APPENDIX 12
PLANT BASICS

In order to understand plant descriptions and accurately identify plant species, it is helpful to understand some basic plant biology and taxonomy. This simple introduction to plant biology and terminology was adapted from the *Native Plant Revegetation Guide for Colorado* published by the Colorado Natural Areas Program.

TYPES OF PLANTS

There are three groups of higher plants: ferns, gymnosperms and angiosperms. All of the plants described in this handbook are angiosperms (flowering plants). However, some members of the carrot family and sunflower family are sometimes mistaken for ferns because of the fern-like characteristic of their leaves. A brief description of each group is included below.

Ferns: Ferns never have flowers. Thus any plant that has flowers is not a fern. Most fern leaves arise directly from a horizontal rhizome just below the surface of the ground. Most flowering plants that have fern-like leaves have the leaves arising from an erect stem or from a fleshy taproot.

Gymnosperms: Gymnosperms are woody plants, mostly with needle-like or scale-like leaves. Gymnosperms do not produce flowers and have fruits that are cones or berry-like cones. Common gymnosperms include pines, firs, spruces and junipers.

Angiosperms: Angiosperms are plants that produce flowers. Angiosperms include plants with obvious flowers such as daisies, as well as those with less obvious flowers such as grasses,

Flowering plants can be further categorized by life cycle, growth form, reproductive strategy, seasonal growth, and other descriptive terms.

LIFE CYCLE

Life cycle refers to the number of growing seasons a single plant lives.

Annual plants live for only one growing season. They reproduce by seed each year. Annuals typically develop within a few weeks or months. Annuals are never woody. They usually have rather weak root systems and are easily pulled out of the ground. Many weeds of croplands are annuals. Winter annuals are a variant of the annual life cycle. These species begin their growth

in the fall or winter and complete their life cycle the following spring or early summer. Downy brome (cheatgrass) is a common winter annual weed.

Biennial plants typically live for two years. First year growth is typically a cluster or rosette of leaves at the surface of the ground. Biennials will bolt (send up a flowering stalk), flower and die during the second year of growth. Native biennials are relatively uncommon; however, many invasive weeds are biennials including musk, Scotch, plumeless and bull thistles, common mullein, and common teasel.

Perennial plants live for many years. Normally, perennials do not flower or produce seeds until they are several years old. Perennials are either woody or herbaceous. Perennials direct more energy to long-term maintenance and typically have more extensive root systems. Most weeds in natural ecosystems are perennials, such as Canada thistle and leafy spurge, while most weeds in crops or highly disturbed situations are annuals.

GROWTH FORM

Growth form refers to the overall size of a plant, whether it is woody or not and whether it is a grass-like or broad-leafed plant.

Trees are woody plants, usually over 15 feet tall at maturity. Trees usually have one main stem with radiating branches on the upper portion of the plant. None of the weeds listed in the Colorado Noxious Weed Act are trees. However, Russian olive, Siberian elm, and tree-of-heaven can be weeds in natural areas.

Shrubs are woody plants, usually less than 15 feet tall, with several more-or-less equal main stems. Of the species listed in the Colorado Noxious Weed Act, only camelthorn and tamarisk are shrubs.

Graminoids include grasses and grass-like plants such as sedges and rushes. Sedges resemble grasses but have solid stems which are often triangular. Rushes resemble grasses but have round, tough, hollow, or pithy stems lacking joints. Grasses have jointed, hollow stems and clusters of small membranous flowers arranged in spikelets. Relatively few weeds are graminoids. Nine of the species listed in the Colorado Noxious Weed Act are graminoids. These are downy brome, green foxtail, johnsongrass, longspine sandbur, quackgrass, wild proso millet, yellow foxtail, jointed goatgrass, and yellow nutsedge.

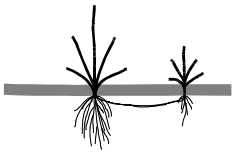
Forbs are non-woody (herbaceous) plants excluding graminoids that die back to the ground each year. The term “forb” is synonymous with “broad-leafed plant” and includes “wildflowers.” Most weeds are forbs and are especially well-represented in the mustard (Brassicaceae) and composite (Asteraceae) families. Examples of weedy mustards include whitetop, dyer’s woad, blue mustard, and flixweed, while composites include the knapweeds, thistles, and many more.

REPRODUCTIVE STRATEGY

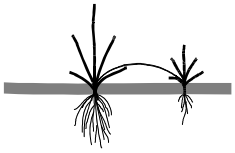
Reproductive strategy refers to how a plant produces more plants.

