the scale attenuated distally, not reaching the very thin end of the scale; common species
E. POLYSTACHION L.
2 Midrib of the scale expanded (or at least not attenuated) distally, reaching the end of the scale; uncommon spp
E. VIRIDICARINATUM
(Engelm.) Fern.
1 Spikelet solitary E. CHAMISSONIS C.A.Meyer

Scirpus L. Bulrush

- 1 Well-developed involucre bract solitary, green, leafy or more often erect and resembling a prolongation of the culm, so that the inflorescence appears to be lateral near the tip of the stem rather than truly terminal; smaller involucre bracts sometimes present, but scalelike and not chlorophyllous
2 Spikelets solitary or few (up to 10 or seldom 15), sessile in a sessile cluster
3 Bract solitary; culms very sharply triquetrous, with notably concave sides; achenes 1.5-2.5 mm long and 1.4-1.7 mm wide
S. OLNEYI Gray
3 Bracts 2 or 3, the second and third ones resembling enlarged scales of the spikelet, but not subtending flowers; culms not very sharply triquetrous, the sides plane to slightly concave or slightly convex; achenes 2.2-3.3 mm long and 1.6-2.3 mm wide
S. AMERICANUS Pers.
2 Spikelets more or less numerous in a branching inflorescence, often sessile in clusters at the ends of branches; culms terete S. ACUTUS Muhl.
1 Well-developed involucre bracts 2 or more, very unequal, but green, leafy-textured, and more or less spreading, the inflorescence thus evidently terminal
S. MICROCARPUS Presl.

GRAMINEAE

KEY TO THE GENERA

- 1 Spikelets shed as a unit, the glumes not persistent on the plant (rarely lacking), the point of disarticulation usually just below the glumes, but not rarely along the rachis or the branches thereof

GROUP I

- 1 Spikelets disarticulating above the glumes, the empty glumes persistent on the plant
- 2 Ligules mainly a fringe of hairs, sometimes with a membranous base but the terminal fringe at least as long as the membranous portion

GROUP II

- 2 Ligules mainly or entirely membranous, often ciliate, erose, or lacerate, but any fringe shorter than the membranous portion
- 3 Sheaths closed at the base for at least one-fourth their length or leaf tips hooded or prow-like (rather than flat)
- 4 Leaves folded in the bud, the tips usually prow-like; lemmas unawned

POA

- 4 Leaves rolled in the bud, the tips not prow-like (but flat and pointed); lemmas sometimes awned
- 5 Lemmas unawned, prominently nerved, the nerves not converging at the tip of the lemma

GLYCERIA

- 5 Lemmas either awned or obscurely convergent-nerved (or both)
- 6 Culms bulbous-based

MELICA

- 6 Culms not bulbous-based
- 7 Upper two to four florets sterile and represented by empty lemmas that enfold one another; auricles lacking; sheaths often closed their full length; plants perennial

MELICA

- 7 Upper one or two florets sometimes sterile but the lemmas not enfolding one another, a palea present in each; auricles sometimes present; sheaths never closed their full length; plants sometimes annual

- Lemmas keeled on the back, never bifid at the tip, often with a cobwebby callus, never awned

POA

- 8 Lemmas rounded on the back, often bifid at the tip, not cobwebby on the callus, often awned

BROMUS

- 3 Sheaths closed for less than one-fourth their length (usually open the full length); leaf tips flat (rather than hooded or prow-like)

- 9 Spikelets sessile or subsessile in spikes, either turned to one side of the rachis or in two rows on opposite sides of it; spikes either single and terminal (if so the leaves often with auricles), or more than one and racemose or digitately arranged

GROUP III

- 9 Spikelets pedicellate (although often very shortly so) in open to contracted panicles, the panicles (when contracted and pseudospicate) obviously bearing the spikelets all the way around the main axis

10 Spikelets 1-flowered GROUP IV

10 Spikelets 2- to many-flowered

- 11 Spikelets 2- or 3-flowered, the uppermost flower perfect and with both a lemma and a palea, the lower flowers either staminate or sterile, sometimes reduced to small, more or less bristle-like remnants (one of which might readily be mistaken for a prolonged rachilla)

12 Spikelets 3-flowered

- 13 Lower two florets staminate, the lemmas sometimes awned; fertile lemma membranous; auricles lacking

HIEROCHLOE ODORATA (L.) Beauv.

- 13 Lower two florets sterile, the lemmas reduced to tiny awnless vestiges; fertile lemma more or less coriaceous; auricles usually present

PHALARIS ARUNDINACEA L.

12 Spikelets 2-flowered

PHALARIS ARUNDINACEA L.

- 11 Spikelets 1- to many-flowered, the reduced flowers (if any) either above, or both above and below the perfect ones

- 14 Culms solid; plants strongly rhizomatous perennials; sheaths with long stiff hairs near the throat, the collar usually pilose DISTICHLIS STRICTA (Torr.) Rydb.
- 14 Culms usually hollow, if (as rarely) solid then the sheaths and throat without long stiff hairs; plants often not rhizomatous
- 15 Glumes (one or both) longer than the first lemma; lemmas usually awned, the awn arising from the back of the lemma or sometimes from the sinus of a bifid apex, but never from a pointed tip
GROUP V
- 15 Glumes (both) shorter than the first lemma; lemmas usually awnless but sometimes awned from the pointed tip or from near the tip
GROUP VI

GROUP I

- 1 Ligules mainly a fringe of hairs, any basal membranous portion shorter than the fringe
- 2 Spikelets sessile in one to several racemosely or paniculately arranged spikes, borne in two rows on one side of the rachis
- 3 Culms solid; spikelets articulate above the glumes, the spikes individually deciduous
BOUPELOUA GRACILIS (H.B.K.)
Lag. ex Steud.
- 3 Culms hollow; spikelets articulate below the glumes, the spikes not individually deciduous
SPARTINA GRACILIS Trin.
- 2 Spikelets pedicellate in open to contracted panicles, if subsessile the apparent spike single and terminal, the spikelets arising all the way around the rachis
- 4 Spikelets subsessile in an erect panicle, subtended and usually exceeded by numerous sterile, bristle-like branches SETARIA VIRIDIS (L.) Beauv.
- 4 Spikelets pedicellate in open panicles, not subtended by bristles PANICUM
- 1 Ligules mainly membranous, any terminal fringe shorter than the basal membranous portion
- 5 Spikelets sessile or subsessile in a single terminal spike, borne alternately on opposite sides of the rachis
- 6 Spikelets on the average two or three per node

- 7 Spikelets all alike, usually two per node
SITANION HYSTRIX (Nutt.)
J. G. Smith
- 7 Spikelets dissimilar, usually 3 per node, the central
one sessile and fertile, the lateral pedicellate and
usually sterile HORDEUM
- 6 Spikelets mostly only one per node
AGROPYRON
- 5 Spikelets pedicellate in open to greatly congested panicles
or sessile and spicate, but only on one side of the rachis,
the spikes more than one
- 8 Culms solid; plants perennial; spikelets either all
sessile or in pairs, one of each pair sessile
BOUTELOUA GRACILIS
(H.B.K.) Lag.
- 8 Culms hollow; plants often annual; spikelets often all
pedicellate
- 9 Spikelets pedicellate in open to contracted panicles,
not confined to one side of the rachis
- 10 Spikelets 1-flowered; sterile lemmas absent
- 11 Glumes awned; panicle contracted, more or
less spikelike POLYPOGON MONSPELIENSIS
(L.) Desf.
- 11 Glumes unawned; panicle sometimes open
ALOPECURUS
- 10 Spikelets 3-flowered, the terminal flower perfect,
the lower 2 reduced to bristle-like, sterile,
vestigial lemmas PHALARIS ARUNDINACEA L.
- 9 Spikelets sessile or subsessile in spikelike racemes
or spikes, confined to one side of the rachis
BECKMANNIA SYZIGUCHNE
(Steud.) Fern.

GROUP II

- 1 Spikelets 1-flowered; sterile lemmas lacking
SPOROBOLUS CRYPTANDRUS
(Torr.) Gray
- 1 Spikelets more than 1-flowered, generally with at least
two perfect flowers

- 2 Spikelets 3-flowered, the two lower flowers staminate, the uppermost perfect   *HIEROCHLOE ODORATA* (L.) Beauv.
- 2 Spikelets 2- to many-flowered, the flowers generally either all perfect or the uppermost staminate or sterile, but rarely the lowest lemma sterile and glume-like
- 3 Spikelets in racemose or digitately arranged spikes, sessile in two rows confined to one side of the rachis
                                          BOUTELOUA GRACILIS
                                          (H.B.K.) Lag.
- 3 Spikelets more or less paniculate
                                          DANTHONIA

GROUP III

- 1 Spikes single and terminal, the spikelets not confined to one side of the rachis; auricles often present
- 2 First glume lacking, the second sometimes very small; spikelets either turned with their edges toward the rachis (rather than flatwise) or confined to one side of the rachis and partially sunken in it
                                          LOLIUM PERENNE L.
- 2 First glume (as well as the second) usually present; spikelets borne alternately on opposite sides of the rachis and flatwise to it
- 3 Spikelets averaging two and three per node
  - 4 Fertile flowers mostly at least two per spikelet; spikelets usually two per node, all alike
  - 5 Spikelets two at almost all nodes; glumes 1- to 5-nerved, narrow, entire to cleft; spikelets 2- to 6-flowered   *ELYMUS*
  - 5 Spikelets one at many nodes; glumes 3- to 9-nerved, usually more or less lanceolate; spikelets 3- to 12-flowered
                                          AGROPYRON
  - 4 Fertile flowers mostly only one per spikelet; spikelets usually 3 per node, the middle one sessile and perfect-flowered, the lateral pair pedicellate and usually sterile
                                          HORDEUM
- 3 Spikelets averaging one per node
  - 6 Lemmas slightly toothed as well as usually awned, the nerves prominent, nonconvergent; plants annual
                                          TRITICUM

- 6 Lemmas not toothed, awnless or awned, the nerves usually rather obscure, converging toward the tip; plants mostly perennial AGROPYRON
- 1 Spikes usually more than one, the spikelets usually confined to one side of the rachis; auricles lacking
 SCHEDONNARDUS PANICULATUS
 (Nutt.) Trel.

GROUP IV

- 1 Glumes equal, longer than the lemma, strongly compressed-keeled, truncately narrowed at the tip and with the midnerve more or less extended into an abrupt point; lemma awnless; spikelets in a cylindric, spikelike panicle; culms sometimes bulbous at base PHLEUM
- 1 Glumes unequal, or shorter than the lemma, or not strongly compressed-keeled, mostly gradually tapered; lemma sometimes awned; spikelets often in open panicles; culms never bulbous at base
- 2 Lemma hardened, much firmer than the glumes, usually terete to obcompressed, awned; callus sometimes hard and sharp
- 3 Awn deciduous, bent but mostly not twisted; lemma plump, rarely more than 5 times as long as thick; callus rarely at all sharp
 ORYZOPSIS
- 3 Awn persistent, usually twisted as well as bent; lemma mostly at least 6 times as long as thick; callus often hard and sharp STIPA
- 2 Lemma membranous, usually no firmer than the glumes, more or less compressed, often unawned; callus not hard and sharp
- 4 Callus with bearding one-fourth as long to as long as the lemma; awned from midlength or below; rachilla prolonged behind the palea as a bristle mostly (0.5) 1-2 mm long; palea well developed, usually subequal to the lemma; glumes 3.5-12 mm
 CALAMAGROSTIS
- 4 Callus not bearded or with bearding mostly less than one-fourth as long as the lemma or rarely the bearding longer but then the lemma unawned or awned from above midlength; rachilla rarely prolonged as much as 0.5 mm; palea often less than half as long as the lemma, sometimes lacking; glumes often less than

3.5 mm long (Polypogon has spikelets articulate below the glumes, and should separate under the first lead No. 11 in Group I, but this feature cannot readily be detected in fresh material)

- 5 Glumes 2-3 times as long as the lemma, terminally awned, the slender awn at least as long as the glumes; lemma erose, awned from near the tip

POLYPOGON MONSPELIENSIS (L.)
Desf.

- 5 Glumes often less than twice as long as the lemma, mostly short-awned or awnless; lemma not erose and awned from near the tip

- 6 Florets short stipitate; rachilla prolonged, bristle-like, about 0.6 mm long; lemma usually with the vestige of a subapical awn; leaf blades 7-15 mm broad; palea subequal to the lemma

CINNA LATIFOLIA (Trevir.)
Griseb.

- 6 Florets not stipitate; rachilla rarely prolonged and bristle-like; leaf blades often less than 7 mm broad; palea often reduced or lacking

- 7 Lemma mostly terminally awned or awn-tipped, if unawned then considerably longer than the glumes; rachilla not prolonged behind the palea; culms often solid; palea well developed, mostly subequal to the lemma

MUHLENBERGIA

- 7 Lemma unawned or awned from the back, if unawned then often shorter than the glumes; rachilla sometimes prolonged; culms never solid; palea often reduced or lacking

AGROSTIS

GROUP V

- 1 Spikelets never more than 2-flowered nor more than 1 cm long; one or both lemmas awned
- 2 Lemmas erose-truncate, awned from (and rounded on) the back; rachilla prolonged

DESCHAMPSIA

- 2 Lemmas acute or bifid, but not erose at the tip, often awned from the sinus, usually keeled on the back; rachilla sometimes not prolonged

- 3 Lemmas bifid at the tip and usually awned from the sinus, but sometimes awnless; rachilla prolonged beyond the second flower

TRISETUM

- 3 Lemmas not bifid at the tip, always awned, the awn mostly from midlength or below; rachilla not prolonged beyond the second flower (it is only rarely that *Calamagrostis* will key here, since the spikelets are almost always 1-flowered)

CALAMAGROSTIS

- 1 Spikelets mostly more than 2-flowered or more than 1 cm long; lemmas sometimes unawned
- 4 Plant a strongly rhizomatous perennial; lemmas awnless, not bifid

SCOLOCHLOA FESTUCACEA

(Willd.) Link.

- 4 Plant an annual or a caespitose perennial; lemmas usually awned or bifid
- 5 Lemmas erose-truncate at the tip, awned from the back
- 5 Lemmas acute or bifid at the tip, mostly awned from the sinus, but sometimes awnless

DESCHAMPSIA

- 6 Lemmas with an exserted, geniculate awn

TRISETUM

- 6 Lemmas unawned or with a short, straight awn

- 7 Ligules mostly 0.5-2 (rarely 3) mm long; panicle greatly condensed; blades folded in the bud; rachilla joints glabrous

KOELERIA CRISTATA Pers.

- 7 Ligules (2.5) 3-4 mm long; panicle somewhat open; blades rolled in the bud; rachilla joints bearded

TRISETUM

GROUP VI

- 1 Nerves of the lemma 5-7, parallel and not convergent above at the tip of the lemma, usually fairly prominent; lemmas unawned
- 1 Nerves of the lemma often other than 5-7, tending to converge at the tip of the lemma, usually obscure; lemmas often awned
- 2 Leaf blades folded in their immature state in the innovations; leaves often turned up at the tip and hooded or more or less like the prow of a canoe

- 3 Lemmas unawned; leaf tips usually prow-like; mostly the sheaths glabrous or the plants rhizomatous
POA
- 3 Lemmas often awn-tipped; leaf tips not prow-like; sheaths pubescent; plants never rhizomatous
KOELERIA CRISTATA Pers.
- 2 Leaf blades rolled in their young state in the innovations; leaf tips pointed, not prow-like
- 4 Auricles well developed on at least some of the leaves
- 5 Spikelets paniculate, all pedicellate
FESTUCA
- 5 Spikelets semi-spicate, at least some of them sessile
ELYMUS
- 4 Auricles lacking
- 6 Plants dioecious, perennial, caespitose; lemmas awnless
HESPEROCHLOA KINGII
(Wats.) Rydb.
- 6 Plants mostly with perfect flowers, often rhizomatous; lemmas sometimes awned
- 7 Spikelets never more than 2-flowered, the rachilla not prolonged beyond the second flower; culms often solid; lemmas not bifid
MUHLENBERGIA
- 7 Spikelets (at least in part) with more than 2 flowers or the rachilla prolonged; culms never solid; lemmas sometimes bifid
- 8 Lemmas more or less deeply bifid at the tip, the awn (if any) arising from the sinus between the teeth and therefore never truly terminal; ligules rarely higher on the sides than at the back (opposite the throat)
- 9 Ligules mostly 0.5-2 (rarely to 3) mm long
rachilla joints glabrous
KOELERIA CRISTATA Pers.
- 9 Ligules (2.5) 3-4 mm long; rachilla joints bearded
TRISETUM
- 8 Lemmas not bifid, the awn (if any) terminal; ligules often higher on the sides than at the back
FESTUCA

Agropyron Gaertn. Wheatgrass

- 1 Plant an annual; spikes ovate-oblong, less than 2 cm long
A. TRITICEUM Gaertn.
- 1 Plant a perennial; spikes usually slender, at least 2 cm long
- 2 Rhizomes lacking or very poorly developed, the plants bunch grasses
- 3 Spikelets crowded, at least some of them as much as 4 times as long as the internodes of the rachis, strongly divergent A. CRISTATUM (L.) Gaertn.
- 3 Spikelets distant to crowded, rarely over 3 times as long as the internodes of the rachis (exclusive of the awns), not strongly divergent
- 4 Anthers about (4) 5 (6) mm long; spikelets rather distant, from shorter to only slightly longer than the internodes of the rachis
A. SPICATUM (Pursh)
Schribn. & Smith
- 4 Anthers 1-2 (2.5) mm long; spikelets crowded, mostly 2-3 times as long as the internodes of the rachis
- 5 Rachis tending to disarticulate at maturity; glumes very narrowly lanceolate, mostly 1- to 3- (5) -nerved; lemmas with a widely divergent awn
A. SCRIBNERI Vasey
- 5 Rachis not disarticulating; glumes narrowly to broadly oblong-elliptic, (3) 4- to 7-nerved; lemmas mostly unawned or with a straight (very rarely divergent) awn
A. CANINUM (L.) Beauv.
- 2 Rhizomes present, usually well developed, the plants not bunch grasses
- 6 Blades normally flat, 5-10 mm broad; lower sheaths usually hirsute-pilose; plants generally not strongly glaucous; awn of lemma (if any) straight
A. REPENS (L.) Beauv.
- 6 Blades normally strongly involute or considerably less than 5 mm broad; lower sheaths generally glabrous or strigillose (sometimes hirsute-pilose); plants often strongly glaucous; awn of lemma, if any, often divergent

- 7 Spikes loose and open, most of the spikelets usually shorter than the internodes of the rachis; rachilla usually plainly visible; lemmas glabrous or only puberulent, never pubescent; anthers about 5mm long; rhizomes short
A. SPICATUM (Pursh)
Schribn. & Smith
- 7 Spikes compact, the upper spikelets usually 2 or 3 times as long as the internodes of the rachis; rachilla usually almost concealed; lemmas often pubescent; anthers often less than 5 mm long; rhizomes usually extensive
- 8 Glumes mostly 5- to 7-nerved, oblong-lanceolate, broadest at or above midlength, shorter than the first lemma, rarely awn-tipped, generally hairy (to glabrous); lemmas usually copiously hairy; lower sheaths finely strigillose to pilose; anthers more than 4 mm long
A. DASYSTACHYUM
(Hook.) Schribn.
- 8 Glumes mostly 3- to 5-nerved, lanceolate, tapered from near the base, often as long as the first lemma, frequently awn-tipped, mostly glabrous but sometimes pubescent; lemmas glabrous; anthers mostly 3-4 mm long
A. SMITHII Rydb.

Agrostis L. Bentgrass

- 1 Anthers at least 1 mm long
A. ALBA L.
- 1 Anthers less than 1 mm long
- 2 Palea well developed, usually at least half as long as the lemma
- 3 Plants usually over 15 cm tall, short-rhizomatous, perennial; panicle (3) 5-10 cm long, more or less open (at anthesis); palea almost as long as the lemma; rachilla vestige 0.1-0.3 mm long
A. THURBERIANA Hitchc.
- 3 Plants often less than 15 cm tall, non-rhizomatous, sometimes annual; panicle 1-6 cm long, often compressed at anthesis; palea not over 3/4 as long as the lemma; rachilla vestige often lacking
- 4 Palea 2/3 - 3/4 as long as the lemma; plant perennial; panicle greatly compressed, scarcely 5 mm broad when pressed
A. HUMILIS Vasey

- 4 Palea scarcely half as long as the lemma; plant annual; panicle not greatly compressed, over 5 mm broad when pressed
A. ROSSIAE Vasey
- 2 Palea lacking or poorly developed, never so much as half the length of the lemma
- 5 Panicle moderately to greatly congested, several times as long as broad when pressed, the branches ascending, usually spikelet-bearing to near the base; plants mostly either alpine or subalpine or with glumes scabridulous over the back
A. EXARATA Trin.
- 5 Panicle relatively loose and open, often not more than 2-3 times as long as broad when pressed, the branches often spreading or spikelet-bearing only above mid-length; plants often not subalpine; glumes rarely scabrous over the back
- 6 Panicle diffuse, the branches capillary, erect to spreading, rarely branched and never spikelet-bearing below midlength; glumes often acuminate to semi-aristate, mostly about 2.3 (1.8-3) mm long, sometimes scabrous over the back; lemmas sometimes awned
A. SCABRA Willd.
- 6 Panicle often contracted, if diffuse the main branches forked and usually spikelet-bearing below midlength; glumes often much less than 2.3 mm long, not scabrous over the back; lemmas unawned
A. IDAHOENSIS Nash

Alopecurus L. Foxtail

- 1 Glumes wooly-silky over their entire surface, 3-4* mm long; anthers 2-2.3 mm long; native perennials with truncate ligules 1-3 mm long, montane (mostly subalpine)
A. ALPINUS J.E.Smith
- 1 Glumes silky to villous, but the pubescence mainly or entirely on the nerves and keel; anthers often less than 2 mm long; the glumes often less than 3 or more than 4 mm long, and the ligules usually acute or more than 3 mm long
A. AEQUALIS Sobol.

* Measurements are for spikelets near middle of inflorescence

Bromus L. Brome-grass

- 1 Plants annual
  - 2 Lemmas narrowly acute to acuminate, the teeth acuminate to acuminate-aristate, at least 2 mm long; first glume 1-nerved, the second mostly 3-nerved; awns usually at least 12 mm long B. TECTORUM L.
  - 2 Lemmas rounded at the tip, usually shallowly bidentate, the teeth rarely as much as 2 mm long; first glume 3 (5)-nerved, the second 5 (7,9)-nerved; awns often much less than 12 mm long B. BRIZAEFORMIS Fisch. & Mey.
- 1 Plants perennial (occasionally flowering the first year)
  - 3 Spikelets strongly compressed; lemmas more or less keeled (rather than rounded) on the back
B. CARINATUS Hook.
  - 3 Spikelets not strongly compressed; lemmas rounded (rather than keeled) on the back
  - 4 Plants rhizomatous; lemmas often unawned or with awn-tip 1-2 (4) mm long
B. INERMIS Leys.
  - 4 Plants non-rhizomatous; lemmas with an awn usually at least 4 mm long
    - 5 Panicle narrow, contracted, the branches erect, many shorter than the spikelets; first glume usually 1-nerved; lemmas glabrous (rarely) to evenly scabrid-puberulent or pubescent; ligules less than 3 mm long B. ANOMALUS Rupr.
    - 5 Panicle open, the branches usually more or less spreading, mostly longer than the spikelets; first glume generally 3-nerved; lemmas often unevenly pubescent; ligules often well over 2 mm long
    - 6 Lemmas pubescent unevenly, often only along the lateral nerves, the tip glabrous or the lower portion with much longer hairs than the upper; first glume often 1-nerved; panicle open, the branches slender, spreading to drooping
B. CILIATUS L.
    - 6 Lemmas pubescent to scabrid-puberulent evenly over the entire surface, except sometimes the margins with longer hairs; first glume 3 (5)-nerved; panicle sometimes with short, stiffly-spreading branches
B. ANOMALUS Rupr.

Calamagrostis Adans. Reedgrass

- 1 Awn geniculate, exserted beyond the glume tips by (1)
1.5-10 mm
- 2 Collar crisp-pubescent; glumes 4-5 mm long; awn
strongly geniculate, generally exserted less than 1.5 mm
C. RUBESCENS Buckl.
- 2 Collar glabrous or only scabrid-puberulent, not crisp-
pubescent; glumes 5-8 mm long; awn usually not
strongly geniculate, mostly exserted at least 1.5 mm
C. PURPURASCENS R. Br.
- 1 Awn straight or sometimes geniculate, but not exserted
beyond (not exceeding) the glumes more than 1 mm
- 3 Awn geniculate, exserted sideways slightly beyond
the glumes; callus hairs usually not half so long as
the lemma
- 4 Collar of at least some leaves crisp-pubescent
C. RUBESCENS Buckl.
- 4 Collar never crisp-pubescent
C. KOELERIOIDES Vasey
- 3 Awn nearly or quite straight, not projecting sideways
out of the spikelet; callus hairs often over half as long
as the lemma
- 5 Callus hairs rarely more than half as long as the lemma
- 6 Collar hairy, the hairs longer than those of the
adjacent blade or sheath
C. RUBESCENS Buckl.
- 6 Collar glabrous or only puberulent, the hairs,
if any, no longer than those of the sheath or blade
C. KOELERIOIDES Vasey
- 5 Callus hairs usually at least 3/4 as long as the lemma
- 7 Panicle relatively congested, rarely over 2 cm
broad when pressed, the individual branches
erect or ascending, not readily distinguished;
glumes mostly 3-4 mm long; blades usually 1.5-
4 mm broad, often involute; callus hairs often
only 1/2-3/4 as long as the lemma; awn stout
C. INEXPANSA Gray
- 7 Panicle almost always open, mostly more than 2 cm
broad when pressed, the branches tending to spread,
rarely obscured; glumes often more than 4 mm long;
blades sometimes well over 4 mm broad, usually flat;
callus hairs in general almost to fully as long as the
lemma; awn delicate C. CANADENSIS (Michx.) Beauv.

Danthonia Lam. & DC. Oatgrass

- 1 Lemmas more or less pilose over the back as well as along the margins; panicle narrow, of (3) 5-10 spikelets, the branches erect, at least after anthesis
D. SPICATA (L.) Beauv.
- 1 Lemmas glabrous over the back, pilose only along the margins and on the callus; panicle often open, of (1) 2-5 spikelets
- 2 Panicle narrow, the branches and pedicels erect, more or less secund; spikelets mostly (4) 5-10; sheaths usually glabrous
D. INTERMEDIA Vasey
- 2 Panicle open, the branches usually spreading; spikelets mostly 1-4 (5); sheaths usually pilose (if the inflorescence is at all narrow and congested)
- 3 Plants mostly over 5 dm tall; spikelets usually more than one, borne on divergent branches; hairs of the collar and throat mostly 1-2 mm long
D. CALIFORNICA Boland
- 3 Plants mostly not over 3 dm tall; spikelets usually single, if more than one, the lower one(s) short-pedicellate and suberect; some of the hairs of the collar and throat usually 3-4 mm long
D. UNISPICATA (Thurb.)
Munro

Deschampsia Beauv. Hairgrass

- 1 Panicle narrow; glumes usually equalling or exceeding the upper floret; anthers less than 1 mm long
D. ELONGATA (Hook.)
Munro
- 1 Panicle usually open, or if narrow the glumes shorter than the upper floret, or the anthers at least 1.5 mm long
D. CESPITOSA (L.) Beauv.

Elymus L. Wild Rye; Rye Grass

- 1 Ligules mostly at least 2 mm long; leaf blades usually flat, (5) 8-20 mm broad; spikelets commonly more than 2 at each node of the spike E. CINEREUS Schribn.
- 1 Ligules rarely if ever as much as 2 mm long; leaf blades often either involute or less than 8 mm broad; spikelets rarely more than 2 per node
- 2 Glumes narrowly lanceolate, usually broadest somewhat below midlength, nearly parallel at the flattened, not strongly indurate base, concealing at least the first joint of the rachilla; lemmas not strongly scabrid-pubescent on the back; awns, if any, mostly straight E. GLAUCUS Buckl.
- 2 Glumes linear and tapered from the base, or if broadest somewhat below midlength then their bases hardened and not parallel (and thus the first joint of the rachilla exposed); lemmas not long-ciliate, but often very strongly scabrid-pubescent; awns, if any, mostly strongly divergent E. CANADENSIS L.

Festuca L. Fescue

- 1 Panicle generally open, often over 15 cm long; second glume rarely over 4 mm long; lemmas less than 6 mm long; some of the awns equalling or exceeding the lemmas F. OCCIDENTALIS Hook.
- 1 Panicle often narrow to congested, mostly not over 15 cm long; either the second glume over 4 mm long the lemma 6 mm or more, or all awns much shorter than the lemmas
- 2 Glumes, lemma, and awn averaging about 2.7, 3.5, 4.2 and 1.5 mm respectively; anthers 0.3-1.7 mm long; panicle congested, rarely as much as 10 cm long; blades filiform, the basal rarely up to 10 cm long F. OVINA L.
- 2 Glumes, lemma, and awn averaging over 2.7, 3.5, 4.2, and 1.5 mm (lemma sometimes unawned); anthers 2-4 mm long; panicle often open or over 10 cm long; blades often over 10 cm long or not filiform

- 3 Plants truly caespitose, not-rhizomatous; basal sheaths firm, greenish (rarely at all red), persistent, not shredding into fibers; awns 2-5 (averaging 3.3 mm) mm long
F. IDAHOENSIS Elmer
- 3 Plants usually either decumbent-based or short-rhizomatous; basal sheaths first reddish then brown, thin, strongly nerved, ultimately shredding into filiform fibers (the marcescent veins); awns mostly less than 3 (averaging barely 1.5) mm long
F. RUBRA L.

Glyceria R. Br. Nom. Conserv. Mannagrass

- 1 Spikelets terete, mostly well over 1 cm long, linear or narrowly oblong in outline, several times as long as thick
G. BOREALIS (Nash) Batch.
- 1 Spikelets mostly flattened, often less than 1 cm long, ovate to broadly oblong, rarely more than 3 times as long as broad
- 2 Ligules usually closed in front (often split in pressing or drying), the lower ones mostly 1.5-3 mm long; blades generally 2-5 (6) mm broad; plants (2) 3-8 (11) dm tall; glumes ovate, rounded to obtuse, the first 0.7-0.8 (1) mm long; lemmas barely 2 mm long
G. STRIATA (Lam.) A.S.Hitchc.
- 2 Ligules open in front, mostly 3-6 mm long; blades 6-10 (12) mm broad; plants mostly 10-15 dm tall; glumes lanceolate-ovate, mostly acute, the first 0.7-1.2 mm long; lemmas mostly 2-2.2 mm long
G. ELATA (Nash) Jones

Hordeum L. Barley; Foxtail Barley; Foxtail

- 1 Glumes awnlike, 2-6 cm long, the spike (awns included) usually nearly or quite as thick as long; auricles usually developed on some leaves but barely 0.5 mm long
H. JUBATUM L.
- 1 Glumes often broadened at base, never so much as 2 cm long, the spike (including awns) much longer than thick; auricles often entirely lacking

- 2 Plants perennial, rarely less than 3 dm tall, the blades 3-8 mm broad H. BRACHYANTHERUM Nevski
- 2 Plants annual, often less than 3 dm tall, the blades mostly 2-4 mm broad H. PUSILLUM Nutt.

Melica L. Melic grass; Oniongrass

- 1 Culms not bulbous-based; lemmas often awned or awn-tipped; sheaths and often the ligules closed in front unless mechanically ruptured M. SMITHII (Porter) Vasey
- 1 Culms bulbous-based; lemmas unawned; sheaths mostly open above
  - 2 Lemmas acuminate, generally pilose-ciliate near the base, 9-13 mm long; sheaths usually closed to the top and the ligule, itself, closed in front; rachilla joints 2-3 mm long; panicle narrow, the branches ascending M. SUBULATA (Griesb.) Schribn.
  - 2 Lemmas acute to obtuse, not acuminate, never pilose-ciliate near the base, often less than 10 mm long; sheaths mostly open above; rachilla joints often only 1.5-2 mm long; panicle often open, the lower branches spreading
  - 3 Culms usually not tightly clustered, but attached from 1-3 cm apart on a rather slender rhizome; lemmas about 7 (6-8) mm long; anther 2-2.5 mm long; usually montane, in meadows or forests or on montane ridges M. SPECTABILIS Schribn.
  - 3 Culm bases tightly clustered on a short thick rhizome; lemmas averaging 9-12 mm long; anthers usually more than 2.5 mm long; more commonly in sagebrush desert

M. BULBOSA Geyer

Muhlenbergia Schreb. Muhly

- 1 Spikelets on long slender pedicels in open, spreading panicles that not rarely are 1/3-2/3 the total height of the plant M. ASPERIFOLIA (Nees&Meyer) Parodi
- 1 Spikelets subsessile or short-pedicellate in contracted (often spikelike) panicles usually less than 1/3 the total height of the plant

- 2 Lemmas neither slenderly awned (sometimes awn-tipped) nor pilose on the lower half (sometimes puberulent or scaberulent); culms solid
- 3 Sheaths and culms minutely nodulose-roughened; plant a strongly rhizomatous perennial; anthers about 1.5 mm long
M. RICHARDSONIS (Trin.) Rydb.
- 3 Sheaths and culms not nodulose-roughened; plant an annual or a more or less stoloniferous (non-rhizomatous) perennial; anthers about 0.5 (0.8) mm long
M. FILIFORMIS (Thurb.) Rydb.
- 2 Lemmas slenderly awned (awn at least 1.5 mm long) or pilose at least on the lower half (or both); culms often hollow
M. ANDINA (Nutt.) A.S.Hitchc.

Oryzopsis Michx. Ricegrass

- 1 Blades 3-7 mm broad, flat, tapered at each end; ligules truncate, scarcely 1 mm long; lemma 6-8 mm long, not pilose-hirsute
O. ASPERIFOLIA Michx.
- 1 Blades less than 3 mm broad or strongly involute, or the ligules acute and much more than 1 mm long; lemma either much less than 6 mm long or else pilose-hirsute
- 2 Lemma pilose-hirsute; glumes 5-9 mm long
O. HYMENOIDES (R.&S.) Ricker
- 2 Lemma strigose-pubescent; glumes mostly less than 6 mm long
O. EXIGUA Thurb.

Panicum L. Panic Grass

- 1 Plants annuals; glumes and sterile lemmas not short pilose
P. CAPILLARE L.
- 1 Plants perennials; glumes and sterile lemma often short-pilose (Including P. thermale)
P. OCCIDENTALE Schribn.

Phleum L. Timothy

- 1 Culms usually bulbous-based; panicle usually over 4.5 cm long, less than 1 cm broad when pressed; anthers generally more than 1.5 mm long

P. PRATENSE L.

- 1 Culms not bulbous-based; panicle rarely as much as 4.5 cm long but often more than 1 cm broad when pressed; anthers mostly 1-1.4 (1.5) mm long

P. ALPINUM L.

Poa L. Bluegrass

- 1 Rhizomes present, often very extensively developed
- 2 Plants partially to completely dioecious, mostly pistillate
- 3 Uppermost culm leaf usually with much-reduced (or no) blade; lower blades stiff, usually strongly scabrous; sheaths rarely closed more than 1/3 their length; lemmas often with longest hairs along the marginal nerves and keel; second glume 3.5-5 mm long
P. FENDLERIANA (Steud.) Vasey
- 3 Uppermost culm leaf usually with a well-developed blade; lower blades usually rather lax, rarely strongly scabrous except along the margins; sheaths usually closed at least half their length; lemmas variously pubescent or scabridulous but not longer-hairy on the marginal nerves and keel; second glume about 3.5 mm long
P. NERVOSA (Hook.) Vasey
- 2 Plants mostly perfect-flowered
- 4 Culms strongly flattened, 2-edged; plants strongly rhizomatous; lemmas scantily if at all webbed
P. COMPRESSA L.
- 4 Culms slightly if at all flattened, not 2-edged; plants often either only weakly rhizomatous or with strongly webbed lemmas
- 5 Panicle narrow, the branches ascending or appressed; lemmas scabrous to pubescent on all the nerves, but not webbed
P. ARIDA Vasey
- 5 Panicle open, the branches mostly spreading; lemmas often webbed at base, or glabrous on the internerves

- 6 Plants alpine or subalpine; lemmas pubescent over the back and silky on the 5 nerves, usually webbed
P. GRAYANA Vasey
- 6 Plants often of lower elevations; lemmas sometimes glabrous on the internerves, or not webbed
- 7 Lemmas not webbed at base, from glabrous over- all or scabrid-puberulent on the keel and marginal nerves only, to finely scabrid-puberulent over the back; sheaths often retrorsely puberulent, closed to well above midlength
P. NERVOSA (Hook.) Vasey
- 7 Lemmas often webbed at base, if not then generally pilose on the keel and marginal nerves, at least
- 8 Anthers mostly 0.5-0.9 (never over 1) mm long; lower panicle branches mostly in 2's
P. LEPTOCOMA Trin.
- 8 Anthers at least 1 mm long; lower panicle branches usually in 3's to 5's
- 9 Plants truly rhizomatous, usually not growing in wet places; ligules mostly not over 1.5 (rarely the uppermost up to 3) mm long, truncate; lemmas more than 3 mm long
P. PRATENSIS L.
- 9 Plants stoloniferous but not truly rhizomatous, often growing in wet places; ligules mostly (2) 3-7 mm long, often acute; lemmas 2.5-3 mm long
P. PALUSTRIS L.
- 1 Rhizomes lacking, although plants sometimes stoloniferous
- 10 Culms usually enlarged and bulbous at base; florets mostly or all modified into small purplish bulblets without stamens or pistil
P. BULBOSA L.
- 10 Culms not bulbous-based; florets not modified into bulblets, but having stamens, a pistil, or both
- 11 Lemmas with long, tangled, cobwebby hairs at base
- 12 Lemmas glabrous (except for the basal cobwebby hairs) or pubescent only on the keel
P. CUSICKII Vasey
- 12 Lemmas pubescent on the marginal nerves as well as on the keel

- 13 Panicle loose, the branches slender, the lower ones 1-3 per node, spreading to reflexed; spikelets usually purplish; ligules glabrous, usually over 1 mm long; anthers not over 1 mm long
- 14 Lower panicle branches reflexed, 1-3 per node
P. REFLEXA Vasey & Schribn.
- 14 Lower panicle branches usually not reflexed, generally in pairs P. LEPTOCOMA Trin.
- 13 Panicle often narrow, the branches ascending, or more than 3 per node; spikelets usually greenish; ligules often puberulent-scabridulous, sometimes all less than 1 mm long
- 15 Spikelets averaging about 6 mm long, the lemmas 4-5 mm long P. GRAYANA Vasey
- 15 Spikelets usually less than 5 mm long, the lemmas less than 4 mm long
- 16 Plants of the lowlands or lower mountains, usually where moist; culms decumbent and usually stolonous, (3) 4-12 dm tall; ligules (2) 3-5 mm long P. PALUSTRIS L.
- 16 Plants montane to subalpine, on moist to open rocky areas; culms erect, not at all stolonous; ligules rarely as much as 2 mm and never so much as 3 mm long
- 17 Culms usually at least 2.5 dm tall; glumes rarely as much as 3.5 mm long; montane to (sometimes) subalpine
P. INTERIOR Rydb.
- 17 Culms rarely over 2 dm tall; second glume 3.5-4.5 mm long; subalpine to alpine
P. PATTERSONII Vasey
- 11 Lemmas not cobwebby at base
- 18 Spikelets compressed, at anthesis usually less than twice as long as broad; lemmas rather strongly keeled; plants sometimes dioecious, or all pistillate
- 19 Lemmas pubescent (usually villous or pilose) on the keel and marginal nerves, or hairy over the entire lower portion, or sericeous, or pilose on the nerves and hairy between
- 20 Plants almost entirely imperfect-flowered, usually functionally pistillate

- 21 Lemmas long-villous on the keel and marginal nerves (see also P. cusickii which does not have greatly reduced blades on the upper culm leaves and which is pilose on the keel, only); blades stiff; usually strongly scabrous, the uppermost on the culms usually greatly reduced or even wanting; sheaths glabrous or scabrous, rarely closed as much as 1/3 their length   P. FENDLERIANA (Steud.) Vasey
- 21 Lemmas uniformly pubescent, not long-villous on the keel and marginal nerves; blades rather lax, mostly scabrid on the margins, only, the uppermost not greatly reduced; sheaths often puberulent, usually closed at least 1/2 their length
P. NERVOSA (Hook.) Vasey
- 20 Plants mostly perfect-flowered, both the stamens and pistil functional
- 22 Panicles narrow, contracted, several times as long as broad, but usually not over 6 cm long; plants rarely over 2 m
- 23 Second glume 3.5-4.2 (averaging almost 4) mm long, subequal (or equal) to the first lemma; panicle very compact (suggestive of that of Calamagrostis purpurascens), almost continuous, the pedicels or panicle branches scarcely visible, rarely as long as the spikelets; plants mostly 5-15 (20) cm tall
P. PATTERSONII Vasey
- 23 Second glume 2.5-3.5 (averaging about 3.2) mm long, shorter than the first lemma; panicle more open than that of Calamagrostis purpurascens, the panicle branches and pedicels mostly visible, and some of them longer than the spikelets; plants mostly 10-20 (25) cm tall
P. RUPICOLA Nash
- 22 Panicles either open and with spreading or ascending to drooping branches, or over 6 cm long, or plants much more than 2 dm tall
- 24 Spikelets 2/3 as broad as long, subcordate; blades flat, 2-4 mm broad, the uppermost below midlength of the culm; ligules coarsely erose, truncate to obtuse, glabrous, (1) 1.5-3 (4) mm long
P. ALPINA L.

