Colorado State University Extension

Colorado Master Gardener[sm] Program

CMG GardenNotes #121

Horticultural Classification Terms

Outline:

Planet Earth is unique because of *plants*. They were the first complex organisms to evolve, and they are credited with making the atmosphere hospitable for animals and other life forms.

Plants make their own food using raw materials from the environment including carbon dioxide, water, soil nutrients, and sunlight in the process of photosynthesis.

Horticulture and Related Fields

Horticulture – The science and art of cultivating flowers, fruits, vegetables, turf and ornamental plants in an orchard, garden, nursery, or greenhouse, on a large or small scale.

Horticultural – An adjective used to describe something relating to horticulture, or produced under cultivation.

Horticulturist – A noun referring to a specialist in horticulture.

The terms "**ornamentals**," "**landscape horticulture**," and "**environmental horticulture**" are common terms used to identify the sub-groupings of horticulture dealing with the landscape setting.

Botany – A branch of biology dealing with plant life, (i.e., anatomy, taxonomy, genetics, physiology, ecology, etc.). The science of applied botany deals with plants grown in uncultivated settings.

Agronomy – A branch of agriculture dealing with field crop production and soil management.

Forestry – The science of developing, caring for, or cultivating forests; the management of growing timber.

Community forestry / **urban forestry** – A branch of forestry dealing specifically with the unique growth limitations and needs of trees in the landscape setting.

Horticultural Classifications

With hundreds of thousands of plants used by mankind, it is impossible to talk about each one individually. Plants are grouped by various common characteristics to help us communicate similar ecological adaptations and cultural requirements. For example, the term "shade plants" indicates plants tolerant to various levels of shade. "Xeric" groups those plants requiring less supplemental irrigation in our climate. It is important to point out that any classification system will have plants that do not exactly fit the groupings.

The following are examples of some common classifications used in horticulture.

Classification by Use

I. Edibles
   - A. Fruits
     - 1) Tree fruits
     - 2) Small fruits
   - B. Vegetables
     - 1) Warm season vegetables
     - 2) Cool season vegetables
   - C. Herbs
     - 1) Culinary
     - 2) Medicinal
   - D. Nuts

II Ornamentals/Landscape Plants
   - A. Woody plants
     - 1) Trees
     - 2) Shrubs
     - 3) Vines and ground covers
   - B. Herbaceous plants
     - 1) Flowers
     - 2) Vines and ground covers
   - C. Grass/turf

III. Potted plants, houseplants, gift plants
   - A. Flowering gift plants
   - B. Foliage plants

Note: Do not confuse the multiple uses of the word "fruit".

In reference to "fruits and vegetables", "fruit" refers to crops primarily used in some European cuisine as a dessert (peaches, apples, strawberries, and raspberries). "Vegetables" refers to crops served as part of the main entrée (potatoes, carrots, corn, and lettuce). In this frame of reference, tomatoes are vegetables.

In reference to "fruit" as a part of plant anatomy (i.e., roots, stems, flowers, fruits, and seeds), tomatoes, squash and watermelons are fruit.

Classification by Climatic Requirements

Temperature Requirements

Tropical plants originate in tropical climates with a year-round summer-like growing season without freezing temperatures. Examples include cocao, cashew and macadamia nuts, banana, mango, papaya, and pineapple.

Sub-tropical plants cannot tolerate severe winter temperatures but need some winter chilling. Examples include citrus, dates, figs, and olives.

Temperate-zone plants require a cold winter season as well as a summer growing season, and are adapted to survive temperatures considerably below freezing. Examples include apples, cherries, peaches, maples, cottonwoods, and aspen. In temperate-zones, tropical and sub-tropical plants are grown as annuals and houseplants.

Cool season plants thrive in cool temperatures (40°F to 70°F daytime temperatures) and are somewhat tolerant of light frosts. Examples include Kentucky bluegrass, peas, lettuce, and pansies.

Warm season plants thrive in warm temperatures (65°F to 90°F daytime temperatures) and are intolerant of cool temperatures. Examples include corn, tomatoes, and squash. Some warm season plants are sub-tropical and tropical plants grown as annuals in Colorado.

Tender plants are intolerant of cool temperatures, frost, and cold winds (e.g., most summer annuals, including impatiens, squash, and tomatoes).

Hardy plants are tolerant of cool temperatures, light frost, and cold winds (e.g., spring-flowering bulbs, spring-flowering perennials, peas, lettuce, and cole crops).