Seed Reproduction: All angiosperms and gymnosperms can reproduce to some extent by seed. However, the level of seed production, germination rate, and viability of seeds varies greatly among plant species.

Vegetative Reproduction: Many shrubs, grasses, and a few trees are capable of spreading by root shoots or points on the roots from which new stems or trunks can emerge. These species spread by rhizomes or stolons.



Rhizomes: Plants that have underground stems and branches that spread in linear patterns. New plants grow from these rhizomes. Some of the most troublesome noxious weeds are rhizomatous, including Canada thistle, Russian knapweed, leafy spurge, Dalmation toadflax, yellow toadflax, field bindweed, johnsongrass, and quackgrass. Rhizomatous weeds are difficult to control because they store large amounts of food underground in the rhizomes and can sprout from buds located on the rhizomes.



Stolons: Plants that spread from creeping aboveground stems. Stems come in contact with the ground, sprout roots and become independent plants. Buffalograss is a common and beneficial stoloniferous plant. Few weeds are stoloniferous.

SEASONAL GROWTH

Understanding seasonal growth characteristics can help identification and management of plants, especially grasses. Two general patterns are recognized, cool season and warm season.

Cool season plants begin their growth in late winter or early spring and bloom in early summer. They may enter dormancy during the summer and resume growth or even bloom again in the fall if adequate moisture is available. In cool / moist or cold / dry climates, cool season plants typically have a competitive advantage over competing warm season plants since they have a well-developed root system and leaf structure by spring to collect water and nutrients while warm season plants are struggling through the seedling stage. In warm / dry climates, warm season plants usually have an advantage over cool season plants.

Warm season plants begin their growth in late spring or early summer and bloom in late summer or early fall. Plants usually enter dormancy or die with the onset of frost.

ADDITIONAL DESCRIPTIVE TERMINOLOGY

Deciduous: Deciduous plants only bear leaves through the growing season, dropping them in the fall. Most flowering plants and almost all weeds in Colorado are deciduous. Sometimes deciduous plants will retain their leaves and remain green during very mild winters.

Evergreen: Evergreen plants bear green leaves throughout the winter. Most gymnosperms are evergreen. Examples include pines, junipers, firs, and spruces.

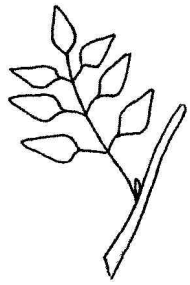
Leaves (simple or compound)

A **simple** leaf is one that is not compound or divided. However, the margins of simple leaves may be notched or grooved. Sometimes the margins can be so deeply indented that they look like compound leaves, as in common ragwort.

Simple leaf

A **compound** leaf is one that is divided into a few or several separate leaflets. Garden peas and walnut trees have compound leaves. Since the leaflets themselves resemble leaves, people sometimes have trouble deciding where a leaf ends and a leaflet begins. Two rules of thumb are:

- In most plants a bud is always present in the leaf axil, the spot where the leaf joins the stem. There are no buds where the leaflets join the common leaf stalk (rachis).
- In woody plants, and in many non-woody plants, the leaf stalk (petiole) has a different color or texture than that of the stem to which it is attached. However, there is usually little difference or demarcation between the stalks of leaflets and the main leaf stalk.

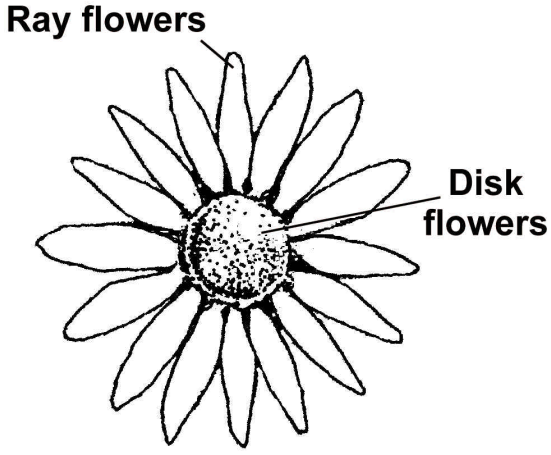


Compound leaf

Flowers (ray and disk)

Ray: Ray-flowers are the strap-shaped marginal flowers in the sunflower family. The "petals" of oxeye daisies are really ray flowers.

Disk: Disk-flowers are the central regular or tubular flowers of species in the sunflower family. For example, in the sunflower or daisy the central part of the "flower" is composed of numerous disk-flowers while the "petals" are actually complete ray-flowers.



Parts of a flower