24 Spikelets usually less than $2/3$ as broad as long, or oblong rather than subcordate; blades often involute or less than 2 mm broad, the uppermost generally above midlength of the culm; ligules various

25 Ligules usually truncate, 0.3-1.0 (or rarely the longest 1.5-2) mm long; spikelets mostly 2- to 3 (4) -flowered; second glume 2.5-3 (rarely to 3.5) mm long

P. INTERIOR Rydb.

25 Ligules usually obtuse to acute, generally at least 1 (the longest 2-4) mm long; spikelets mostly 3- to 5-flowered; second glume rarely less than 4 mm long

P. GRAYANA Vasey

19 Lemmas glabrous or scabrous to scabrid-puberulent, not villous or pilose on the keel and marginal nerves and not truly pubescent elsewhere

26 Panicles open, the pedicels evident; sheaths of basal culm leaves often puberulent or reddish-purple, those of the upper part of the culm closed to well above midlength; blades mostly 2-3.5 (5) mm broad; lower ligules truncate, thickish, strongly pubescent, ciliate, averaging 0.5-1 mm long; glumes about 3 and 3.5 mm long, respectively

P. NERVOSA (Hook.) Vasey

26 Panicles congested, the pedicels mostly not evident; sheaths of basal leaves rarely either puberulent or reddish-purple, those of the upper part of the culm rarely closed as much as half the length; blades often much less than 2 mm broad; lower ligules often acute, or well over 1 mm long, or not pubescent; glumes tending to average more than 2 and 3.5 mm long

P. CUSICKII Vasey

18 Spikelets only slightly compressed, at anthesis over twice as long as broad; lemmas rounded on the back, or only slightly keeled; plants perfect-flowered

27 Ligules thickish, strongly ciliate, truncate to rounded, those of the innovations and basal culm leaves scarcely visible from the side, mostly not over 0.5 (to 1) mm long, those of the upper culm leaves mostly 1-1.5 (2, rarely 2.5) mm long

P. JUNCIFOLIA Schribn.

- 27 Ligules thin and membranous, rarely ciliolate, usually acute, those of the innovations and lower culm leaves usually over 1 mm long, those of the upper culm leaves mostly 2-7 mm
- 28 Lemmas scabrous or glabrous, but not crisp-puberulent, on the lower half or fourth and sometimes all over
P. NEVADENSIS Vasey
- 28 Lemmas crisp-puberulent on the lower half or fourth or sometimes only at the base, but not scabrous all over
- 29 Plants greenish, usually over 4 dm tall; spikelets mostly tawny or light green, the lemmas sometimes purple-banded but usually not purplish all over; basal leaf blades 1-3 mm broad, usually over 5 cm long P. SCABELLA (Thurb.) Benth.
- 29 Plants often more or less reddish-tinged, mostly less than 3, and very rarely over 4 dm tall; spikelets mostly purplish-tinged; basal leaf blades usually filiform and not over 1 mm broad, involute to folded, mostly less than 5, but very rarely up to 8 cm long
P. SANDBERGII Vasey

Puccinellia Parl. Nom. Conserv. Alkali-grass

- 1 Nerves of the lemma prominent; plants occurring in fresh water; blades flat, 3-12 (15) mm broad; ligules erose or lacerate, 3-9 mm long
P. PAUCIFLORA (Presl.) Munz
- 1 Nerves of the lemma rather indistinct; plants usually of saline or alkaline soil; blades often involute, mostly less than 3 and rarely over 4 mm broad; ligules entire or subentire, rarely over 3 mm long
- 2 Lemmas mostly 1.5-1.8 (1.4-2) mm long; anthers 0.5-0.8 mm long; lower panicle branches usually reflexed, spikelet-bearing chiefly near the tip
P. DISTANS (L.) Parl.
- 2 Lemmas mostly more than 2 mm long; anthers often over 0.8 mm long; lower panicle branches often erect, usually spikelet-bearing most of their length
P. NUTTALLIANA (Schult.)
A.S.Hitchc.

Stipa L. Needlegrass; Needle & Thread; Porcupine Grass

- 1 Glumes 15-40 mm long; lemma 8-25 mm long, the awn usually (6) 10-20 cm long S. COMATA Trin. & Rupr.
- 1 Glumes less than 15 mm long; lemma mostly less than 8 mm long, the awn rarely over 6 cm long
  - 2 Panicle open, the branches spreading, spikelet-bearing only near the tip; awn rarely as much as 25 mm long S. RICHARDSONII Link.
  - 2 Panicle narrow, the branches ascending to erect, often spikelet-bearing to near the base; awns often over 25 mm long
    - 3 Palea glabrous, less than half as long as the lemma; florets "plump", 5-6 mm long and nearly 1 mm thick; callus short and not very sharp S. VIRIDULA Trin.
    - 3 Palea either hairy or over half as long as the lemma, or both; florets often more than 6 times as long as thick; callus often slender and sharp S. OCCIDENTALIS Thurb.

Trisetum Pers. Trisetum

- 1 Lemmas awnless or with a short straight awn not over 6 mm long T. WOLFII Vasey
- 1 Lemmas awned, the awn curved or geniculate T. SPICATUM (L.) Richter

SPARGANIACEAE Bur-reed Family

Sparganium L. Bur-reed

- 1 Staminate heads usually single (rarely 2), the anthers 0.3-0.6 (0.8) mm long, at least half as broad; beak of the achene about 1-1.5 mm long; leaves 3-6 (2-9) mm broad
S. MINIMUM Fries

- 1 Staminate heads usually 2 or more, the anthers often more than 0.8 mm long or less than half as broad as long; beak of the achene much more than 1.5 mm long; leaves often much more than 6 mm broad

- 2 Stems and leaves generally submersed or floating; leaves mostly less than 5 (to 8) mm broad, not scarious-margined; mature pistillate heads 1-2 cm thick; stigma scarcely 1 mm long; achene beak (including stigma) about 2 mm long

S. ANGUSTIFOLIUM Michx.

- 2 Stems and leaves often over 5 mm broad, sometimes scarious-margined near the base; pistillate heads usually more than 2 cm thick when mature; stigma about 2.5 mm long; achene beak (including stigma) well over 3 mm long (S. Simplex)

S. EMERSUM Rehmann

TYPHACEAE Cat-tail Family

Typha L. Cat-tail

- 1 Leaves mostly 8-20 mm broad; pollen in tetrads; plants often over 1.5 m tall; staminate and pistillate portions of the spike tending to be contiguous; subtending bract usually lacking in the pistillate flowers; stigmas oblanceolate-obovate; abortive ovaries pyriform

T. LATIFOLIA L.

- 1 Leaves mostly about 5 (3-10) mm broad; pollen grains single; plants rarely over 1.5 m tall; staminate and pistillate portions of the spike not contiguous; subtending bract usually present in the pistillate flowers; stigmas linear; abortive ovaries flattened and more or less cuneate
T. ANGUSTIFOLIA L.

LEMNACEAE Duckweed Family

Lemna L. Duckweed

- 1 Fronds oblong to lanceolate, 6-10 (12) mm long, many with slender stalks as long as the main body, usually remaining attached together to form large mats, often submersed
L. TRISULCA L.
- 1 Fronds more nearly oval, less than 6 mm long, not long stalked, tending to separate into individual plants or small colonies, floating
  - 2 Thalli averaging less than twice as long as broad, obscurely 3-nerved
L. MINOR L.
  - 2 Thalli averaging more than twice as long as broad, 1-nerved
L. MINIMA Philippi

LILIACEAE Lily Family

- 1 Perianth in 2 very dissimilar series, either the sepals or the petals with a deep round to oblong gland
CALOCHORTUS
- 1 Perianth in 2 series of essentially similar segments (tepals), all either gland-bearing or glandless
  - 2 Flowers several to many in a terminal umbel or head on a leafless scape; leaves basal, linear; plants from tunicated bulbs
ALLIUM
  - 2 Flowers solitary to racemose or paniculate, never in a single umbel or head on a leafless scape
    - 3 Leaves linear, tough and stiff, persistent year after year in a basal rounded clump, often sharp pointed or with fibrous margins; inflorescence a large raceme or panicle, terminal on an annual stem
XEROPHYLLUM TENAX
(Pursh) Nutt.
- 3 Leaves various, but never persistent year after year; inflorescence various
  - 4 Leaves primarily on the flowering stem and mostly above the base, sometimes non basal, usually not strongly reduced upward on the stem
  - 5 Plants from a deep-seated scaly bulb; leaves linear to lanceolate, often whorled; flowers showy, white or yellow to purple, the tepals (12) 20-70 mm long
FRITILLARIA

- 5 Plants rhizomatous; leaves scale-like to ovate, never whorled; flowers mostly not showy, the tepals often less than 12 mm long
- 6 Stem unbranched; flowers 5-10 (20) in terminal raceme or more in terminal panicle
SMILACINA
- 6 Stem usually branched; flowers born along stem 1-2 per node, or 1-4 at the tips of the main branches
- 7 Flowers 1-several at the tip of the branches of the main stem; leaves usually strongly oblique at the base
DISPORUM TRACHYCARPUM
(Wats.) Benth. & Hook.
- 7 Flowers 1 or 2 per node along the lower side of the stem; leaves usually slightly or not at all oblique
STREPTOPUS AMPLEXIFOLIUS
(L.) DC.
- 4 Leaves primarily basal, the flowering stem naked or with leaves greatly reduced upward
- 8 Styles 3, distinct almost to the ovary; flowers sometimes perigynous
- 9 Leaves 2-ranked and more or less equitant; plants rhizomatous; tepals 2.5-6.5 mm long; pedicels usually in 3's, each with 3 separate to strongly connate bracteoles near the tip; pollen sacs not confluent; stamens hypogynous
TOFIELDIA GLUTINOSA Michx.
- 9 Leaves not 2-ranked or equitant; plants with a bulb; tepals often more than 6.5 mm long; pedicels usually single and not bracteolate near the tip; pollen sacs confluent; stamens often perigynous
ZIGADENUS
- 8 Styles 1, or 3 but connate more than half the length; flowers nearly or quite hypogynous
- 10 Leaves several, linear, at least 10 times as long as broad; flowers mostly 10 or more in a bracteate raceme, regular to irregular
CAMASSIA QUAMASH
(Pursh) Greene
- 10 Leaves mostly 2, lanceolate or oblong to oblanceolate, less than 10 times as long as broad; flowers 1-5, regular
ERYTHRONIUM GRANDIFLORUM
Pursh

Allium L. Wild Onion; Wild Garlic

- 1 Inflorescence subcapitate, flowering from the center outward; leaves cylindrical, hollow

A. SCHOENOPRASUM L.

- 1 Inflorescence subumbellate, flowering from the outside inward; leaves solid, flat or channeled, rarely terete

- 2 Bulb coats persisting as reticula of coarse anastomosing fibers; ovary crested with 6 low knobs

- 3 Leaves usually 2 per scape; tips of inner perianth segments spreading; flowers usually white

A. TEXTILE Nels. & MacBr.

- 3 Leaves usually 3 or more per scape; tips of inner perianth segments erect; flowers usually pink sometimes replaced by bulbils

A. GEYERI Wats.

- 2 Bulb coats without fibers or with parallel fibers, never fibrous-reticulate

- 4 Bulbs elongate, terminating stout primary rhizomes or only stipitate (short-rhizomatous); outer bulb coats striate with elongate cells in regular vertical rows

- 5 Bulbs from stout Iris-like rhizomes; umbel erect; ovary crestless; stamens often included in perianth

A. BREVISTYLUM Wats.

- 5 Bulbs merely stipitate (often obscurely so); umbel nodding; ovary conspicuously crested with 6 thin processes; stamens exerted

A. CERNUUM Roth

- 4 Bulbs ovoid to subspherical; rhizomes, if present, slender and secondary; outer bulb coats often cellular-reticulate

A. BRANDEGEI Wats.

Calochortus Pursh Sego Lily

- 1 Ovaries and fruits orbicular to oblong, 3 winged; basal leaf broad and flat

C. EURYCARPUS Wats.

- 1 Ovaries and fruits linear, triangular in section, but not winged; basal leaf linear, concave-convex, channeled

C. GUNNISONII Wats.

Fritillaria L. Fritillary

- 1 Flowers yellow, fading to red or purplish; style one, the stigma discoid F. PUDICA (Pursh) Spreng.
- 1 Flowers purplish, often more or less mottled; styles 3, connate only near the base, the stigmas 3 F. ATROPURPUREA Nutt.

Smilacina Desf. False Solomon's Seal

- 1 Flowers paniculate, scarcely 3 mm long; stamens exceeding perianth S. RACEMOSA (L.) Desf.
- 1 Flowers usually simple racemose (very rarely the raceme compound near the base), usually 4-7 mm long; stamens shorter than perianth S. STELLATA (L.) Desf.

Zygadenus Michx. Death Camas

- 1 Tepals 8-11 mm long not clawed, the gland obcordate; stamens perigynous, the ovary 1/4-1/3 inferior Z. ELEGANS Pursh
- 1 Tepals less than 7 mm long, at least the inner series clawed, the gland broadly ovate; stamens hypogenous, the ovary superior Z. VENENOSUS Wats.

IRIDACEAE Iris Family

- 1 Perianth segments essentially similar; style branches slender, not at all petaloid SISYRINCHIUM ANGUSTIFOLIUM Mill.
- 1 Perianth segments dissimilar, the outer the more showy, usually spreading to reflexed; style branches petaloid IRIS MISSOURIENSIS Nutt.

ORCHIDACEAE Orchid Family

- 1 Plant without green leaves when in flower, often white, reddish-brown, or very pale yellow
- 2 Spur well developed; underground parts of the plant neither profusely branched nor coral red
HABENARIA
- 2 Spur lacking or very short and merely saccate; underground parts of the plant often profusely branched and coral red
- 3 Perianth segments not connate into a hood, yellow to pink, brownish-red, or purple; roots much-branched, reddish CORALLORHIZA
- 3 Perianth segments connate into a long hood, white or cream; roots fleshy, fascicled, neither much-branched nor reddish SPIRANTHES ROMANZOFFIANA Cham.
- 1 Plants with at least one green leaf when in flower
- 4 Base of the lip forming a well-developed, saccate to slender spur
HABENARIA
- 4 Base of the lip not forming a spur
- 5 Flowers 1 or very occasionally 2; lip saccate; plant with a subglobose corm and a single leaf
CALYPSO BULBOSA (L.) Oaks
- 5 Flowers usually several to many, the lip either not saccate or the plant with several leaves
- 6 Leaves 1 or 2, either basal or near midlength of the stem; plants often cormose at the base
LISTERA
- 6 Leaves usually more than 2, alternate or basal; plants not cormose at the base
- 7 Leaves basal and rosulate, usually somewhat mottled, persistent; plants rarely in swampy area, the roots neither fleshy nor fascicled
GOODYERA OBLONGIFOLIA Raf.
- 7 Leaves cauline, alternate, not mottled, non-persistent; plants usually in wet to swampy areas, the roots fleshy and fascicled
SPIRANTHES ROMANZOFFIANA Cham.

Corallorhiza Chat. Coral Root

- 1 Sepals and petals pinkish, prominently 3 (4- to 5) -striped with reddish-brown or purple, the sepals (7) 10-17 mm long; lip unlobed; spur lacking

C. STRIATA Lindl.

- 1 Sepals and petals yellow or pink to wine-red, not striped although often lightly red-veined, the sepals often less than 10 mm long; lip often lobed; spur often present
- 2 Sepals (4.5) 5 (6) mm long, yellow or greenish-yellow to nearly white (seldom purplish-tinged), 1-nerved; lip toothed-lobed near the base

C. TRIFIDA Chat.

- 2 Sepals 6-13 mm long, often reddish, usually 3-nerved; lip sometimes not lobed
- 3 Lip neither laterally-lobed nor -toothed; sepals 6-8 mm long
- 3 Lip usually laterally-lobed or -toothed; sepals (6) 8-10 (13) mm long
- 4 Column slender, mostly 6-7 (8) mm long; spur usually with a free tip 1-3 mm long; lip with no more than 1 or 2 spots

C. MERTENSIANA Bong.

- 4 Column stout, 3.5-4.5 (5) mm long; spur generally lacking, or reduced to a small gibbosity at the top of the ovary; lip usually with several spots

C. MACULATA Raf.

Habenaria Willd. Rein Orchid

- 1 Leaves all on the lower third of the stem, often truly basal, the plants scapose, the greater length of the flowering stem merely with 1-several greatly reduced bracts; flowers predominantly greenish
- 2 Sepals 1-nerved; leaves 1-5, always at least 5 times as long as broad together on the lower 1/3 of the stem but not all basal, tending to wither by anthesis; flowers subsessile, without obvious pedicels; lip less than 6 mm long; plants mostly of dry areas

H. UNALASCENSIS (Spreng) Wats.

- 2 Sepals 3- to many-nerved; leaves 1-2 (rarely 3), less than 5 times as long as broad, basal, not withering by anthesis; flowers with evident pedicels (1) 2-7 mm long; lip (4) 5-20 mm long (if less than 6 mm long the basal leaves 1 or at most 2); plants usually in moist areas
H. OBTUSATA (Banks) Richards.
- 1 Leaves several to many, all cauline, the stems leafy most of their length; flowers often white
- 3 Sepals 1-nerved; stems leafless and not leafy-bracteate above the middle
H. UNALASCENSIS (Spreng.) Wats.
- 3 Sepals 2-nerved, the lateral nerves sometimes obscure; stems leafy or leafy-bracteate above the middle
- 4 Spur scrotiform, much enlarged near the tip where somewhat didymous, scarcely at all curved, usually less than $2/3$ as long (rarely nearly as long) as the lip; flowers greenish; lip narrowly oblong to elliptic, rounded to obtuse; raceme usually open
H. SACCATA Greene
- 4 Spur linear to clavate, rarely if ever at all scrotiform, generally slightly to strongly curved, if less than $2/3$ as long as the lip then the flowers white and the lip usually considerably widened near the base; lowermost cauline leaves often acute; raceme mostly rather congested
- 5 Flowers white or only pale greenish; lip rhombic-lanceolate or -oblong, considerably broadened just above the base and usually abruptly narrowed to a lanceolate or (commonly) narrowly oblong distal half, usually cellular-serrulate along the margin; spur from shorter than the lip to almost twice as long, only slightly or not at all clavate
H. DILATATA (Pursh) Hook.
- 5 Flowers greenish; lip lanceolate to linear, sometimes broadened at the base but not rhombic, the margin not cellular-serrulate; spur rarely any longer than the lip, but if longer then usually strongly clavate
H. HYPERBOREA (L.) R.Br.

Listera R.Br. Twayblade

- 1 Lip cleft about half the length into 2 linear-lanceolate, somewhat divergent lobes; leaves subcordate; column and anther scarcely 1.5 mm long

L. CORDATA (L.) R.Br.

- 1 Lip rounded to retuse or only shallowly bilobed, the lobes broad and rounded; leaves rarely at all cordate; column and anther usually at least 2 mm long

L. CAURINA Piper

SALICACEAE Willow Family

- 1 Flowers individually subtended by an obliquely cup-shaped disk, but without obvious glands; leaf buds covered by several scales, stamens 6-many; scales subtending the flowers lacinate or fimbriate, subentire; trees with pendulous catkins

POPULUS

- 1 Flowers lacking a disk but provided with one or two enlarged basal glands; leaf buds covered by a single scale; stamens typically 2, sometimes 5-8 or only 1; scales subtending the flowers entire or occasionally somewhat toothed; trees or more often shrubs, with erect or sometimes pendulous catkins

SALIX

Populus L. Poplar

- 1 Smooth-barked tree; buds shiny but not resinous; bracts more or less persistent, deeply few-lobed and conspicuously long-white-hairy; stamens 6-14; capsules narrow and small, lanceolate or lance-ovate, 4-6 mm long, 2-carpellate; stigmas slenderly lobed; petioles strongly flattened laterally; leaves not distinctly cartilaginous-margined; plants not confined to streambanks and lakeshores

P. TREMULOIDES Michx.

- 1 Rough-barked trees; buds resinous; bracts deciduous at anthesis, laciniate-fringed but otherwise glabrous or only inconspicuously short-hairy; stamens 12-60 or more; capsules mostly larger and relatively broader, 2- to 4-carpellate; stigmas broadly dilated, with irregular margins; petioles and leaves various; plants largely confined to streambanks and lakeshores
- 2 Leaf blades mostly 2-5 times as long as wide, with cuneate base (base rounded on large leaves or vigorous young shoots), on petioles up to a third as long; carpels 2
P. ANGUSTIFOLIA James
- 2 Leaf blades mostly 1.4-2 times as wide, with broadly cuneate to rounded-ovate base, on petioles 1/3-3/5 as long; carpels 2-3
- 3 Leaf blades green beneath not glaucous
P. ACUMINATA Rydb.
- 3 Leaf blades glaucous beneath, dark green above
P. BALSAMIFERA L.

Salix Willows

Taken From Dorn (1970)

- 1 Trees, usually with one main trunk at the base;
  - 2 Leaves green beneath (rarely glaucous); glandular processes on petiole near base of leaf blade
S. LASIANDRA Benth.
  - 2 Leaves glaucous or much lighter beneath than above; glandular processes usually absent
  - 3 Leaves mostly widest at about the middle; mature buds usually with depressed margins; bark of older twigs cracked giving white-streaking appearance; catkins on leafy peduncles; pedicels 2-5 mm long; habitat various S. BEBBIANA Sarg.
  - 3 Leaves mostly widest above the middle, often round at the tip; buds and twigs usually not as above; freshly stripped bark of living twigs of previous year usually with a "skunky" odor; catkins sessile or nearly so; pedicels 1-2 mm long; most common drier locations in upland forests, and burned-over areas
S. SCOULERIANA Barratt
- 1 Shrubs, usually with several to many stems at the base, sometimes to 15 m tall
  - 4 Dwarf, creeping shrubs, 2-8 cm tall; near or above timberline

- 5 Leaves 7 mm or less long, not glaucous beneath; old leaves usually present; capsules not hairy
S. ROTUNDIFOLIA Trautv.
- 5 Leaves mostly over 7 mm long, glaucous or not beneath; old leaves present or not; capsules hairy
- 6 Leaf tip usually rounded or slightly notched; leaves glaucous and prominently netted-veined beneath
S. RETICULATA L.
- 6 Leaf tip usually pointed; leaves glaucous or not beneath, often strongly pinnately-veined but usually not prominently netted-veined beneath
S. ARCTICA Pall.
- 4 Erect shrubs, mostly over 3 dm tall; only occasionally above timberline
- 7 Leaves mostly linear, over 6 times longer than wide, usually less than 1 cm wide; twigs never pruinose
S. FLUVIATILIS Nutt.
- 7 Leaves less than 6 times longer than wide, or if more then not linear; twigs sometimes pruinose
- 8 Leaves densely white-hairy or silvery-hairy beneath, the hairs concealing the leaf surface or nearly so, dark green and not hairy or more sparsely hairy above; capsules hairy
S. DRUMMONDIANA Barratt
- 8 Leaves not densely white-hairy or silvery-hairy beneath, or if so, then similarly hairy above; capsules hairy or not
- 9 Twigs of previous year pruinose, sometimes only apparent at the nodes, especially behind buds; leaves usually hairy
- 10 Catkins on leafy peduncles, usually loosely flowered, less than 2 times longer than wide; all buds about the same size and less than 4 mm long; twigs mostly reddish
S. GEYERIANA Andress.
- 10 Catkins usually sessile, densely flowered, more than 2 times longer than wide; mature buds of two sizes, the larger over 4 mm long; twigs often yellowish
S. DRUMMONDIANA Barratt
- 9 Twigs not pruinose (rarely thinly pruinose in Salix phylicifolia)
- 11 Plant with mature female catkins
- 12 Mature capsules hairy

- 13 Catkins sessile or nearly so
  - 14 Pedicels less than 1 mm long; styles over 0.7 mm long; leaves, if present, elliptic, entire or shallowly toothed; twigs of previous year chestnut to red, shining S. PHYLICIFOLIA L.
  - 14 Pedicels 1-2 mm long; styles less than 0.8 mm long; leaves, if present, obovate to oblanceolate, or if elliptic, then coarsely wavy-toothed; twigs of previous year yellowish to reddish-brown dull S. SCOULERIANA Barratt
- 13 Catkins on leafy peduncles
  - 15 Capsules on pedicels 2-5 mm long; style less than 0.5 mm long S. BEBBIANA Sarg.
  - 15 Capsules sessile or on pedicels less than 2 mm long; style over 0.5 mm long except in S. scouleriana
  - 16 Leaves glaucous or distinctly lighter beneath, variously hairy
    - 17 Plants mostly over 2 m high, most common at middle elevations in upland forests or burned-over areas; catkins appearing before the leaves; leaves, if present, obovate to oblanceolate S. SCOULERIANA Barratt
    - 17 Plants mostly less than 2 m high, most common in damp areas at higher elevations; catkins appearing with the leaves; leaves mostly elliptic to ovate
      - 18 Catkins 1-2 cm long; pedicels usually less than 0.5 mm long; petioles mostly 1-3 mm long S. BRACHYCARPA Nutt.
      - 18 Catkins over 2 cm long; pedicels often over 0.5 mm long; petioles mostly over 3 mm long S. GLAUCA L.
  - 16 Leaves nearly the same green above and beneath, silky hairy on both surfaces to almost without hairs
    - 19 Leaves over 3 times longer than wide, mostly less than 3 cm wide; catkins 1-3 cm long S. WOLFII Bebb.
    - 19 Leaves less than 3 times longer than wide, mostly over 2 cm wide; catkins 3-6 cm long S. COMMUTATA Bebb.
- 12 Mature capsules not hairy
  - 20 Leaves nearly the same green above and beneath

- 21 Leaves entire, not hairy; plants mostly less than 1 m high S. FARRAE Ball
- 21 Leaves either toothed or hairy; plant height various
  - 22 Larger leaves long-tapering to the tip; glandular processes on the petiole near base of leaf blade S. LASIANDRA Benth.
  - 22 Larger leaves more abruptly tapering to the tip; glandular processes absent S. NOVE-ANGLIAE Andress.
- 20 Leaves glaucous beneath or at least distinctly lighter beneath than above
  - 23 Leaves mostly entire; plants mostly less than 1 m tall S. FARRAE Ball
  - 23 Leaves mostly toothed; plants mostly taller
    - 24 Larger leaves long-tapering to the tip S. LASIANDRA Benth.
    - 24 Larger leaves more abruptly tapering to the tip
      - 25 Styles less than 0.7 mm long S. RIGIDA Muhl.
      - 25 Styles over 0.7 mm long S. MONTICOLA Bebb.
- 11 Plant without mature female catkins; with mature leaves
  - 26 Leaves mostly widest above the middle, usually at least sparsely hairy, distinctly lighter beneath than above; twigs often hairy; freshly stripped bark of living twigs of previous year usually with a "skunky" odor; most common in drier locations in upland forests or burned-over areas S. SCOULERIANA Barratt
- 26 Plant not with the above combination of characters
  - 27 Leaves distinctly lighter beneath than above, usually sparsely hairy, mostly elliptic, often entire; twigs of the year hairy, usually red-purple; mature buds usually with depressed margins; bark of older twigs cracked giving white-streaking appearance; in all willow habitats except high mountains S. BEBBIANA Sarg.
  - 27 Plant not with the above combination of characters

- 28 Leaves lanceolate to elliptic, not hairy or with very few scattered hairs, nearly the same green on both sides, toothed
S. LASIANDRA Benth.
- 28 Leaves not with the above combination of characters
  - 29 Leaves mostly entire, nearly the same green on both sides, densely silky hairy on both sides to almost without hairs; twigs of the year hairy
See separation 19 above
  - 29 Leaves not with the above combination of characters; twigs various
    - 30 Most leaves entire or nearly so
      - 31 Leaves conspicuously hairy
        - 32 Leaves usually sparsely to moderately hairy; petioles mostly over 3 mm long
S. GLAUCA L.
        - 32 Leaves usually densely hairy, the hairs often concealing the leaf surface; petioles mostly less than 3 mm long
S. BRACHYCARPA Nutt.
      - 31 Leaves without hairs or with very few scattered hairs
        - 33 Leaves dark green and shining above
S. PHYLICIFOLIA L.
        - 33 Leaves yellowish-green and dull above
S. FARRAE Ball
    - 30 Most leaves toothed
      - 34 Leaves not glaucous beneath although sometimes slightly lighter; twigs of the year and sometimes twigs of the previous year with long, spreading hairs
S. COMMUTATA Bebb.
      - 34 Leaves glaucous beneath; twigs of the year either not hairy or with short hairs appressed to the twigs
        - 35 Larger leaves long-tapering to the tip
S. LASIANDRA Benth.
        - 35 Larger leaves more abruptly tapering to the tip
          - 36 Leaf blades at the base mostly rounded or with their sides forming an angle greater than 90 degrees

Betula L. Birch

- 1 Plant shrubs from less than 1 to as much as 3 (6) m tall; fruit narrowly winged, the wings usually not so broad as the nutlet itself; young growth densely puberulent as well as strongly wart-glandular; leaves mostly 1-2 (but rarely up to 4) cm long, simply crenate-serrate or serrate, usually rather leathery; primarily in or near marshes, lakes, bogs and stream margins

B. GLANDULOSA Michx.

- 1 Plants mostly tall shrubs or small trees usually 4 (to 20) m tall; wing of the fruit usually at least as broad as the nutlet itself; young growth more often glabrous or crisp-pubescent than puberulent, sometimes scarcely at all warty; leaves various, often well over 4 cm long, mostly slightly lobed or doubly serrate, usually not leathery; plants of many habitats, not characteristically of swamps

B. OCCIDENTALIS Hook.

URTICACEAE Nettle Family

- 1 Plants with alternate, exstipulate, entire leaves and without stinging hairs PARIETARIA PENNSYLVANICA Muhl.
- 1 Plants with opposite, stipulate, toothed leaves, and stinging hairs URTICA DIOICA L.

LORANTHACEAE Mistletoe Family

Arceuthobium Bieb. Nom. Conserv. Dwarf Mistletoe

- 1 Flowers sessile or (the pistillate) with short, slender pedicels up to 1 mm long, usually in pairs at each node; staminate flower buds lenticular, the lateral perianth segments keeled; stems often over 2 mm thick and usually at least 3-4 cm long A. CAMPYLOPODUM Engelm.
- 1 Flowers terminal on short, lateral, jointed branches, the branches (at least those bearing staminate flowers) often more than 2 per node; staminate flower buds subglobose, neither lenticular nor with keeled lateral perianth segments; stems rarely as much as 2 mm thick, often less than 3 cm long A. AMERICANUM Nutt.

POLYGONACEAE Buckwheat Family

- 1 Leaves without sheathing stipules
ERIOGONUM
- 1 Leaves with evident (often membranous) sheathing stipules
- 2 Leaf blades reniform; perianth 4-parted nearly to the base; pistil 2-carpellary, the ovary strongly compressed
OXYRIA DIGYNA (L.) Hill
- 2 Leaf blades never reniform, if cordate or hastate then the perianth 5 (6)-lobed or -parted, the pistil 3-carpellary
- 3 Perianth segments usually 7 (rarely 4), 1 or more often with a grain like callosity on the outside; leaves not jointed to the stipular base
RUMEX
- 3 Perianth segments usually 5 (rarely 4 or 6), never with grain like callosities; leaves often jointed to the stipular base
POLYGONUM

Eriogonum Michx. Wild Buckwheat

- 1 Perianth narrowed to a slender stipelike base which is jointed to (and only slightly if at all thicker than) the pedicel, the stipe (0.5) 1-2 (3) mm long; flowering stems sometimes with a whorl of leaves (bracts) about midlength, the bracts of the inflorescence more or less verticillate
- 2 Involucres solitary at the tip of the naked flowering stems, with oblong and recurved lobes, ebracteate; perianth pilose-lanate below (very occasional specimens of E. umbellatum, which usually has a glabrous or only slightly pubescent perianth, will key here also)
E. CAESPITOSUM Nutt.
- 2 Involucres either more than 1 per flowering stem or the stem with a whorl of leaves from below midlength to immediately below the involucres
- 3 Perianth usually pubescent externally
- 4 Teeth of the (usually campanulate) involucres oblong, mostly (1.5) 3 (5) mm long, spreading to reflexed
E. UMBELLATUM Torr.

- 4 Teeth of the (commonly turbinate) involucre triangular to lanceolate, erect, usually less than 1.5 mm long; leaves various; plants usually caespitose
E. FLAVUM Nutt.
- 3 Perianth usually glabrous externally, rarely pubescent (in *E. heracleoides*) but then the involucre more than 1 and umbellate and the flowering stem with a whorl of leaves near midlength
- 5 Flowering stems usually with a whorl of foliaceous bracts at about midlength, these sometimes reduced to only 1 or 2 or even wanting; leaves mostly linear or linear-lanceolate to linear-oblong (oblongate), grayish-lanate on both surfaces or the upper surface only sparsely woolly and much less grayish, the blade at least 3 (usually well over 4) times as long as broad
E. HERACLEOIDES Nutt.
- 5 Flowering stems usually without floral leaves below the umbel, but occasionally with 1 or 2; leaf blades usually oblongate to elliptic or oval, rarely as much as 3 times as long as broad
E. UMBELLATUM Torr.
- 1 Perianth rounded to acute at base, narrowed to the point of attachment (joint) with the pedicel but without a slender stipelike base, occasionally narrowed to a more slender base usually less than 0.5 mm long (borderline plants are not included here if the inflorescence is verticillate-bracteate at base)
E. OVALIFOLIUM Nutt.

Polygonum L. Doorweed; Knotweed; Smartweed

- 1 Plants annuals, usually with small taproots and without nodally rooting branches, characteristically in dry areas, but sometimes on wet soil
- 2 Stems twinning; leaf blades sagittate-ovate
P. CONVULVULUS L.
- 2 Stems not twinning; leaves never sagittate
- 3 Pedicels becoming sharply recurved by (or shortly after) anthesis, the older flowers reflexed; plants spreading to erect; racemes elongate, the flowers not at all crowded, borne in the axils of bracts that are much reduced but gradually transitional to the leaves below
P. DOUGLASII Greene

3 Pedicels erect or spreading but not sharply reflexed; plants sometimes prostrate; flowers often greatly crowded in short terminal racemes, the bracts sometimes much exceeding the flowers

4 Flowers in terminal spikelike racemes, closely crowded and usually overlapping, borne in the axils of often considerably longer bracts; leaves linear to linear-lanceolate or linear-ob lanceolate, rarely over 2 mm broad, never with the lateral veins plainly visible; stems usually fairly sharply angled rather than terete and striate

5 Floral bracts mostly plainly white-margined, the upper ones often no longer than the flowers; plants very commonly over 7 cm tall

P. CONFERTIFLORUM Nutt.

5 Floral bracts only slightly or not at all white-margined, the upper ones usually exceeding the flowers; plants usually less than 7 cm tall

P. KELLOGGII Greene

4 Flowers mainly axillary to the leaves, seldom strongly crowded, the upper ones often borne in the axils of (and longer than) reduced bracts; leaves various, but often elliptic or oblong to obovate, commonly over 2 mm broad; stems mostly terete and longitudinally striate

6 Outer 3 perianth segments cucullate-keeled, longer and broader than the inner 2; leaves oval to obovate, rounded (obtuse); achenes usually included, smooth P. ACHOREUM Blake

6 Outer perianth segments generally not cucullate-keeled, usually only slightly (if at all) longer and broader than the inner 2; leaves linear to lanceolate or oblanceolate, often more or less acute; achenes mostly faintly striate, often exserted

P. AVICULARE L.

1 Plants perennials, often rhizomatous, generally growing in or near water, the stems tending to root freely wherever they touch the soil

7 Flowers borne in a single, terminal, pedunculate head on a leafless to bracteate or only few-leaved stem; plant from a short, thick rhizome, the leaves chiefly basal

- 8 Racemes mostly less than 1 (to 1.5) cm broad (when pressed), usually well over 3 times as long as broad, the lower flowers, at least, usually replaced by bulblets
P. VIVIPARUM L.
- 8 Racemes mostly at least 1.5 cm broad (when pressed), rarely (if ever) over 3 times as long as broad, with none of the flowers replaced by bulblets
P. BISTORTOIDES Pursh
- 7 Flowers in axillary as well as terminal racemes on foliate stems; plants various
P. AMPHIBIUM L.

Rumex L. Sorrel

- 1 Flowers mostly or entirely imperfect, the plants usually dioecious; leaves either sagittate or hastate, or the plant a strong montane to alpine perennial with numerous elliptic to oblanceolate leaves
- 2 Leaves tapered at each end, never at all sagittate or hastate; plants alpine to subalpine, with thick tap-roots; outer perianth segments not sharply reflexed in fruit
R. PAUCIFOLIUS Nutt.
- 2 Leaves in part (at least) hastate to sagittate; more or less weedy species, often with rhizomes; outer perianth parts sometimes sharply reflexed in fruit
R. ACETOSELLA L.
- 1 Flowers all (or mostly) perfect; leaves varied in shape but never hastate and only rarely sagittate; plants mainly of the lowlands
- 3 Plant strongly rhizomatous, the leaves usually leathery
R. VENOSUS Pursh
- 3 Plant not rhizomatous, usually with a strong taproot, the leaves various
- 4 Inner perianth segments becoming more or less strongly toothed or dissected (the teeth at least 1 mm long), one or more with a prominent callosity
R. MARITIMUS L.
- 4 Inner perianth segments entire to slightly erose or denticulate, but never toothed or dissected (the denticulations less than 1 mm long), sometimes without callosities
- 5 Valves without callosities, even in fruit
R. OCCIDENTALIS Wats.

- 5 Valves (1, 2, or all 3) with a prominent dorsal callosity
- 6 Stems unbranched below the inflorescence; petioles usually more or less papillate- or scabrid-puberulent; callosities often reticulate-pitted

R. CRISPUS L.

- 6 Stems with axillary (often much reduced) branches at some or all of the nodes below the inflorescence; petioles rarely scabrid- or papillate-puberulent; callosities not reticulate-pitted

R. SALICIFOLIUS Weinm.

CHENOPODIACEAE Goosefoot Family

- 1 Bracts and leaves strongly spinulose at the tips; flowers perfect; fruiting calyx broadly winged transversely

SALSOLA KALI L.

- 1 Bracts and leaves not spinulose, the spines (if any) cauline in origin; fruiting calyx usually not transversely winged but if so the flowers generally in part imperfect

- 2 Plants spinose-branched shrubs with linear, semi-terete leaves; embryo spirally coiled; endosperm lacking

SARCOBATUS VERMICULATUS
(Hook.) Torr.

- 2 Plants herbs or shrubs, if shrubby and at all spinose then with flattened leaves and with an annular embryo surrounding the endosperm

- 3 Leaves, at least those present at anthesis, linear to narrowly lanceolate, entire, densely hairy, sometimes stellate, and (like the rest of the plant) grayish to rufous; embryo annular, surrounding the endosperm
- 4 Pubescence largely stellate; plants monoecious, the pistillate flowers enclosed in 2 partially connate bractlets, but without a perianth; seed erect

EUROTIA LANATA (Pursh) Mog.

- 4 Pubescence simple; plants mostly perfect-flowered, all with a 5-merous, ultimately horizontally winged perianth; seed horizontal

KOCHIA SCOPARIA (L.) Schrad.