Hardiness refers to a plant's tolerance to winter climatic conditions. Factors that influence hardiness include minimum temperature, recent temperature patterns, water supply, wind and sun exposure, genetic makeup, and carbohydrate reserves.

Cold hardiness zone refers to the average annual minimum temperature for a geographic area. Temperature is only one factor that influences a plant's winter hardiness. As of printing time, a new U.S. Department of Agriculture (USDA) Hardiness Zone Map is ready for release. With an extensive database, it will clear up some of the confusion created in previous versions and documents some zone creeping (zone moving north as temperatures warm).

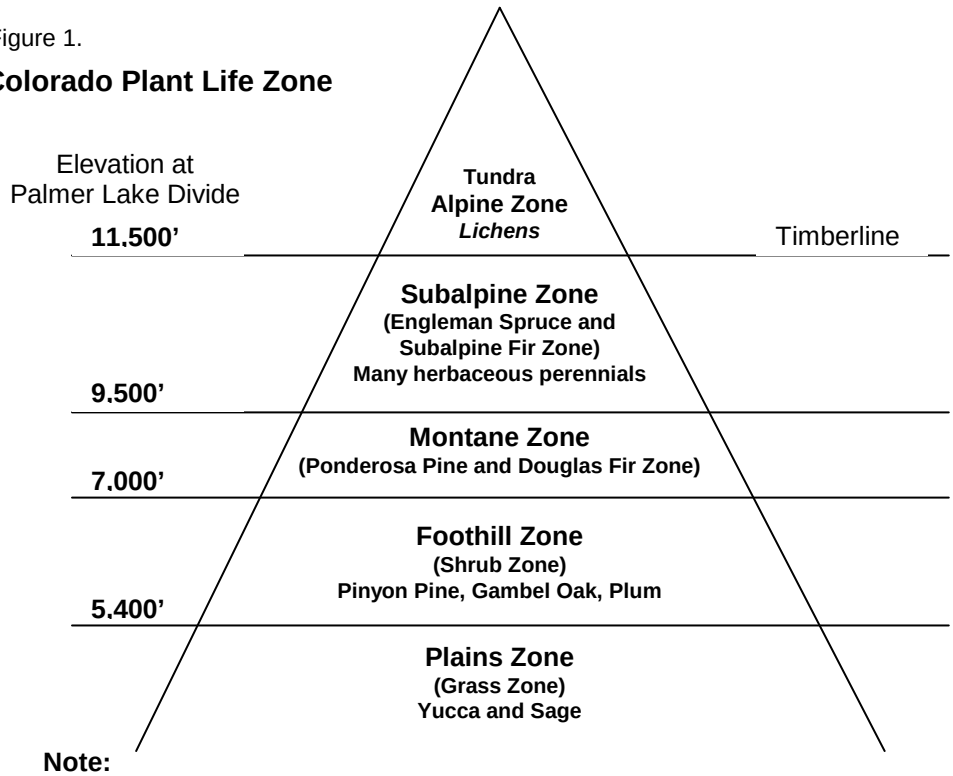
Heat zone refers to the accumulation of heat, a primary factor in how fast crops grow and what crops are suitable for any given area. This is only one factor that influences a plant's heat tolerance. On a heat-zone map, the Colorado Front Range falls into zones 5 to 7.

Classification by Elevation and Plant Life Zones

Higher elevations have increasingly shorter growing seasons due to colder temperatures. High elevations have drier soils, stronger light, persistent winds, and greater temperature changes. Due to this harsh environment, alpine and tundra plants tend to be compact in form. [Figure 1]

Figure 1.

Colorado Plant Life Zone



Note:

1. Along the Colorado Front Range, elevation of timberline decreases northward.
2. A climb of 1,000' is roughly equal to a trip of 600 miles northward. Average temperature is decreased approximately 3°F for every 1,000 feet gain in elevation.
3. In New Mexico, corresponding plant life zones will be at higher elevations than those given above, but considerably lower elevations in Montana. This does not apply to Apline zones.
4. The Palmer Lake Divide, often called Monument Hill, is the marker for increase/decrease of plant life zone elevations.

Classification by Ecological Adaptations

Many of our plant care problems arise as gardeners try to grow plants outside of their natural environment or "ecological adaptation."