- 3 Leaves at anthesis either broader (than narrowly lanceolate) or toothed or not grayish-hairy; embryo sometimes spiral

- 5 Embryo spirally coiled; endosperm scant or lacking; leaves linear and more or less terete; flowers all axillary, borne singly, in clusters of 2-5 along the main stem, or in lateral spikes; perianth in fruit horizontally winged, transversely corrugate, or more or less corniculate
SUAEDA DEPRESSA (Pursh)Wats.
- 5 Embryo annular, usually surrounding a copious endosperm; flowers (at least in part) generally in crowded, bracteate to ebracteate spikes or panicles; perianth often neither horizontally winged, nor transversely corrugate, nor corniculate, sometimes lacking
- 6 Perianth (if any) consisting of a single (2 or 3) bractlike segment; smaller than the fruit and not enclosing it; seed vertical; annuals with entire to hastately lobed leaves MONOLEPIS NUTALLIANA (Schultes) Greene
- 6 Perianth 3- to 5- lobed; fruit at least partially enclosed by the perianth or by large subtending bracts; seeds often horizontal; annuals or perennials, the leaves often toothed
- 7 Flowers imperfect, the pistillate naked or with greatly reduced perianth but each subtended and enclosed by 2 accrescent, sepaloid bracteoles, the staminate flowers ebracteate and with a 3- to 5-lobed perianth
- 8 Plants (young herbage and branches) stellate-scurfy with small spreading hairs; bractlets of the pistillate flowers connate and ultimately closely investing the fruit, much compressed from the sides, wing-margined, and nearly orbicular in outline; shrubs with entire, oblanceolate leaves, the branches often spinose at the tip GRAYIA SPINOSA (Hook.) Mog.
- 8 Plants not stellate-scurfy; bractlets of the pistillate flowers mostly not connate, sometimes dorsiventrally compressed; herbs or shrubs, if shrubby then usually with broader, sometimes toothed leaves
ATRIPLEX
- 7 Flowers mostly perfect and with a regular, (3-4) 5-lobed perianth
- 9 Plants annual; perianth not winged in fruit
CHENOPODIUM
- 9 Plant perennial; perianth becoming carinate and transversely winged in fruit
KOCHIA SCOPARIA (L.) Schrad.

- 1 Plants dioecious, perennial shrubs, the main branches woody, more or less rigid, sometimes spinose at the tip
- 2 Plants woody only at the base, the younger stems herbaceous, rarely over 4 dm tall; fruiting bractlets not prominently winged lengthwise

A. GARDINERI (Mog.) Standl.

- 2 Plants woody almost throughout, usually over 4 dm tall; fruiting bractlets usually prominently winged lengthwise

A. CANESCENS (Pursh) Nutt.

- 1 Plants monoecious annuals, herbaceous, not at all (or only very slightly) woody at base
- 3 Leaves opposite below, generally alternate above (except sometimes when immature), usually not grayish-farinose on either surface, often glabrate, when farinose the farina not covering half the surface and the leaves greenish in appearance

A. HORTENSIS L.

- 3 Leaves sometimes alternate throughout, grayish-farinose on both surfaces or at least on the lower, the meal tending to cover the entire surface
- 4 Fruiting bracts 2-3 mm long, connate to the tip, cuneate, truncate or somewhat rounded and slightly 2- to 3 (5) -toothed across the tip, usually smooth on the back; leaves sessile to short-petiolate, truncate to subcordate or somewhat hastate at base, entire to undulate, but not toothed A. TRUNCATA (Torr.) Gray
- 4 Fruiting bracts mostly over 3 mm long, never at once cuneate and with a subtruncate tip, often conspicuously toothed or tuberculate on the back; leaves more commonly either cuneate at base, or petiolate, or with toothed margins
- 5 Plants rounded, mostly 2-5 (8) dm tall, native, not weedy; leaves entire to slightly toothed; pistillate bracts connate to well above the middle, often with a stipelike base, broadest above midlength, with greenish, foliaceous, usually strongly laciniate margins and mostly strongly tuberculate-appendaged and greatly hardened sides; radicle superior

A. ARGENTEA Nutt.

- 5 Plants erect, usually not rounded, 2-20 dm tall, introduced and usually weedy; leaves plainly dentate; pistillate bracts connate not quite to midlength, broadest at or below the middle, the greenish margin mostly dentate, the sides not greatly hardened and usually with only short tubercles; radicle lateral (i.e. intermediate between superior and inferior)
- A. ROSEA L.

Chenopodium L. Lamb's Quarters; Goosefoot; Pigweed

- 1 Seed usually erect, the fruit laterally flattened; leaves large, triangular, often hastate, greenish on both surfaces; flowers all glomerate in the axils and in a single terminal spike, or in both axillary and terminal, simple to compound spikes; perianth often turning red at maturity
- 2 Glomerules less than 4 mm broad, aggregated into numerous, axillary, simple to compound spikes; calyx not reddish and fleshy
- 3 Axillary glomerules simple; stems usually simple and erect
- C. HIANs Standl.
- 3 Axillary glomerules compound or if simple then stems low growing and spreading
- C. RUBRUM L.
- 2 Glomerules often over 4 mm broad at maturity of the flowers, mostly in a single, terminal spike, but sometimes in a more or less compound spike, the flowers terminal on the main branches; calyx often reddish and fleshy
- C. CAPITATUM (L.) Asch.
- 1 Seed mostly horizontal, the fruit flattened at the tip, if seed vertical then the leaves either farinose or not hastate; flowers more diffusely borne, not all in axillary glomerules of axillary and terminal spikes; perianth not reddish at maturity
- 4 Plant usually prostrate or low and spreading (erect); leaves lanceolate to oblong-ovate, green above, grayish-farinose beneath, sinuate-dentate; at least some of the fruits usually with the seed vertical
- C. GLAUCUM L.
- 4 Plant usually erect; leaves various but if grayish-farinose beneath then the seeds all horizontal

- 5 Leaf blades entire to once or twice hastately lobed at base, linear or oblong to triangular-ovate, the margin mostly not toothed; pericarp not tightly adherent to the seed
C. FREMONTII Wats.
- 5 Leaf blades usually toothed on the margin as well as frequently hastately lobed, the teeth sometimes inconspicuous; pericarp generally very tightly adherent to the seed
- 6 Leaves linear to narrowly lanceolate, only lightly if at all hastately lobed, usually at least 4 times as long as broad
C. LEPTOPHYLLUM (Mog.) Wats.
- 6 Leaves broadly lanceolate or ovate to triangular, often prominently hastately lobed, usually less than 4 times as long as broad
C. ALBUM L.

AMARANTHACEAE Amaranth Family

Amaranthus

- 1 Flowers in small axillary clusters, never in terminal elongate spikes; leaf blades rarely over 3 cm long
A. ALBUS L.
- 1 Flowers in terminal and axillary, simple to compound spikes; leaf blades usually well over 3 cm long
A. RETROFLEXUS L.

PORTULACACEAE Purslane Family

- 1 Flowers closely clustered in scorpioid umbels or panicles; sepals 2, scarious or scarious-margined; petals 2, 3, or 4, much less evident than the sepals; stigmas 2; stamens 1-3
SPRAGUEA UMBELLATA Torr.
- 1 Flowers single to many in usually open racemes or cymes; sepals 2-many, usually not scarious; petals mostly 5 or more, generally rather showy; often the stigmas more than 2 and the stamens more than 3
- 2 Plants annual or perennial, sometimes with slender rootstocks or stolons but never with fleshy corms or thick fleshy taproots; petals usually white (pinkish); sepals 2; stamens 2-5 MONTIA
- 2 Plants perennial, with fleshy corms or thick fleshy taproots; petals usually pink or red; sepals sometimes more than 2 and stamens often more than 5

- 3 Capsule circumscissile near the base, the lid sometimes splitting upward; sepals sometimes more than 2; petals and stamens often more than 5; stigmas frequently more than 3

LEWISIA

- 3 Capsule dehiscent downward by 3 valves; sepals 2; petals and stamens usually 5; stigmas 3

CLAYTONIA LANCEOLATA Pursh

Lewisia Pursh

- 1 Plants with a globose or ovoid corm not over 1 cm long; basal leaves lacking (rarely 2) at anthesis; cauline leaves 2-3 (4-5), approximately whorled

L. TRIPHYLLA (Wats.) Robins

- 1 Plant with a fleshy, often napiform or carrot-shaped root more than 1 cm long; basal leaves present at anthesis; cauline leaves usually reduced and bractlike, mostly alternate

- 2 Sepals (4) 5-9, imbricate; flowers 1 per scape, the peduncle readily disarticulating above the whorl of linear, scarious bracts that are borne about midlength of the scape

L. REDIVIVA Pursh

- 2 Sepals 2 (sometimes apparently 4 because of 2 immediately subtending bracts); flowers often 2-many, the pedicels not disarticulating; bracts not whorled

L. PYGMAEA (Gray) Robins

Montia L. Miner's Lettuce

- 1 Cauline leaves usually several, alternate, with narrow petioles or petiole-like bases that are generally slightly enlarged and scarious at the juncture with the stem; plant perennial or annual, if annual the petals not over 5 mm long and rarely exceeding the sepals

M. LINEARIS (Dougl.) Greene

- 1 Cauline leaves mostly opposite, frequently sessile, if alternate then the plant an annual and the petals at least twice as long as the sepals

M. CHAMISSOI (Ledeb.)

Robins & Fern.

CARYOPHYLLACEAE Pink Family

- 1 Calyx polysepalous, the segments distinct nearly or quite to the base
- 2 Styles nearly always 5; capsule narrowly cylindric, delicately membranous, mostly (1) 2-3 times as long as the calyx and curved near the tip, dehiscent by 10 usually revolute-margined teeth

CERASTIUM

- 2 Styles usually 3 or 4, if 5 then the capsule not cylindric and curved near the tip, but dehiscent by fewer than 10 teeth or valves
- 3 Styles normally 5 (4) alternate with the sepals; valves of the capsule entire, opposite the sepals

SAGINA SAGINOIDES (L.) Britt.

- 3 Styles usually 3 or if 4 or 5 then opposite the sepals and valves of the capsule alternate with the sepals
- 4 Petals more or less deeply bilobed, sometimes rudimentary or wanting; capsule dehiscent by twice as many teeth as there are styles; stamens and petals inserted under the ovary

STELLARIA

- 4 Petals usually rounded, rarely somewhat shallowly retuse; capsules often dehiscing by the same number of valves as there are styles, the valves entire or 2-toothed; stamens and petals often inserted at the edge of a distinct disc

ARENARIA

- 1 Calyx gamosepalous, forming a distinct tube that in most cases is longer than the lobes
- 4 Styles commonly 2, very occasionally 3
- 5 Petals appendaged at the juncture of the claw and blade
- 5 Petals neither appendaged nor clearly differentiated into claw and blade

SAPONARIA OFFICINALIS L.

VACCARIA SEGETALIS (Neck.) Garcke

- 4 Styles commonly 3 to 5
- 6 Styles normally 3, occasionally 4 or 5 but then the flowers usually perfect

SILENE

- 6 Styles normally 5, sometimes 4, the flowers then usually imperfect

LYCHNIS

Arenaria L. Sandwort

- 1 Leaves narrowly oblong to ovate or obovate, not acerose, mostly well over 2 mm broad; plants perennial; seeds often strophiolate A. LATERIFLORA L.
- 1 Leaves mostly narrowly linear and acerose, if (as rarely) over 1.5 mm broad then the plants annuals
- 2 Capsule dehiscent by 3 entire valves; plants mostly low and matted, usually not over 10 (but occasionally up to 15) cm tall, the primary leaves mostly less than 10 mm long, often with secondary leaves fascicled in their axils; flowers usually 10-many in open cymes; seeds plump, 0.5-1.5 mm long A. OBTUSILOBA (Rydb.) Fern.
- 2 Capsule dehiscent by 6 valves; plants mostly either with flowering stems well over 10 cm tall or the flowers closely aggregated in congested cymes; leaves often over 10 mm long, seldom with secondary leaves fascicled in their axils; seeds flattened and more or less wing-margined, (1.25) 1.5-3 mm long A. CONGESTA Nutt.

Cerastium L. Mouse-ear Chickweed

- 1 Plant a native perennial with petals at least half again as long as the sepals C. ARVENSE L.
- 1 Plant either an annual, or a weedy biennial or perennial and with petals subequal to the sepals C. VULGATUM L.

Lychnis L.

- 1 Flowers imperfect (the plants dioecious); blades of the petals well over 5 mm long L. ALBA Mill.
- 1 Flowers mostly perfect; blades of the petals less than 5 mm long L. DRUMMONDII (Hook.) Wats.

Silene L. Campion; Catchfly; Wild Pink

- 1 Plants annuals, more or less weedy, mostly in waste places, but often apparently native
  - 2 Plant glabrous above, often glandular in bands just below the nodes; blade of the petals 2-4 mm long
S. ANTIRRHINA L.
  - 2 Plant pubescent throughout, not glandular in bands below the nodes; blade of the petals 7-10 mm long
S. NOCTIFLORA L.
- 1 Plants native perennials, mostly montane or on undisturbed soil
  - 3 Calyx glabrous; plant a pulvinate perennial usually less than 10 cm tall
S. ACAULIS L.
  - 3 Calyx pubescent; plants usually over 10 cm tall
    - 4 Corolla, including the carpophore and blades, usually less than 10 (12) mm long; flowers in open leafy cymes
S. MENZIESII Hook.
    - 4 Corolla, including the carpophore and blades, usually over 12 mm long; flowers mostly subtended by considerably reduced bracts
      - 5 Appendages 4 or 6; petals equally 4-lobed or the middle lobes again deeply divided
S. OREGANA Wats.
      - 5 Appendages usually 2, if 4 then the blades bilobed or unequaly 4-lobed
S. PARRYI (Wats.) Hitchc. & Mag.

Spergularia (Pers.) J. & C. Presl Nom. Conserv. Sand Spurry

- 1 Stamens usually 10, rarely as few as 6 or 7
S. RUBRA (L.) J. & C. Presl
- 1 Stamens 2-5
S. MARINA (L.) GRISEB.

Stellaria L. Starwort; Chickweed

- 1 Leaves, at least the basal, tending to be oblong, ovate, or ovate-lanceolate, some usually more or less petiolate; flowers often single in the axils; petals usually much shorter than the sepals
  - 2 Flowers single in the axils

- 3 Leaves usually glabrous, the margins minutely crisped;
sepals scarious-margined, acute
S. CRISPA Cham. & Schlecht.
- 3 Leaves always ciliate at base, the margins not at all
crisped; sepals slightly if at all scarious-margined,
more or less obtuse S. OBTUSA Engelm.
- 2 Flowers in axillary or terminal cymes
S. CALYCANTHA (Ledeb.) Bong.
- 1 Leaves linear to lanceolate, all usually sessile; flowers
mostly in cymes or umbels, rarely single; petals often
exceeding the sepals
- 4 Petals rudimentary or absent, less than half the length
of the 2-3 mm sepals; stems and pedicels very slender;
flowers more or less numerous in scarious-bracteate,
umbellate cymes S. UMBELLATA Turcz.
- 4 Petals usually well over half as long as the sepals which
are often over 3 mm long; stems and pedicels stouter;
flowers single to many and cymose, the cymes sometimes
leafy-bracteate
- 5 Flowers axillary, not cymose; petals at least as long
as the sepals
- 6 Leaves mostly linear or linear-lanceolate, stiff,
sharply acute; sepals about 4 mm long at anthesis
S. LONGIPES Goldie
- 6 Leaves from linear-lanceolate to oblong, acutish
to obtuse, not stiff; sepals often less than 4 mm
long at anthesis S. CRASSIFOLIA Ehrb.
- 5 Flowers few to many in cymes; petals often shorter
than the sepals
- 7 Cymes leafy-bracteate; petals shorter than the
sepals, sometimes wanting
S. CALYCANTHA (Ledeb.) Bong.
- 7 Cymes either membranous-bracteate or the petals
longer than the sepals
- 8 Leaf margins very finely tuberculate-scaberulous
as viewed under a strong (30-power) lens
S. LONGIFOLIA Muhl.
- 8 Leaf margins smooth
S. LONGIPES Goldie

RANUNCULACEAE Buttercup Family

- 1 Flowers very irregular, bilaterally symmetrical, showy
- 2 Upper sepal spurred but not hooded; petals 4, not concealed by the sepals

DELPHINIUM

- 2 Upper sepal hooded but not spurred; petals usually 2, concealed inside the hood

ACONITUM COLUMBIANUM Nutt.

- 1 Flowers essentially regular, often inconspicuous
- 3 Petals prominently spurred, showy; fruit of several follicles; plant perennial

AQUILEGIA

- 3 Petals not at once prominently spurred and showy (often lacking), if spurred (as in Myosurus) then inconspicuous, the fruit other than follicular, and the plant an annual
- 4 Plant a scapose, linear-leaved annual; flowers inconspicuous; sepals spurred; fruit achenial, the achenes numerous in a slender spicate cluster on a much elongate receptacle MYOSURUS

- 4 Plant usually perennial; flowers generally showy; fruit often follicular or baccate, when achenial the achenes not borne in a spicate cluster
- 5 Pistil 1; fruit a berry; leaves large, several times dissected ACTAEA RUBRA (Ait.) Willd.

- 5 Pistils usually 2 or more; fruit an achene or a follicle; leaves various
- 6 Fruit a 1-seeded achene

- 7 Perianth consisting of both the calyx and corolla, the corolla more showy than the calyx RANUNCULUS

- 7 Perianth either consisting only of the calyx, or the corolla present but less showy than the calyx

- 8 Sepals inconspicuous, usually greenish (white), less showy than the stamens; cauline leaves (if any) alternate

- 9 Leaves simple, palmately lobed; flowers perfect TRAUTVETTERIA

- 9 Leaves ternately decomposed; flowers often imperfect

THALICTRUM

- 8 Sepals usually conspicuous and more showy than the
stamens; cauline leaves opposite or whorled
- 10 Cauline leaves opposite; plants sometimes woody
and viny; achenes with a long plumose style;
sepals usually 4 CLEMATIS
- 10 Cauline leaves usually in a whorl of 3; plants never
woody or viny; styles short and glabrous to long
and plumose; sepals mostly 5 or more
ANEMONE
- 6 Fruit a 2- to many-seeded follicle
- 11 Leaves simple, the margins merely crenate or dentate
CALTHA LEPTOSEPALA DC.
- 11 Leaves deeply 5-lobed to nearly compound
TROLLIUS LAXUS Salisb.

Anemone L. Wind Flower

- 1 Styles plumose 2-3.5 cm long at maturity; flowers very
showy, the sepals 2-4 cm long; (A. patens)
A. NUTALLIANA DC.
- 1 Styles much less than 1.5 cm long usually not plumose
at maturity; the sepals less than 2 cm long
A. MULTIFIDA Poir.

Aquilegia L. Columbine

- 1 Sepals blue or purple to white
A. COERULEA James
- 1 Sepals yellow to pinkish or red
A. FLAVESCENS Wats.

Clematis L. Virgin's Bower; Vase Flower

- 1 Sepals bluish to reddish or brownish-purple; flowers
single, terminal and pedunculate on the main or on axillary
stems
- 2 Plants herbaceous perennials, not at all viny; flowers
solitary at the tips of the main stems; sepals leathery,
connivent at base; leaves pinnately dissected
C. HIRSUTISSIMA Pursh

- 2 Plants somewhat woody vines; flowers terminal on short axillary stems; sepals neither leathery nor connivent at base; leaves ternate or ternately dissected
C. COLUMBIANA (Nutt.) T. & G.
- 1 Sepals white or yellowish; flowers paniculate
C. LIGUSTICIFOLIA Nutt.

Delphinium L. Larkspur

- 1 Stems notably fistulose, (6) 10-30 dm tall; roots extensive and tough and fibrous, rather than fleshy; leaves with 5-7 main lobes that are variously toothed but not dissected; flowers not particularly showy the sepals rarely over 12 mm long, cupped forward rather than flared; plants of wet habitats, usually in mt. meadows or along streams; the following three species are very closely related and are separable only rather arbitrarily
  - 2 Follicles usually hairy all over (rather glabrous); racemes compact, many-flowered, the pedicels often no longer than the calyx spurs; flowers often whitish-streaked or pale blue D. OCCIDENTALE Wads.
  - 2 Follicles usually either glabrous or pubescent only along the sutures; racemes more or less open, the pedicels generally longer than the spurs; calyx deep purplish
  - 3 Follicles glabrous on the sutures; basal and lower cauline leaves divided $2/3$ - $3/4$ ($4/5$) of their length into (usually) 5 lobes, the larger blades up to 15-20 cm broad D. GLAUCUM Wads.
  - 3 Follicles hairy along the sutures; basal and lower cauline leaves divided almost full length (over $4/5$ of the length) into (usually) 7 main segments, the larger blades seldom over 12 cm broad
D. BROWNII Rydb.
- 1 Stems either not fistulose or the plant otherwise not as above; several of the following species approach D. occidentale, but each can be separated either because of the larger, more showy, flared sepals or because of the habitat, many occurring on dry, open, sagebrush slopes

- 4 Plants usually tall and often somewhat fistulose-stemmed, primarily of wet habitats (the area often drying by mid-season); root system extensive; branched and fibrous (woody) rather than tuberous

D. BURKEI Greene

- 4 Plants of varied habit, usually occurring in dry habitats, such as on sagebrush slopes or in open forests, if (as occasionally) in wet areas, then the root system very small, and fleshy or tuberous rather than tough and fibrous
- 5 Leaves strongly dimorphic, those of midstem closely overlapping and much shorter-petiolate and more finely divided and more closely spaced than the lower ones; plants with small clusters of somewhat fleshy roots, finely crisp-puberulent D. BURKEI Greene
- 5 Leaves not noticeably dimorphic, usually rather uniformly spaced and not overlapping; plants various
- 6 Stems 1-several and often over 4 dm tall, from an extensive root system, mostly glabrous, at least below the inflorescence, usually not glandular pubescent; lower petals blue; sepals various, often cupped forward rather than widely flared

D. GLAUDESCENS Rydb.

- 6 Stems mostly single (or occasionally several), rarely over 4 dm tall, often pubescent with either straight or glandular hairs, if glabrous then the lower petals white or the racemes broad (because of the spreading pedicels), or the sepals unequal and usually rather broad (oblong to somewhat ovate), always widely flared than cupped forward
- 7 Lower petals deep blue, shallowly notched, the sinus rarely over $1/5$ the length of the blade; sepals unequal, the lowest pair much the longest

D. BICOLOR Nutt.

- 7 Lower petals variously colored, often white or pale blue, but very heavily pencilled, deeply notched, the sinus usually $1/4$ - $1/2$ the length of the blade; sepals more nearly equal

D. NUTTALLIANUM Pritz.

Myosurus L. Mouse-tail

- 1 Beak of the achenes well developed, (0.5) 0.8-1.5 mm long; mature spike mostly 5-10 mm long, with 20-50 (90) achenes; sepals various, usually 1-nerved
M. ARISTATUS Barth.
- 1 Beak of the achenes inconspicuous, seldom over 0.5 (0.7) mm long; spike mostly (8) 15-25 mm long at maturity, and often with over 100 achenes; sepals 3 (5) nerved
M. MINIMUS L.

Ranunculus L. Buttercup; Crowfoot

- 1 Leaves entire to serrate but none dissected or compound, sometimes lobed at the tip and then the stems stolonous; scale of the nectary forming a distinct pocket, the margins adnate the full length or free for as much as half their length; achenes glabrous (very sparsely pubescent), the cluster usually less than 1 cm broad
- 2 Achenes 50-200 in a columnar head, longitudinally ribbed
R. CYMBALARIA Pursh
- 2 Achenes less than 50 or in a more or less globular head, not longitudinally ribbed
- 3 Stems decumbent to prostrate, rooting at the nodes, frequently appressed-pubescent; sepals usually hairy; nectary scale generally considerably broader than long
R. FLAMMULA L.
- 3 Stems erect, not rooting at the nodes, usually glabrous or sometimes the petioles and pedicels pubescent; nectary scale at least as long as broad
R. ALISMAEFOLIUS Geyer
- 1 Leaves (at least in part) deeply lobed to compound, if simple the achenes usually finely puberulent or the cluster of achenes about 1 cm broad; nectary scale various; achenes sometimes hairy or spiny
- 4 Achenes prominently cross-corrugated; petals white or with a white blade and yellowish claw; nectary scale very short to almost obsolete, broader than long, forming a minute pocket or a mere thickening; plants aquatic
R. AQUATILIS L.

- 4 Achenes not prominently cross-corrugated; petals usually yellow; plants mostly terrestrial; nectary scale generally rather prominent, often with free margins
- 5 Plants aquatic or semi-aquatic, often with some finely dissected submerged leaves, the stems usually creeping and often nodally rooting; nectary scale conspicuous, more or less adnate to the petal, the margins and tip generally free, bearing the gland on the exposed (ventral) surface rather than concealed beneath it; achenes glabrous, either beakless or with a beak much less than 0.5 mm long, or with corky thickening on the margins
- 6 Plant annual, erect, not nodally rooting, mostly over 15 cm tall; stylar beak almost lacking, somewhat corky, not over 0.2 mm long; nectary scale usually with a free margin surrounding the gland

R. SCELERATUS L.

- 6 Plant perennial, usually with floating or reclining and nodally rooting stems and less than 15 cm tall; stylar beak commonly well over 0.2 mm long; nectary scale often completely fused with the petal and without free margins above
- 7 Leaves 5-15 mm long, never finely dissected, merely 3- or 5-lobed, the lobes entire or shallowly notched; stylar beak less than 0.3 mm long; nectary scale free only at the base and along the sides

R. NATANS C.A.Meyer

- 7 Leaves either well over 15 mm long or rather finely dissected; stylar beak mostly over 0.3 mm long; nectary scale usually with a free border all around the gland (R. purshii) R. GMELINII DC.
- 5 Plants not aquatic and with dissected leaves, the stems mostly not nodally rooting; achenes either hairy or with a conspicuous beak but not corky-thickened on the margin
- 8 Achenes only moderately compressed (the thickness at least 1/3 the dorsiventral width), often finely pubescent; nectary scale usually short, its margins adnate to the petal nearly or quite to the tip, forming a small pocket; receptacle usually elongating markedly in fruit and sometimes becoming as much as 10 times as long as at anthesis

- 9 Achenes in a semiglobular cluster (7) 10-30 mm broad; petals (6) 8-15 mm long, the nectary scale (1) 1.5-3 mm long, more or less oblong, adnate nearly or quite to the tip, the upper margin often ciliate; plant glabrous to sparsely hirsute above, but long-hirsute on the basal stipules and more or less tomentose toward the tips of the main roots; stems mostly ascending to somewhat decumbent, seldom over 15 cm tall

R. GLABERRIMUS Hook.

- 9 Achenes usually in a more elongate or much narrower cluster; petals often less than 6 mm long, the nectary scale usually less than 1 (rarely 1.5) mm long, often broader than long, its upper margin not ciliate; plants often pilose, the roots not tomentose; stems mostly erect and often well over 15 cm tall

- 10 Achenes finely pubescent (sometimes glabrate)

- 11 Roots enlarged and clavate, abruptly rounded, tuberlike, 1-2.5 (3) cm long, 2-5 mm thick; stems rarely up to 10 cm tall; basal leaves (if any) deeply divided into 3-5 oblanceolate lobes

R. JOVIS A.Nels.

- 11 Roots not modified as above but tapered gradually to the tip; stems mostly over 10 cm long

- 12 Petals (if any) 2-6 (8) mm long; basal leaf blades cunneate, at least some of them usually no more than crenate R. INAMOENUS Greene

- 12 Petals either over 8 mm long or the basal leaves deeply lobed or divided, often cordate

R. ESCHSCHOLTZII Schlecht.

- 10 Achenes glabrous

- 13 Petals mostly over 8 mm long, if shorter (5-8 mm) then the basal leaves all lobed at least half their length; plants mostly 5-20 cm tall

R. ESCHSCHOLTZII Schlecht.

- 13 Petals usually not over 5 mm long but if longer (to 8 mm) then the basal leaves (at least in part) merely deeply crenate or the stems well over 2 dm tall

- 14 Beak of the achene 0.1-0.2 mm long; achenes 20-45 per flower

R. ABORTIVUS L.

- 14 Beak of the achene 0.7-0.9 mm long; achenes 50-100 per flower

R. INAMOENUS Greene

8 Achenes strongly compressed, often discoid (the thickness less than the dorsiventral width), never pubescent; nectary scale elongate, the margins free for at least the upper $1/2$ to $2/3$ ($3/4$) of their length; receptacle in fruit not over 2-3 times the length at anthesis

- 15 Beak of the achenes straight, 2.5-4 mm long; basal leaves apparently pinnately 5- to 7-lobed; petals usually more than 10 mm long

R. ORTHORHYNCHUS Hook.

- 15 Beak of the achenes often recurved or hooked, seldom over 2.5 mm long; basal leaves seldom pinnately lobed; petals sometimes less than 10 mm long

- 16 Petals considerably longer than the sepals, usually well over 7 (5-18) mm long; basal leaves simple or if compound and with stalked leaflets then the stems either nodally rooting or enlarged and bulbous or cormose at the base R. OCCIDENTALIS Nutt.

- 16 Petals mostly over slightly if at all longer than the sepals, usually much less than 7 mm long (if plant borderline in this respect, then the basal leaves compound but the stems neither nodally rooting nor enlarged and bulbous or cormose at base)

- 17 Basal leaf blades (in part at least) compound, the leaflets usually stalked; receptacle elongating in fruit to at least 3 times its length in flower

R. MACOUNII Britt.

- 17 Basal leaf blades simple, the lobation not extending full length R. UNCINATUS D. Don

Thalictrum L. Meadow Rue

- 1 Flowers perfect, racemose or paniculate; plants either subscapose or with anthers not over 1 mm long

T. SPARSIFLORUM Turcz.

- 1 Flowers usually at least in part imperfect, borne in panicles; plants mostly dioecious, with leafy stems; anthers never less than 1 mm long

- 2 Achenes spreading to reflexed, elliptic-fusiform in outline, (4) 5-8 (10) mm long, usually less than half as broad, membranous-walled, moderately flattened; stigma commonly purplish, with the style usually 3-4.5 mm long; pistillate inflorescence open, rather leafy, the pedicels slender, of approximately the same length and longer than the achenes; leaflets not prominently veined, 1.5-3 cm long

T. OCCIDENTALE Gray

- 2 Achenes often erect or ascending, 3-6 mm long, either subterete and narrowly elliptic in outline, or obliquely obovate-elliptic in outline and strongly compressed; stigma rarely purplish, with the style 1.5-3.5 mm long; pistillate inflorescence often congested, inconspicuously bracteate, some of the pedicels often shorter than the achenes; leaflets mostly 1-2 cm long, often prominently veined
T. VENULOSUM Trel.

FUMARIACEAE Fumitory Family

- 1 Outer pair of petals similar, both spurred or saccate at the base; plants scapose
DICENTRA UNIFLORA Kell.
- 1 Outer pair of petals dissimilar, only 1 of them spurred or saccate; plants leafy-stemmed
CORYDALIS AUREA Willd.

CRUCIFERAE Mustard Family

- 1 Fruit stipitate, the stipe at least 1 mm long
THELYPODIUM
- 1 Fruit sessile or the stipe less than 1 mm long
  - 2 Pod composed of 2 distinct segments, the basal portion usually valvular, although often indehiscent, usually seed-bearing, sometimes sterile, the upper segment often not valvular, sometimes fertile but more commonly sterile, sometimes consisting entirely of the scarcely narrowed, often flattened or otherwise beaklike style
BRASSICA
  - 2 Pod composed of only one segment, this seed-bearing; style often conspicuous but smaller in diameter than the valves and mostly not beaklike
  - 3 Fruit a silicle, varying from cordate to oval, somewhat oblong, elliptic, or obcordate, sometimes didymous or only 1-seeded
  - 4 Silicles from greatly compressed to somewhat inflated, but never globose or terete in section, and not didymous
  - 5 Seeds 1 per locule
    - 6 Plant a densely stellate perennial with sessile, appressed, many-rayed hairs; flowers yellow
LESQUERELLA ALPINA (Nutt.) Wats.

- 6 Plant various, but (except sometimes in Alyssum, an annual) not with sessile, many-rayed stellae; flowers often not yellow
- 7 Plant scapose; pubescence not stellate or malpighiaceous DRABA
- 7 Plant not scapose; pubescence stellate or malpighiaceous ALYSSUM ALYSSOIDES L.
- 5 Seeds 2 or more per locule
- 8 Plant a scapose, white-flowered perennial 1-3 cm tall; silicles ovoid, leathery DRABA
- 8 Plant not scapose, or over 3 cm tall, or with other than an ovoid, leathery silicle
- 9 Silicles oblong to elliptic, usually over twice as long as broad DRABA
- 9 Silicles oval to obovate, not over twice so long as broad
- 10 Petals yellow; plants perennial, densely stellate with appressed hairs LESQUERELLA ALPINA (Nutt.) Wats.
- 10 Petals usually white, if yellow or purplish then plants either annual or not appressed-stellate
- 11 Style not over 2 mm long; silicles oval in outline, less than 5 mm long; petals not bilobed ALYSSUM ALYSSOIDES L.
- 11 Style mostly 3-4 mm long; silicles oval-elliptic to obovate, usually at least 5 mm long; petals sometimes bilobed CAMELINA
- 4 Silicles from conspicuously to only slightly obcompressed, or so greatly inflated as to be terete and often didymous
- 12 Plant aquatic, scapose, the leaves linear, more or less terete, acicular SUBULARIA AQUATICA L.
- 12 Plant not aquatic or if apparently so then not scapose and leaves not acicular
- 13 Fruits inflated, sometimes didymous
- 14 Petals yellow (rarely purplish); seeds usually more than 1 per locule
- 15 Pubescence stellate; plants usually of dry areas
- 16 Silicles 7-20 mm long, often didymous, or at least with a distinct apical sinus 2-4 mm deep, often cordate at base PHYSARIA

- 16 Silicles not didymous, usually without an apical sinus, less commonly with a sinus as much as 1 mm deep, but the silicles then not over 7 mm long, never cordate-based
LESQUERELLA ALPINA
(Nutt.) Wats.
- 15 Pubescence, if any, unbranched; plants usually of wet places RORIPPA
- 14 Petals white or purple; pubescence never sessile-stellate; seeds 1 per locule
CARDARIA PUBESCENS
(Meyer) Jarm.
- 13 Fruit more or less obcompressed, rather than inflated
- 17 Silicles obcordate to triangular, with more than 1 seed per locule; cauline leaves auriculate
CAPSELLA BURSA-PASTORIS (L.)
- 17 Silicles not obcordate or triangular, or seeds only 1 per locule, or cauline leaves not auriculate
- 18 Plant stellate-pubescent
PHYSARIA
- 18 Plant glabrous to pubescent with simple (never stellate) hairs
- 19 Seeds 1 per locule
LEPIDIDIUM
- 19 Seeds 2-several per locule
THLASPI
- 3 Fruit an elliptic to linear silique, normally (i.e. in normal specimens) more than 1-seeded
- 20 Petals yellow (sometimes very pale) to orange
- 21 Plant conspicuously pubescent with 2-rayed (malpighiaceus) or occasionally 3- or 4-rayed, sessile, appressed hairs oriented with the axis of the leaf or stem
ERYSIMUM
- 21 Plant glabrous to variously pubescent, but not with predominantly malpighiaceus or 3- or 4-rayed sessile hairs
- 22 Style (or what appears to be the style) beak-like, nearly as broad as the valves
BARBAREA ORTHOCERAS Ledeb.
- 22 Style not beaklike, if prominent then much narrower than the valves
- 23 Seeds biseriate
- 24 Pubescence unbranched or lacking

- 25 Leaves simple; plants often scapose;
siliques strongly compressed
DRABA
- 25 Leaves often pinnate; plants never scapose;
siliques terete to slightly compressed
RORIPPA
- 24 Pubescence branched to stellate
  - 26 Plant a scapose perennial with simple, entire
leaves DRABA
  - 26 Plant annual or biennial; leaves 1-3 times
pinnatifid DESCURAINIA
- 23 Seeds uniseriate
  - 27 Plant stellate-pubescent; leaves 1-3 times
pinnatifid DESCURAINIA
  - 27 Plant with simple pubescence; leaves simple to
pinnatifid
    - 28 Style at least 0.3 mm long
      - 29 Cauline leaves auriculate or cordate-
clasping BARBAREA ORTHOCERAS Ledeb.
      - 29 Cauline leaves not auriculate or cordate-
clasping RORIPPA
    - 28 Style less than 0.3 mm long
SISYMBRIUM
- 20 Petals white or pinkish to purple, never yellow
  - 30 Seeds biseriate
    - 31 Plant a scapose perennial; siliques compressed
DRABA
    - 31 Plant leafy-stemmed; siliques various
RORIPPA
      - 32 Siliques much elongate, usually at least 8
times as long as broad
ARABIS
      - 32 Siliques rather short, less than 8 times as
long as broad DRABA
  - 30 Seeds uniseriate
    - 33 Pubescence simple (not branched) or lacking
      - 34 Cauline leaves (at least some of them)
pinnate or pinnatifid
CARDAMINE
      - 34 Cauline leaves entire to toothed
        - 35 Anthers tending to coil after dehiscence
THELYPODIUM
        - 35 Anthers not coiling after dehiscence

- 36 Leaves (in part at least) compound
CARDAMINE
- 36 Leaves simple or occasionally lyrate-pinnatifid
  - 37 Plant either with rhizomes or tubers or entirely glabrous and only 2-10 cm tall; style 1-2 mm long
CARDAMINE
  - 37 Plant never rhizomatous or tuberous, usually somewhat hairy, mostly over 10 cm tall; style various
ARABIS
- 33 Pubescence branched to stellate
  - 38 Leaves, including those that are cauline, pinnatifid
    - 39 Petals white; style usually at least 0.5 mm long; plants alpine or subalpine
SMELOWSKIA CALYCINA
(Steph.) C. A. Mey.
    - 39 Petals usually cream, if white the style less than 0.5 mm long or plants neither alpine nor sub-alpine
DESCURANINIA
  - 38 Leaves, at least those that are cauline, mostly simple
    - 40 Siliques usually with a short stipe at least 0.5-1 mm long
THELYPODIUM
    - 40 Siliques sessile or with a stipe less than 0.5 mm long
      - 41 Plants biennials, glabrous and glaucous
THELYPODIUM
      - 41 Plants either annuals or perennials, or if biennials then not glabrous and glaucous
ARABIS

- 1 Seeds wingless or (as in *A. hirsuta*) with a wing barely as much as 0.3 mm broad; siliques erect, often tightly appressed, not over 2 mm broad; flowers usually white but sometimes slightly pinkish- to lavender-tinged
- 2 Cauline leaves usually auriculate; plants mostly well over 3 dm tall, strongly hirsute at base
- 3 Seeds uniseriate, the siliques noticeably compressed; outer sepals gibbous-based
A. HIRSUTA (L.) Scop.
- 3 Seeds biseriate, the siliques only slightly compressed; outer sepals not gibbous-based
A. GLABRA (L.) Bernh.
- 2 Cauline leaves not auriculate; plants usually less than 3 dm tall, often not at all or only sparsely hirsute at base
A. NUTTALLII Robins
- 1 Seeds winged, the wing often over 0.3 mm broad; siliques erect to reflexed, frequently over 2 mm broad; flowers white to pink or purple
- 4 Basal leaves oblanceolate to oblanceolate-obovate, rounded or only slightly acutish, usually pannose with tiny, grayish, dendritic hairs; plants 0.5-2 dm tall, arising from a multicipital caudex; racemes 3- to 10-flowered, secund in flower; pedicels 2-6 mm long; siliques ascending to spreading or slightly reflexed
A. LEMMONI Wats.
- 4 Basal leaves either not pannose, or (if pannose) then distinctly acute or narrow or plants well over 2 dm tall or in other ways not as above
- 5 Plants mostly under 2 (3 or occasionally to 7) dm tall (if over 2 dm tall the stems notably slender); perennial with (usually) a multicipital caudex; basal leaves elliptic-oblanceolate to narrowly oblanceolate, 1.5-3 cm long, 1.5-4 (5) mm broad, acute; siliques ascending-erect to arcuate-spreading but not reflexed; seeds uniseriate; plants usually either with markedly glabrous and fleshy leaves or with many very slender stems scarcely 1 mm thick
- 6 Stems barely 1 mm thick at midlength; basal leaves usually toothed, glabrous or (more commonly) copiously pubescent and somewhat grayish with several-branched hairs
- 7 Siliques ascending to slightly spreading, 4-5.5 cm long; petals 3 to 4 mm long
A. MICROPHYLLA Nutt.

- 7 Silques divergent to occasionally reflexed 1 to 2.5 cm long; petals 4.5 to 5.5 mm long; known only from Undine Falls area   A. FRUCTICOSA A. Nels.
- 6 Stems usually well over 1 mm thick at midlength; basal leaves all entire, greenish or fleshy, mostly glabrous but sometimes finely hairy
A. LYALLII Wats.
- 5 Plants mostly well over 3 dm tall, but if shorter then usually with a simple crown, or with reflexed siliques, or in other ways not as above
- 8 Leaves, except sometimes the upper ones, densely pubescent and often grayish with small dendritic hairs, never ciliate with simple or forked hairs; siliques spreading-arcuate to pendulous, but the pedicel curved rather than abruptly reflexed; cauline leaves auriculate   A. LIGNIFERA A. Nels.
- 8 Leaves greenish to grayish, the hairs usually bi- or trifurcate to stellate rather than dendritic, but if dendritic then either the leaves with long, simple or forked cilia, or the siliques sharply reflexed, or the cauline leaves not auriculate
- 9 Seeds biseriate, the wing nearly 1 mm broad at the widest point; siliques strictly erect, 2-3 mm broad; pubescence (if any) of the lower stem simple to bifurcate, often appressed; basal leaves mostly malpighiaceus-pubescent
A. DRUMMONDII Gray
- 9 Seeds uniseriate (partially uniseriate in A. divaricarpa), the wing not over 0.5 mm broad; siliques erect to reflexed, 1-2.5 mm broad; pubescence of the lower stem often stellate to dendritic; basal leaves mostly with trifurcate to stellate or dendritic hairs
- 10 Pubescence of the lower stems and leaves predominantly trifurcate; siliques mostly straight, from rather stiffly erect to spreading
A. DIVARICARPA A. Nels.
- 10 Pubescence more freely branched; siliques mostly either distinctly arcuate or conspicuously reflexed
- 11 Siliques ascending to spreading-drooping, 4-12 cm long, usually strongly arcuate; pedicels not geniculate and abruptly reflexed at the base   A. SPARSIFLORA Nutt.

- 11 Siliques pendulous, 3-7 cm long, nearly or quite straight; pedicels usually geniculate and abruptly reflexed at the base, if gradually curved downward then the cauline leaves not auriculate
A. HOLBOELLII Hornem.

Brassica L. Mustard

- 1 Beak conspicuously flattened, 3-nerved; valves 3-nerved
B. KABER (DC.) Wheeler
1 Beak more or less terete, usually 1-nerved; valves 1-nerved
B. CAMPESTRIS L.

Camelina Crantz False Flax

- 1 Stems strongly hirsute-stellate, at least below; silicles mostly 5-7 mm long; pedicels seldom over 15 mm long
C. MICROCARPA Andrez.
1 Stems sparsely hairy to glabrous at the base; silicles 7-9 mm long, usually about 2/3 as broad; pedicels often over 15 mm long
C. SATIVA (L.) Crantz

Cardamine L. Bitter Cress

- 1 Leaves simple
C. CORDIFOLIA Gray
1 Leaves compound, at least in part
2 Plants perennial with well-developed (although sometimes short and thickened) rhizomes; petals 3-7 mm long
C. BREWERI Wats.
2 Plants annual or biennial (short-lived perennial?) from a taproot, not rhizomatous; petals 2-4 mm long
C. OLIGOSPERMA Nutt.

Descurainia Webb & Berth. Nom. Conserv. Tansy Mustard

- 1 Leaves, at least the lower ones, bi- or tripinnate; siliques narrowly linear, mostly over 20-seeded; seeds uniseriate; replum of the silique 2- to 3-nerved
D. SOPHIA (L.) Webb

- 1 Leaves mostly pinnate or the siliques clavate or the seeds either less than 20 or partially biseriate; replum of the silique nerveless or 1-nerved
- 2 Siliques somewhat clavate, rounded above, only slightly or not at all torulose; replum usually not nerved
D. PINNATA (Walt.) Britt.
- 2 Siliques linear or at least not clavate, pointed above, strongly torulose; replum 1-nerved
D. RICHARDSONII (Sweet) Schulz

Draba L.

- 1 Plant an annual
  - 2 Upper portion of the stem and (usually) the pedicels pubescent
D. PRAEALTA Greene
  - 2 Upper portion of the stem and the pedicels glabrous
    - 3 Leaves usually all basal and rosulate, but rarely 1 or 2 of them cauline, their upper surfaces usually glabrous
D. CRASSIFOLIA R. Grah.
    - 3 Leaves usually not all basal and rosulate, but several of them cauline, their upper surfaces often pubescent
      - 4 Pedicels 1-5 (usually at least 1.5) times as long as the elliptic or elliptic-oblong to oblong-oblong-olate fruits; silicles 2-3 mm broad
D. NEMOROSA L.
      - 4 Pedicels rarely as much as 1.5 times as long as the narrowly oblong fruits; silicles 1.5-2.3 mm broad
D. STENOLOBA Ledeb.
- 1 Plant a biennial or perennial
  - 5 Plant a low, scapose, white-flowered perennial mostly 2-6 cm tall; leaves oblanceolate, 5-10 mm long, 1-2 mm broad, very strongly ciliate with simple hairs and often also pubescent with 1- or 2-forked hairs, the midnerve very prominent; silicles oblong-ovate, 3-6 mm long, 1.5-2 mm broad, apiculate, the style 0.1-0.2 mm long, 10- to 20-seeded
D. FLADNIZENSIS Wulfen
  - 5 Plant various, but not at once as above if, as sometimes, white-flowered
    - 6 Stems leafy, the plant usually not caespitose nor matted

- 7 Style very short or lacking, generally less than 0.2 mm long
- 8 Leaves densely pubescent on both surfaces with simple and forked to stellate hairs; petals white or cream
D. PRAEALTA Greene
- 8 Leaves generally sparsely pubescent, the upper surface often glabrous; petals mostly yellow
- 9 Pedicels mostly shorter than the silicles which are narrowly elliptic or narrowly lanceolate-elliptic, 5-12 mm long, and 2-3 mm broad; cauline leaves only 1 or 2
D. CRASSIFOLIA R. Grah.
- 9 Pedicels mostly equalling or exceeding the silicles which are linear to narrowly oblong, 8-22 mm long and 1.5-2.3 mm broad; cauline leaves usually several
D. STENOLOBA Ledeb.
- 7 Style present, generally conspicuous, at least 0.2 mm long
D. AUREA Vahl.
- 6 Stems mostly leafless; plants usually caespitose and matted
- 10 Style lacking (rarely 0.15 mm long); plant a short-lived perennial, not matted
D. CRASSIFOLIA R. Grah.
- 10 Style usually well over 0.15 mm long; plants commonly matted and caespitose
- 11 Pubescence of the leaves (especially that of the lower surfaces) wholly or in large part of sessile or short-stalked, 2-rayed, doubly pectinate hairs, many of which lie parallel to the leaf axis
- 12 Leaves averaging less than 1.5 mm broad; pubescence of the leaves closely appressed
D. OLIGOSPERMA Hook.
- 12 Leaves averaging about 2 mm broad; pubescence of the leaves not closely appressed
D. INCERTA Pays.
- 11 Pubescence of the leaves simple to stellate, never doubly pectinate
- 13 Leaves almost glabrous except for prominent, straight, simple cilia, although the lower surfaces sometimes sparsely pubescent with forked to stellate hairs
D. DENSIFOLIA Nutt.

- 13 Leaves pubescent (often cinereous) on both surfaces
- 14 Leaves 0.75-1.5 mm broad, conspicuously ciliate with long, simple and bifurcate hairs, the midnerve prominent beneath, the lower surfaces with elongate, tangled, branched hairs, the upper surfaces with simple and forked hairs

D. PAYSONII Macbr.

- 14 Leaves usually at least 2 mm broad, pubescent with cruciate to stellate hairs, the midnerve not prominent

D. VENTOSA Gray

Erysimum L. Wallflower

- 1 Petals usually less than 10 (3.5-11) mm long; style rarely more than 1.5 mm long
- 2 Siliques 1.5-3 cm long; petals 3.5-5 mm long; plant an annual
E. CHEIRANTHOIDES L.
- 2 Siliques mostly 2.5-5 cm long; petals 7-11 mm long; plant a biennial to short-lived perennial
E. INCONSPICUUM (Wats.) MacM.
- 1 Petals more than 11 mm long, or style more than 1.5 mm long
E. ASPERUM (Nutt.) DC.

Lepidium L. Pepper Grass

- 1 Cauline leaves auriculate to pseudo perfoliate, ovate
L. PERFOLIATUM L.
- 1 Cauline leaves neither auriculate or pseudo perfoliate
- 2 Silicles oblong-obovate, widest above the middle; petals generally lacking or vestigial; cotyledons incumbent or very slightly oblique
L. DENSIFLORUM Schrad.
- 2 Silicles elliptic to oval, widest near the middle or below; petals sometimes conspicuous or cotyledons oblique to accumbent
- 3 Silicles approximately elliptic, distinctly longer than broad; cotyledons incumbent; petals lacking or vestigial
L. RAMOSISSIMUM A. Nels.
- 3 Silicles elliptic-rotund to nearly orbicular, nearly or quite as broad as long; cotyledons accumbent to oblique (ours); petals usually rather conspicuous, 1-3 mm long
L. VIRGINICUM L.

Physaria (Nutt.) Gray

- 1 Styles 7-9 mm long; replum obovate to broadly oblong, not constricted; siliques coarsely pubescent with spreading dendritic hairs; ovules 4 on each side of the replum
P. DIDYMOCARPA (Pays.) Rollins
- 1 Styles 4-6 mm long; replum oblong, constricted; siliques densely pubescent, with appressed stellate hairs; ovules 2 on each side of the replum
P. AUSTRALIS (Hook.) Gray

Rorippa Scop.

- 1 Petals white (sometimes purple-tinged), 3-6 mm long; plants aquatic
R. NASTURTIUM-AQUATICUM
(L.) Schinz & Thell.
- 1 Petals yellow, often less than 3 mm long
- 2 Pedicels (3) 4-12 mm long, usually at least as long as the fruits; silique ovate to oblong, 3-8 (12) mm long, 2-3 mm broad; stems mostly erect, 3-10 dm tall
R. ISLANDICA (Oed.) Borbas
- 2 Pedicels mostly (1) 2-4 (7) mm long, usually markedly shorter than the fruits; silique from linear to oval, 2-15 mm long; stems commonly somewhat spreading to decumbent, rarely over 4 dm tall
- 3 Siliques oval to oblong-lanceolate, 2-6 (8) mm long, 2-2.5 mm broad, usually not arcuate
R. OBTUSA (Nutt.) Britt.
- 3 Siliques linear, 6-14 mm long, 1-1.5 mm broad, usually arcuate
R. CURVISILIQUA (Hook.) Bessey

Sisymbrium L.

- 1 Pedicels slender, 7-20 mm long, much less thick than the fruit; siliques ascending to erect, 2-3.5 cm long
S. LOESELII L.
- 1 Pedicels stout, 4-10 mm long, nearly as thick as the fruits; siliques spreading, rigid, 5-10 cm long
S. ALTISSIMUM L.

Thelypodium Endl.

- 1 Cauline leaves mainly or entirely sessile and auriculate
at base T. SAGITTATUM (Nutt.) Endl.
- 1 Cauline leaves petiolate or at least not auriculate
T. INTEGRIFOLIUM (Nutt.) Endl.

Thlaspi L.

- 1 Plant annual; style not more than 0.1-0.2 mm long
T. ARVENSE L.
- 1 Plant perennial; style more than 0.3 mm long
T. PARVIFLORUM A. Nels.

CRASSULACEAE Stonecrop or Orpine Family

Sedum L. Stonecrop

- 1 Flowers usually pink to purple (white); leaves mostly
on the flowering stems, strongly flattened, persistent
on the stems through the season, often toothed
- 2 Petals greenish or white to pink, mostly 8-10 mm long;
flowers perfect S. RHODANTHUM Gray
- 2 Petals usually purple, never over 5 mm long; flowers
mostly imperfect S. ROSEUM (L.) Scop.
- 1 Flowers usually yellow, but sometimes drying to pinkish;
leaves mostly basal along the creeping stems and sterile
shoots, those of the flowering stems entire, generally
deciduous by late anthesis
S. LANCEOLATUM Torr.

SAXIFRAGACEAE Saxifrage Family

- 1 Pistil 4-carpellary, with 4 parietal placentae; stigmas almost or quite sessile; stamens 5, alternate with simple to fimbriate staminodia PARNASSIA

- 1 Pistil usually 2 or 3 (4 or 5) -carpellary and mostly with 2-3 axils or parietal placentae; stigmas usually borne on well-developed styles; stamens (3) 5-10; staminodia lacking

- 2 Ovary 1-celled and with usually 2 (less commonly 3) parietal to semibasal placentae

- 3 Styles or style branches 3; petals white or pinkish, lacinate; plants usually bulblet-bearing in the leaf axils or on the underground parts

LITHOPHRAGMA

- 3 Styles or style branches normally 2; petals mostly either greenish or not lacinate; plants usually not bulblet-bearing

- 4 Petals entire

- 5 Flowers paniculate or thyrsoid, at least in the lower part of the often almost spicate inflorescence; seeds finely echinulate in longitudinal rows; stamens usually 5; calyx never narrowly turbinate HEUCHERA

- 5 Flowers racemose; seeds rarely echinulate but if so then the calyx narrowly turbinate; stamens sometimes 3 or 10 CONIMITELLA WILLIAMSII

(D.C.Eat.) Rydb.

- 4 Petals trifid to pectinately lobed

MITELLA PENTANDRA Hook.

- 2 Ovary 2 (rarely 3-5) -celled, the placentation axile

- 7 Styles partially connate; petals pink to deep red; calyx campnulate, usually reddish, (5) 6-10 mm long; leaves alternate, petiolate

TELESONIX JAMESII (Torr.) Raf.

- 7 Styles free above the ovuliferous portion of the ovary; petals usually white, but if (as rarely) pink or red (to purple) then either the calyx not at once campanulate, red and so much as 6 mm long, or the leaves sessile and opposite

SAXIFRAGA

Heuchera L. Alumroot

- 1 Calyx at anthesis mostly 2-3 mm long, regular, turbinate at the adnate base, the hypanthium flared and somewhat saucer-shaped, nearly as long as the spreading lobes, 1-1.3 mm long, lined with a thin glandular disc that more or less covers the almost completely inferior ovary; petals broadly elliptic to ovate

H. PARVIFOLIA Nutt.

- 1 Calyx at anthesis usually well over 3 mm long, often oblique, generally campanulate at base and the hypanthium cup-shaped, the lobes usually erect, most 1.5 mm long; hypanthium not gland-lined or if so the disc not covering the top of the ovary, the ovary usually no more than half inferior; petals often lanceolate to oblanceolate or wanting

H. CYLINDRICA Dougl.

Lithophragma Nutt. Prairie Star; Woodland Star

- 1 Seeds muricate; basal leaves glabrous or very sparsely pubescent; flowers mostly 2-5 (7), more or less corymbose at anthesis, later becoming "racemose", but the lower pedicels usually elongate and mostly 1.5-3 times as long as the calyx; cauline leaves often bulbiferous; petals usually 5-lobed

L. BULBIFERA Rydb.

- 1 Seeds from nearly smooth (slightly wrinkled) to verrucose or reticulate but never muricate; basal leaves moderately to copiously pubescent at least on the lower surface; flowers (sometimes as few as 4 or 5) usually 6-11, racemose, the lower pedicels mostly subequal to (to half again as long as) the calyx; cauline leaves not bulbiferous; petals often only 3-lobed

- 2 Calyx obconic-cyathiform, (3) 4-6 mm long at anthesis, mostly 6-10 mm long in fruit; ovary at least 2/3 inferior; petals commonly 3-lobed

L. PARVIFLORA (Hook.) Nutt.

- 2 Calyx more nearly campanulate, 2-3 (3.5) mm long at anthesis and 3.5-5 mm long in fruit; ovary about 1/2 inferior; petals mostly 5 (7) -lobed

L. TENELLA Nutt.

Parnassia L. Grass-of-Parnassus

- 1 Petals fringed on the lower half

P. FIMBRIATA Konig.

- 1 Petals not fringed on the lower half

- 2 Leaf blades elliptic to elliptic-ovate, neither truncate nor cordate at the base; bract never at all clasping; petals usually 5-veined, mostly 4-7 mm long, rarely over 1.5 times as long as the calyx lobes

P. PARVIFLORA DC.

- 2 Leaf blades from lanceolate to broadly ovate, often cordate; bract often clasping; petals 7- to 13-veined, mostly (6) 7-12 mm long, usually over 1.5 times as long as the calyx lobes

P. PALUSTRIS L.

Saxifraga L. Saxifrage

- 1 Leaves entire, mostly linear to lanceolate, usually 1 or more of them borne on the flowering stems below the inflorescence

S. BRONCHIALIS L.

- 1 Leaves toothed to lobed, or if entire then all basal

- 2 Leaves (or some of them) with 3 apical cuspidate teeth, otherwise entire; petals white, usually reddish-to purplish-spotted; ovary not more than 1/5 inferior

S. BRONCHIALIS L.

- 2 Leaves various, but not with 3 apical cuspidate teeth; petals various; ovary often more than 1/5 inferior

- 3 Flowers rarely more than 10; ovary usually at least 1/2 inferior at anthesis, if less than half inferior then most of the flowers replaced by bulbils; leaf blade generally not more than 2 cm in width or length; at least 2 or 3 of the leaves usually cauline

- 4 Leaves mostly narrowly oblong-cuneate to oblanceolate-obovate, apically 3 (5-7) -toothed or -lobed into sometimes linear segments; some of the leaves (especially the basal) usually entire, the petiole (if any) generally broad, no longer than (and not clearly distinguishable from) the blade; bulbils lacking

S. CAESPITOSA L.

- 4 Leaves (at least in part) reniform and rather evenly lobed, the basal ones with a slender petiole at least as long as the blade; bulbils usually present in the inflorescence or in the axils of the basal leaves

S. CERNUA L.

- 3 Flowers usually more than 10; ovary often less than 1/2 inferior at anthesis; flowering stems usually leafless although sometimes bracteate; leaf blades usually well over 2 cm in length or width
- 5 Leaves more or less orbicular, or reniform or cordate at base, usually broader than long; filaments clavate
S. ARGUTA D. Don
- 5 Leaves never reniform, mostly flabellate to lanceolate or obovate, usually much longer than broad; filaments often not clavate
- 6 Ovary less than half inferior at anthesis, the stamens inserted at the edge of a narrow bandlike gland or nectary surrounding but not covering the top of the ovary; plants mostly 1-2.5 (rarely to 3) dm tall; leaves regularly crenate-serrate; filaments often clavate
S. OCCIDENTALIS Wats.
- 6 Ovary either over half inferior at anthesis or plants averaging over 3 dm tall; stamens inserted at the edge of a flattened, lobed disc that more or less covers the greater part of the ovuliferous portion of the pistil; leaves usually entire to sinuate or remotely denticulate, rather than regularly crenate-serrate; filaments not clavate
- 7 Flowering stems mostly 3-12 dm tall; inflorescence elongate and narrow to openly corymbose, rarely less than 1 dm long in late anthesis; leaves usually well over 5 cm long, slenderly ovate to oblanceolate, narrowed gradually to a sessile base or to a broadly winged petiole, neither the leaves nor the bracts ever reddish pilose-lanate
S. OREGANA Howell
- 7 Flowering stems mostly not over 3 dm tall; inflorescence often congested and less than 1 dm long even in fruit; leaves various, frequently with narrow petioles, they and the bracts sometimes reddish-pilose
S. RHOMBOIDEA Greene

GROSSULARIACEAE Currant or Gooseberry Family

Ribes L. Currants and Gooseberries

- 1 Plants with spines or prickles at the nodes and often also along the internodes and on the fruit (these sometimes very few in number and reduced in size)
- 2 Free hypanthium shallowly cup-shaped or saucer-shaped; pedicels jointed below the ovary; racemes 3- to 15-flowered
- 3 Leaves copiously pubescent and more or less glandular, 1-2.5 (4) cm broad; berries reddish; pedicels stout, rarely as much as twice as long as the bracts
R. MONTIGENUM McClatchie
- 3 Leaves glabrous or only sparsely pubescent, never glandular, mostly 2-5 (7) cm broad; berries deep purple; pedicels slender, often at least twice as long as the bracts
R. LACUSTRE (Pers.) Poir.
- 2 Free hypanthium tubular or campanulate, rarely cup-shaped but never saucer-shaped; pedicels not jointed near the ovary; racemes (1) 2- to 5-flowered
- 4 Stamens at least twice as long as the petals, sometimes exceeding the extended sepals and conspicuously exerted
R. INERME Rydb.
- 4 Stamens usually about as long as the petals, rarely as much as twice their length, never as long as the extended sepals and not conspicuously exerted even with the sepals reflexed
R. SETOSUM Lindl.
- 1 Plants without prickles or spines; pedicels jointed below the ovary; flowers usually more than 5 (rarely as few as 2) per raceme (wild currants)
- 5 Free hypanthium campanulate to cylindric, never saucer-shaped or shallowly cup-shaped, at least as long as broad; ovary never with sessile, yellow, crystalline glands; flowers sometimes bright yellow
- 6 Hypanthium twice as long as the sepals; berry red
R. CEREUM Dougl.
- 6 Hypanthium about equaling the sepals; berry bluish to black
R. VISCOSISSIMUM Pursh
- 5 Free hypanthium saucer-shaped or very shallowly cup-shaped, broader than long; ovary sometimes with sessile, yellowish, crystalline glands; flowers never bright yellow
R. HUDSONIANUM Richards

ROSACEAE Rose Family

- 1 Plants prickly-bearing; leaves pinnate; carpels several, enclosed within the globose to urceolate calyx (in fruit the calyx usually reddish and fleshy but the carpels themselves dry) ROSA

- 1 Plants not at once prickly-bearing, pinnate-leaved with several carpels enclosed within a globose to urceolate and ultimately fleshy calyx

- 2 Calyx adnate to the compound, 2- to 5-carpellary, more or less completely inferior ovary; ripe fruit fleshy; deciduous trees or shrubs

- 3 Leaves pinnate, the leaflets 5-17

SORBUS SCOPULINA Greene

- 3 Leaves simple

AMELANCHIER ALNIFOLIA Nutt.

- 2 Calyx sometimes enclosing (but not adnate to) the 1 to several superior, 1-carpellary ovaries; ripe fruit dry to fleshy; plants herbaceous, shrubby, or rarely arborescent

- 4 Plant a shrub or small tree with large, deciduous, simple leaves and racemose flowers; pistils 1-5; fruit fleshy, drupaceous

PRUNUS VIRGINIANA L.

- 4 Plant an herb or shrub, if shrubby the leaves often persistent, or lobed to compound; pistils 1-many, if 1 or 5 the fruit not drupaceous; flowers usually perfect

- 5 Leaves deciduous, simple, cuneate, deeply 3-toothed at the tip, otherwise entire, revolute-margined, greenish above, tomentose beneath; pistils 1 (2); erect, rigidly branched shrubs

PURSHIA TRIDENTATA

(Pursh)DC.

- 5 Leaves various but if cuneate and 3-toothed then the pistils more than 2, or plants herbaceous or evergreen

- 6 Plant a prostrate shrub with freely rooting branches; leaves simple, crenate, evergreen; flowers single, pedunculate at branch ends

DRYAS OCTOPETALA L.

- 6 Plants herbaceous or if shrubby then not trailing; leaves lobed to compound; flowers not single

- 7 Plant an erect, unarmed shrub with toothed or lobed (but never compound) leaves; pistils (1) 2-7

- 8 Leaves palmately 3- to 5-lobed; calyx usually stellate; fruit a somewhat inflated, several-seeded follicle, dehiscent on both sutures
PHYSOCARPUS MALVACEUS
(Greene) Kuntze
- 8 Leaves pinnately many-lobed to toothed; calyx not stellate; fruit an achene or a follicle dehiscent only on the adaxial suture
SPIRAEA
- 7 Plant often herbaceous but if an erect shrub then with compound leaves, or with prickles, or with numerous (more than 7) pistils
- 9 Stamens in ours 5; pistils usually 2-15
- 10 Leaves ternate; style laterally attached to the ovary
SIBBALDIA PROCUMBENS L.
- 10 Leaves pinnately dissected; style subterminal
IVESIA GORDONII (Hook.) T. & G.
- 9 Stamens 10 or more; pistils usually numerous
- 11 Stamens 10; anthers dehiscing lengthwise by slits on the inner (adaxial) face; perennials with pinnate leaves, the leaflets (5) 7-19, sometimes dissected
HORKELIA FUSCA Lindl.
- 11 Stamens either more than 10 or, if 10, then the plants annuals or biennials with nondissected pinnae
- 12 Calyx ebracteolate; plants rhizomatous, stoloniferous, or trailing to erect, sometimes armed shrubs; mature fruit an aggregation of weakly coherent drupelets
RUBUS
- 12 Calyx bracteolate; plant various, but mostly herbaceous, never armed; mature fruit an achene, often borne partially embedded in the fleshy receptacle
- 13 Receptacle enlarged and hemispheric, in fruit becoming spongy or fleshy; leaves usually ternate; stems strongly stolonous, freely rooting at the nodes
FRAGARIA
- 13 Receptacle not becoming spongy or fleshy and strawberry-like; leaves various but if ternate the stems rarely if ever stolonous
- 14 Style slender, apical, straight to bent or geniculate, persistent in fruit, although (if jointed) the upper segment usually deciduous; leaves usually lyrate-pinnatifid
GEUM
- 14 Style various, apically to laterally or almost basally inserted, straight, or only 1 segment, jointed to the achene and usually deciduous (or readily broken off); leaves various, but rarely if ever lyrate-pinnatifid
POTENTILLA

Fragaria L. Strawberry

- 1 Leaves bright yellow-green and not glaucous on the upper surface, relatively thin and more or less veiny, the upper surface slightly bulged between the primary lateral veins and almost always somewhat pilose-silky; terminal tooth of the leaflets relatively well developed, usually projecting beyond the uppermost lateral teeth; inflorescence commonly equaling or surpassing the leaves

F. VESCA L.

- 1 Leaflets glaucous and somewhat bluish-green on the upper surface, rather thick and not very prominently veiny, the upper surface not bulged between the veins and nearly always glabrous; terminal tooth of the leaflets small, usually surpassed by the adjacent lateral teeth; inflorescence commonly shorter than the leaves

F. VIRGINIANA Duchesne

Geum L.

- 1 Sepals reflexed in flower; hypanthium saucer-shaped, lined with a glandular disc at least on the lower half; styles strongly geniculate and jointed, the persistent (longer) portion hooked at the tip
- 2 Lower (persistent) segment of the style eglandular, glabrous or slightly hirsute near the base; terminal segment of the basal leaves somewhat larger than the main lateral lobes but similarly cuneate-based

G. ALEPPICUM Jacq.

- 2 Lower (persistent) segment of the style somewhat glandular-pubescent; terminal segment of the basal leaves many times larger than the main lateral lobes and usually rounded to subcordate at base

G. MACROPHYLLUM Willd.

- 1 Sepals ascending to erect; hypanthium turbinate to bowl-shaped, the lower half usually not disc-lined; styles often neither geniculate nor jointed and hooked on the persistent portion
- 3 Petals erect to convergent, the flower somewhat vase-shaped, usually closed; cauline leaves 2 (4) opposite, their bases more or less sheathing

G. TRIFLORUM Pursh

- 3 Petals spreading, or at least not erect or convergent, the flower more nearly rotate; cauline leaves 1 to several, alternate
G. ROSSII (R.Br.) Ser.

Potentilla L. Cinquefoil; Five-finger

- 1 Flowers purple to deep red
P. PALUSTRIS (L.) Scop.
- 1 Flowers white, cream, or yellow
2 Plant shrubby; ovaries and achenes strongly hirsute
P. FRUTICOSA L.
- 2 Plant herbaceous; ovaries and achenes glabrous
3 Plants annuals or biennials or perhaps sometimes short-lived perennials but without rootstocks, the leaves never white-tomentose on the lower surface; stamens 10-20
4 Stems stiffly hirsute below with unicellular, more or less pustular based, spreading hairs; achenes usually strongly undulate-corrugate longitudinally; stamens (15) 20; petals mostly at least 3/4 as long as the sepals
P. NORVEGICA L.
- 4 Stems soft-pubescent below, often with glandular or with multicellular or semitomentose pubescence; achenes smooth or very slightly striate; stamens mostly 10-15; petals usually less than 3/4 as long as the sepals
P. BIENNIS Greene
- 3 Plants perennials, usually with well-developed rootstocks; leaves often white-tomentose on the lower surface; stamens 20-30 (40)
5 Flowers single on naked peduncles; plants strongly stoloniferous and with multipinnate leaves
P. ANSERINA L.
- 5 Flowers usually several on more or less leafy flowering stems; plants not stoloniferous; leaves often ternate to palmate
6 Style slenderly fusiform, usually roughened at or below midlength, attached somewhat below midlength of the ovary; leaves pinnate, with 5-11 leaflets; stamens about 25, sometimes up to 40

- 7 Cymes narrow and strict (often much elongate), the lateral branches almost erect; sepals mostly 6-8 mm long at anthesis; petals pale yellow ("white"), usually equaling to slightly exceeding (by 1-2 mm) the sepals; plants mostly over 4 dm tall

P. ARGUTA L.

- 7 Cymes usually open to diffuse, sometimes glomerate, the lateral branches not tightly appressed; sepals often less than 6 mm long; petals pale to deep yellow, if pale yellow ("white") then usually shorter than the sepals or the plants mostly less than 4 dm tall or the inflorescence open P. GLANDULOSA Lindl.
- 6 Style usually tapered from the base, or filiform or attached near the top of the ovary; leaves palmate or if pinnate often with more than 11 leaflets; stamens often 20
- 8 Basal leaves predominately odd-pinnate, at least some with 5 or more leaflets, few (if any) digitate although occasionally a few ternate
- 9 Leaflets usually oblong, (1) 2-5 cm long, grayish-tomentose beneath and often grayish-strigose on the upper surface, rarely toothed over halfway to the midvein; plants often over 3 (and rarely less than 2) dm tall
- 10 Anthers 0.5-0.7 mm long; leaves usually unmis- takably pinnate P. HIPPIANA Lehm.
- 10 Anthers over 0.8 mm long; leaves subdigitate P. GRACILIS Dougl.
- 9 Leaflets usually less than 2 cm long or otherwise not as above, often either greenish or dissected much more than halfway to the midvein; if gray or tomentose then the plants usually less than 2 dm tall
- 11 Pinnae mostly 5-7, crowded, often in part digi- tate, obovate to oblong; mostly 1-3 (5) cm long, usually greenish on both surfaces (never tomen- tose); plants (1) 1.5-4.5 dm tall P. DIVERSIFOLIA Lehm.
- 11 Pinnae either more numerous, or tomentose at least beneath; plants often less than 1.5 dm tall P. OVINA Macoun
- 8 Basal leaves predominantly digitate, although some- times with only 3 leaflets (ternate)

- 12 Flowers mostly well under 1 cm broad, born on nearly filiform pedicels in leafy-bracteate cymes; plants with numerous, ascending, conspicuously leafy stems; leaflets 0.5-2.5 cm long, greenish above, whitish-lanate beneath, toothed well over halfway to the midvein; style thickened and glandular at the base

P. ARGENTEA L.

- 12 Flowers mostly over 1 cm broad, born in inconspicuously bracteate cymes; plants usually with most of the leaves basal rather than cauline; leaves various but never greenish above and lanate beneath if the flowers are less than 1 cm broad; styles often filiform and not warty glandular at the base

- 13 Plants alpine (or subalpine), (1) 1.5-4.5 dm tall; leaflets mostly 1-3.5 (to 5) cm long, usually greenish or nearly equally grayish-sericeous on both surfaces; anthers mostly 0.4-0.6 mm long

P. DIVERSIFOLIA Lehm.

- 13 Plants mostly from the lowlands to medium elevations in the mountains, as much as 8 dm tall; leaflets (2) 3-8 (12) cm long, often tomentose beneath or much paler on the lower than on the upper surface; anthers mainly 0.8-1.3 mm long

P. GRACILIS Dougl.

Rosa L. Rose

- 1 Stems more or less bristly with slender prickles, the infrastipular prickles, if present, not differentiated from the others

R. ACICULARIS Lindl.

- 1 Stems mostly with well-defined infrastipular prickles, or sometimes nearly unarmed

R. WOODSII Lindl.

Rubus L. Bramble; Blackberry; Raspberry

- 1 Plants unarmed

R. PARVIFLORUS Nutt.

- 1 Plants armed with bristlelike to broad-based and often curved prickles

R. IDAEUS L.

Spiraea L.

- 1 Petals pink to red; inflorescence and the lower surface of the leaves often puberulent

S. DENSIFLORA Nutt.

- 1 Petals white or with only a pale pinkish or lavender tinge; plant glabrous or merely ciliolate on the leaves and bracts

S. BETULIFOLIA Pall.

LEGUMINOSAE Pea Family

- 1 Stamens distinct; leaves trifoliolate; flowers yellow, racemose; pod several times as long as the calyx

THERMOPSIS MONTANA Nutt.

- 1 Stamens more or less connate; leaves various but if trifoliolate then the flowers other than yellow and racemose or the pods barely exceeding the calyx

- 2 Herbage thickly dotted with small glands; leaflets either 3 (less commonly 5) or the fruits covered with hooked spines

GLYCYRRHIZA LEPIDOTA Pursh

- 2 Herbage seldom at all glandular-punctate but if so then the fruits neither burlike nor the leaves trifoliolate

- 3 Leaves trifoliolate, usually shallowly toothed; mature fruits either spirally coiled or more or less completely enclosed within the calyx

- 4 Pod falcate to coiled, very heavily veined, sometimes prickly; flowers either few and borne in axillary, pedunculate, small heads, or more numerous and racemose, yellow or purplish

MEDICAGO

- 4 Pod neither falcate to coiled nor spiny; flowers mostly numerous in heads or racemes, often other than yellow or purplish

- 5 Flowers in long narrow racemes, white or yellow; plants usually 0.5-3 m tall

MELILOTUS

- 5 Flowers in heads or short spikes, mostly other than yellow but if yellow then the plants usually decumbent or at least much less than 0.5 m tall

TRIFOLIUM

- 3 Leaves seldom trifoliolate but if so then the leaflets entire or the pods elongate beyond the calyx and not coiled

- 6 Leaves palmately compound; leaflets (4) 5-17
- 7 Flowers in elongate racemes; stamens monadelphous
LUPINUS
- 7 Flowers in heads or headlike spikes or racemes;
stamens diadelphous TRIFOLIUM
- 6 Leaves not palmately compound
- 8 Pods much constricted between the seeds, breaking
crosswise into 1-seeded segments; keel sometimes
equaling or considerably exceeding the wings
HEDYSARUM
- 8 Pods not conspicuously constricted between the seeds,
dehiscing lengthwise rather than breaking crosswise;
keel usually shorter than the wings
- 9 Leaves even-pinnate, the rachis prolonged as a slender
bristle or a simple or branched tendril; plants often
scandent VICIA AMERICANA Muhl.
- 9 Leaves odd-pinnate or at least with a terminal leaf-
let, the rachis not prolonged as a bristle or tendril
(although the terminal leaflet sometimes confluent
with rachis); plants not scandent
- 10 Leaves trifoliolate; pods pubescent; flower yellow
MEDICAGO
- 10 Leaves pinnate; leaflets usually at least 5; pods and
flowers various
- 11 Keel of the corolla abruptly narrowed to a beaklike
point; plants usually without leafy stem
OXYTROPIS
- 11 Keel of the corolla not abruptly beaked; plants
mostly with leafy stems
ASTRAGALUS

Astragalus L. Locoweed; Milk Vetch; Rattlepod

KEY USABLE ON FLOWERING MATERIAL

- 1 Leaflets 5-11, linear-elliptic, all continuous with the rachis
and mucronate or pinulose at the tip; raceme 1- to 3-flowered,
short-pedunculate or sessile, the small flowers (banner
4-8 mm long) usually appearing axillary; pod less than 1 cm
long, 1-locular A. KENTROPHYTA Gray
- 1 Leaflets not as above, if all continuous with the rachis, then
the racemes several-flowered and long-pedunculate and
the flowers larger
- 2 Pubescence of the herbage dolabriform
A. CANADENSIS L.

- 2 Pubescence basifixed, all leaflets jointed to the rachis, the leaves imparipinnate
- 3 Stipules at the lowest nodes (and sometimes at all) fully amplexicaul and connate opposite the petiole, or (if the lowest nodes bladeless) the stipules united around the stem as a low collar or sheath
- 4 Banner (measured along the curvature of the midvein) over 15 mm long
  - 5 Stems and herbage villous-hirsute with horizontally spreading hairs up to 1-2 mm long; pod pendulous, stipitate, glabrous, 2-locular
A. DRUMMONDII Hook.
  - 5 Stems and herbage pilose or strigillose, the hairs either appressed or, if loose, then less than 1 mm long; pod either erect or 1-locular (A. dasyglottis)
A. AGRESTIS Dougl.
- 4 Banner not over 15 mm long
  - 6 Banner 10-15 mm long
    - 7 Wings deeply bidentate at the apex; pod stipitate, laterally compressed
A. ABORIGINUM Richards.
    - 7 Wings entire or at most shallowly truncate-emarginate
    - 8 Flowers erect, subsessile, closely crowded in ovoid heads; caudex subterranean, with few to numerous partially buried branches; calyx tube 4-7 mm long; pods hirsute (A. dasyglottis)
A. AGRESTIS Dougl.
    - 8 Flowers variously oriented, but if erect then loosely racemose or plant otherwise not as in A. agrestis
      - 9 Stems arising singly or few together from slender, widely creeping and adventitiously rooting, subterranean caudex branches; plants of cool or moist soils in the mts.
A. ALPINUS L.
      - 9 Stems arising together from the crown or caudex; if the root crown subterranean the caudex branches not rooting and the plants of lower elevations
A. MISER Dougl.
  - 6 Banner less than 10 mm long
    - 10 Keel petals 2.5-6 mm long

- 11 Immature pod nearly always bearing some black or fuscous hairs A. EUCOSMUS Robins.
- 11 Immature pod strigillose with white hairs exclusively, or glabrous
- 12 Stems mostly erect; flowers white; pod stipitate; stipules blackening A. TENELLUS Pursh
- 12 Stems diffuse or prostrate, often matted, if erect the petals purplish; pod sessile; stipules not blackening A. VEXILLIFLEXUS Sheld.
- 10 Keel petals over 6 mm long
- 13 Wings deeply bidentate at apex A. ABORIGINUM Richards.
- 13 Wings entire or obscurely truncate-emarginate
- 14 Stems arising singly or few together from slender, widely creeping and adventitiously rooting, subterranean caudex branches; plants of moist or cool soils in the mts. A. ALPINUS L.
- 14 Stems arising together from the root crown or caudex; if the root crown subterranean then the plants of dry foothills and prairies or alpine scree and ridges A. MISER Dougl.
- 3 Stipules petiolar or petiolar-cauline, variably decurrent-amplexicaul but not united opposite the petiole
- 15 Banner over 15 mm long
- 16 Ovary and pod glabrous A. DRUMMONDII Hook.
- 16 Ovary and pod pubescent
- 17 Racemes not over 10-flowered; leaflets uniformly and densely silvery-strigose or softly villous-tomentose on both sides A. PURSHII Dougl.
- 17 Racemes usually over 10-flowered, or if rarely less than 10-flowered, then the herbage green and the leaflets glabrous or medially glabrescent above A. CIBARIUS Sheld.
- 15 Banner not over 15 mm long
- 18 Banner 10-15 mm long

- 19 Cauline stipules very large, foliaceous, becoming papery, several-nerved, deflexed; leaflets 9-15, ample and thin-textured, 1.5-6 cm long; pod pendulous, stipitate, bladdery, membranous; plants of stream banks and mountain woods, mesophytic
A. AMERICANUS (Hook.)
M.E.Jones
- 19 Cauline stipules not foliaceous; leaflets mostly less than 1.5 cm long; pod sessile if inflated; plants xerophytic
A. PURSHII Dougl.
- 18 Banner less than 10 mm long
  - 20 Leaflets 5-7 (or in var. lagopinus as many as 11), densely pannose-tomentose; pod thickly hirsute-tomentose, 1-celled
A. PURSHII Dougl.
  - 20 Leaflets more than 7; if plant tomentose then the ovary nearly or quite 2-celled
A. EUCOSMUS Robins.

KEY USABLE ON PLANTS IN FRUIT

- 1 Plant prostrate, densely matted; leaflets linear-filiform, 3-10 mm long, silvery-strigose, acerose; flowers 1 or 2 (3) in each raceme; pods 1- to 4-seeded, indehiscent, about 5 mm long
A. KENTROPHYTA Gray
- 1 Plant not at once prostrate and matted and with linear-filiform, acerose leaflets, only 1 or 2 flowers per raceme, and 1- to 4-seeded, indehiscent pods
  - 2 Inflorescence, even in fruit, a head-like spike nearly as broad as long; calyx often black-hairy; corolla purplish, about 15 mm long; pod erect, about 1 cm long; ovoid, grayish- or blackish-pilose, cordate in cross section due to the complete intrusion of the lower suture; plant rhizomatous (A. dasyglottis)
A. AGRESTIS Dougl.
  - 2 Inflorescence seldom capitate or as broad as long, but if so, plants then not otherwise like A. agrestis
  - 3 Pods woolly or villous with long white or grayish hairs that almost or quite conceal the surface, usually woody or coriaceous in texture with the lower suture intruded to divide the cavity more or less completely into 2 cells
A. PURSHII Dougl.