Characteristics of the Colorado high plains include low humidity, limited rainfall, and alkali soils low in organic matter. One of our most limiting factors is rapid temperature change. We can go from a beautiful warm spring day to a cold winter blizzard in just hours.

In our higher mountain communities, the short frost-free season and low summer growing temperatures significantly limit plant selection.

The following are a few examples of terms used to describe classifications based on ecological adaptation.

Alpine plants tolerate the short growing season, cold, and wind of higher mountain elevations. They are typically low-growing, small leaf perennials. Snow cover depth often dictates the plant's growing height.

Prairie plants are adapted to the open sun and winds of the plains. These plants are further classified into dry, mesic, and wet prairie categories.

Woodland plants are adapted to a low light conditions and soils rich in organic matter. They typically have large leaves and small flowers.

Wetland plants tolerate continually moist soil conditions of a bog or a pond. Wetlands play a primary role in water quality as a filtering system for water-borne pollutants.

Xeric plants tolerate conditions of low water, bright light, and warm temperatures due to a variety of adaptations such as thick, waxy, or fleshy leaves, hairy leaves, small narrow leaves, taproots and succulent stems.

An excellent text on xeriscape gardening is ***Xeriscape Plant Guide***, by Denver Water, published by Fulcrum Publishing.

Native and adapted plants for the urban environment

Native (indigenous) plant refers to plants adapted to a given area during a defined time period. In America, the term often refers to plants growing in a region prior to the time of settlement by people of European descent.

The term is so overused that it has little meaning. With recent interest in water conservation, many gardeners mistakenly consider “native” plants as “xeric” plants, and “xeric” plants as “native” plants. The two terms are not interchangeable”.

The concept of native should not refer to political boundaries, such as state or country, but rather to an ecological habitat during a defined chronological period. For example, Colorado blue spruce and quaking aspen are "native" to the ecological habitat referred to as the montane zone. They are not "native" to the Colorado high plains, or elevations below 8,000 feet. From a chronological reference point, what is now the grassland of the Great Plains was once an inland sea. Therefore, aquatic plants such as kelp would have been "native" at one time. Over time, the ecological habitat changed, changing the "native" plants along with it. Environmental change is an ongoing process, based both on global climatic events and on the activity of all organisms, including humankind.

Adapted (or introduced) plants are those that reliably grow well in a given habitat without specific attention from humans in the form of winter protection, soil amendments, pest protection, water, etc. Adapted plants are considered to be ***low maintenance*** plants.

Urban environment – For gardening purposes, the urban setting needs to be recognized as a unique ecosystem. Characteristics of the urban environment include:

- Soil compaction
- Rooting areas covered with buildings, roads, and parking lots
- Increased surface runoff creating significant water quality

problems

- Higher temperatures and lower humidity
- Air pollution

Characteristics of an urban environment cultivated by humans may include:

- Reduced wind
- Increased availability of water due to irrigation
- Increased organic matter and soil fertility
- Reduced pests
- Increased soil stability
- Slower temperature fluctuations

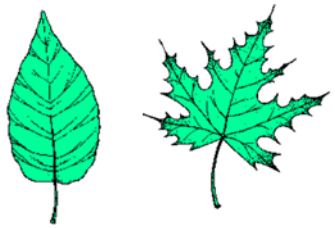
Classification by Stem and Leaf Texture

Herbaceous plants have non-woody stems.
Woody plants have woody stems that generally live for several years, adding new growth each year.

Deciduous plants shed all leaves at approximately the same time annually. [
Evergreen plants retain some leaves longer than one growing season so that leaves are present throughout the year. Seasonal drop of some of the oldest interior leaves is a natural part of the life cycle.
Semi-evergreen refers to plants that may retain their leaves, depending on the winter temperature and moisture.

Broadleaf plants have a broad leaf blade (e.g., ash, maple, lilac, and beans). [Figure 2]
Narrowleaf plants have needle-like (e.g., pine, spruce) or awl-like (e.g. junipers) leaves. [Figure 3]
Grass-like plants have narrow leaves, usually arising from the base of the plant. The leaves may be soft (ornamental grasses) or stiff (yucca).