- 3 Pods neither woolly nor with the surface concealed by the often dense but short, or less abundant longer pubescence, the texture of the pod various, the lower suture often not intruded
- 4 Pods inflated, thin and papery, and not at all woody, ellipsoid, acute at each end, 2-3 cm long, stipitate flowers ochroleucous   A. AMERICANUS (Hook.)
M.E.Jones
- 4 Pods not inflated, or if inflated then tough and often woody usually elliptic to linear or oblong in outline, often strongly compressed or obcompressed
- 5 Pod not visibly stipitate, the stalk (if any) shorter than the calyx and concealed by it
- 6 Legumes 1-celled with the lower suture very slightly (if at all) intruded, either round in section or, more commonly, compressed
- 7 Pod 4-10 (12) mm long, elliptic-oblong, acute; leaflets 1-4 mm broad, grayish-hairy; flowers 4-8 (10) mm long   A. VEXILLIFLEXUS Sheld.
- 7 Pod over 10 mm long and (usually) linear or oblong, or leaflets either over 4 mm broad or not grayish-hairy, or flowers over 10 mm long
- 8 Legume obliquely elliptic in outline, 8-12 mm long   A. EUCOSMUS Robins.
- 8 Legume linear or narrowly oblong in outline, usually well over 12 mm long
A. MISER Dougl.
- 6 Legumes either partially to completely 2-celled (the lower suture at least somewhat intruded) or more or less cordate, reniform, or obcompressed in section
- 9 Flowers (15) 30-150 borne in spikelike congested racemes, 12-18 mm long; pedicels about 1 mm long; pubescence of the calyx and stems appressed, dolabriform; stipules membranous, mostly connate opposite the petioles; pod 8-20 mm long, seldom over twice as long as the calyx, the lower suture deeply sulcate   A. CANADENSIS L.
- 9 Flowers seldom borne in spikelike racemes; pubescence usually basi-fixed; stipules seldom connate; pod mostly over 1 cm long
- 10 Legume gray- and black-hairy, less than 13 mm long, pendulous; flowers 6-9 mm long
A. EUCOSMUS Robins.

- 10 Legume not at once black-hairy, less than 13 mm long, and pendulous, when the flowers are less than 10 mm long .
A. CIBARIUS Sheld.
- 5 Pod stipitate, the body narrowed to a stalk at the mouth of the calyx tube or outside the calyx, this stipe at least as long as the calyx tube and visible at maturity of the fruit
- 11 Pod from strongly compressed to round in cross section, strictly 1-celled, the lower suture rarely protruding into the cavity, the partition (if any) rudimentary and less than 1/4 the height of the cavity
- 12 Rachis of leaves seldom as much as 5 cm long; leaflets usually 2-5 mm broad
A. ABORIGINUM Richards.
- 12 Rachis of leaves usually well over 5 cm long; leaflets often less than 2 mm broad
A. TENELLUS Pursh
- 11 Pod round, cordate, or triangular in section, or obcompressed, usually with the lower suture rather deeply sulcate, if pod round or compressed then with a partition extending at least 1/3 across the cavity
- 13 Pod and calyx black-hairy, pod pendulous, the body 8-12 mm long; plant rhizomatous
A. ALPINUS L.
- 13 Pod and calyx not at once black-hairy when the plant is rhizomatous and has reflexed pods with the body of the pod less than 15 mm long
A. DRUMMONDII Hook.

Hedysarum L.

- 1 Flowers yellowish to nearly white
H. SULPHURESCENS Rydb.
- 1 Flowers pink or carmine to purplish
H. BOREALE Nutt.

Lupinus L. Lupine

- 1 Either the banner conspicuously hairy over much of the abaxial (back) surface, or the calyx spurred
- 2 Calyx not spurred; either the pubescence of the banner extending to the upper third, or the flowers less than 9 mm long, or the wing petals not pubescent on the upper half
L. SERICEUS Pursh
- 2 Calyx spurred; pubescence of the banner usually not extending to the upper third; wing petal often hairy on the upper half; flowers at least 9 mm long
L. CAUDATUS Kell.
- 1 Neither the banner conspicuously hairy on the back nor the calyx spurred; pubescence of the banner, if any, largely concealed by the calyx
- 3 Banner slightly or moderately reflexed from the wings and keel, consequently (or because of the small-sized flowers) the banner index only 2-10; plants caulescent, the stems rarely less than 1 (and usually over 2) dm long, exceeding the lower petioles (including A. alpestris, A. monticola, A. parviflorus)
L. ARGENTEUS Pursh
- 3 Banner mostly so well reflexed (or the flowers so large) that the banner index averages well over 10 (usually at least 15), sometimes the index less than 15, but then the plants subcaulescent, with stems rarely over 1 dm long and usually shorter than the longer petioles
- 4 Plants low and spreading, usually less than 3 dm tall, the leafy stems generally shorter than the scapes and racemes; upper calyx lip bidentate for 1/2 of the length or more
L. LEPIDUS Dougl.
- 4 Plants usually well over 3 dm tall, mostly with leafy stems longer than the peduncles and equal to the longest basal petioles; upper calyx lip subentire to deeply bidentate
- 5 Leaflets pubescent (usually strigose) on the upper surface, mostly abruptly acuminate to apiculate, from linear-oblongate, 2-4 (7) cm long, 2-6 (14) mm broad; stems only slightly or not at all fistulose
L. WYETHII Wats.

- 5 Leaflets glabrous on the upper surface, mostly rounded or acute, elliptic-oblongate, (3) 4-10 (15) cm long, 10-25 mm broad; stems often strongly fistulose
L. POLYPHYLLUS Lindl.

Medicago L.

- 1 Plant perennial, deep-rooted; flowers blue, 6-10 mm long; fruits unarmed M. SATIVA L.
1 Plant annual, rather shallow-rooted; flowers yellow, less than 6 mm long; fruits often armed
M. LUPULINA L.

Melilotus Mill. Sweet Clover; Melilot

- 1 Corolla white M. ALBA Desr.
1 Corolla yellow M. OFFICINALIS (L.) Lam.

Oxytropis DC. Nom. Conserv. Stemless Loco

- 1 Stipules foliaceous, adnate to the base of the petiole for only 1-3 mm, the free portion lanceolate 6-12 mm long; pods pendulous; plants often with short leafy stems
O. DEFLEXA (Palls.) DC.
1 Stipules adnate to the base of the petiole for half their length or more; pods spreading or (more commonly) erect; plants acaulescent
2 Plant more or less glandular-verrucose and often viscid, the warts especially evident on the calyx teeth (sometimes lacking elsewhere); flowers cream to purple
O. VISCIDA Nutt.
2 Plant neither viscid nor glandular-verrucose
3 Flowers purple or reddish-purple
O. LAGOPUS Nutt.
3 Flowers white to yellowish, the keel sometimes purple-tinged
4 Pod fleshy before maturity, then hardened and bony, the dried wall nearly 1 mm thick; flower mostly well over 15 mm long
O. SERICEA Nutt.

- 4 Pod more membranous than fleshy, the dried wall scarcely 0.5 mm thick; flowers frequently less than 15 mm long
O. CAMPESTRIS (L.) DC.

Trifolium L. Clover

- 1 Flowers subtended by a true involucre
T. PARRYI Gray
- 1 Flowers not subtended by a true involucre, although sometimes the stipules of the upper leaves somewhat involucreal
- 2 Calyx glabrous or only very sparsely pubescent with scattered hairs
- 3 Flowers 5-9 mm long; heads axillary
- 4 Corolla white or slightly pinkish-tinged; plant stoloniferous; calyx glabrous; leaflets usually retuse to obcordate; stipules 3-10 mm long
T. REPENS L.
- 4 Corolla usually pink to reddish (white); plant usually not stoloniferous, the stems ascending to erect; calyx with a few hairs at the base of the teeth; leaflets frequently rounded; stipules 5-20 mm long
T. HYBRIDUM L.
- 3 Flowers at least 10 mm long; heads often terminal and solitary
- 5 Plant glabrous, caespitose or nearly so, the leafy stems scarcely 5 cm tall; high montane in the Rocky Mts.
T. HAYDENII Porter
- 5 Plant either pubescent or with leafy stems over 5 cm tall
T. LONGIPES Nutt.
- 2 Calyx strongly pubescent to villous or plumose
- 6 Heads sessile or very short-pedunculate, 50- to 200-flowered; peduncles shorter than the subtending leaves; stipules of the upper leaves forming a false involucre
T. PRATENSE L.
- 6 Heads pedunculate, sometimes few-flowered; peduncle either longer than the leaves, or the upper stipules not involucreal
T. LONGIPES Nutt.

GERANIACEAE Geranium Family

- 1 Leaves pinnately compound; fertile stamens 5
ERODIUM CICUTARIUM (L.) L'Her.
- 1 Leaves palmately-lobed or -divided; fertile stamens
usually 10 GERANIUM

Geranium L. Crane's-bill; Wild Geranium

- 1 Plants annual or biennial; petals less than 12 mm long;
seeds smooth or reticulate-pitted
G. BICKNELLII Britt.
- 1 Plants perennial; petals at least 12 mm long; seeds
reticulate
  - 2 Petals white or pale pink, with pinkish or purplish
veins, pilose about half their length on the inner face;
inflorescence pilose with glandular, purplish-tipped
hairs; beak of the stylar column no longer than the
free lobes of the stigma
G. RICHARDSONII Fisch.&Trautv.
  - 2 Petals pink to deep magenta-purple, rarely white,
usually pilose on the inner face for not more than 1/3
their length; inflorescence eglandular or glandular
with yellowish hairs; beak of the stylar column
considerably longer than the stigmatic lobes
G. VISCOSISSIMUM F. & M.

EUPHORBIACEAE Spurge Family

Euphorbia L. Spurge

- 1 Seeds coarsely transcorrugated; leaves thick-margined,
linear-oblong, entire to denticulate; involucre more or
less turbinate E. GLYPTOSPERMA Engelm.
- 1 Seeds smooth to wrinkled or pitted but not coarsely
transcorrugated; leaves more nearly obovate-oblong or
ovate-oblong, the margins serrulate but not thickened;
involucre approximately campanulate
E. SERPYLLIFOLIA Pers.

ANACARDIACEAE Sumac Family

Rhus L. Sumac

- 1 Fruit abundantly reddish-hairy; petals pilose on the inner surface R. TRILOBATA Nutt.
- 1 Fruit nearly or quite glabrous, not red; petals glabrous (Toxicodendron) R. RADICANS L.

RHAMNACEAE Buckthorn Family

- 1 Fruit fleshy; flowers greenish; petals short-clawed or lacking RHAMNUS ALNIFOLIA L'Her.
- 1 Fruit capsular; flowers white to blue; petals long-clawed CEANOTHUS VELUTINUS Dougl.

MALVACEAE Mallow Family

- 1 Petals mostly over 2 cm long; leaves large and suggestive of those of the grape; carpels smooth on the sides, dehiscent full length ILIAMNA RIVULARIS (Dougl.) Greene
- 1 Petals mostly less than 2 cm long; leaves small and often deeply lobed to incised; carpels strongly reticulate on the sides below the middle SPHAERALCEA COCCINEA (Pursh) Rydb.

HYPERICACEAE St. John's Wort Family

Hypericum L. St. John's Wort

- 1 Sepals linear-lanceolate, 3-5 times as long as broad, mostly acute; leaves lanceolate to obovate-oblongeolate or narrowly spatulate-oblongeolate; seeds brownish, usually over 1 mm long, distinctly pitted in longitudinal rows, not striate H. PERFORATUM L.
- 1 Sepals triangular to ovate-lanceolate, less than 3 times as long as broad, rounded to acute; leaves ovate-oblong to ovate; seeds yellowish, 1 mm long or less, indistinctly reticulate-alveolate but not pitted, apparently longitudinally striate H. FORMOSUM H.B.K.

VIOLACEAE Violet Family

Viola L. Violet

- 1 Petals predominantly white, often with bluish or purplish shading, but not yellow
- 2 Plants producing annual, flower-bearing, elongate to short and tufted-leafy stems
V. CANADENSIS L.
- 2 Plants not producing annual floriferous stems, the flowers pedunculate on the main rhizome
- 3 Petals generally tinged with some violet or blue on the back, usually at least 8 mm long; stolons well developed; leaves mostly over 2.5 cm broad, glabrous
V. PALUSTRIS L.
- 3 Petals seldom other than pure white (aside from the purplish pencilling), often less than 8 mm long; stolons present or absent; leaves often less than 2.5 cm broad
V. MACLOSKEYI Lloyd
- 1 Petals predominantly blue, violet, or yellowish, rather than white
- 4 Corolla bluish to purple, definitely not yellow
- 5 Stolons present, very slender and elongate; erect leafy stems lacking, the leaves arising from the rhizomes; plants of very moist or boggy ground
V. PALUSTRIS L.
- 5 Stolons absent or if present the plants with erect leafy stems
- 6 Aerial stems well developed, often longer than the leaves and peduncles, floriferous on the upper 2/3; the leaves more or less acuminate
V. CANADENSIS L.
- 6 Aerial stems lacking or at least shorter than the peduncles which are borne mainly on the rhizomes; rarely the stems longer than the peduncles
- 7 Head of the style not bearded; plants glabrous, caulescent or acaulescent
V. NEPHROPHYLLA Greene
- 7 Head of the style bearded; plants glabrous or hairy, usually caulescent
V. ADUNCA Sm.
- 4 Corolla partially or wholly yellow

- 8 Flowers from near the tip of erect leafy stems that are naked below; leaves mostly large, thin, and cordate-based
V. CANADENSIS L.
- 8 Flowers not confined to the tip of erect branches, the stems leafy and floriferous below
  - 9 Leaf blades coarsely veined, usually not over 4 cm long, coarsely few-toothed or -lobed, not regularly serrate or dentate, often glaucous and more or less purplish, at least along the veins; upper petals deep purple on the back; capsules puberulent
V. PURPUREA Kell.
  - 9 Leaf blades not coarsely veined, from entire to finely or obscurely serrate or dentate, often well over 4 cm long, usually not glaucous and not noticeably purplish, even along the veins; upper petals often not purple on the back; capsules glabrous or puberulent
V. NUTTALLII Pursh

LOASACEAE Blazing-Star Family

Mentzelia L. Blazing Star

- 1 Plants biennial to perennial; petals 1.5-8 cm long; seeds flattened
  - 2 Petals apparently 10, the inner five (staminodia) not quite so broad as the outer (true) petals; floral bracts adherent to the ovary; seeds thin-margined but not winged
M. DECAPETALA (Pursh)
Urb. & Gilg.
  - 2 Petals 5, the five outer stamens sometimes flattened and somewhat petaloid, but much narrower than the true petals; floral bracts not adherent to the ovary; seeds distinctly wing-margined
M. LAEVICAULIS (Dougl.) T. & G.
- 1 Plants annual; petals less than 1.5 cm long; seeds not flattened
  - 3 Floral bracts mostly ovate-lanceolate to ovate; inflorescence congested; capsules linear; seeds uniseriate throughout, prismatic, grooved on the vertical margins, so obscurely tuberculate-muricate as apparently to be smooth, even when viewed with a 10x lens
M. DISPERSA Wats.

- 3 Floral bracts narrowly to broadly lanceolate; inflorescence not congested; capsules usually noticeably broadened upward; seeds obviously tuberculate-muricate when viewed with a 10x lens, and prismatic and often grooved on the vertical angles in the lower portion of the capsules, those above arranged and shaped irregularly and not grooved on the angles   M. ALBICAULIS Dougl.

CACTACEAE Cactus Family

Opuntia Mill. Prickly-Pear Cactus

- 1 Joints of the stems not greatly flattened, often nearly as thick as broad, usually less than 5 cm long, readily detached from the plant; spines rather strongly barbed; areoles usually noticeably white-woolly; flowers yellow
O. FRAGILIS (Nutt.) Haw.
- 1 Joints of the stems conspicuously flattened, the larger ones 5-13 cm long, not readily detached from the plant; spines only slightly barbed; areoles usually with rusty wool, if any; flowers yellow to reddish
O. POLYACANTHA Haw.

ELAEAGNACEAE Oleaster Family

- 1 Leaves alternate; plants perfect flowered; stamens 4
ELAEAGNUS COMMUTATA Bernh.
- 1 Leaves opposite; plants dioecious; stamens 8
SHEPHERDIA CANADENSIS (L.) Nu

ONAGRACEAE Evening Primrose Family

- 1 Fruit nutlike, hardened, indehiscent, 1- to 4-seeded, 4-angled and flat-sided   GAURA PARVIFLORA Dougl.
- 1 Fruit capsular, many-seeded, dehiscent, usually more or less terete
  - 2 Seeds with a conspicuous tuft of long hairs at the tip; plants often growing along streams or on moist soil; leaves often opposite   EPILOBIUM

- 2 Seeds glabrous or very finely strigose-puberulent;
plants mainly from dry hills or drying mud flats; leaves
nearly always alternate
- 3 Ovary 2-celled, slender; plants usually very freely
branched; flowers small, white to pinkish, the petals
up to 5 mm long
- GAYOPHYTUM
- 3 Ovary 4-celled; habit and flowers diverse, the petals
often well over 5 mm long
- OENOTHERA

Epilobium L. Willow Herb

- 1 Stigma 4-cleft; petals either yellow or at least 1 cm long (sometimes both yellow and over 1 cm long)
- 2 Petals yellow E. SUFFRUTICOSUM Nutt.
- 2 Petals pink to purple (white)
- 3 Leaves (in part at least) usually over 8 cm long; plants mostly over 4 dm tall, strongly "rhizomatous"; styles exceeding the stamens, hairy near the base; floral bracts much reduced, linear; racemes elongate, usually at least 15-flowered
- E. ANGUSTIFOLIUM L.
- 3 Leaves less than 8 cm long; plants usually less than 4 dm tall, not rhizomatous; styles shorter than the stamens, glabrous; floral bracts similar to the leaves although somewhat reduced; racemes usually not more than 15-flowered
- E. LATIFOLIUM L.
- 1 Stigma usually entire or, if with short lobes, the petals never yellow (sometimes creamy-white) and seldom as much as 1 (rarely to 1.3) cm long
- 4 Plant an annual, taprooted, usually growing on well-drained soil; epidermis on the lower portion of the stem usually exfoliating E. PANICULATUM Nutt.
- 4 Plant a perennial, usually rhizomatous, generally growing in moist places; lower epidermis mostly not exfoliating
- 5 Plants usually grayish-strigillose, at least above, producing turions; leaves linear to narrowly lanceolate, (1) 2-6 cm long, 1-4 (8) mm broad; petals white to pink
- E. PALUSTRE L.
- 5 Plants not grayish-strigillose, or if so not producing turions or the leaves not linear or the petals not white

E. LATIFOLIUM L.

6 Turions usually present; seeds often papillate
E. GLANDULOSUM Lehm.

6 Turions absent; seeds various

7 Plants glabrous throughout or with minute pubescence in the inflorescence or on the ovary, usually distinctly glaucous, often matted at the base; leaves lanceolate to ovate, entire to denticulate

E. GLABERRIMUM Barbey

7 Plants usually pubescent, not glaucous

8 Stems usually well over 3 dm tall and freely branched above the middle; rhizomes short or lacking; leaves often well over 4 cm long, usually denticulate to serrate; seeds conspicuously crested-papillate in numerous parallel longitudinal lines; coma white

E. WATSONII Barbey

8 Stems seldom over 3 dm tall, simple or with a few basal branches; rhizomes usually well developed and the plants matted; leaves seldom over 4 cm long, often entire; seeds smooth or the papillae very small and not in distinct rows; coma usually dingy

E. ALPINUM L.

Gayophytum Juss.

1 Capsules nearly or quite sessile, only slightly or not at all constricted between the seeds; plants basally branched, very leafy above, the leaves commonly much longer than the internodes
G. HUMILE Juss.

1 Capsules pedicelled, usually constricted between the seeds; plants commonly branched above, the internodes often longer than the leaves

G. RAMOSISSIMUM Nutt.

Oenothera L. Evening Primrose

1 Plants mostly without leafy stems, the flowers borne among the rosettes of leaves, stems (if present) short and concealed by the leaves and flowers; hypanthium several times as long as the ovary

2 Petals white or yellow, aging to pink or purple, 1-5 cm long; stigma lobes linear, usually at least 3 mm long; hypanthium deciduous from the developing fruit

- 3 Petals white O. CAESPITOSA Nutt.
- 3 Petals yellow O. FLAVA (Nels.) Garrett
- 2 Petals yellow, seldom aging to purple, less than 2 cm long; stigmas globose or discoid; hypanthium filiform, persistent on the fertile portion of the ovary, flared only at the top O. BREVIFLORA T. & G.
- 1 Plants with leafy flowering stems; hypanthium often shorter than the mature capsules; annuals or perennials
- 4 Petals white or pinkish and more than 1 cm long O. NUTTALLII Sweet
- 4 Petals either yellow or less than 1 cm long O. STRIGOSA Mack. & Bush.

UMBELLIFERAE Parsley Family

ARTIFICIAL KEY TO THE GENERA

- 1 Leaves all simple, entire BUPLEURUM AMERICANUM
Coult. & Rose
- 1 Leaves or most of them compound or very deeply cleft
- 2 Leaves or many of them with more or less well-defined leaflets, not dissected into small and narrow segments
- 3 Leaflets 3, very large, mostly 1-4 dm long and wide HERACLEUM LANATUM Michx.
- 3 Leaflets usually more than 3, seldom as much as 1 dm wide
- 4 Plants perennial from fibrous or fleshy-thickened, fascicled roots, without a taproot or well-developed caudex SANICULA GRAVEOLENS Poepp
- 5 Base of the stem thickened, hollow, and with well-developed transverse partitions; some of the roots usually tuberous-thickened; primary lateral veins of the leaflets tending to be directed to the sinuses between the teeth CICUTA DOUGLASII (DC.)
Coult. & Rose
- 5 Base of the stem without transverse partitions; roots not tuberous-thickened; veins not directed to the sinuses
- 6 Ribs of the fruit inconspicuous, mature fruit 1.5-2 mm long; margin of leaflets or ultimate leaf segments irregular, crenate to incised; plant often stoloniferous BERULA ERECTA (Huds.) Cov.

- 6 Ribs of the fruit prominent, more or less corky thickened; fruit 2-3 mm long; margin of leaflets or ultimate leaf segments evenly serrulate to serrate

SIUM SUAVE Walt.

- 4 Plants annual, biennial, or perennial from a taproot or stout caudex
- 7 Plants low, scapose or subscapose (or with a pseudo-scape), up to 2 dm tall

LOMATIUM

- 7 Plants taller and usually more or less leafy-stemmed
- 8 Biennial weed; flowers yellow; fruit unarmed

PASTINACA SATIVA L.

- 8 Perennials, not weedy
- 9 Fruit dorsally flattened
- 10 Stylopodium well developed; flowers white or occasionally pinkish

ANGELICA

- 10 Stylopodium obsolete or nearly so; flowers yellow

LOMATIUM

- 9 Fruit subterete or flattened laterally
- 11 Fruit linear or linear-oblong to calvate, not at all winged, 8-22 mm long; leaves always with well-defined leaflets

OSMORHIZA

- 11 Fruit broader and often shorter, often some of the ribs winged; leaflets not always well defined

LIGUSTICUM

- 2 Leaves more or less dissected into mostly rather small and narrow ultimate segments, without well-defined leaflets

- 12 Plant a robust, short-lived perennial weed, 1-2 m tall, when well developed, with glaucous stems, yellow flowers, and finely dissected leaves, the ultimate segments well under 1 mm wide

FOENICULUM VULGARE Mill.

- 12 Plants distinctly otherwise, differing in one or more respects from the above

- 13 Plant a weedy European biennial from a taproot; flowers white, never yellow

CARUM CARVI L.

- 13 Plants perennial, with or without a taproot; native species, not weedy

- 14 Fruit armed with hooked prickles

SANICULA GRAVEOLENS Poepp.

- 14 Fruit unarmed

15 Plants definitely taprooted, the taproot sometimes fleshy-thickened, but distinctly elongate; taproot often surmounted by a stout branching caudex

16 Fruit essentially wingless, slightly compressed laterally
MUSINEON DIVARICATUM
(Pursh) Nutt.

16 Fruit with at least the lateral ribs produced into evident wing-margins when fully mature

17 Body of the fruit subterete or slightly compressed laterally
LIGUSTICUM

17 Body of the fruit distinctly compressed dorsally

18 Dorsal ribs of the fruit wingless or nearly so, only the lateral ribs distinctly winged; involucre dimidiate or not
LOMATIUM

18 Dorsal ribs of the fruit generally winged, the wings sometimes narrower than those of the lateral ribs; involucre dimidiate (all on one side of the umbellet)

CYMOPTERUS

15 Plants with fibrous or fleshy-thickened roots; roots when flesh-thickened either clustered or solitary, and when solitary always short, not over about an inch long

19 Roots strictly fibrous, not at all fleshy; plants growing in water or very wet places

BERULA ERECTA (Huds.) Cov.

19 Roots or some of them more or less fleshy-thickened; plants of wet or more often dry places

20 Fruit slightly to strongly flattened laterally, wingless or the mericarps with thickened, incurved lateral wings; flowers white or pink

21 Fruit linear, mostly 8-10 mm long

LOMATIUM

21 Fruit linear-oblong or broader, 2-7 mm long
PERIDERIDIA GAIRDNERI
(H. & A.) Mathais

20 Fruit more or less strongly flattened dorsally, the marginal ribs with thin spreading wings at maturity; flowers yellow or white

LOMATIUM

Angelica L.

- 1 Leaves oblong to elliptic, pinnate to incompletely bipinnate; involucre wanting A. PINNATA Wats.
- 1 Leaves more deltoid, ternate-pinnate; involucre present or absent A. ARGUTA Nutt.

Cymopterus Raf. (Including Pteryxia & Pseudocymopterus)

- 1 Calyx teeth prominent, linear-lanceolate, acuminate
C. TEREBINTHINUS (Hook.)
T. & G.
- 1 Calyx teeth minute or lacking
C. LONGIPES (S. Wats.) C. & R.

Ligusticum L. Licorice-root

- 1 Leaves dissected into numerous more or less linear segments mostly 1-3 mm wide
L. FILICINUM Wats.
- 1 Leaves less dissected, the ultimate segments broader
  - 2 Secondary leaflets divided nearly to midrib
L. PORTER Coult. & Rose
  - 2 Secondary leaflets not divided nearly to midrib
(presence of this taxon in the park is questionable.
Our only specimens with this name are immature)
L. CANBYI Coult. & Rose

Lomatium Raf. Desert Parsley; Biscuitroot

- 1 Ultimate segments of the leaves relatively large, many or all of them 1 cm long or longer
- 2 Ultimate segments of the leaves forming more or less definite leaflets, these entire to deeply cleft, usually over 5 mm wide
- 3 Herbage (or at least the stems and peduncles) more or less hirtellous puberulent
L. TRITERNATUM (Pursh)
Coult. & Rose
- 3 Herbage essentially glabrous and often glaucous
L. NUDICAULE (Pursh)
Coult. & Rose

- 2 Ultimate segments of the leaves narrow and scarcely leafletlike, seldom as much as 5 mm wide
- 4 Fruits linear to narrowly oblong, mostly (2.5) 3-8 times as long as wide, less than 4 mm wide over-all the wings up to 1/3 or rarely 1/2 as wide as the body, or obsolete
- 5 Involucel generally wanting; pedicels elongate, mostly 4-13 mm long at maturity; flowers yellow or somewhat purplish in age
  - L. AMBIGUUM (Nutt.)
  - Coult. & Rose
- 5 Involucel present; pedicels short or elongate; flowers yellow or white
  - L. TRITERNATUM (Pursh)
  - Coult. & Rose
- 4 Fruits broader, either more than 4 mm wide, or not more than about 2.5 times as long as wide, the wings often well over 1/3 as wide as the body
- 6 Bractlets of the involucel broadly oblanceolate to broadly obovate or elliptic; flowers yellow
  - L. COUS (Wats.) Coult. & Rose
- 6 Bractlets of the involucel narrow, mostly linear or lanceolate, or wanting
- 7 Stems or scapes solitary or few from the simple or occasionally few-branched rootcrown
  - L. TRITERNATUM (Pursh)
  - Coult. & Rose
- 7 Stems several or numerous from a large, woody root that is often surmounted by a branching caudex
  - L. DISSECTUM (Nutt.)
  - Math. & Const.
- 1 Ultimate segments of the leaves relatively small, rarely any of them as much as 1 cm long
- 8 Bractlets of the involucel broadly oblanceolate to obovate, ovate, or subrotund, entire to sometimes more or less connate
  - L. COUS (Wats.) Coult. & Rose
- 8 Bractlets of the involucel narrow, mostly linear or lanceolate, distinct or merely connate at the base, or wholly wanting
  - L. MACROCARPUM (Nutt.)
  - Coult. & Rose

Osmorhiza Raf. Sweet Cicely

- 1 Fruit concavely narrowed to the summit, the terminal (0.5) 1-2 mm more or less distinctly set off as a broadly beaklike apex; pedicels and rays of the umbel mostly ascending-spreading O. CHILENSIS H. & A.
- 1 Fruit convexly narrowed to the rounded or obtuse to merely acutish summit, the apex not at all beaklike; pedicels and rays of the umbel generally widely divaricate O. DEPAUPERATA Phil.

CORNACEAE Dogwood Family

Cornus L. Dogwood

- 1 Low trailing subshrub less than 3 dm tall, the leaves whorled at the tip of the stem C. CANDENSIS L.
- 1 Woody trees or shrubs with opposite leaves throughout C. STOLONIFERA Michx.

ERICACEAE Heath Family

- 1 Plants without green leaves
  - 2 Corolla urn-shaped, gamopetalous; anthers awned on the back PTEROSPORA ANDROMEDEA Nutt.
  - 2 Corolla not urn-shaped, usually polypetalous; anthers unawned HYPOPITYS MONOTROPA Crantz
- 1 Plants with well-developed, green leaves
  - 3 Ovary inferior or apparently inferior because of the fleshiness of the persistent calyx; fruit a true berry or a capsule surrounded by the thickened, fleshy calyx which forms a pseudo berry
    - 4 Ovary truly inferior; erect shrubs, mostly deciduous VACCINIUM
    - 4 Ovary superior but surrounded by the fleshy calyx when ripe and apparently inferior; mostly prostrate to semierect evergreen shrublets GAULTHERIA HUMIFUSA (Grah.) Rydb.
  - 3 Ovary superior, free of the calyx

- 5 Fruit fleshy; creeping evergreen shrub with relatively larger, leathery leaves and deep reddish to purplish bark; flowers urn-shaped

ARCTOSTAPHYLOS UVA-URSI
(L.) Spreng.

- 5 Fruit a dry capsule; herbs to large shrubs; corolla often not urn-shaped; leaves often scalelike

- 6 Corolla polypetalous or nearly so, flowers usually open and not at all tubular

- 7 Plants more herbaceous than woody, seldom over 3 dm tall; leaves large and coriaceous, evergreen

- 8 Leaves cauline, scattered or whorled, the plants scapose; styles very short, usually not noticeable; filaments enlarged and hairy about midlength; flowers corymbose CHIMAPHILA UMBELLATA

(L.) Bart.

- 8 Leaves mostly basal, the plants scapose; styles elongate, visible in flower, often strongly curved; filaments not enlarged and hairy; flowers racemose or single PYROLA

- 7 Plants woody shrubs, usually over 3 dm tall

LEDUM GLANDULOSUM Nutt.

- 6 Corolla gamopetalous; flowers often urceolate

- 9 Corolla rotate (saucerlike) with 10 pouches in which the anthers fit in the bud; leaves often strongly revolute KALMIA MICROPHYLLA Heller

- 9 Corolla either not rotate or not saccate

PHYLLODOCE EMPETRIFORMIS
(Sw.) D. Don

Pyrola L. Pyrola; Shinleaf; Wintergreen

- 1 Flowers single and terminal (Moneses)

P. UNIFLORA L.

- 1 Flowers two or more in racemes

- 2 Style straight or nearly so, without a collar or ring below the peltate-lobed stigma; flowers less than 1 cm broad; anthers opening at the upper end by large pores and without either horns or tubes projecting above the pores

- 3 Styles usually well over 2 mm long; racemes secund petals white, 4-5 mm long (Ramischia)

P. SECUNDA L.

- 3 Styles not over 2 mm long; racemes not secund; petals flesh color or pinkish, about 3 mm long (Erxlebenia)
P. MINOR L.
- 2 Style bent to one side, often with a collar or ring below the stigma; flowers usually at least 1 cm broad; anthers usually with short horns or tubes and lateral pores (Pyrola)
  - 4 Leaves deep green but mottled on the upper surface with pale streaks above the main veins; blades mostly ovate to ovate-elliptic P. PICTA Smith
  - 4 Leaves not mottled; blades various
    - 5 Leaves tapered to an acute base, spatulate or oblanceolate to rhombic-elliptic, usually at least 3 cm long and not much over 1/2 as broad, seldom over 2.5 cm in width, pale green or bluish-green, thickish; petals greenish-white; racemes 10- to 30-flowered
P. DENTATA Smith
    - 5 Leaves usually ovate to orbicular and well over half as long as broad, many over 2.5 cm in width, often rounded at the base
      - 6 Flowers pale yellowish or greenish-white
(P. virens) P. CLORANTHA Sw.
      - 6 Flowers pinkish to rose-purple
P. ASARIFOLIA Michx.

Vaccinium L. Blueberry; Huckleberry; Whortleberry

- 1 Branches bright green or yellow-green, sharply angled, very numerous; leaves sharply serrulate, usually less than 15 mm long; berry bright, but not deep, red; pedicels less than 3 mm long; flowers about 4 mm long; plants usually less than 2.5 dm tall
V. SCOPARIUM Leiberg
- 1 Branches usually neither bright green nor sharply angled, but if angled then the leaves mostly over 15 mm long, or the berry not red or plants over 2.5 dm tall
  - 2 Plants usually 2-3 dm tall; berry dark red to bluish; branches green and angled; leaves sharply serrulate, 1-3 cm long; flowers single in the axils
V. MYRTILLUS L.
  - 2 Plants either over 4 dm tall or branches not angled, or leaves entire or but slightly serrulate; flowers often more than 1 per axil; berry mostly deep bluish-black

- 3 Calyx deeply lobed, the lobes triangular, persistent in fruit; flowers 1-4 per axil; buds with 4-7 scales, these conspicuous at the base of the pedicels; branches not angled; leaves entire V. OCCIDENTALE Gray
- 3 Calyx shallowly lobed, the rounded lobes deciduous; tube of calyx forming a crowning ring on the fruit; branches often angled; flowers single in the leaf axils; bud scales two
- 4 Plants usually 2-3 (less than 5) dm tall; leaves more or less serrate above the middle, mostly no more than indistinctly serrulate on the lower half; twigs inconspicuously angled to terete V. CAESPITOSUM Michx.
- 4 Plants either well over 5 dm tall, or the leaves either entire or serrulate below midlength V. GLOBULARE Rydb.

PRIMULACEAE Primrose Family

- 1 Plant a caespitose perennial with cushions of persistent, small, narrow leaves; flowering stems leafless, flowers 1-several, showy, pink to violet DOUGLASIA MONTANA Gray
- 1 Plants not caespitose, or if so, the corollas white or the stems leafy
- 2 Leaves in basal rosettes; flowering stems leafless
- 3 Lobes of the corolla several times as long as the tube, sharply reflexed; stamens protruding their full length DODECATHEON Merrill
- 3 Lobes of the corolla less than twice as long as the tube, not sharply reflexed; stamens usually included ANDROSACE
- 2 Leaves not confined to basal rosettes; flowering stems leaf-bearing GLAUX MARITIMA L.

Androsace L.

- 1 Perennial, grayish-pilose; scapes single from each rosette; corolla lobes over 2 mm long A. LEHMANNIANA Spreng.
- 1 Annuals or biennials, not pilose; scapes usually several from the leaf rosette

- 2 Flowers less than 3 mm long; calyx hemispheric; plant glabrous or sparsely glandular-puberulent above; leaves abruptly narrowed to distinct petioles; seeds light yellow, less than 0.5 mm long

A. FILIFORMIS Rete.

- 2 Flowers often more than 3 mm long; calyx more nearly turbinate; plants usually puberulent; leaves narrowed gradually to the base; seeds dark brown, over 0.5 mm long

A. SEPTENTRIONALIS L.

Dodecatheon L. Shooting Star

- 1 Filaments usually less than 1 (1.5) mm long, free or united into a tube, the connectives cross-wrinkled; capsule operculate

D. CONJUGENS Greene

- 1 Filaments usually over 1.5 mm long, connectives often smooth or longitudinally wrinkled rather than cross-wrinkled; capsule valvate to the tip

D. PULCHELLUM (Raf.) Merrill

GENTIANACEAE Gentian Family

- 1 Corolla salverform to tubular, the lobes usually no longer than the tube

GENTIANA

- 1 Corolla rotate, the lobes usually longer than the tube

- 2 Styles thick, scarcely 1 mm long; flowers 5-merous

SWERTIA PERENNIS L.

- 2 Styles slender, at least 2 mm long; flowers 4-merous

FRASERA SPECIOSA Dougl.

Gentiana L. Gentian

- 1 Perennials; corollas usually 5-merous and well over 2.5 cm long, if shorter then the plants either somewhat prostrate and matted and spreading by very slender rhizomes, or the leaves with long, sheathing, connate bases and the blades then less than 1 cm long; stigmas never flabellate-erose

- 2 Flowers white or pale yellowish, blotched and striped with purple; leaves 4-12 cm long, usually three times as long as broad

G. ALGIDA Pall.

- 2 Flowers bluish or purple, if yellowish then the leaves scarcely 2 times as long as broad

G. AFFINIS Griseb.

- 1 Annuals; corollas mostly less than 2 cm long, if longer, then usually 4-merous or with lacerate-fimbriate lobes, or the stigmas broadly flabellate-erose
3 Corollas deep blue, usually over 2 cm long, 4-merous; stigmas broadly flabellate-erose

G. DETONSA Rottb.

- 3 Corollas less than 2 cm long and not deep blue, sometimes 5-merous; stigmas not flabellate-erose

G. AMARELLA L.

APOCYNACEAE Dogbane Family

Apocynum L. Dogbane

- 1 Flowers less than 5 (2-4.5) mm long; corolla greenish-white to white, usually less than twice as long as the calyx, lobes erect or but slightly spreading; leaves ascending

- 2 Follicles usually more than 12 cm long; coma of seeds 2-3 cm long; leaves, except sometimes the lower cauline, distinctly petioled and not cordate-based

A. CANNABINUM L.

- 2 Follicles less than 12 cm long; coma of seeds 1-2 cm long; leaves of main stem usually all sessile or subsessile and cordate-based

A. SIBIRICUM Jacq.

- 1 Flowers usually at least 5 mm long; corolla pinkish, often more than twice the length of the calyx, the lobes spreading to reflexed; leaves mostly drooping to spreading

- 3 Calyx usually at least half as long as the corolla, the lobes narrowly lanceolate, acute to acuminate; leaves often ascending

A. MEDIUM Greene

- 3 Calyx usually less than half as long as the corolla, the lobes lanceolate to deltoid or ovate often obtuse; leaves mostly spreading or drooping

A. ANDROSAEMIFOLIUM L.

- 1 Leaves represented only by the persistent cotyledons and by a whorl of entire, often basally connate bracts just beneath the compact inflorescence; small annuals
GYMNOSTERIS PARVULA Heller
- 1 Leaves more or less well developed, either clustered at the base, or distributed along the stem, or both; annual to perennial
  - 2 Calyx tube of essentially uniform texture throughout, somewhat accrescent, not ruptured by the developing capsule; leaves not at once palmatifid and sessile
  - 3 Leaves pinnately compound, with definite leaflets (these broader than linear except in one species); calyx tube herbaceous at anthesis; perennials, one species annual
POLEMONIUM
  - 3 Leaves entire to variously dissected, but without definite leaflets; calyx tube chartaceous at anthesis
COLLOMIA LINEARIS Nutt.
  - 2 Calyx tube with green costae separated by hyaline intervals, or, if greenish essentially throughout, then the leaves sessile and palmatifid into linear segments
  - 4 Filaments very unequally inserted; leaves entire, partly or wholly opposite
    - 5 Perennial; leaves all, or nearly all, opposite; seeds not becoming mucilaginous when moistened
PHLOX
    - 5 Annual; upper leaves alternate; seeds becoming mucilaginous when moistened
MICROSTERIS GRACILIS
(Hook.) Greene
    - 4 Filaments about equally, or occasionally somewhat unequally, inserted; leaves seldom at once opposite and entire
    - 6 Leaves sessile, palmatifid into linear segments
      - 7 Annual; leaves soft, mostly or all opposite; seeds often becoming mucilaginous when moistened
LINANTHUS SEPTENTRIONALIS
Mason
      - 7 Perennial; seeds remaining unchanged when moistened
LEPTODACTYLON PUNGENS
(Torr.) Nutt.
      - 6 Leaves diverse, but not at once sessile and palmatifid; herbs or subshrubs with alternate (or all basal), entire to dissected leaves
GILIA

Gilia R. & P.

- 1 Corolla relatively very large (the undivided portion 1.5-3.5 cm long), often partly or wholly bright red; biennial or short-lived perennial G. AGGREGATA (Pursh) Spreng.
- 1 Corolla smaller (the undivided portion not over 1 cm long), never bright red G. TENERRIMA Gray

Phlox L. Wild Sweet William

- 1 Plants more or less erect, or loosely repent, with well-developed internodes, and with the larger leaves often more than 3.5 cm long or more than 5 mm wide; flowers mostly slender-pedicellate in a 3- to many-flowered terminal cyme P. LONGIFOLIA Nutt.
- 1 Plants compact and tending to form mats, occasionally looser and up to 1 or even 1.5 dm tall; leaves short and crowded, rarely more than 3 cm long, never more than 5 mm wide; flowers mostly solitary (3), short-pedicellate or sessile at the ends of the numerous stems, scarcely forming distinct inflorescences
- 2 Leaves narrowly linear, mostly (2.5) 4-10 (13) mm long and about 0.5 (1) mm wide near the middle, firm and pungent, very often arachnoid; plants forming dense cushions; style 2-5 (6) mm long P. HOODII App.
- 2 Leaves never arachnoid, and usually longer or wider, or distinctly softer than those of P. hoodii, but if similar to those of P. hoodii in size and texture, then the plants looser and suberect
- 3 Plants tending to be loosely erect, 5-15 cm tall, often resembling a small Leptodactylon in habit; leaves narrow, firm, commonly 5-13 mm long and 0.5 (1) mm wide near the middle; calyx and pedicels (often also the herbage) usually glandular; style 3-7 (8) mm long; chiefly in and near the lower douglas-fir zone P. CAESPITOSA Nutt.
- 3 Plants either more compact and mat-forming, or, if looser and suberect, then with the leaves distinctly longer, or wider, or softer than those of P. caespitosa; pubescence and styles diverse

- 4 Styles 1-5 mm long; leaves fairly firm, rarely as much as 1.5 cm long, the margins somewhat thickened, but not strongly whitish; calyx usually glandular-hairy; moderate to high elevations in the mountains

P. PULVINATA (Wherry) Cronq.

- 4 Styles mostly 5-12 mm long, or occasionally only 4 mm in plants which differ in other respects from P. Pulvinata

P. MULTIFLORA A.Nels.

Polemonium L.

- 1 Corolla more or less funnelform or tubular-funnelform to subsalverform, longer than wide, the lobes shorter than the tube; dwarf (rarely to 4 dm) alpine and sub-alpine, petrophilous, very strongly glandular and mephitic plants with numerous stems from a taproot and much-branched (sometimes elongate) caudex

P. VISCOSUM Nutt.

- 1 Corolla campanulate or broader, about as wide as long, or wider, the lobes about as long as the tube, or longer; plants of various habit, usually less strongly glandular and mephitic

- 2 Stems solitary from the upturned end of a mostly rather short and simple horizontal rhizome, erect, (1.5) 4-10 dm tall; very wet places at moderate elevations

P. OCCIDENTALE Greene

- 2 Stems more or less clustered from a branched (sometimes elongate and rhizome-like) caudex which usually surmounts a taproot; plants lax, up to 3 (5) dm tall, of moist to dry, often rocky places, at moderate to high elevations

P. PULCHERRIMUM Hook.

HYDROPHYLLACEAE Waterleaf Family

- 1 Flowers (at least in our species) borne singly, or sometimes a few of them in a lax, few-flowered, terminal inflorescence

- 2 Leaves entire or subentire; placentae more or less strongly intruded and partitionlike

HESPEROCHIRON PUMILUS

(Griseb.) Porter

- 2 Leaves coarsely toothed to pinnatifid; placentae enlarged but not at all partitionlike, nearly filling the young ovary, and forming a lining for the mature capsule

NEMOPHILA BREVIFLORA Gray

- 1 Flowers in definite inflorescences, not solitary

- 3 Inflorescence of subdichotomously branched (sometimes capitate) cymes without an evident central axis; placentae enlarged but not at all partitionlike, nearly filling the young ovary, and forming a lining for the mature capsule; fibrous-rooted, perennial mesophytes with cleft leaves and exserted stamens

HYDROPHYLLUM CAPITATUM

Dougl.

- 3 Inflorescence of one or more sympodial, more or less helicoid cymes which may be aggregated into a compound, often thyrsoïd inflorescence; placentae evidently intruded and partitionlike; taprooted annuals or perennials, mesophytic or xerohytic, with entire to variously dissected leaves and included or exserted stamens

PHACELIA

Phacelia Juss.

- 1 Leaves all entire, or in some species some of them with a large, entire terminal segment and one or several smaller, entire lobes or leaflets below the middle
- 2 Plants biennial or perennial; filaments strongly exserted; ovules 4; seeds 1-4

P. HASTATA Dougl.

- 2 Plants annual; filaments only shortly or not at all exserted; ovules (and usually seeds) more than 4

P. LINEARIS (Pursh) Holz.

- 1 Leaves coarsely toothed or pinnatilobate to more often pinnatifid or bipinnatifid, mostly without a large, entire, terminal segment
- 3 Plants annual or biennial, single-stemmed or with central stem surrounded by ascending lesser stems; corolla glabrous within; filaments only shortly or scarcely exerted P. FRANKLINII (R.Br.) Gray
- 3 Plants perennial, usually several-stemmed; corolla hairy within P. SERICEA (Grah.) Gray

BORAGINACEAE Borage Family

- 1 Nutlets broadly attached at the base to the broad low gynobase LITHOSPERMUM
- 1 Nutlets apically or medially to basilaterally or nearly basally attached, but the attachment, if nearly basal, always small
- 2 Nutlets either evidently armed with glochidiate prickles or uncinat bristles, or provided with a continuous, entire or cleft dorsomarginal ridge or wing that is complete around the base or across the back of the nutlet, or both armed and ridged
- 3 Nutlets more or less widely spreading in fruit, the rather large scar apical or apicolateral, not extending below the middle of the fruit, never elongate and narrow CYNOGLOSSUM OFFICINALE L.
- 3 Nutlets erect or incurved to somewhat spreading; scar distinctly otherwise
- 4 Nutlets essentially unarmed, the dorsomarginal ridge entire or merely toothed lacerate MYOSOTIS SYLVATICA Hoffm.
- 4 Nutlets armed with glochidiate prickles at least along the dorsomarginal ridge
- 5 Nutlets narrowly attached to the elongate gynobase along the well-developed, median, ventral keel, free near the base; pedicels erect or ascending in fruit; "racemes" evidently bracteate; plants mostly annual LAPPULA REDOWSKII (Hornem.) Greene

- 5 Nutlets medially attached to the broad, low gynobase, the scar more or less rounded, not elongate; pedicels recurved or deflexed in fruit; "racemes" naked or nearly so; plants mostly perennial

HACKELIA

- 2 Nutlets smooth or variouly roughened, but without hooked or glochidiate prickles or bristles (except for some very small dorsal ones in species of Plagiobothrys), sometimes sharp-edged, especially distally, but not with the ridge complete across the back or around the base of the nutlet

- 6 Corolla blue or occasionally pink (in rare individuals white), tubular or tubular-funnelform to campanulate, never salverform; perennials, never pungently hairy

MERTENSIA

- 6 Corolla white to yellow or orange, often salverform; annual or perennial, often pungently hairy

- 7 Nutlets with a closed or narrowly open ventral groove-scar running most of their length, this often expanded below into a depressed areola; plants annual to perennial, often pungently hairy

CRYPTANTHA

- 7 Nutlets with a ventral keel extending to the middle or to near the base, the attachment elevated, caruncle-like, placed at the base of the keel, or rarely extending along the keel; ours annuals and generally not pungently hairy

PLAGIOBOTHRYUS SCOULERI

(H.&A.) Johnst.

Cryptantha Lehm.

- 1 Plants perennial or sometimes merely biennial, relatively coarse, usually with a well-developed tuft of basal leaves; spikes aggregated into a dense, terminal, irregularly bracteate thyse, often eventually elongating and distinct; corolla more or less conspicuous, the limb mostly 4-12 mm wide; calyx persistent

C. INTERRUPTA (Greene) Pays.

- 1 Plants annual, relatively slender, without any conspicuous tuft of basal leaves; corollas not over about 2.5 mm wide
- 2 Nutlets all smooth, or finely and inconspicuously granular, not at all tuberculate or spiculate-papillate

- 3 Nutlets of 2 kinds, 1 differing definitely in size, color, or shape from the others
C. PATTERSONII (Gray)Greene
- 3 Nutlets all alike or essentially so (sometimes 1 or more fails to develop)
  - 4 Margins of the nutlets prominent, sharply angled, especially above C. WATSONII (Gray)Greene
  - 4 Margins of the nutlets rounded or obtuse, not prominent
  - 5 Nutlets lanceolate, 0.5-0.7 mm wide; plants of very sandy soil C. FENDLERI (Gray)Greene
  - 5 Nutlets ovate, 0.8-1.2 mm wide; plants common and widespread in our area
C. TORREYANA (Gray)Greene
- 2 Nutlets, or some of them, rough, with evident tubercles or spiculate papillae on the dorsal surface
C. AMBIGUA (Gray) Greene

Hackelia Opiz. Stickseed; Wild Forget-me-not

- 1 Corolla limb blue, sometimes withering pink
- 2 Plants relatively short lived, biennial or barely perennial, often single-stemmed from a taproot and simple crown; intramarginal prickles wanting, or occasionally 1 or 2 H. FLORIBUNDA (Lehm.)Johnst.
- 2 Plants perennial, ordinarily with several or many stems from a taproot and branching caudex; intramarginal prickles present, usually several
H. MICRANTHA (Eastw.)
J.L.Gentry
- 1 Corolla limb white to ochroleucous or greenish-tinted, sometimes marked or very lightly washed with pale blue
H. PATENS (Nutt.) Johnst.

Lithospermum L. Stoneseed

- 1 Corolla pale yellowish, often greenish-tinted, the tube 4-6 mm long, the limb 7-13 mm wide, the lobes entire or nearly so L. RUDERALE Dougl.
- 1 Corolla bright yellow, the tube (12) 15-30 mm long, the limb 10-20 mm wide, the lobes evidently erose
L. INCISUM Lehm.

Mertensia Roth Nom. Conserv. Bluebells

- 1 Plants relatively tall and robust (4-15 dm) with evident lateral veins in cauline leaves; blooming in late spring and summer M. CILIATA (Torr.) G. Don
- 1 Plants smaller, seldom as much as 4 dm tall, usually without evident lateral veins (except sometimes in M. oblongifolia, which can also be up to 6 dm tall but is separated by its longer lanceolate calyx teeth) blooming as soon as snow and temperature permit
- 2 Filaments short scarcely if at all over 1 mm long, base of anthers not elevated beyond the fornicies of the corolla, alpine plants M. ALPINA (Torr.) G. Don
- 2 Filaments longer and more conspicuous, broad and flattened, 1.5-3 mm long; base of anthers elevated above the fornicies; plants not alpine, except sometimes M. viridis
- 3 Corolla tube bearing a ring of hairs inside below the middle (sometimes scattered over much of the inner surface) tube usually shorter than limb; moderate to high elevations M. VIRIDIS A. Nels.
- 3 Corolla tube glabrous inside, obviously longer than the limb; foothills to moderate elevations
M. OBLONGIFOLIA
(Nutt.) G. Don

LABIATAE Mint Family

- 1 Corolla only obscurely or scarcely bilabiate, either subequally 5-lobed with the lobes all about alike, or subequally 4-lobed with one of the lobes usually broader than the others and sometimes emarginate
- 2 Stamens 4; plants aromatic; calyx 10-nerved; corolla white, pink or purple MENTHA ARVENSIS L.
- 2 Stamens 2; plants odorless; calyx 5-nerved; corolla white
LYCOPUS AMERICANUS Muhl.
- 1 Corolla more or less strongly bilabiate
- 3 Stamens 2 MONARDA FISTULOSA L.
- 3 Stamens 4 (or obsolete in pistillate plants)
- 4 Calyx bilabiate, with entire lips, bearing a prominent transverse external appendage on the upper side; lower stamens each with only 1 functional pollen sac
SCUTELLARIA GALERICULATA L.

- 4 Calyx regular or irregular, sometimes bilabiate, but in every case evidently toothed, and lacking any transverse appendage; each stamen with 2 pollen sacs, these sometimes confluent in dehiscence
- 5 Inflorescence appearing terminal, the verticels tending to be crowded and mostly subtended by mere bracts that are evidently differentiated from the foliage leaves
- 6 Stamens evidently exerted, readily visible without dissection of the flower; upper lip of the corolla not at all galeate
AGASTACHE UTRICIFOLIA
(Benth.) Kuntze
- 6 Stamens ascending under the more or less galeately rounded upper lip of the corolla, scarcely or not at all exerted
- 7 Calyx 5- to 10-nerved; lower stamens longer than the upper
PRUNELLA VULGARIS L.
- 7 Calyx 15-nerved; upper stamens longer than the lower
- 8 Calyx regular or nearly so, with subequal teeth
NEPETA CATARIA L.
- 8 Calyx strongly irregular, ours with the upper tooth much broader than the other 4
DRACOCEPHALUM PARVIFLORA
Nutt.
- 5 Inflorescences appearing axillary, the flowers or verticels of flowers mostly subtended by more or less well developed leaves that are separated (except often in Lamium) by internodes of approximately normal length
- 9 Lower lip of the corolla constricted at the base of the enlarged, cleft or emarginate central lobe, the lateral lobes broad and low, seeming to arise from the corolla throat, each terminating in a short, divergent tooth
LAMIUM AMPLEXICAULE L.
- 9 Lower lip of the corolla not constricted at the base of the central lobe, the lateral lobes directed more or less forward
- 10 Lower lip of the corolla with a pair of nipples projecting internally near the base; annual
GALEOPSIS LADANUM L.
- 10 Lower lip of the corolla without nipples; our species perennial
GLECOMA HEDERACEA L.

SOLANACEAE Potato or Nightshade Family

- 1 Fruit capsular, dehiscent; flowers relatively large, the corolla funnelform to salverform, in ours 2-10 cm long; heavy-scented, narcotic herbs, ours annual or biennial

HYOSCYAMUS NIGER L.

- 1 Fruit a fleshy or dry berry, indehiscent; flowers smaller, ours less than 2 cm long, funnelform or campanulate to rotate, or with reflexed lobes; plants of diverse habit, ours not markedly heavy-scented

SOLANUM

Solanum L. Nightshade

- 1 Leaves evidently pinnatilobate

S. TRIFLORUM Nutt.

- 1 Leaves entire to merely toothed or wavy-margined

S. SARRACHOIDES Sendt.

SCROPHULARIACEAE Figwort Family

- 1 Corolla galeate, i.e. the upper lip forming a hood or beak (galea) that tends to enclose the anthers, the teeth of the upper lip short or obsolete; inflorescence of leafy-bracted spikes, spikelike racemes, or heads; stigmas wholly united; sepals more or less connate at least below (sometimes in groups)

- 2 Pollen sacs similar in size and position; calyx lobes typically 5, sometimes 4 or only 2; leaves toothed to dissected, never entire, often basal as well as cauline

PEDICULARIS

- 2 Pollen sacs unequally set, one medifixed and appearing terminal on the filament, the other (sometimes reduced or obsolete) attached by its apex and pendulous or lying alongside the upper part of the filament; calyx lobes 2-4; leaves wholly cauline, entire or cleft, seldom toothed or definitely pinnatifid with broad segments

- 3 Galea more or less strongly surpassing the lower lip; plants perennial, except for C. exilis, in which the galea is very conspicuously longer than the lower lip

CASTILLEJA

- 3 Galea only slightly, or not at all, surpassing the lower lip; plants annual ORTHOCARPUS LUTEUS Nutt.

- 1 Corolla not galeate, though often bilabiate, the upper lip if differentiated, not forming a hood or beak; inflorescences, sepals and stigmas diverse
- 4 Filaments 5; stigmas wholly united
  - 5 Anthers 5; leaves alternate; corolla rotate, only slightly irregular VERBASCUM THAPSUS L.
  - 5 Anthers 4; leaves opposite (the cauline ones sometimes much reduced); corolla tubular, more or less strongly bilabiate PENSTEMON
- 4 Filaments 2-4
  - 6 Anthers 2; sepals distinct, except in Besseyia
    - 7 Leaves wholly cauline, opposite (the bracts sometimes leafy and alternate)

VERONICA
    - 7 Leaves chiefly basal, the cauline ones, if present, reduced, usually alternate; stigmas wholly united

BESSEYA WYOMINGENSIS
(A.Nels.) Rydb.
  - 6 Anthers 4; sepals diverse
    - 8 Flowers with the central lobe of the lower lip keeled-saccate, forming a pouch which encloses the stamens; annuals

COLLINSIA PARVIFLORA Lindl.
    - 8 Flowers with the central lobe of the lower lip flat or nearly so, not forming a pouch; annuals or perennials

MIMULUS

Castilleja Mutis Indian Paintbrush

- 1 Root annual; stems usually solitary; leaves and bracts entire, linear-lanceolate, the latter much longer than the flowers, with only distal 1/3 of the uppermost colored red

C. EXILIS A. Nels.
- 1 Root perennial, usually woody; stems clustered, often decumbent and sometimes rooting at the base; bracts 3- to 9-lobed or -divided or, if entire, much broader
  - 2 Galea short, rarely over 1/2 the length of the corolla tube; lower lip prominent, usually more than 1/3 the length of the galea; bracts usually yellow or yellowish, rarely purplish or reddish, except C. pulchella
    - 3 Calyx subequally cleft into 4 linear or triangular lobes

C. LONGISPICA A.Nels.

- 3 Calyx divided usually less than half as deeply laterally as sagittally
- 4 Calyx lobes acute or, if obtuse or obtusish, the plants rather harshly puberulent or pubescent or growing in dry habitats C. PALLESCENS (Gray) Greenm.
- 4 Calyx lobes obtuse or, if acute, the plants rather softly pubescent and growing in meadows or other moist situations
- 5 Bracts mostly as long as, or longer than, the flowers, obtuse or rounded; plants mostly of medium and lower elevations C. CUSICKII Greenm.
- 5 Bracts mostly shorter than the flowers, at least the lower ones acute or acutish, purple or purplish; plants of alpine and subalpine habitats C. PULCHELLA Rydb.
- 2 Galea usually longer and more slender, at times equaling or exceeding corolla tube length; lower lip usually reduced, dark green and thickened, in most species $\frac{1}{5}$ galea length or less (more prominent and as much as $\frac{1}{3}$ galea length in C. rhexifolia ad C. sulphurea); bracts showy, red or purple, rarely yellowish or whitish except in C. gracillima and C. sulphurea
- 6 Calyx much more deeply cleft below than above, usually more showy than the bracts C. LINARIAEFOLIA Benth.
- 6 Calyx subequally cleft above and below or more deeply so above; bracts usually more showy than the calyx
- 7 Bracts predominantly yellow or yellowish (but varying to red or purple C. gracillima)
- 8 Stems clumped, rather stout, erect or ascending from a woody base C. SULPHUREA Rydb.
- 8 Stems mostly solitary, although several may be attached to a remote caudex, slender, decumbent or creeping and often rooting at the base; wet meadows, middle altitudes C. GRACILLIMA Rydb.
- 7 Bracts predominantly red or purple, yellow only in rare individuals
- 9 Stems mostly 1-3 dm tall, usually unbranched; bracts crimson (drying purple), rarely scarlet; flowers mostly 20-30 mm long; alpine and sub-alpine zones C. RHEXIFOLIA Rydb.

- 9 Stems mostly more than 3 dm tall, often branched; bracts scarlet, rarely crimson; flowers mostly 30-40 mm long; plants of lower elevations

C. MINIATA Dougl.

Linaria Mill. Toadflax

- 1 Leaves linear, not clasping

L. VULGARIS Hill

- 1 Leaves ovate or lance-ovate, clasping

L. DALMATICA (L.) Mill.

Mimulus L. Monkey Flower

- 1 Plants perennial from rhizomes or stolons; flowers long-pedicellate, the pedicels longer than the calyx; corollas dropping before withering; septum of the capsule remaining intact at maturity, or splitting only above the middle
- 2 Corollas pink-purple, marked with yellow, 3-5.5 cm long; calyx 1.5-2.5 (3) cm long; erect plants with the leaves sessile and several-nerved from the base

M. LEWISII Pursh

- 2 Corollas yellow, sometimes marked with red or maroon, or in part washed with pale purplish; calyx, habit, and habitat diverse

- 3 Upper calyx toothed conspicuously larger than the others; leaves palmately or subpalmately veined, the 3-7 main veins arising at or very near the base; corolla strongly bilabiate, and with broad, strongly flaring throat

- 4 Plants with definite, creeping, often sod-forming rhizomes, often stoloniferous as well; flowers few (mostly 1-5), large, the corolla mostly 2-4 cm long; low plants, commonly 2 dm tall or less, of high altitudes in the mountains

M. TILINGII Regel

- 4 Plants with stolons, but only rarely with definite creeping rhizomes; flowers often more than 5, and usually less than 2 cm long when few; plants usually over 2 dm tall; low to moderate elevations in the mountains

M. GUTTATUS DC.

3 Upper calyx tooth not evidently larger than the others, or if so, then the leaves pinnately veined; corolla various M. MOSCHATUS Dougl.

1 Plants annual, without stolons or rhizomes; pedicels, corollas, and capsules diverse

5 Corollas yellow, often marked with red or maroon; pedicels elongate, mostly longer than the calyx; corollas generally deciduous before withering; septum of the capsule remaining intact at maturity, or splitting only above the middle

6 Corolla strongly bilabiate, the lower lip evidently longer than the upper and strongly deflexed from it; corolla not less than 8 mm long; principal leaves of fairly broad form and usually petiolate

M. GUTTATUS DC.

6 Corolla only slightly bilabiate, the lower lip only slightly longer than the upper and not much deflexed from it; corolla often less than 8 mm long; leaves diverse

7 Leaves abruptly contracted to the petiole; herbage generally evidently viscid-pubescent, or sometimes only shortly and inconspicuously so

M. FLORIBUNDUS Lindl.

7 Leaves tapered to the petiolar or sessile base; herbage finely glandular-puberulent

M. SUKSDORFII Gray

5 Corollas purple or red commonly marked in the tube or throat with yellow or white; pedicels, except often in M. breweri, mostly shorter than the calyx; corollas tending to persist for sometimes after withering (the tendency least marked in M. breweri)

8 Flowers small and slender, 5-10 mm long; septum splitting only above the middle; pedicels from a little shorter to evidently longer than the calyx

M. BREWERI (Greene) Rydb.

8 Flowers larger and more showy, 1-5 cm long; septum splitting to the base at maturity, the halves of the placenta adherent to the respective valves; pedicels shorter than the calyx M. NANUS H. & A.

- 1 Leaves merely toothed; calyx lobes 2
P. RACEMOSA Dougl.
- 1 Leaves or many of them pinnatilobate to bipinnatifid;
calyx lobes 5
  - 2 Plants leafy-stemmed, the basal leaves, if present,
not markedly larger than the cauline (though sometimes
with longer petioles); bracts sharply differentiated
from the leaves; galea beakless or with a very short
beak P. BRACTEOSA Benth.
  - 2 Plants with the leaves basally disposed, the cauline
leaves mostly few and more or less reduced
    - 3 Pinnae of the leaves, or many of them, deeply cleft
P. CYSTOPTERIDIFOLIA Rydb.
    - 3 Pinnae or lobes of the leaves mostly merely toothed
      - 4 Beak straight, spreading, about 1-4 mm long
P. PARRYI Gray
      - 4 Beak strongly curved, often more than 4 mm long
        - 5 Beak lunately downcurved, not much, if at all
exserted from the well-developed lower lip;
widespread species of wooded or open slopes
and drier meadows in the mountains
P. CONTORTA Benth.
        - 5 Beak strongly upcurved, the living flowers
reminiscent of an elephant's head with trunk
upraised; plant of wet meadows and other
wet places P. GROENLANDICA Retz.

Penstemon Mitch. Beardtongue

- 1 Anthers more or less densely long-woolly with tangled
hairs (visible with naked eye)
  - 2 Leaves all cauline, the lower reduced, the sterile
shoots few and similar to the fertile ones; plants
herbaceous P. MONTANUS Greene
  - 2 Larger leaves tending to be clustered near the base of
the plant or near the base of the season's growth;
usually on short sterile shoots as well as on flowering
stems; plants ascending or erect shrubs
P. FRUTICOSUS (Pursh) Greene
- 1 Anthers glabrous, or inconspicuously hispidulous with
short, mostly straight hairs

- 3 Flowers white or whitish, plants more or less shrubby at base
P. DEUSTUS Dougl.
- 3 Flowers other than white, mostly blue or purple or if white then not shrubby at base
- 4 Plants not glandular
  - 5 Plants glabrous throughout; leaves firm or fleshy often glaucous; flowers large up to 38 mm or inflorescence more than 1/3 the length of the plant
  - 6 Verticillasters loose; inflorescence secund; flowers large, 18-38 mm
P. CYANEUS Pennell
  - 6 Verticillasters dense; inflorescence cylindrical, usually at least 1/2 the length of the plant ; staminode strongly widened at apex and densely golden pubescent
P. ARENICOLA A.Nels.
  - 5 Plants pubescent at least in the inflorescence or if glabrous then the inflorescence much less than 1/2 the length of the plant; flowers small 6-16 mm long
  - 7 Flowers small, 6-11mm more or less declined
P. PROCERUS Dougl.
  - 7 Flower larger, 11-20 mm; scarcely declined
P. RYDBERGII A.Nels.
- 4 Plants more or less glandular in the inflorescence
  - 8 Ovary and capsule ordinarily glandular-puberulent near the summit; calyx elongate 7-13 mm long with herbaceous and entire segments; staminode exerted
  - 9 Plants essentially glabrous below the inflorescence; montane species
P. WHIPPLEANUS Gray
  - 9 Plants more or less hairy below the inflorescence, foothills and lowland species
P. ERIANTHERUS Pursh
- 8 Ovary and capsule ordinarily glabrous; calyx seldom over 8 mm long; staminode included
  - 10 Leaves (except for being glandular-hairy in the inflorescence) all glabrous
P. ATTENUATUS Dougl.
  - 10 Leaves (all or at least some of the cauline ones) cinereous with numerous very short hairs
P. RADICOSUS A.Nels.

Veronica L. Speedwell

- 1 Main stem terminating in an inflorescence, its flowers either densely crowded or more remote and axillary, the upper bract-leaves usually alternate
- 2 Rhizomatous perennials; seeds numerous
- 3 Capsules higher than wide; stem (and often also the otherwise glabrous leaves) sparsely to densely villous-hirsute with loosely spreading hairs; stems simple, erect or merely decumbent at the base; filaments 1-1.5 mm long; moderate to high altitude
V. WORMSKJOLDII Roem.&Schult.
- 3 Capsules wider than high; stem finely and closely puberulent; leaves glabrous or nearly so; stems tending to creep at the base, or to produce prostrate lower branches; filaments (l) 2-4 mm long; lowlands to rather high elevations
V. SERPYLLIFOLIA L.
- 2 Annual V. PEREGRINA L.
- 1 Main stem never terminating in an inflorescence, the leaves opposite throughout and the flowers all in axillary racemes
- 4 Leaves all short-petiolate; capsules turgid slightly or scarcely notched, slightly if at all wider than high; seeds numerous 0.5 mm long or less
V. AMERICANA Schwein.
- 4 Leaves (at least the middle and upper ones of the flowering shoots) sessile; capsules flattened, conspicuously notched, evidently wider than high; seeds 5-9 per locule, 1.2-1.8 mm long
V. SCUTELLATA L.

OROBANCHACEAE Broomrape Family

Orobanche L. Broomrape; Cancerroot

- 1 Flowers subtended by bractlets; calyx not equally 5-cleft; watch for O. ludoviciana which has glabrous anthers O. MULTIFLORA Nutt.
- 1 Flowers not subtended by bractlets but on naked peduncles; calyx equally 5-cleft
O. FASCICULATA Nutt.

LENTIBULARIACEAE Bladderwort Family

Utricularia L. Bladderwort

- 1 Flowers large, the lower lip mostly 10-20 mm long; leaves mostly 2-parted at the base, then unequally and quasipinnately several times dichotomous, the segments more or less terete, the ultimate ones filiform, strongly acuminate; bladders abundant, borne on ordinary leaves U. VULGARIS L.
- 1 Flowers smaller, the lower lip mostly 4-12 mm long; leaves mostly 3-parted at the base, then 1-3 times dichotomous, often unequally, but not quasipinnately so, the segments flat U. MINOR L.

PLANTAGINACEAE Plantain Family

Plantago L. Plantain; Ribgrass

- 1 Plants evidently perennial (some species may bloom during the first year)
  - 2 Ovules and seeds 6-30; leaves broad, the well-defined blade broadly elliptic to cordate-ovate and mostly 1.3-2.3 (3) times as long as wide; plants not woolly at the base; seeds reticulate, 1 mm long; native and introduced, mostly weedy plants P. MAJOR L.
  - 2 Ovules 2-4; leaves narrower, the elliptic or narrower blade mostly (2) 2.5-10 times as long as wide, or even longer; plants often woolly at the base; seeds not reticulate, well over 1 mm long P. LANCEOLATA L.
- 1 Plants annual
  - 3 Capsules 4 (6) -seeded; stamens mostly 2; leaves puberulent or glabrous, rarely as much as 3 mm wide; inflorescence wholly glabrous; corolla very small, the lobes less than 1 mm long; bracts ovate, succulent, 2 mm long; plants of saline situations P. ELONGATA Pursh
  - 3 Capsules 2-seeded; stamens 4; leaves more or less woolly-villous to glabrate, often over 3 mm wide; inflorescence sparsely to densely long-hairy; corolla larger, the lobes mostly 1.5-2 mm long; bracts linear or nearly so, firm, mostly longer; plants of nonsaline situations P. PATAGONICA Jacq.

RUBIACEAE Madder Family

- 1 Leaves opposite, with small stipules; ovules basally attached; corolla salverform-funnelform
KELLOGGIA GALOIODES Torr.
- 1 Leaves whorled (or the uppermost sometimes merely opposite); ovules laterally attached (to the partition); corolla diverse
GALIUM

Galium L. Bedstraw

- 1 Plants perennial from creeping rhizomes
  - 2 Flowers more or less numerous in a terminal, compound and much-branched, rather showy inflorescence; stems prostrate or ascending to more often erect, glabrous or pubescent, but not retrorsely scabrous on the angles; corollas 4-lobed
G. BOREALE L.
  - 2 Flowers solitary or few in small, rather inconspicuous inflorescences; stems weak, tending to recline or scramble on other vegetation, commonly retrorse-scabrous on the angles; corollas 3-lobed or less often 4-lobed
G. TRIFIDUM L.
- 1 Plants annual from a short taproot
  - 3 Leaves 2-4 whorl, not cuspidate; stem glabrous; fruit with hooked hairs
G. BIFOLIUM Wats.
  - 3 Leaves mostly 5-8 whorl, cuspidate; stem retrorsely scabrous or rarely glabrous; fruits diverse
G. APARINE L.

CAPRIFOLIACEAE Honeysuckle Family

- 1 Styles very short or none, the stigmas sessile or nearly so; inflorescence branched and mostly with more or less numerous flowers, umbelliform to corymbiform or paniculiform; corolla rotate to shortly open-campanulate

SAMBUCUS RACEMOSA L.

- 1 Style well developed, more or less elongate; inflorescence various, of paired flowers at the end of a peduncle, or of short racemes or spikes, or of sessile verticels on an elongate or foreshortened axis, but not umbelliform, corymbiform nor paniculiform; corolla short-campanulate to elongate and tubular not at all rotate; leaves simple
- 2 Stamens as many as the corolla lobes, mostly 5; fruits fleshy; plants not at once trailing and with flowers paired on terminal peduncles

- 3 Corolla regular or merely ventricose (the tube unequally expanded, somewhat bulged on one side); ovary with 2 fertile uniovulate locules and 2 sterile locules with several abortive ovules each; fruit white, drupaceous, with 2 seedlike stones

SYMPHORICARPOS

- 3 Corolla evidently irregular, either 2-lipped, or spurred at the base or both; ovary mostly 2- to 3-locular, with several ovules in each locule; fruit a several-seeded berry, red to blue or black

LONICERA

- 2 Stamens 4, corolla lobes 5; fruits dry; trailing plants with the flowers mostly paired on terminal peduncles

LINNAEA BOREALIS L.

Lonicera L. Honeysuckle

- 1 Bracts at the summit of the peduncle enlarged, broad and foliaceous, often anthocyanic, forming an involucre, the outer pair 8-15 mm long or more; ovaries and fruits wholly distinct

L. INVOLUCRATA

(Rich.) Banks

- 1 Bracts at the summit of the peduncle narrow and mostly small, relatively inconspicuous, less than 5 mm long except in forms of L. caerulea

- 2 Bractlets (inner bracts) wholly connate into a narrow-mouthed cup which tightly encloses the ovaries and grow with them into a fruit, the ovaries thus appearing wholly united, but actually distinct within the cup; corolla yellow, obscurely or scarcely bilabiate, the lobes about as long as the tube L. CAERULEA L.
- 2 Bractlets small and inconspicuous, or obsolete, not enclosing the ovaries; ovaries and fruit united at least at the base, but obviously paired L. UTAHENSIS Wats.

Symphoricarpos Duhmel. Snowberry

- 1 Corolla relatively short and broad, short-campanulate, not much, if at all, longer than wide (pressed), often bulged on one side (ventricose), the lobes varying from half as long to longer than the tube
  - 2 Style elongate, (3) 4-7 (8) mm long, more or less exerted, long-hairy near the middle or occasionally glabrous; anthers about 1.5-2 mm long, evidently shorter than the filaments; corolla lobes mostly equaling or a little longer than the tube
- S. OCCIDENTALIS Hook.
- 2 Style short, 2-3 mm long, glabrous; anthers about 1-1.5 mm long, not much, if at all, shorter than the filaments; corolla-lobes often evidently shorter than the tube
- S. ALBUS (L.) Blake
- 1 Corolla relatively long and narrow, elongate-campanulate, evidently longer than wide, not evidently ventricose, the lobes mostly 1/4-1/2 as long as the tube; erect shrubs with short styles
- S. OREOPHILUS Gray

- 2 Style short, 2-3 mm long, glabrous; anthers about 1-1.5 mm long, not much, if at all, shorter than the filaments; corolla-lobes often evidently shorter than the tube
S. ALBUS (L.) Blake
- 1 Corolla relatively long and narrow, elongate-campanulate, evidently longer than wide, not evidently ventricose, the lobes mostly 1/4-1/2 as long as the tube; erect shrubs with short styles
S. OREOPHILUS Gray

VALERIANACEAE

Valeriana L.

- 1 Plants with a stout taproot and short, branched caudex; basal leaves tapering more or less gradually to the petiolar base; inflorescence more or less paniculiform even at anthesis
V. EDULIS Nutt.
- 1 Plants with a stout rhizome or caudex and numerous fibrous roots; lower leaves with mostly sharply differentiated blade and petiole; inflorescence corymbiform at anthesis, though often more expanded in fruit
- 2 Relatively small plants, 1-4 (6) dm tall, not very leafy, the lateral lobes of the cauline leaves mostly well under 1 cm wide; achenes lanceolate, glabrous
V. DIOICA L.
- 2 Relatively robust plants, 3-9 dm tall, tending to be amply leafy the lateral lobes of some of the cauline leaves often over 1 cm wide; achenes a little broader, mostly lance-ovate, short-hairy or occasionally glabrous
V. OCCIDENTALIS Heller

CAMPANULACEAE Harebell Family

- 1 Filaments and anthers distinct; corolla regular
CAMPANULA ROTUNDIFOLIA L.
- 1 Filaments and anthers united into a tube, two of the anthers shorter than the others, the orifice of the tube thus oblique or appearing lateral; corolla distinctly irregular (or wanting in some flowers)
PORTERELLA CARNULOSA
(H. & A.) Torr.

ARTIFICIAL KEYS TO THE GENERA

- 1 Flowers all ligulate and perfect; juice milky; Group VI (201)
- 1 Flowers not all ligulate; ray (ligulate) flowers when present marginal, either pistillate or neutral; juice ordinarily watery
  - 2 Heads radiate
    - 3 Rays yellow or orange (sometimes marked with purple or reddish brown at the base)
      - 4 Pappus chaffy, or of firm awns, or none; receptacle chaffy, bristly, or naked
        - GROUP I (193)
      - 4 Pappus partly or wholly of capillary (sometimes plumose) bristles; receptacle naked
        - GROUP II (195)
    - 3 Rays white to pink-purple, red, or blue, not yellow or orange
      - GROUP III (196)
  - 2 Heads discoid or disciform, without rays (some plants with very small and inconspicuous rays are keyed here as well as in the radiate group)
    - 5 Pappus partly or wholly of numerous capillary (sometimes plumose) bristles
      - GROUP IV (197)
    - 5 Pappus of scales, or awns, or very short chaffy bristles, or a mere crown, or none, never plumose
      - GROUP V (200)

Group I. Rays yellow or orange; pappus chaffy, or of firm awns, or none

- 1 Receptacle chaffy or bristly throughout
  - 2 Involucral bracts in two distinct, dissimilar series; achenes strongly flattened at right angles to the radius of the head
    - BIDENS CERNUA L.
  - 2 Involucral bracts in one or more series, all of more or less similar nature; achenes either not much compressed or compressed parallel to the radius of the head
    - 3 Receptacle merely bristly; leaves alternate, or rarely all basal
      - GAILLARDIA ARISTATA Pursh
    - 3 Receptacle chaffy, provided with definite bracts rather than mere bristles; leaves various

4 Plants subscapose, cauline leaves much reduced
BALSAMORHIZA SAGITTATA
(Pursh) Nutt.

4 Plants evidently leafy stemmed, although the basal
leaves maybe larger than the cauline ones

5 Cauline leaves all alternate

6 Receptacle flat or merely convex; rays pistillate
and fertile; leaves entire or merely toothed

WYETHIA

6 Receptacle conic or columnar; rays neutral; leaves
various

7 Rays subtended by receptacular bracts; achenes
flattened, with 2 sharp and often 2 very blunt
angles; leaves pinnatifid

RATIBIDA COLUMNIFERA (Nutt.)
Woot. & Standl.

7 Rays not subtended by receptacular bracts;
achenes equably quadrangular, or somewhat
compressed, not strongly flattened; leaves
entire to pinnatifid

RUDBECKIA OCCIDENTALIS Nutt.

5 Cauline leaves, or at least the lower ones, opposite

8 Pappus none; rays mostly 7-17 mm long

VIGUIERA MULTIFLORA
(Nutt.) Blake

8 Pappus present, though sometimes readily deciduous;
rays mostly 1.5-5 cm long

9 Pappus persistent; disk achenes strongly com-
pressed, thin-edged

HELIANTHELLA

9 Pappus readily deciduous (at least as to the two
principal awn scales); achenes only slightly
or moderately compressed

HELIANTHUS

1 Receptacle naked, or with a single row of chaff between
the rays and disk flowers (sometimes only a few or even
only a solitary disk flower present)

10 Rays well developed and conspicuous, mostly 5-30 mm
long; receptacle naked

11 Involucral bracts few, mostly 5-13 (15), mostly sub-
equal and subuniseriate, tending to subtend the
rays individually; rays 5-13

ERIOPHYLLUM LANATUM
(Pursh) Forbes

- 11 Involucral bracts many, mostly 20 or more in 2-3 subequal series, usually not individually subtending the 35-55 ray flowers

HULSEA ALGIDA Gray

- 10 Rays short and inconspicuous, mostly 1-5 mm long

- 12 Involucral bracts well imbricate in several series

GUTIERREZIA SAROTHRÆ

(Pursh) Britt. & Rusby

- 12 Involucral bracts essentially uniseriate

MADIA GLOMERATA Hook.

Group II. Rays yellow or orange; pappus partly or wholly of capillary bristles

- 1 Shrubs

HAPLOPAPPUS

- 1 Herbs

- 2 Leaves (except sometimes the reduced uppermost ones) opposite

ARNICA

- 2 Leaves alternate, or all basal

- 3 Involucral bracts uniseriate, equal, narrow, commonly with a few very much shorter outer ones at the base; style branches truncate, exappendiculate, minutely penicillate

SENECIO

- 3 Involucral bracts in 2 or more series, equal or imbricate, narrow or broad; style branches with short or elongate, externally hairy appendages

- 4 Plants with numerous fibrous roots arising from a rhizome or short caudex, without a taproot; heads few to generally more or less numerous, small, the involucre mostly 2-7 mm high; pappus bristles mostly equal and white

SOLIDAGO

- 4 Plants taprooted except for a few species that have solitary heads; heads often larger; pappus various

- 5 Style appendages very short, 0.5 mm long or less; involucral bracts subequal or more or less imbricate, often green in part, but neither definitely leafy nor with chartaceous base and herbaceous green tip

ERIGERON LINEARIS

(Hook.) Piper

- 5 Style appendages longer, mostly 0.7 mm long or more; involucre various

- 6 Pappus double, the outer much shorter than the inner

CHRYSOPSIS VILLOSA var.