Figure 2. Venation of broadleaf, deciduous trees



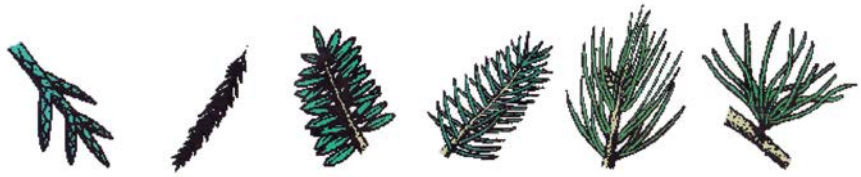


Figure 3. Conifer leaf types

Reminder:

- Some evergreens are broadleaf (e.g., Oregon grape, most true hollies, and evergreen euonymus).
- Some narrow-leaf plants are deciduous (e.g., larch and bald cypress).
- ***Conifer*** refers to cone-bearing. Most conifers are narrow-leaf evergreens. A few conifers are deciduous (larch, bald cypress).

Classification by Growth Habit

Growth habit refers to the genetic tendency of a plant to grow in a certain shape and to attain a certain mature height and spread. [Figure 4.]

Trees typically have a single trunk and mature height over 12 feet.
Shrubs typically have multiple-branches from the ground and a mature height less than 12 feet.
Vines have a climbing, clasping, or self-clinging growth habit.

Note: Many landscape plants could be considered small trees or large shrubs. The terms tree or shrub would be applied based on the general appearance of the plant.

Plants have vastly different growth habits. It is important to understand growth habits in order to make knowledgeable decisions regarding plant placement, plant selection, pruning and maintenance requirements.

The species, cultivar, and/or variety name sometimes indicates some characteristic of growth habit.

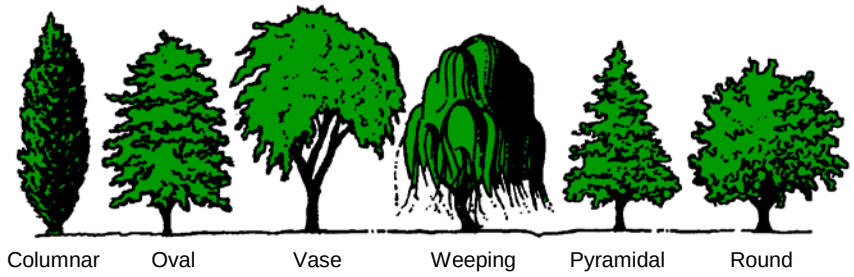


Figure 4. Tree Forms

Classification by Life Span

From a horticultural perspective, life span is a function of climate **and** usage. Many garden plants (including tomatoes and geraniums) grown as annuals in Colorado would be perennials in climates without freezing winter temperatures.

Annuals complete their life cycle (from seedling to setting seed) within a single growing season. However, the growing season may be from fall to summer, not just from spring to fall. These plants come back only from seeds.

Summer annuals germinate from seed in the spring and complete flowering and seed production by fall, followed by plant death, usually due to cold temperatures. Their growing season is from spring to fall. Examples include marigolds, squash, and crabgrass.

Winter annuals germinate from seed in the fall, with flowering and seed development the following spring, followed by plant death. Their growing season is from fall to summer. Examples include winter wheat and annual bluegrass. Many weeds in the lawn (such as chickweed and annual bluegrass) are winter annuals.

Biennials complete their life cycle within two growing seasons. Biennials germinate from seed during the growing season and often produce an over-wintering storage root or bulb the first summer. Quite often, they maintain a rosette growth habit the first season, meaning that all the leaves are basal. They flower and develop seeds the second summer, followed by death. Many biennial flowers self-seed, giving the appearance of a perennial growth habit.

In the garden setting, we grow many biennials as annuals (e.g., carrots, onions, and beets) because we are more interested in the root than the bloom. Some biennial flowers may be grown as short-lived perennials (e.g., hollyhocks).

Perennials live through several growing seasons, and can survive a period of dormancy between growing seasons. These plants regenerate from root systems or protected buds, in addition to seeds.

Herbaceous perennials develop over-wintering woody tissue only at the base of shoots (e.g., peony and hosta) or have underground storage structures from which new stems are produced. Note: Golden Vicary Privet and Blue Mist Spirea (*Caryopteris* spp.) can be either herbaceous or woody as grown in Colorado.

Spring ephemerals have a relatively short growing season but return next season from underground storage organs (e.g., bleeding heart, daffodils).

Woody perennials develop over-wintering tissue along woody stems and in buds (e.g., most trees and shrubs grown in Colorado).

Combinations – Plants are usually classified as annual, biennial, or perennial on the basis of the plant part that lives the longest. For example, raspberries have biennial canes and perennial roots.

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