DEPRESSA (Purs.) Nutt.

- 6 Pappus simple, the bristles generally unequal, but not divided into two lengths

HAPLOPAPPUS

Group III. Rays white to pink, purple, red, or blue

- 1 Receptacle chaffy or bristly throughout; pappus of scales, or awns, or very short chaffy bristles, or a mere crown, or none

- 2 Rays very large, mostly 1.5-5 cm long; perennial

WYETHIA

- 2 Rays smaller, seldom over about 1 cm long; annual or perennial

ACHILLEA MILLEFOLIUM L.

- 1 Receptacle naked, or with a row of chaff between the ray and disk flowers; pappus various

- 3 Pappus of the disk flowers composed partly or wholly of capillary bristles; receptacle naked

- 4 Rays very numerous, filiform, and short, scarcely longer than the disk flowers; annual weeds, blooming chiefly in late summer and fall, with the involucre and style nearly of Erigeron

CONYZA CANADENSIS

(L.) Cronq.

- 4 Rays well developed and conspicuous, obviously surpassing the disk, except for a few species which are either longer-lived or have the involucre and style of Aster

- 5 Involucral bracts subequal or more or less imbricate, often green in part, but neither definitely leafy nor with chartaceous base and herbaceous green tip; style appendages lanceolate or broader, acute to obtuse, 0.5 mm long or less; plants blooming chiefly in spring and early summer (or in midsummer at high elevations)

ERIGERON

- 5 Involucral bracts either subequal and the outer leafy, or more commonly evidently imbricate, with chartaceous base and evident green tip, sometimes chartaceous throughout; style appendages lanceolate or narrower, acute or acuminate, ordinarily more than 0.5 mm long; plants blooming chiefly in late summer and fall (or in midsummer at high elevations)
- 6 Plants distinctly taprooted; leaves spinulose-tipped and often spinulose-toothed or pinnatifid; style appendages generally longer than the stigmatic part

MACHAERANTHERA

- 6 Plants otherwise, most species fibrous rooted, often rhizomatous; leaves entire or toothed, but not spinulose; style appendages generally shorter than the stigmatic part

ASTER

- 3 Pappus of scales, or awns, or distinctly flattened, chaffy bristles or a mere crown, or none; receptacle naked, or with a row of bracts between the ray and disk flowers

- 7 Receptacle evidently conic or hemispheric

MATRICARIA MATRICARIOIDES
(Less.) Porter

- 7 Receptacle flat or nearly so, sometimes very small

- 8 Pappus of the disk flowers of about 10 or more flattened, bristlelike scales

TOWNSENDIA

- 8 Pappus lacking

CHRYSANTHEMUM
LEUCANTHEMUM L.

Group IV. Heads discoid or disciform; pappus capillary

- 1 Leaves either more or less spiny and thistlelike, or heads with densely bristly receptacle, or both
- 2 Plants thistlelike with more or less spiny-margined leaves and usually also with spiny involucre

- 3 Pappus bristles merely barbellate
CARDUUS NUTANS L.
- 3 Pappus bristles plumose (or those of the outermost
row of flowers sometimes merely barbellate); recept-
acle densely bristly CIRSIUM
- 2 Plants scarcely or not at all thistlelike, the leaves not
spiny-margined; involucre not spiny
CENTAUREA MACULOSA Lam.
- 1 Leaves not at all thistlelike; receptacle naked
- 4 Shrubs
  - 5 Involucral bracts 4-6, equal
TETRADYMIA CANESDENS DC.
  - 5 Involucral bracts more numerous, imbricate, or at
least in several series CHRYSOTHAMNUS
- 4 Herbs
  - 6 Flowers all perfect and fertile (heads discoid)
    - 7 Leaves opposite; flowers yellow or orange
ARNICA
    - 7 Leaves alternate, or if rarely opposite or whorled,
then the flowers not yellow or orange
    - 8 Principal involucral bracts essentially equal
and uniseriate, although some very much
reduced outer bracts may be present
SENECIO
    - 8 Principal involucral bracts more or less imbricate
in 2-several series
    - 9 Style branches flattened, with well developed,
introrsely marginal stigmatic lines and a short
or elongate, externally hairy appendage;
flowers usually yellow, occasionally reddish;
pappus merely barbellate
    - 10 Style appendages very short, 0.5 mm
long or less ERIGERON
    - 10 Style appendages longer, mostly 0.7 mm
long or more
    - 11 Plants either caudiciferous, fibrous-
rooted, and tall (6-12 dm), or if smaller
and taprooted then short-lived (barely
perennial) and with the herbage evi-
dently canescent-puberulent
ASTER BRACHYACTIS Blake
    - 11 Plants not with the foregoing combination
of characters
HAPLOPAPPUS MACRONEMA
Gray

- 9 Style branches with short stigmatic lines and an elongate, papillate appendage; flowers cream, white, to pink-purple, not yellow

BRICKELLIA GRANDIFORA

(Hook.) Nutt.

- 6 Flowers, the outer, or in some heads, all, pistillate (heads disciform); (some dioecious plants, in which some heads are wholly pistillate, and other wholly hermaphrodite, are keyed here)

- 12 Herbage more or less white-woolly; leaves simple and entire or nearly so; involucre bracts mostly with dry, scarious, thin, white to yellowish, brownish, or blackish-green tips

- 13 Plants taprooted, or perennial; heads all with outer pistillate and central perfect (or functionally staminate) flowers GNAPHALIUM

- 13 Plants fibrous-rooted, perennial, often with rhizomes or stolons, but without a taproot; dioecious or nearly so, the heads on at least some of the plants wholly staminate, or wholly pistillate

- 14 Basal leaves generally forming a conspicuous, persistent tuft; stem seldom very leafy, with or without stolons and rhizomes; strictly dioecious (staminate plants rare in some species)

ANTENNARIA

- 14 Basal leaves soon deciduous, not markedly larger than the numerous and well developed cauline ones; plants with rhizomes, but no stolons; pistillate plants commonly with a few central, functionally staminate flowers in each head

ANAPHALIS MARGARITACEA

(L.) B. & H.

- 12 Herbage not at all white-woolly, though often otherwise pubescent; involucre bracts not markedly scarious at the tip

- 15 Perennial ERIGERON

- 15 Annual CONYZA CANADENSIS

(L.) Cronq.

Group V. Heads discoid or disciform; pappus chaffy, or of awns, or none

- 1 Receptacle chaffy or bristly throughout, or a few of the central flowers bractless
- 2 Receptacle elongate, the large black heads thus shaped like the end of a finger or thumb
RUDBECKIA OCCIDENTALIS
Nutt.
- 2 Receptacle flat or merely convex; heads not black (involucre blackish in spp. of Centaurea)
- 3 Heads very small, the involucre only 1.5-4 mm high, the disk up to about 5 mm wide
IVA
- 3 Heads obviously larger; involucre 6-40 mm high, the disk seldom less than 1 cm wide
- 4 Receptacle chaffy; involucre bracts biserial and obviously dimorphic; achenes basifixed
BIDENS CERNUA L.
- 4 Receptacle bristly; involucre bracts not divided into two distinct series; achenes obliquely attached to the receptacle
CENTAUREA MACULOSA Lam.
- 1 Receptacle naked, or with a single row of chaffy bracts between the ray and disk flowers (heads sometimes short and very few-flowered)
- 5 Plants with an evident though sometimes short pappus of distinct awns or scales
- 6 Pappus of a few firm, deciduous awns; involucre strongly resinous
GRINDELIA SQUARROSA
(Pursh) Dunal
- 6 Pappus of scales; involucre sometimes glandular, but scarcely resinous
CHAENACTIS
- 5 Plants without a pappus, or the pappus a mere minute crown
- 7 Involucre bracts uniserial and equal, each subtending and wholly enclosing an achene; linear-leaved annuals with minute rays
MADIA GLOMERATA Hook.
- 7 Involucre bracts in several series, not enclosing the achenes; flowers various
- 8 Inflorescence spiciform, racemiform, or paniculiform
ARTEMISIA
- 8 Inflorescence corymbiform to capitate, or the heads solitary

- 9 Receptacle high, hemispheric or conic at least at maturity
 MATRICARIA MATRICARIOIDES
 (Less.) Porter
- 9 Receptacle flat or somewhat convex
 TANACETUM VULGARE L.

Group VI. Flowers all ligulate

- 1 Pappus of simple (sometimes barbellate) capillary bristles only (some of the outer bristles sometimes evidently stronger than the others)
- 2 Achenes more or less strongly flattened; some of the pappus bristles no more than 4-celled in cross-section at the base; corolla tube mostly more than half as long as the ligule; our species erect, leafy-stemmed, and commonly with several or many heads
- 3 Achenes beakless, without any enlarged pappiferous disk at the summit; some of the outer pappus bristles evidently stouter than the others; heads mostly many-flowered (about 85- to 250-flowered in our species)
 SONCHUS ASPER (L.) Hill
- 3 Achenes beaked or less often beakless, in either case somewhat enlarged at the summit where the pappus is attached; none of the pappus bristles much stouter than the others; heads relatively few-flowered (about 11- to 56-flowered in our species)
 LACTUCA
- 2 Achenes terete or prismatic, scarcely flattened; pappus, corolla, and habit various
- 4 Achenes smooth or nearly so, not evidently spinulose or muricate
- 5 Perennial from a elongate or (in all our species) very short rhizome, with numerous fibrous roots; taproot wanting; achenes truncate or sometimes narrowed upwards, not beaked; pappus mostly sordid or brownish
 HIERACIUM
- 5 Annual, biennial, or more often perennial, from a taproot or several strong roots, without rhizomes (some of the Old World species of Crepis are truly rhizomatous rather than taprooted); achenes beaked or beakless; pappus mostly white or nearly so

6 Plants with at least a few cauline leaves; heads several or numerous to rarely solitary; involucre more or less calyculate
CREPIS

6 Plants scapose or nearly so, with strictly solitary heads; involucre bracts imbricate or subequal

7 Achenes evidently beaked at maturity (except sometimes in one variety of Agoseris glauca that has conspicuously pubescent herbage and involucre)

AGOSERIS

7 Achenes beakless, herbage and involucre glabrous or nearly so
MICROSERIS

4 Achenes spinulose or muricate near the summit of the body, tipped by a slender beak; plants scapose, monocephalous; involucre more or less calyculate; flowers yellow in our species
TARAXACUM

1 Pappus of plumose bristles, or bristles and scales, or scales, or minute awns, or none, the scales sometimes very slender and bristle-like in species of Microseris

8 Flowers pink or occasionally white; principal bracts few, in our species mostly 3-8; pappus plumose at least above
STEPHANOMERIA

8 Flowers yellow or orange to sometimes purple, not pink; principal bracts often more numerous

9 Pappus of scales, these sometimes narrow, and often with a terminal (in one species plumose) awn, or in one species of intermingled capillary bristles and narrow, gradually attenuate scales; achenes sometimes narrowed above, but not beaked

MICROSERIS

9 Pappus (except sometimes in the marginal flowers) of plumose bristles, sometimes with some shorter outer nonplumose bristles or scales; achenes beaked or beakless
TRAGOPOGON

Agoseris Raf. False Dandelion, Mountain Dandelion

1 Achenes generally with a short, stout, more or less striate beak up to about half as long as the body (beak sometimes longer in var. laciniata, sometimes wanting in var. dasycephala); flowers yellow, often drying pinkish
A. GLAUCA (Pursh) Raf.

1 Achenes with a long, slender, scarcely or not at all striate beak, more than half as long as the body of achene; flowers burnt orange
A. AURANTIACA (Hook.) Greene

- 7 Heads smaller, the involucre 4-7 mm high, the dry pistillate corollas mostly 2.6-4.5 mm long; common and widespread
A. MICROPHYLLA Rydb.
- 3 Plants without stolons, mostly not mat-forming, though often with several or many stems arising from a branched subterranean rhizome or caudex
- 8 Involucre scarious to the base, glabrous or nearly so, the outermost bracts occasionally a little woolly at the base
A. LUZULOIDES T. & G.
- 8 Involucre with a densely pubescent, not at all scarious lower portion, the pubescence extending even to the inner bracts
- 9 Plants mostly 1-2 dm tall; involucre blackish in aspect, although the inner bracts may be white at the tip
A. LANATA (Hook.) Greene
- 9 Plants mostly 2-5 dm tall
A. ANAPHALOIDES Rydb.

Arnica L. Arnica

- 1 Cauline leaves mostly 5-12 pairs
- 2 Involucral bracts obtuse or merely acutish, bearing a tuft of long hairs at or just within the tip
A. CHAMISSONIS Less.
- 2 Involucral bracts more or less sharply acute, the tip not markedly more hairy than the body
A. LONGIFOLIA D.C. Eat.
- 1 Cauline leaves mostly 2-4 pairs, not including those (if any) of the basal cluster
- 3 Heads characteristically discoid (marginal corollas sometimes ampliate, rarely truly radiate)
A. PARRYI Gray
- 3 Heads characteristically radiate (rare rayless forms occur, chiefly in company with the normal radiate plants)
- 4 Pappus subplumose, more or less tawny; no evident tufts of basal leaves on the flowering stem
- 5 Heads narrow, more or less turbinate; cauline leaves ovate or deltoid to broadly elliptic or lance-elliptic
A. DIVERSIFOLIUS Greene
- 5 Heads broader, subhemispheric; cauline leaves more variable
A. MOLLIS Hook.

- 4 Pappus merely barbellate, usually white or nearly so; basal leaves often conspicuous, sometimes small or wanting
- 6 Leaf blades relatively broad, the larger ones mostly 1-2.5 (or rarely 3) times as long as wide; basal leaves sometimes persistent, but not densely tufted
- 7 Achenes generally glabrous below, or glabrous throughout; basal leaves (those on separate short shoots) seldom cordate when present, the cauline leaves even less frequently so; leaves generally more or less toothed; involucre with few or no long hairs
A. LATIFOLIA Bong.
- 7 Achenes mostly short-hairy (or glandular) nearly or quite to the base; leaves and involucre various
A. CORDIFOLIA Hook.
- 6 Leaf blades narrower, mostly 3-10 times as long as wide; basal leaves often densely tufted, but not always so
- 8 Heads relatively large, hemispheric or nearly so, with mostly 10-23 rays; lower cauline leaves generally petiolate; foothills and moderate elevations in the mts.
- 9 Old leaf bases with dense tufts of long brown wool in the axils; disk corollas with some spreading glandless hairs, as well as commonly stipitate-glandular
A. FULGENS Pursh
- 9 Old leaf bases without axillary tufts, or the hairs few and white; disk corollas stipitate-glandular, generally not otherwise hairy
A. SORORIA Greene
- 8 Heads smaller, turbinate-campanulate, with mostly 7-10 rays; lower cauline leaves tending to be sessile; alpine and subalpine
A. RYDBERGII Greene

Artemisia L. Sagebrush; Wormwood

- 1 Marginal flowers pistillate; herbs or shrubs
- 2 Disk flowers fertile, with normal ovary
- 3 Receptacle not hairy
- 4 Perennial from a rhizome or caudex, or sometimes from a taproot; plants more or less hairy, at least on the lower surfaces of the leaves when young

- 5 Leaves ordinarily with one or two pairs of stipule-like lobes at the base; divisions of the principal leaves again toothed, cleft or lobed; introduced, weedy, rare in our range

A. VULGARIS L.

- 5 Leaves ordinarily without stipule-like lobes at the base, variously entire to bipinnatifid; native

- 6 Leaves small and finely divided, the best developed ones about 2-5 cm long, bipinnatifid; often with the ultimate segments again toothed; widespread

A. MICHAUXIANA Bess.

- 6 Leaves less divided and often larger, varying from entire to pinnatifid or occasionally sub-bipinnatifid

A. LUDOVICIANA Nutt.

- 4 Annual or biennial from a taproot; leaves green, essentially glabrous

A. BIENNIS Willd.

- 3 Receptacle beset with numerous long hairs between flowers; leaves dissected

- 7 Plants mat-forming and subshrubby, with numerous heads; leaf blades up to 12 mm long

A. FRIGIDA Willd.

- 7 Plants strictly herbaceous and not at all mat-forming; cauline leaves few; heads few, mostly 5-25; at least some of the basal leaves with blades 1.5 cm long or more

A. SCOPULORUM Gray

- 2 Disk flowers sterile, with abortive ovary

- 8 Leaves mostly entire, or the lower sometimes with 3-5 long narrow segments

A. DRACUNCULUS L.

- 8 Leaves pinnatifid, bipinnatifid, or dissected, except the uppermost

A. CAMPESTRIS L.

- 1 Flowers all perfect; shrubs (Sagebrush)

- 9 Leaves all or nearly all entire

A. CANA Pursh

- 9 Leaves, or many of them 3-toothed at the apex or 3-to 5-cleft

- 10 Leaves, or many of them, deeply cleft into linear or linear-oblong divisions which may themselves be 3-cleft; flowers mostly 5-8 in each head; inflorescence rather loosely paniculiform

A. TRIPARTITA Rydb.

- 10 Leaves mostly merely toothed at the apex (occasionally more deeply cleft forms differ in other respects from A. tripartita)
  - 11 Plants dwarf, mostly 1-4 dm tall, with spikelike to narrowly paniculiform inflorescence seldom as much as 1.5 cm wide A. ARBUSCULA Nutt.
  - 11 Plants taller, mostly 4-20 dm tall, with more paniculiform inflorescence that is mostly 1.5-7 cm wide A. TRIDENTATA Nutt.

·   Aster L. Aster; Michaelmas Daisy

- 1 Annuals with slender, short, inconspicuous rays only slightly exceeding the disk, or the pistillate flowers with tubular-filiform, rayless corolla; pistillate flowers more numerous than the disk flowers (Brachyactis)

A. BRACHYACTIS Blake
- 1 Annuals, biennials, or most commonly perennials, most species with well developed rays (short and inconspicuous in a few perennials, or the pistillate flowers completely wanting in a few perennials); pistillate (ray) flowers mostly fewer than the disk flowers
  - 2 Pappus distinctly double, with an outer series of very short bristles in addition to the principal bristles; heads solitary; leaves numerous, narrow (up to 4 mm wide), uniform (Ionactis)

A. SCOPULORUM Gray
  - 2 Pappus simple or occasionally more or less double; habit various; but not as in Ionactis
  - 3 Plants with a taproot or with an erect, taprootlike caudex, without rhizomes or numerous fibrous roots; style appendages equalling or longer than the stigmatic portion; rays blue or purple

A. ALPIGENUS (T. & G.) Gray
  - 3 Plants fibrous-rooted, often with creeping rhizomes, without a taproot or taprootlike caudex (or sometimes with a taproot in a white-rayed species of Eucephalus); style appendages in most species shorter than the stigmatic portion

- 4 Rays few, typically about 5, 8, or 13, sometimes 21 (or the pistillate flowers completely wanting); involucre bracts tending to be keeled, seldom strongly herbaceous; lower stem leaves clearly reduced, plants without well developed creeping rhizomes (Eucephalus)
  - 5 Outer involucre bracts rounded to slightly acutish
A. GLAUCODES Blake
  - 5 Outer involucre bracts sharply acute or acuminate
    - 6 Leaves large, mostly 15-35 mm wide, 2.5-6 times as long as wide; rays white (often becoming pinkish in age or in drying); robust plants, mostly 6-15 dm tall
A. ENGELMANNII (Eat.) Gray
    - 6 Leaves smaller, 3-15 mm wide; smaller plants, up to 6 or rarely 8 dm tall
A. PERELEGANS Nels. & Macbr.
- 4 Plants differing in one or more respects from the section Eucephalus as described above
  - 7 Achenes 3-nerved, flattened; monocephalous, arctic-alpine plants with the habit of Erigeron (Amellastrum)
A. ALPINUS L.
  - 7 Achenes mostly several-nerved; plants of various, but mostly not arctic-alpine habitats, mostly not at all erigeroid in habit (Euaster)
    - 8 Involucre and peduncles glandular
      - 9 Leaves mostly sharply serrate or dentate, sessile, gradually larger toward the middle of the stem, with the lower leaves soon deciduous; involucre bracts strongly imbricate
A. CONSPICUUS Lindl.
      - 9 Leaves entire, the upper leaves sessile, clasping, strongly reduced from the persistent, petiolate lower leaves; involucre seldom much imbricate
A. INTEGRIFOLIUS Nutt.
  - 8 Involucre and peduncles, as well as the rest of the plant, without glands, or apparently so
    - 10 Disk corollas with the tube equaling or generally surpassing the slender limb; involucre often more or less suffused with anthocyanin
A. SIBIRICUS L.
    - 10 Disk corollas with the tube distinctly shorter than the limb; involucre bracts sometimes purple-tipped, but normally not distinctly purple-margined or suffused with anthocyanin except in some forms of A. foliaceus

- 11 Pubescence of the stem and branchlets occurring in lines decurrent from the leaf bases, commonly neither uniform under the heads nor confined to the inflorescence; inflorescence generally large and leafy

A. HESPERIUS Gray

- 11 Pubescence of the stem uniform, or, if in lines, then either uniform under the heads or very scanty and confined to the inflorescence; inflorescence various

- 12 Involucral bracts, at least the outer, with loose or squarrose, minutely spinulose-mucronate tip; rays white

A. FALCATUS Lindl.

- 12 Involucral bracts not spinulose-mucronate at the tip (rarely obscurely so in A. chilensis), variously appressed to spreading; rays white or more often colored

- 13 Involucres strongly graduated, at least the outer bracts obtuse, markedly shorter than the inner, and not foliaceous

A. CHILENSIS Nees.

- 13 Involucres not strongly graduated, or, if so, then the bracts markedly acute; involucral bracts acute, or, if obtuse, then enlarged and foliaceous

- 14 Inflorescence a long narrow leafy panicle with usually numerous heads; stem pubescence mostly uniform and short; leaves mostly over 7 times as long as wide; rays usually pink or white

A. EATONII (Gray) Howell

- 14 Inflorescence few-headed, or, if with many heads, then shorter, more open, and cymose-paniculate often with much reduced leaves; leaves and pubescence various; rays usually blue or violet

- 15 Leaves and involucral bracts relatively small and narrow, the middle cauline leaves mostly less than 1 cm wide and more than 7 times as long as wide, the involucral bracts small and linear or linear-oblong, never enlarged and leafy

A. OCCIDENTALIS (Nutt.) T. & G.

- 15 Leaves and involucral bracts relatively large, the middle cauline leaves mostly over 1 cm wide (narrower in reduced alpine plants) and less than 7 times as long as wide, some of the involucral bracts often more or less enlarged and leafy (sometimes all narrow and linear)

A. FOLIACEUS Lindl.

Chaenactis DC.

- 1 Alpine perennial with 1 or usually several rosettes, the naked axillary peduncles up to 1 dm long, otherwise stemless C. ALPINA (Gray) Jones
- 1 Leafy-stemmed biennials or perennials, with or without rosettes, seldom alpine C. DOUGLASII (Hook.) H. & A.

Chrysothamnus Nutt. Rabbit Brush

- 1 Twigs glabrous or minutely spreading-puberulent, not at all tomentose C. VISCIDIFLORUS (Hook.) Nutt.
- 1 Twigs covered with a feltlike tomentum, this sometimes so close as to escape casual observation
- 2 Outer involucral bracts regularly shortened, not herbaceous-tipped C. NAUSEOSUS (Pall.) Britt.
- 2 Outer involucral bracts commonly prolonged into a slender herbaceous tip or appendage C. PARRYI (Gray) Greene

Cirsium Mill. Thistle
From Gardner (1972)

- 1 Involucre of largest mature heads (0.9-) 1.2-1.7 (-2) cm tall, 0.6-1 cm broad at base; heads numerous, in loose clusters, corymbiform; heads of two kinds, if pappus longer than corolla, anthers 1-2 mm long, if pappus shorter than corolla, anthers 4-5 mm long C. ARVENSE (L.) Scop.
- 1 Involucre of largest mature heads more than 1.8 cm tall, and 1 cm or more broad at base; heads solitary or in compact terminal clusters or axillary, not corymbiform; regardless of pappus/corolla relationship, all anthers similar in length
- 2 Heads frequently in terminal cluster, occasionally axillary on upper half of stem; all heads exceeded by one to several cauline leaves; leaves not markedly reduced upwards; phyllaries without a glutinous dorsal ridge (except a few glands on an occasional specimen of C. tweedyi)
- 3 Pappus longer than the corolla by 1 mm or more; achenes 4 mm long and 2 mm or less broad C. FOLIOSUM (Hook.) DC.

- 3 Pappus shorter than the corolla; achenes longer than 4mm and 2 mm or more broad
- 4 Leaf bases of most cauline leaves decurrent, wings 6-30 mm long; leaves glabrous above and below, rarely a thin tomentum below; involucre 1-1.5 cm broad at base C. TWEEDYI Rydb.
- 4 Leaf bases of all leaves clasping, not decurrent; leaves tomentose below; involucre 1.5-3 cm broad at base C. SCARIOSUM Nutt.
- 2 Heads borne singly or in loose clusters, always one terminal on stem and branches, occasionally axillary on upper half of stem; heads never appreciably exceeded by cauline leaves; leaves markedly reduced upwards; phyllaries with or without a glutinous dorsal ridge
- 5 Upper leaf surfaces with minute, appressed spines, otherwise glabrous; outer phyllaries to 1 mm broad at base and reflexed near middle C. VULGARE (Savi) Airy-Shaw
- 5 Upper leaf surfaces without minute, appressed spines, either glabrous or tomentose; outer phyllaries 1-3 mm broad at base, not reflexed, although spines may be reflexed at base
- 6 Leaves clasping stem, rarely decurrent, if so, wings less than 12 mm long
- 7 Yellow apical collar on achenes 0.4-0.7 mm broad; rosette leaves, at least a few, and occasionally all cauline leaves entire, with marginal spines; upper leaf surface usually green C. FLODMANII (Rydb.) Arthur
- 7 Yellow apical collar on achenes to 0.2 mm broad or lacking; rosette leaves and cauline leaves dissected, rarely subentire, upper leaf surface usually gray C. UNDULATUM (Nutt.) Spreng.
- 6 Leaves decurrent, wings of middle cauline leaves at least 15 mm long C. SUBNIVEUM Rydb.

Crepis L. Hawk's-beard

- 1 Introduced annual or biennial weeds of lawns and waste places C. TECTORUM L.
- 1 Native perennial species, not weedy
  - 2 Stem and leaves glabrous, or more or less hispid, but not at all tomentose

- 3 Flowers mostly 9-12 in each head; plants commonly 1-3 dm tall C. ELEGANS Hook.
- 3 Flowers mostly 20-50 in each head; plants mostly 2-7 dm tall C. RUNCINATA (James) T.&G.
- 2 Stem and leaves more or less tomentose or puberulent, at least when young, sometimes also setose or glandular-hispidulous
- 4 Involucres, or lower part of stem, or both, conspicuously setose, but not at all glandular (forms of C. atrabarba, recognizable by the deeply pinnatifid leaves with narrow, entire segments, might be sought here) C. MODOCENSIS Greene
- 4 Involucres and stem sparingly or not at all setose, or, if evidently setose, then the setae gland-tipped
- 5 Heads very narrow, mostly 5- to 10-flowered, with 5-7 (8) inner involucre bracts, which are glabrous or occasionally tomentulose; well developed plants mostly with 20-100 or more heads C. ACUMINATA Nutt.
- 5 Heads broader, mostly 10- to 40-flowered, with 8-15 inner involucre bracts, these never glabrous; heads 3-30, or rarely 40
- 6 Leaf segments linear or narrowly lanceolate, mostly entire; achenes generally greenish C. ATRABARBA Heller
- 6 Leaf segments broader, mostly lanceolate or deltoid, some of them usually toothed; achenes mostly yellowish or brownish C. OCCIDENTALIS Nutt.

Erigeron L. Daisy; Fleabane

- 1 Pistillate corollas very numerous, filiform, with very narrow short erect rays, these sometimes not exceeding the disk, or the inner pistillate corollas tubular and rayless; involucre glandular or hirsute or both, but not woolly-villous
- 2 Rayless pistillate flowers present between the rays and disk flowers; inflorescence corymbiform, the peduncles arcuate or obliquely ascending, or the head solitary E. ACRIS L.

- 2 Rayless pistillate flowers wanting; inflorescence racemiform, the peduncles erect or nearly so, or the head solitary E. LONCHOPHYLLUS Hook.
- 1 Pistillate corollas few to numerous (rarely absent), the tube generally cylindrical, the rays well developed and spreading, or occasionally reduced or absent, but not short, narrow and erect except in a few high-northern species with woolly-villous involucre
- 3 Pappus of the ray and disk flowers unlike, that of the disk flowers composed of bristles and short outer setae, that of the ray flowers lacking the bristles E. STRIGOSUS Muhl.
- 3 Pappus of the ray and disk flowers alike, of bristles sometimes also with outer setae or scales
- 4 Cauline leaves ample, usually lanceolate or broader; plants when well developed tall and erect, somewhat Asterlike
- 5 Rays mostly 2-4 mm wide; pappus mostly simple E. PEREGRINUS (Pursh) Greene
- 5 Rays mostly about 1 mm wide or less; pappus mostly double
- 6 Plants rather equably leafy, the upper leaves gradually reduced, the middle leaves commonly as large as or larger than the often deciduous lowermost ones E. SPECIOSUS Lindl.
- 6 Plants rather inequably leafy, the uppermost leaves strongly reduced, the middle ones commonly smaller than the mostly persistent lowermost ones E. GLABELLUS Nutt.
- 4 Cauline leaves usually much reduced, mostly linear or oblanceolate, broader in some low species; plants scarcely Asterlike, mostly relatively low, and often spreading
- 7 Leaves, or some of them, more or less lobed, divided, parted, or coarsely toothed E. COMPOSITUS Pursh
- 7 Leaves entire, or rarely slightly toothed
- 8 Involucre woolly-villous with multicellular hairs; monocephalous alpine and subalpine or arctic plants E. SIMPLEX Greene
- 8 Involucre variously pubescent or glandular but not woolly-villous; habit and habitat various

- 9 Rays yellow, or shorter than the disk and inconspicuous, or lacking E. LINEARIS (Hook.) Piper
- 9 Rays evident, blue or purple to pink or white, not yellow
- 10 Cauline leaves relatively well developed, lanceolate to ovate or ovate-oblong E. CAESPITOSUS Nutt.
- 10 Cauline leaves mostly not very well developed, mostly linear or oblanceolate, sometimes narrowly lance-oblong, those of some species, while narrow, sometimes not much smaller than the lowermost ones
- 11 Caudex with several or many slender, almost rhizomatous branches, bearing numerous fibrous roots, and without a well defined taproot or long central axis; base of stem and bases of basal leaves conspicuously purplish
- 12 Involucre glandular and spreading-hirsute E. URSINUS D.C.Eat.
- 12 Involucre strigose or strigose-hirsute with appressed or slightly loose hairs, scarcely or not at all glandular E. GRACILIS Rydb.
- 11 Caudex simple or more commonly with relatively stout (occasionally slender) branches, with few or no long fibrous roots (except in E. glabellus and E. peregrinus); plants with an evident taproot or stout central underground axis (except in E. glabellus); base of stem and bases of basal leaves purplish in only a few species, and these not with slender caudical branches
- 13 Plants with a simple or slightly branched caudex and numerous fibrous roots; stem erect; rays numerous, usually well over 100, about 1 mm wide E. GLABELLUS Nutt.
- 13 Plants with the caudex variously branched or simple, but without numerous fibrous roots except in E. peregrinus; stem and rays various
- 14 Pubescence of the stem appressed or ascending or wanting
- 15 Basal leaves usually triple-nerved; outer pappus setulose and obscure, or wanting E. EATONII A.Gray
- 15 Basal leaves not at all triple-nerved; outer pappus usually rather conspicuous, of scales or thick setae

- 16 Achenes 4- to 7-nerved
E. PEREGRINUS (Pursh) Greene
- 16 Achenes 2-nerved E. TWEEDI Canby
- 14 Pubescence of the stem widely spreading
- 17 Plants freely branched, mostly biennials or short-lived perennials, with disk corollas only about 2-3 mm long
E. DIVERGENS T. & G.
- 17 Plants simple or sparingly branched (except in E. pumilus); true perennials often with a branched caudex; disk corollas over 3 mm long
- 18 Basal leaves in well developed plants evidently triple-nerved
- 19 Involucral bracts evidently thickened on the back; basal leaves usually rounded or obtuse at the tip; stem rarely purplish at the base
E. CAESPITOSUS Nutt.
- 19 Involucral bracts only slightly or obscurely thickened on the back; basal leaves acute; stem ordinarily purplish at the base
E. CORYMBOSUS Nutt.
- 18 Basal leaves not triple-nerved, or only very faintly so
- 20 Heads turbinate, solitary or sometimes 2; pubescence of the leaves short and fine; mountain plants
E. RYDBERGII Cronq.
- 20 Heads hemispheric; leaves conspicuously pubescent with coarse spreading hairs; chiefly foothill and plains plants
E. PUMILUS Nutt.

Gnaphalium L. Cudweed; Everlasting

- 1 Heads small the involucre mostly 2-4 mm high; glomerules of heads leafy-bracted; plants rarely as much as 3 dm tall, usually much branched G. PALUSTRE Nutt.
- 1 Heads larger, the involucre mostly 4-7 mm high; glomerules not conspicuously leafy-bracted; plants mostly 2-9 dm tall, simple below the inflorescence or moderately branched
- 2 Annual or biennial; leaves merely adnate-auriculate
G. CHILENSE Spreng.
- 2 Perennial; leaves narrowly decurrent
G. MICROCEPHALUM Nutt.

Haplopappus Cass. Nom. Conserv.

- 1 Plants shrubby, low, branching, not at all caespitose
  - 2 Rays uniformly wanting; twigs densely white-tomentose
H. MACRONEMA Gray
  - 2 Rays ordinarily present; twigs glandular to glabrous
or occasionally gray-tomentose
H. SUFFRUTICOSUS (Nutt.) Gray
- 1 Plants herbaceous, sometimes with a shortly aerial woody
caudex, often densely caespitose; in any case the flowering
stems herbaceous and of only a single year's duration
  - 3 Plants more or less densely caespitose and generally
mat-forming or cushion-forming, with a much branched
caudex, numerous tufted basal leaves, and more or less
numerous monocephalous stems rarely over 2 dm tall
H. ACAULIS (Nutt.) Gray
  - 3 Plants not densely caespitose and not at all mat-forming
or cushion-forming, the caudex simple or moderately
branched, the flowering stems several or solitary,
leafy or sub-naked, with 1-many heads, often well
over 2 dm tall
    - 4 Heads characteristically solitary, occasionally with
1 or 2 lateral heads in robust plants
    - 5 Involucre mostly 10-14 mm high, the disk corollas
mostly 7-10 mm long
H. INTEGRIFOLIUS Gray
    - 5 Involucre 5-10 mm high, the disk corollas mostly
5-7 mm long
H. UNIFLORUS (Hook.) T. & G.
  - 4 Heads characteristically several or numerous, occa-
sionally solitary in depauperate plants
H. LANCEOLATUS Hook.

Helianthella T. & G.

- 1 Involucral bracts ovate or lanceolate; rays pale yellow;
receptacular bracts soft and scarious
H. QUINQUENERVIS (Hook.) Gray
- 1 Involucral bracts mostly lance-linear to sometimes
linear-oblong; rays bright yellow; receptacular bracts
firm
H. UNIFLORA (Nutt.) T. & G.

Helianthus L. Sunflower

- 1 Plants annual
  - 2 Central receptacular bracts conspicuously white-bearded at the tip; involucre bracts lanceolate, tapering, not long-hairy, scarcely ciliate
H. PETIOLARIS Nutt.
  - 2 Central receptacular bracts inconspicuously hairy, not at all bearded; involucre bracts chiefly ovate or ovate-oblong and abruptly contracted above the middle, usually ciliate and with some long hairs on the back
H. ANNUUS L.
- 1 Plants perennial
H. NUTTALLII T. & G.

Hieracium L. Hawkweed

- 1 Flowers yellow; stellate hairs always present on the involucre (though sometimes obscured by the longer bristles), often also on the stem and leaves
  - 2 Leaves generally more or less long-hairy, at least marginally, the lower ones often well over 10 cm long; mostly rather stout plants, occurring in dry places, commonly 3-13 dm tall
H. CYNOGLOSSOIDES Arv.-Touv.
  - 2 Leaves glabrous, or sometimes inconspicuously short-hairy, up to 10 (13) cm long; slender plants of moist places in the mts. mostly 0.3-3.5 dm tall
H. GRACILE Hook.
- 1 Flowers white; stellate hairs wanting
H. ALBIFLORUM Hook.

Iva L.

- 1 Annual; leaves long-petiolate; inflorescence paniculiform, the heads not individually subtended by leaves
I. XANTHIFOLIA Nutt.
- 1 Perennial from a creeping rootstock; leaves sessile or subpetiolate; heads axillary
I. AXILLARIS Pursh

Lactuca L. Lettuce

- 1 Annual or biennial; heads relatively small, the fruiting involucre mostly 9-15 mm high; flowers yellow, often drying blue L. SERRIOLA L.
- 1 Perennial; heads relatively large and showy, the fruiting involucre 15-20 mm high; flowers blue L. PULCHELLA (Pursh) DC.

Machaeranthera Ness

- 1 Annual with pinnately incised to tripinnatifid leaves M. TANACETIFOLIA (H.B.K.)
Nees
- 1 Biennial or perennial with entire or merely toothed leaves M. CANESCENS (Pursh) Gray

Microseris Don (Including Nothocalais)

- 1 Plants more or less caulescent, often branched and several-headed; pappus of 8-20 members, these chaffy at the base, tipped with a definite, slender awn M. NUTANS (Geyer) Shultz
- 1 Plants scapose, simple and monocephalous; pappus of 10-80 very narrow, gradually attenuate scales or bristles or both, these not clearly divided into a chaffy base and awn tip (Nothocalais)
  - 2 Leaves narrow, mostly 20-50 times as long as wide, the margins generally more or less crisped or wavy; involucral bracts lanceolate or linear-lanceolate M. TROXIMOIDES Gray
  - 2 Leaves broader, mostly 5-20 times as long as wide, the margins scarcely or not at all crisped or wavy; involucral bracts ovate or broadly lanceolate; meadows and moist slopes M. NIGRESCENS Hend.

Senecio L. Groundsel; Ragwort; Butterweed

- 1 Cauline leaves well developed, only gradually reduced upwards; no well developed tuft of basal leaves present
- 2 Dwarf, freely branched; leaves about 4 cm long or less
S. FREMONTII T. & G.
- 2 Taller, mostly 2-15 dm tall or more, the stem generally simple below the inflorescence; leaf blades mostly over 4 cm long
- 3 Cauline leaves, at least in part, sessile, with broad, more or less clasping base
S. CRASSULUS Gray
- 3 Cauline leaves, except sometimes the reduced upper ones, petiolate, or tapering to a narrow, petioliform base
- 4 Leaves, at least the lower, triangular, with deltoid to cordate base
S. TRIANGULARIS Hook.
- 4 Leaves all tapering to the base, not at all triangular
S. SERRA Hook.
- 1 Cauline leaves generally strongly and progressively reduced upwards (or the stem sometimes scapose); basal or lower cauline leaves well developed, often tufted
- 5 Plants glabrous from the first, or sometimes lightly floccose-tomentose when young; if tomentose when young, then glabrous by flowering time except occasionally for a little inconspicuous tomentum at the base and in the leaf axils
- 6 Leaves entire or denticulate to sharply dentate, not at all pinnatifid, lobed, wavy, or crenate; plants, except sometimes S. crassulus, with the numerous fibrous roots arising from a very short, erect, short-lived crown, without any more elongate caudex or rhizome. (The glabrate extremes of several of the pubescent species might be sought here, except for the well developed rhizome or caudex.)
- 7 Heads few, seldom as many as a dozen, apparently always radiate; plants of dry to moderately moist habitats
S. CRASSULUS Gray
- 7 Heads more numerous, seldom less than a dozen in well developed plants, often very numerous, radiate or more often discoid; plants mostly of wet places
S. HYDROPHILUS Nutt.

- 6 Leaves, or some of them, pinnatifid, lyrate, crenate, or wavy; plants with a more evident, longer-lived and more woody, ascending or horizontal caudex or rhizome
- 8 Heads solitary or rarely 2; alpine to subalpine plants, to 3 dm tall
S. CYMBALARIOIDES Buck.
- 8 Heads generally several
- 9 Basal leaves, or some of them, cordate or subcordate, sharply toothed; cauline leaves laciniate-pinnatifid, at least toward their bases; leaves thin
S. PSEUDAUREUS Rydb.
- 9 Basal leaves not cordate or subcordate, though sometimes subrotund
- 10 Leaves relatively thin and lax, the basal ones mostly elliptic or oblanceolate, crenate or serrate to subentire
S. PAUPERCULUS Michx.
- 10 Leaves relatively thick and firm, the basal ones mostly elliptic to subrotund, coarsely crenate to shallowly lobulate or subentire
- 11 Cauline leaves well developed, the middle and lower clasping and as large as or even larger than the basal ones; basal leaves generally broadly ovate to orbicular or subreniform, 1-1.5 times as long as wide; alpine and subalpine meadows and rocky slopes
S. DIMORPHOPHYLLUS Greene
- 11 Cauline leaves progressively reduced, not clasping; basal leaves generally elliptic to ovate or subrotund, typically about twice as long as wide; woods and moist to moderately dry open places at mid to high elevations
S. STREPTANTHIFOLIUS Greene
- 5 Plants more or less pubescent at flowering time
- 12 Pubescence loosely crisp-villous or arachnoid-villous, sometimes very sparse by flowering time; plants with numerous fibrous roots arising from a very short, erect, short-lived crown, without a more elongate caudex or rhizome
S. INTEGERRIMUS Nutt.
- 12 Pubescence finer, more tomentose or floccose; plants with an evident, more or less woody, ascending or horizontal caudex or short rhizome

- 13 Leaves sharply dentate (with divergent teeth) to merely callous-denticulate or even (in forms S. sphaerocephalus) entire; plants with the stems mostly arising singly from a short, horizontal rhizome
- 14 Involucral bracts with minute black or brownish tips, mostly about 21, rarely only 13; plants of moderate elevations in and near the mts.
S. SPHAEROCEPHALUS Greene
- 14 Involucral bracts with very conspicuous black tips, commonly about 13, rarely up to 21
S. LUGENS Rich.
- 13 Leaves entire to crenate, crenate-serrate, or more or less lobed or pinnatifid; plants generally with several stems arising from a branched caudex, which may surmount a taproot
S. CANUS Hook.

Solidago L. Goldenrod

- 1 Plants with well developed creeping rhizomes; stem varying from densely and rather equably leafy, without well developed basal leaves (in most species) to sometimes more sparsely and inequably leafy, with enlarged lower and basal leaves (in forms of S. missouriensis)
- 2 Stem glabrous below the inflorescence; leaf surfaces nearly always glabrous
- 3 Stem glaucous, becoming definitely puberulent in the inflorescence; plants 0.5-2 m tall; rays mostly about 13 (10-17); leaves numerous and equably distributed
S. GIGANTEA Ait.
- 3 Stem glabrous or very nearly so throughout, not glaucous; plants mostly 2-9 dm tall; rays typically about 8, rarely 13; habit varying from that of the S. multiradiata group to nearly that of S. gigantea and S. canadensis
S. MISSOURIENSIS Nutt.
- 2 Stem puberulent, at least above the middle; leaves puberulent to subglabrous
S. CANADENSIS L.
- 1 Plants with mostly short and stout rhizomes, or a mere caudex; stem rather inequably leafy, the basal or lower cauline leaves larger and differently shaped than those above, tending to be persistent, the cauline leaves conspicuously reduced upwards and not very numerous

- 4 Leaves densely and finely canescent with short spreading hairs
- 5 Inflorescence either with more or less secund branches, or elongate and nodding at the tip; disk flowers mostly 5-9, about as many as or mostly fewer than the rays   S. NEMORALIS Ait.
- 5 Inflorescence corymbiform and usually relatively broad, neither nodding at the tip nor with evidently secund branches; disk flowers mostly 8-16, ordinarily more numerous than the rays
S. NANA Nutt.
- 4 Leaves glabrous except for the sometimes ciliate margins
S. MULTIRADIATA Ait.

Stephanomeria Nutt. Rush Pink; Skeletonweed

- 1 Plants low, mostly 1-2 dm tall, with the principal leaves evidently runcinate-pinnatifid; achenes pitted and tuberculate
S. RUNCIANTA Nutt.
- 1 Plants taller, commonly 2-7 dm tall, with linear or filiform, entire or toothed leaves; achenes smooth or very nearly so (except for being longitudinally ribbed)
S. TENUIFOLIA (Torr.) Hall

Taraxacum Hall. Dandelion

- 1 Introduced, weedy species
- 2 Achenes becoming red to reddish brown or reddish purple at maturity, the beak mostly 1-3 times as long as the body; leaves tending to be deeply cut for their whole length, without an enlarged terminal segment, the lobes narrow; outer involucre bracts appressed to loose or sometimes reflexed; inner involucre bracts commonly corniculate   T. LAEVIGATUM (Willd.) DC.
- 2 Achenes olivaceous or stramineous to brown, the beak mostly 2.5-4 times as long as the body; leaves usually less deeply cut, often with an enlarged terminal lobe; outer involucre bracts reflexed; inner involucre bracts not corniculate   T. OFFICINALE Weber
- 1 Native, unaggressive species of the high mts.; leaves less dissected than in T. laevigatum; outer involucre bracts appressed to lax or somewhat spreading, not reflexed
T. CERATOPHORUM (Ledeb.) DC.

Townsendia Hook. Daisy

- 1 Plants annual, biennial, or short-lived perennials with a mere crown, commonly several-stemmed from the base (the stems leafy), seldom less than 5 cm high
T. PARRYI Eat.
- 1 Plants caespitose perennials, the taproot surmounted by an evident branching caudex; acaulescent plants, seldom more than 5 cm high
- 2 Achenes glabrous or very nearly so; herbage sparsely strigose or glabrate; rays blue or violet; montane
- 3 Involucral bracts broadly lanceolate to ovate or elliptic, obtuse or acute
T. MONTANA Jones
- 3 Involucral bracts linear to lanceolate, strongly acute; morphologically approaching T. montana
T. LEPTOTES (Gray) Osterh.
- 2 Achenes persistently hairy, at least toward the base; herbage rather sparsely to densely strigose; rays white or pinkish; lower elevations
T. EXSCAPA (Rich.) Porter

Tragopogon L. Goatsbeard

- 1 Peduncles not enlarged in flower, scarcely so in fruit; achenes mostly 15-25 mm long (including the beak); flowers wholly yellow, the outer ligules equaling or surpassing the involucral bracts; involucral bracts mostly about 8; leaves obscurely floccose at first, soon glabrate, with cirrhose-recurved tip; widespread diploid weed
T. PRATENSIS L.
- 1 Peduncles enlarged and fistulous above in flower and fruit; achenes mostly 25-40 mm long; flowers yellow or purple, the ligules slightly to very much shorter than the involucral bracts; leaves not cirrhose-recurved at the tip; involucral bracts and pubescence various
- 2 Heads yellow, or with a yellow eye; involucral bracts commonly about 13, or only 8 on last-formed heads or on depauperate plants T. DUBIUS Scop.
- 2 Heads wholly purple; involucral bracts commonly about 8; ligules slightly to much shorter than the involucral bracts; leaves glabrous
T. PORRIFOLIUS L.

Wyethia Nutt.

- 1 Herbage and involucre entirely glabrous, resinous-varnished; rays yellow   W. AMPLEXICAULIS Nutt.
- 1 Herbage more or less pubescent, not resinous-varnished; involucral bracts conspicuously ciliate
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ovalifolium	Cushion b., oval-leaved e.
umbellatum	Sulfurflower, sulfur b.

Eriophorum (CYPERA)	54
chamissonis	Chamisso's cotton-grass
polystachion	Many-spiked cotton-grass
viridicarinatum	Green keeled cotton-grass
Eriophyllum (COMPOS)	194
lanatum	Eriophyllum
Erodium (GERANI)	153
cicutarium	Crane's-bill, stork's-bill
Erysimum (CRUCIF)	129
asperum	Rough wallflower, prairie rocket
cheiranthoides	Treacle mustard, wormseed m.
inconspicuum	Smallflowered rocket, small w.
Erythronium (LILIAC)	83
grandiflorum	Pale fawn-lily, dogtooth violet glacier lily
Euphorbia (EUPHOR)	153
glyptosperma	Corrugate-seeded spurge
serpyllifolia	Thyme-leaf spurge
Eurotia (CHENOP)	101
lanata	Winterfat, white sage
Festuca (GRAMIN)	fescue 70
idahoensis	Blue bunchgrass, Idaho f.
occidentalis	Western f.
ovina	Sheep f.
rubra	Red f.
Floerkea (LIMNAN)	24
proserpinacoides	False-mermaid
Foeniculum (UMBELL)	161
vulgare	Sweet fennel
Fragaria (ROSACE)	139
vesca	Woods strawberry
virginiana	Wild strawberry
Frasera (GENTIA)	169
speciosa	Giant frasera
Fritillaria (LILIAC)	85
atropurpurea	Checker lily, chocolate lily
pudica	yellow bell, fritillary
Gaillardia (COMPOS)	193
aristata	Blanket-flower
Galeopsis (LABIAT)	179
ladanum	Hemp nettle
Galium (RUBIAC)	bedstraw 189
aparine	Goose-grass
bifolium	Thinleaf b., low mt. b.

Galium (RUBIAC) continued		
boreale	Northern bedstraw	
trifidum	Sweetscented b., fragrant b.	
Gaultheria (ERICAC) wintergreen		165
humifusa	Alpine w., western w., matted w.	
Gaura (ONOGRA)		157
parviflora	Small-flowered gaura	
Gayophytum (ONOGRA)		159
humile	Dwarf groundsmoke	
ramosissimum	Hairstem groundsmoke	
Gentiana (GENTIA) gentian		169
affinis	Pleated g., prairie g.	
algida	Whitish g.	
amarella	Northern g.	
detonsa	Small fringed g.	
Geranium (GERANI) geranium		153
bicknellii	Bicknell's g.	
richardsonii	White g., sticky g.	
viscosissimum	Sticky purple g.	
Geum (ROSACE) avens		139
aleppicum	Yellow a.	
macrophyllum	Large-leaved a.	
rossii	Ross' a.	
triflorum	Prairie smoke a., old man's whiskers	
Gilia (POLEMO)		172
aggregata	Scarlet gilia, skyrocket	
tenerrima	Delicate gilia	
Glaux (PRIMUL)		168
maritima	Saltwort, sea-milkwort	
Glecoma (LABIAT)		179
hederacea	Gill-over-the-ground, field balm, creeping Charlie	
Glyceria (GRAMIN)		71
borealis	Northern mannagrass	
elata	Tall mannagrass	
striata	Fowl mannagrass	
Glycyrrhiza (LEGUMI)		143
lepidota	American licorice	
Gnaphalium (COMPOS)		215
chilense	Cotton-batting plant	
microcephalum	Slender cudweed, white c.	
palustre	Lowland cudweed	

Goodyera (ORCHID)	86
oblongifolia	Western rattlesnake-plantain, Giant r.
Grayia (CHENOP)	102
spinosa	Spiny hopsage
Grindelia (COMPOS)	200
squarrosa	Resin-weed, curly-cup gumweed
Gutierrezia (COMPOS)	195
sarthrae	Broom snakeweed
Gymnosteris (POLEMO)	171
parvula	Small-flowered gymnosteris
Habenaria (ORCHID)	bog-orchid, rein-orchid 87
dilatata	White b., leafy white orchis
hyperborea	Northern green b.
obtusata	Blunt-leaf r., one-leaf r.
saccata	Slender b.
unalascensis	Alaska r.
Hackelia (BORAGI)	177
floribunda	Many-flowered stickseed
micrantha	Blue stickseed
patens	Spreading stickseed
Haplopappus (COMPOS)	goldenweed 216
acaulis	Stemless g.
integrifolius	Entire-leaved g.
lanceolatus	Lance-leaf g.
macronema	Discoid g.
suffruticosus	Shrubby g., big-head g.
uniflorus	One-flowered g.
Hedysarum (LEGUMI)	149
boreale	Northern hedysarum
sulphurescens	Yellow hedysarum
Helianthella (COMPOS)	216
quinquenervis	Nodding helianthella
uniflora	Rocky Mt. helianthella
Helianthus (COMPOS)	217
annuus	Common sunflower
nuttalli	Nuttall's sunflower
petiolaris	Prairie sunflower
Heracleum (UMBELL)	160
lanatum	Cow-parsnip
Hesperochiron (HYDROP)	174
pumilus	Dwarf hesperochiron
Hesperochloa (GRAMIN)	63
kingii	Spike-fescue

Heuchera (SAXIFR)	alumroot	133
cylindrica	Roundleaf a., lava a.	
parvifolia	Common a., small-leaved a.	
Hieracium (COMPOS)	hawkweed	217
albiflorum	White-flowered h.	
cynoglossoides	Hounds-tongue h.	
gracile	Slender h., alpine h.	
Hierochloe (GRAMIN)		56, 59
odorata	Sweetgrass, vanillagrass, holy grass	
Hippuris (HIPPUR)		11
vulgaris	Common mare's-tail	
Hordeum (GRAMIN)		71
brachyantherum	Meadow barley	
jubatum	Squirrel-tail, foxtail barley	
pusillum	Little barley	
Horkelia (ROSACE)		138
fusca	Horkelia	
Hulsea (COMPOS)		195
algida	Alpine hulsea	
Hydrophyllum (HYDROP)		174
capitatum	Ballhead waterleaf, wool breeches	
Hyoscyamus (SOLANA)		180
niger	Black henbane, hog's bean	
Hypericum (HYPERI)		154
formosum	Western St. John's-wort	
perforatum	Common St. John's-wort	
Hypopitys (ERICAC)		165
monotropa	Fringed pinesap	
Iliamna (MALVAC)		154
rivularis	Streambank globemallow	
Iris (IRIDAC)		85
missouriensis	Western blue fleur-de-lis	
Isoetes (ISOETA)		35
bolanderi	Bolander's quillwort	
lacustris	Lake quillwort	
Iva (COMPOS)		217
axillaris	Poverty-weed, deep-root	
xanthifolia	Tall marsh-elder	
Iversia (ROSACE)		138
gordonii	Gordon's iversia	
Juncus (JUNCAC)	rush	42
balticus	Baltic r.	
drummondii	Drummond's r.	

Juncus (JUNCAC)	continued	
ensifolius	Dagger-leaf r.	
hallii	Hall's r.	
longistylis	Long-styled r.	
mertensianus	Merten's r.	
nevadensis	Sierra r.	
parryi	Parry's r.	
regelii	Regel's r.	
tenuis	Slender r.	
torreyi	Torry's r.	
tracyi	Tracy's r.	
tweedyi	Tweedy's r.	
Juniperus (CUPRES)		38
communis	Common or mt. juniper	
scopulorum	Rocky Mt. juniper	
Kalmia (ERICAC)		166
microphylla	Small-leaved or alpine laurel	
Kelloggia (RUBIAC)		189
galoides	Kelloggia	
Kochia (CHENOP)	burning-bush	102
scoparia	Summer or mock cypress, b.	
Koeleria (GRAMIN)	Junegrass	62, 63
cristata	Prairie j., Koeler's grass	
Lactuca (COMPOS)		218
pulchella	Blue lettuce	
serriola	Prickly lettuce	
Laminum (LABIAT)		179
amplexicaule	Common dead-nettle, henbit	
Lappula (BORAGI)		175
redowskii	Western stickseed	
Ledum (ERICAC)	labrador-tea	166
glandulosum	Trapper's t., smooth l., mt. l.	
Lemna (LAMNAC)	duckweed	82
minima	Least d.	
minor	Water lentil	
trisulca	Star d., ivy d.	
Lepidium (CRUCIF)	pepper grass	129
densiflorum	Prairie p., common p.	
perfoliatum	Clasping p.	
ramosissimum	Branched p.	
virginicum	Tall p.	
Leptodactylon (POLEMO)		171
pungens	Prickly phlox	

Lesquerella (CRUCIF)		119, 120, 121
alpina	Alpine bladderpod	
Lewisia (PORTUL)		106
pygmaea	Least, dwarf, alpine lewisia	
rediviva	Bitterroot	
triphylla	Threeleaf lewisia	
Ligusticum (UMBELL)		163
canbyi	Canby's licorice-root	
filicinum	Fern-leaf licorice-root	
porteri	Porter licorice-root	
Linathus (POLEMO)		171
septentrionalis	Northern linanthus	
Linaria (SCROPH)		183
dalmatica	Dalmatian toadflax	
vulgaris	Butter and eggs	
Linnaea (CAPRIF)		190
borealis	Twinflower	
Linum (LINACE)		31
perenne	Blue flax	
Listera (ORCHID)	twayblade	89
caurina	Western t.	
cordata	Heart-leaf listera, t.	
Lithophragma (SAXIFR)	fringecup	133
bulbifera	Bulbiferous f., prairiestar	
parviflora	Smallflower f., woodlandstar	
tenella	Slender f., prairiestar	
Lithospermum (BORAGI)	gromwell	177
incisum	Yellow g.	
ruderales	Western g., Columbia puccoon	
Lolium (GRAMIN)		59
perenne	English ryegrass	
Lomatium (UMBELL)	desert-parsley	163
ambiguum	Swale d.	
cous	Cous, Cous biscuit-root	
dissectum	Fern-leaved lomatium or d.	
macrocarpum	Large-fruit d.	
nudicaule	Bare-stem lomatium, pestle parsnip	
triternatum	Nine-leaf lomatium	
Lonicera (CAPRIF)	honeysuckle	190
caerulea	Sweet-berry h., bluefly h.	
involucrata	Bearberry h., black twin-berry	
utahensis	Utah h.	

Lupinus (LEGUMI)	lupine	150
	argenteus	Slivery l.
	caudatus	Tailcup l., Kellogg spurred l.
	lepidus	Prairie l.
	polyphyllus	Bigleaf l., many-leaved l.
	sericeus	Silky l.
	wyethii	Wyeth's l.
Luzula (JUNCAC)	woodrush	44
	campestris	Field w., Sweep's brush
	parviflora	Smallflowered w.
	piperi	Piper's w.
	spicata	Spiked w.
Lychnis (CARYOP)	campion	108
	alba	White c., evening c.
	drummondii	Drummond c.
Lycopodium (LYCOPO)	clubmoss	1
	annotinum	Interrupted c., stiff c.
Lycopus (LABIAT)		178
	americanus	Cut-leaved water horehound
Machaeranthera (COMPOS)		218
	canescens	Hoary aster
	tanacetifolia	Tansy aster
Madia (COMPOS)		195, 200
	glomerata	Cluster tarweed, mt. t.
Mahonia (BERBER)	Oregongrape	12, 16
	repens	Creeping O., low O.
Matricaria (COMPOS)		197, 201
	matricarioides	Pineapple weed
Medicago (LEGUMI)		151
	lupulina	Black medic, hop clover
	sativa	Alfalfa, lucerne
Melica (GRAMIN)		72
	bulbosa	Oniongrass
	smithii	Smith's melic
	spectabilis	Showy oniongrass
	subulata	Alaska oniongrass
Melilotus (LEGUMI)		151
	alba	White sweet-clover
	officinalis	Yellow sweet-clover
Mentha (LABIAT)		178
	arvensis	Corn mint, field mint
Mentzelia (LOASAC)	mentzelia	156
	albicaulis	White-stemmed m., small flowered m.

Mentzelia (LOASAC)	mentzelia continued	
decapetala	Sand lily, evening star	
dispersa	Bushy m., small-flowered m.	
laevicaulis	Blazing-star m.	
Menyanthes (MENYAN)		11
trifoliata	Buckbean, bogbean	
Mertensia (BORAGI)	bluebells	178
alpina	Alpine b.	
ciliata	Ciliate b., Broad-leaved b.	
oblongifolia	Leafy b.	
viridis	Green b.	
Microseris (COMPOS)		218
nigrescens	Black-hairy microseris	
nutans	Nodding microseris	
troximoides	False-agoseris	
Microsteris (POLEMO)		171
gracilis	Pink microteris	
Mimulus (SCROPH)	monkey-flower	183
breweri	Brewer's m.	
floribundus	Purple stem m.	
guttatus	Yellow m.	
lewisii	Lewis' m.	
moschatus	Musk-flower, musk-plant	
nanus	Dwarf purple m.	
suksdorfii	Suksdorf's m.	
tilingii	Large m.	
Mitella (SAXIFR)	miterwort	132
pentandra	Alpine m., five-stamened m.	
Monarda (LABIAT)		178
fistulosa	Wild bergamont	
Monolepis (CHENOP)		102
nuttaliana	Povertyweed, patata	
Montia (PORTUL)	montia	106
chamissoi	Chamisso's m., water m.	
linearis	Narrowleaved m.	
Muhlenbergia (GRAMIN)	muhly	72
andina	Foxtail m., hairy m.	
asperifolia	Alkli m., rough-leaved dropseed	
filiformis	Pullup m., slender m.	
richardsonis	Mat m., short-leaved m.	
Musineon (UMBELL)		162
divaricatum	Leafy musineon	
Myosotis (BORAGI)		175
sylvatica	Wood forget-me-not	

Myosurus (RANUNC)	mouse-tail	115
aristatus	Sedge m., bristly m.	
minimus	Least m., tiny m., common m.	
Myriophyllum (HALORA)		11
spicatum	Spiked water-milfoil	
Nemophila (HYDROP)		174
breviflora	Great Basin nemophila	
Nepeta (LABIAT)		179
cataria	Catnip, catmint	
Nuphar (NYMPHA)		11
polysepalum	Spatter-dock, Indian pond lily	
Oenothera (ONOGRA)	primrose	159
breviflora	Short-flowered evening p.	
caespitosa	Rock-rose evening p., butte p.	
flava	Long-tubed evening p.	
nuttallii	White evening p., Nuttall's p.	
strigosa	Long-leaf evening p.	
Opuntia (CACTAC)		157
fragilis	Brittle cholla	
polyacantha	Starvation cholla, Plains prickly pear	
Orobanche (ORBAN)		187
fasciculata	Clustered broomrape	
multiflora		
Orthocarpus (SCROPH)		180
luteus	Yellow owl-clover	
Oryzopsis (GRAMIN)	ricegrass	73
asperifolia	Rough-leaved r.	
exigua	Little r.	
hymenoides	Indian r.	
Osmorhiza (UMBELL)		165
chilensis	Mountain sweet-root	
depauperata	Blunt-fruit sweet-root	
Oxyria (POLYGO)		97
digyna	Mountain sorrel	
Oxytropis (LEGUMI)	crazyweed	151
campestris	Slender c., field c.	
deflexa	Pendent-pod c.	
lagopus	Rabbit-foot c.	
sericea	Silky c.	
viscida	Sticky c.	
Paeonia (PAEONI)		23
brownii	Brown's peony	

Panicum (GRAMIN) witchgrass	73
capillare	Common w., old-w.
occidentale	Western w.
Parietaria (URTICA)	96
pennsylvanica	Pellitory
Parnassia (SAXIFR) grass-of-parnassus	134
fimbriata	Fringed g., Rocky Mt. g.
palustris	Wideworld g.
parviflora	Small-flowered g.
Pastinaca (UMBELL) parsnip	161
sativa	Common p., wild p.
Pedicularis (SCROPH) lousewort	185
bracteosa	Bracted l.
contorta	White coiled-beak l.
cystopteridifolia	Fern-leaved l.
groenlandica	Pink elephants, elephants's head
parryi	Parry's l.
racemosa	Leafy l., sickletop l.
Penstemon (SCROPH) penstemon	185
arenicola	
attenuatus	Sulfur p., taper-leaved p.
cyaneus	Dark-blue p.
deustus	Hot-rock p.
eriantherus	Crested tongue p., fuzzytongue p.
fruticosus	Shrubby or bush p.
montanus	Mountain beardtongue
procerus	Tiny-bloom p., small-flowered p.
radicosus	Matroot p.
rydbergii	Rydberg's p.
whippleanus	Whipple's p.
Perideridia (UMBELL)	162
gairdneri	Gairdner's yampah
Phacelia (HYDROPH) phacelia	174
franklinii	Franklin's p.
hastata	Whiteleaf p., silver leaf p.
linearis	Threadleaf p.
sericea	Silky p.
Phalaris (GRAMIN)	56, 58
arundinacea	Reed canary grass
Phelum (GRAMIN) timothy	74
alpinum	Alpine t., mountain t.
pratense	Common t.

Phlox (POLEMO)	phlox	172
caespitosa	Tufted p., clumped p.	
hoodii	Hood's p.	
longifolia	Long-leaf p.	
multiflora	Many-flowered p.	
pulvinata	Cushion p.	
Phyllodoce (ERICAC)	Mountain-heath	166
empetriformis	Red m., pink m.	
Physaria (CRUCIF)		130
australis		
didymocarpa	Common twinpod	
Physocarpus (ROSACE)		137
malvaceus	Mallow ninebark	
Picea (PINACE)	spruce	39
engelmanni	Engelmann, white, mtn., or silver s.	
glauca	White, Can., Black Hills, or skunk s.	
Pinus (PINACE)	pine	39
albicaulis	Whitebark p.	
contorta	Lodgepole, black, scrub, or tamarack p.	
flexilis	Limber p.	
Plagiobothrys (BORAGI)		176
scouleri	Scouler's popcorn-flower	
Plantago (PLANTA)	plantain, ribwort	188
elongata	Slender p.	
lanceolata	English p. buckhorn p., r.	
major	Common p., nippleseed p.	
patagonica	Indian-wheat	
Poa (GRAMIN)	bluegrass	74
alpina	Alpine b.	
arida	Dryland b., prairie speargrass	
bulbosa	Bulbous b.	
compressa	Canada b.	
cusickii	Cusick's b.	
fendleriana	Mutton grass	
grayana	Gray's b.	
interior	Inland b.	
juncifolia	Alkali b.	
leptocoma	Bog b.	
nervosa	Wheeler's b.	
nevadensis	Nevada b.	
palustris	Fowl b., meadow-grass	

Poa (GRAMIN) bluegrass continued	
pattersonii	Patterson's b.
pratensis	Kentucky b.
reflexa	Nodding b.
rupicola	Timberland b.
sandbergii	Sandberg's b.
scabrella	Pine b.
Polemonium (POLEMO) polemonium	173
occidentale	Western p.
pulcherrimum	Showy p., skunk-leaved p.
viscosum	Skunk p., sticky p.
Polygala (POLYGA)	21
alba	
Polygonum (POLYGO) smartweed, knotweed	98
achoreum	
amphibium	Water s., white ladysthumb
aviculare	Doorweed, prostrate k.
bistortoides	Am. bistort, Western b., snakeweed
confertiflorum	Closeflowered k.
convolvulus	Dullseed, cornbind, black bindweed
douglasii	Douglas' k.
kelloggii	Kellogg's k.
viviparum	European bistort, alpine b. viviparous b.
Polypogon (GRAMIN) polypogon	58, 61
monspeliensis	Rabbitfoot p., annual beard-grass
Polystichum (POLYPO)	37
lonchitis	Mountain holly-fern
scopulinum	Rock sword-fern
Populus (SALICA) cottonwood, aspen	89
acuminata	Rydberg's c.
angustifolia	Black c., mt. c., narrow-leaved c.
balsamifera	Balsam poplar
tremuloides	Aspen, quaking a., trembling a.
Porterella (CAMPAN)	192
carnulosa	Porterella
Potamogeton (POTAMO) pondweed	40
alpinus	Northern or reddish p.
fibrillosus	Fibrous-stipuled p.
filiformis	Slender-leaved p.
foliosus	Close-leaved p.
gramineus	Grass-leaved p.

Potamogeton (POTAMO) pondweed continued		
natans	Broad or floating-leaved p.	
nodosus	Long-leaved p.	
pectinatus	Fennel-leaved p.	
praelongus	Long- or white-stalked p.	
richardsonii	Richardson's p.	
robbinsii	Robins' p.	
Potentilla (ROSACE) cinquefoil		140
anserina	Common silverweed	
argentea	Silvery c.	
arguta	Tall, valley or glandular c.	
biennis	Biennial c.	
diversifolia	Diverse-leaved c., vari-leaf c.	
fruticosa	Shrubby c., yellow rose	
glandulosa	Sticky c., gland c.	
gracilis	Graceful c.	
hippiana	Woolly c.	
norvegica	Norwegian c.	
ovina	Sheep c.	
palustris	Purple c., marsh c.	
Prunella (LABIAT)		179
vulgaris	Self-heal, all-heal	
Prunus (ROSACE)		137
virginiana	Common chokecherry	
Pseudotsuga (PINACE)		38
menziesii	Douglas-fir	
Pteridium (POLYPO)		36
aquilinum	Bracken, brake-fern	
Pterospora (ERICAC)		165
andromedea	Woodland pinedrops	
Puccinellia (GRAMIN) alkaligrass		79
distans	Weeping a.	
nuttalliana	Nuttall's a.	
pauciflora	Weak a.	
Purshia (ROSACE)		137
tridentata	Antelope-brush, bitter-brush	
Pyrola (ERICAC) pyrola, wintergreen		166
asarifolia	Alpine p., common pink w.	
clorantha	Green w., greenish w.	
dentata	Toothleaf p.	
minor	Lesser w., snowline p.	
picta	White vein p.	
secunda	One-sided w., sidebells p.	
uniflora	Woodnymph, single delight, wax-flower	

Ranunculus (RANUNC)	buttercup	115
abortivus	Small-flowered b.	
alsimaefolius	Plaintainleaved b.	
aquatilis	White water-b., water crowfoot	
cymbalaria	Shore or seaside b.	
eschschooltzii	Subalpine b.	
flammula	Creeping b., lesser spearwort	
glaberrimus	Sagebrush b.	
gmelinii	Small yellow water-b.	
inamoenus	Unlovely b.	
jovis	Jove's b.	
macounii	Macoun's b.	
natans	Floating water-b.	
occidentalis	Western b.	
orthorhynchus	Straightbeak b.	
scleratus	Celeryleaved crowfoot or b.	
unicinatus	Little b.	
Ratibida (COMPOS)		194
columnifera	Prairie coneflower	
Rhamnus (RHAMNA)		154
alnifolia	Alder buckthorn	
Rhus (ANACAR)		154
radicans	Poison ivy, poison oak	
trilobata	Smooth sumac, squawbush, skunkbush	
Ribes (GROSSU)	current, gooseberry	136
cereum	Squaw c., wax c.	
hudsonianum	Stinking c., northern black c.	
inermis	Whitestem g.	
lacustre	Swamp g., swamp black g.	
montigenum	Alpine prickly c., mt. g.	
setosum	Missouri g.	
viscosissimum	Sticky c.	
Rorippa (CRUCIF)	yellowcress	130
curvisiliqua	Western y.	
islandica	Marsh y., hispid y.	
nasturtium-aquaticum	Water-cress	
obtusum	Bluntleaved y.	
Rosa (ROSACE)		142
acicularis	Prickly rose	
woodsii	Wood's rose	
Rubus (ROSACE)		142
idaeus	Red raspberry	
parviflorus	Thimbleberry	

Rudbeckia (COMPOS)		200
occidentalis	Black-head, W. coneflower	
Rumex (POLYGO)	dock, sorrel	100
acetosella	Sheep, red, cow, mt. or horse s.	
crispus	Curly, sour or yellow d.	
maritimus	Seaside d., golden d.	
occidentalis	Western d.	
paucifolius	Alpine or mt. s.	
salicifolius	Willow d., narrow-leaved d.	
venosus	Veiny d., winged d., wild begonia	
Sagina (CARYOP)		107
saginoides	Alpine or arctic pearlwort	
Sagittaria (ALISMA)		5
cuneata	Arumleaf arrowhead, wapato	
Salix (SALICA)	willow	90
arctica	Arctic w.	
bebbiana	Bebb w.	
brachycarpa	Short-fruited w.	
commutata	Undergreen w., variable w.	
dodgeana	Dodge w.	
drummondiana	Drummond w.	
farriæ	Farr's w.	
fluviatilis	River w.	
geyeriana	Geyer w.	
glauca	Glaucous w.	
lasiandra	Pacific w., red w.	
monticola	Mountain w.	
myrtilifolia	Blueberry w. bilberry w.	
nivalis	Snow w.	
phylicifolia	Tea-leaved w.	
reticulata	Net veined w.	
rigida	Yellow w.	
rotundifolia	Roundleaved w.	
scouleriana	Scouler w.	
wolfii	Wolf's w.	
Salsola (CHENOP)		101
kali	Russian thistle, tumbleweed	
Sambucus (CAPRIF)		190
racemosa	Elderberry	
Sanicula (UMBELL)		161
graveolens	Sierra'sanicle	
Saponaria (CARYOP)		107
officinalis	Bouncing bett, soapwort	

Sarcobatus (CHENOP)	101
vermiculatus	Black greasewood
Saxifraga (SAXIFR)	saxifrage 134
arguta	Brook s.
bronchialis	Matted s., spotted s.
caespitosa	Tufted s.
cernua	Nodding s.
occidentalis	Western s., redwool s.
oregana	Bog s., Oregon s.
rhomboidea	Diamondleaf s.
Schedonnardus (GRAMIN)	60
paniculatus	Tumblegrass
Scirpus (CYPERA)	bulrush 54
acutus	Hardstem b., viscid b.
americanus	American b., three-square b.
microcarpus	Small-fruit b.
olneyi	Olney's b.
Scolochloa (GRAMIN)	62
festucea	Fescue scolochloa
Scutellaria (LABIAT)	skullcap 178
galericulata	Marsh s., willow-weed s.
Sedum (CRASSU)	131
lanceolatum	Lanceleaved stonecrop
rhodanthum	Rose crown
roseum	King's crown
Selaginella (SELAGI)	1
densa	Compact selaginella
Senecio (COMPOS)	groundsel, butterweed 219
canus	Woolly g.
crassulus	Thick-leaved g.
cymbalarioides	Few-leaved g., alpine meadow b.
dimorphophyllus	Payson's g.
fremontii	Dwarf mountain b.
hydrophilis	Alkali-marsh b.
integerrimus	Western g., one-stemmed b.
lugens	Black-tipped b.
pauperculus	Balsam g., Canada b.
pseudaureus	Streambank b.
serra	Butterweed g., tall b.
sphaerocephalus	Mountain marsh b.
streptanthifolius	Rocky Mt. b., cleft-leaf g.
triangularis	Arrowleaf g.
Setaria (GRAMIN)	57
viridis	Green bristlegrass

Shepherdia (ELEAGN)		157
canadensis	Canada buffalo-berry, russet b., soapberry	
Sibbaldia (ROSACE)		138
procumbens	Creeping sibbaldia	
Silene (CARYOP) silene		109
acaulis	Moss campion, moss pink, cushion pink	
antirrhina	Sleepy catchfly	
menziesii	Menzies' s.	
noctiflora	Nightflower s., sticky cockle	
oregana	Oregon s.	
parryi	Parry's s.	
Sisymbrium (CRUCIF) tumbled mustard		130
altissimum	Jim Hill mustard, t.	
loeselii	Loesel t.	
Sisyrinchium (IRIDAC)		85
angustifolium	Blue-eyed grass, blue star, eye-bright	
Sitanion (GRAMIN)		58
hystrix	Bottlebrush squirrel tail	
Sium (UMBELL)		161
suave	Hemlock water-parsnip	
Smelowskia (CRUCIF) smelowskia		123
calycina	Alpine s., Siberian s.	
Smilacina (LILIAC) solomon-plume		85
racemosa	False spikenard, western s.	
stellata	Starry s., star-flowered s.	
Solanum (SOLANA) nightshade		180
sarrachoides	Hairy n.	
triflorum	Cut-leaved n.	
Solidago (COMPOS) goldenrod		221
canadensis	Canada g., meadow g.	
gigantea	Smooth g., late g.	
missouriensis	Missouri g.	
multiradiata	Northern g.	
nana	Low g.	
nemoralis	Gray g., field g.	
Sonchus (COMPOS)		201
asper	Prickly sow-thistle	
Sorbus (ROSACE)		137
scopulina	Cascade mountain-ash	
Sparganium (SPARGA) bur-weed		81
angustifolium	Narrowleaf or floating b.	

Sparganium (SPARGA) continued	
emersum	Simplestem b.
minimum	Small b.
Spartina (GRAMIN)	57
gracilis	Alkali cordgrass
Spergularia (CARYOP) sandspurry	109
marina	Saltmarsh s.
rubra	Red s.
Sphaeralcea (MALVAC)	154
coccinea	Red globe-mallow
Spiranthes (ORCHID)	86
romanzoffiana	Ladies-tresses, pearl-twist
Spirea (ROSACE) spirea	143
betuifolia	Shiny-leaf s.
densiflora	Subalpine s.
Sporobolus (GRAMIN)	58
cryptandrus	Sand dropseed
Spraguea (PORTUL)	105
umbellata	Pussypaws
Stellaria (CARYOP) starwort	109
calycantha	Northern s.
crassifolia	Thickleaved s.
cripa	Criped s.
longifolia	Longleaved s.
longipes	Longstalk s.
obtusa	Bluntsepaled s.
umbellata	Umbellate s.
Stephanomeria (COMPOS) skeletonweed	222
runcinata	Runcinate-leaved s.
tenuifolia	Narrow-leaved s.
Stipa (GRAMIN) needlegrass	80
comata	Neddle-and thread
occidentalis	Western n.
richardsonii	Richardson's n.
viridula	Green n
Streptopus (LILIAC)	83
amplexifolius	Clasping-leaved twisted-stalk
Suaeda (CHENOP)	102
depressa	Pahute weed
Subularia (CRUCIF)	120
aquatica	Awlwort
Swertia (GENTIA)	169
perennis	Swertia

Symphoricarpos (CAPRIF) snowberry	191
albus	Common s.
occidentalis	Wolfberry, western s.
oreophilus	Mountain s.
Tanacetum (COMPOS)	201
vulgare	Common tansy
Taraxacum (COMPOS) dandelion	222
ceratophorum	Horned d.
laevigatum	Red-seeded d.
officinale	Common d.
Telesonix (SAXIFR)	132
jamesii	James' saxifrage
Tetradymia (COMPOS) horse-brush	198
canescens	Gray h., spineless h.
Thalictrum (RANUNC) meadowrue	118
occidentale	Western m.
sparsiflorum	Fewflowered m.
venulosum	Veiny m.
Thelypodium (CRUCIF) thelypody	131
integrifolium	Entireleaved t.
sagittatum	Slender t.
Thermopsis (LEGUMI)	143
montana	Mountain thermopsis
Thlaspi (CRUCIF)	131
arvense	Field pennycress, fanweed
parviflorum	Smallflowered pennycress
Tofieldia (LILIAC)	83
glutinosa	Sticky tofieldia
Townsendia (COMPOS) townsendia	223
exscapa	Easter daisy
leptotes	Common t.
montana	Mountain t.
parryi	Parry's t.
Tragopogon (COMPOS) salsify	223
dubius	Yellow s.
porrifolius	Vegetable oyster, s.
pratensis	Meadow s., Jack-go-to-bed-at-noon
Trifolium (LEGUMI) clover	152
haydenii	Hayden's c.
hybridum	Alsike c.
longipes	Long-stalked c.
parryi	Parry's c.
pratense	Red c.
repens	White c., Dutch c.

Triglochin (JUNCAG) arrowgrass	40
concinnum	Graceful a.
maritimum	Seaside a.
palustre	Marsh a.
Trisetum (GRAMIN) trisetum	80
spicatum	Spike t., downy oat-grass
wolfii	Wolf's t., beardless t.
Trollius (RANUNC)	112
laxus	Globeflower
Typha (TYPHAC) cat-tail	81
angustifolia	Lesser c.
latifolia	Common c.
Urtica (URTICA)	96
dioica	Stinging nettle
Utricularia (LENTIB) bladderwort	188
minor	Lesser b.
vulgaris	Common b.
Vaccaria (CARYOP)	107
segetalis	Cowcockle, cowherb
Vaccinium (ERICAC) huckleberry	167
caespitosum	Dwarf bilberry, dwarf h.
globulare	Globe h.
myrtillus	Dwarf bilberry, low bilberry
occidentale	Western h., w. bog blueberry
scoparium	Grouseberry, whortleberry
Valeriana (VALERI) valerian	192
dioica	Northern v.
edulis	Edible v., tobacco-root
occidentalis	Western v.
Verbascum (SCROPH)	181
thapsus	Common mullein, flannel m.
Verbena (VERBEN)	19
bracteata	Bracted verbena
Veronica (SCROPH) speedwell	187
americana	American brooklime
peregrina	Purslane s.
scutellata	Marsh s., skullcap s.
serpyllifolia	Thyme-leaved s.
wormskjoldii	American alpine s.
Vicia (LEGUMI)	144
americana	American vetch
Viguiera (COMPOS)	194
multiflora	Viguiera

Viola (VIOLAC)	violet	155
adunca	Early blue v., hook v.	
canadensis	Canada v.	
macloskeyi	Small white v.	
nephrophylla	Northern bog v.	
nuttallii	Nuttall's v.	
palustris	Marsh v.	
purpurea	Goosefoot v., purplish v.	
Woodsia (POLYPO)		37
orogana	Woodsia	
scopulina	Rocky Mt. woodsia	
Wyethia (COMPOS)	wyethia	224
amplexicaulis	Northern w., Mule's-ears	
helianthoides	White-rayed w., white-head w.	
Xerophyllum (LILIAC)		82
tenax	Indian basket-grass, beargrass	
Zannichellia (ZANNIC)		3
palustris	Horned pondweed	
Zigadenus (LILIAC)		85
elegans	Glaucous zigadenus	
venenosus	Meadow death-camas	

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