MASTER GARDENER
COLORADO STATE UNIVERSITY
EXTENSION

CMG GardenNotes #121

Horticultural Classification Terms

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.

Horticulturist – A specialist in horticulture.

The terms **ornamental horticulture**, **landscape horticulture**, and **environmental horticulture** are commonly used to identify the sub-fields of horticulture dealing with designed landscape settings.

Agriculture – The theory and practice of growing crops.

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

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

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

Urban forestry – A branch of forestry dealing specifically with the unique growth limitations and needs of trees in the landscape setting.

Horticultural Classifications of Plants

With hundreds of thousands of plant species and varieties on the planet, horticulturists look for practical ways to group them together. Plants are grouped by various common characteristics to help us communicate similar cultural requirements, garden uses, morphology, or taxonomy among other things. The following are examples of common classifications used in horticulture.

Classification by Use

1. **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

2. **Ornamentals/Landscape Plants**
   A. Woody plants
      1. Trees.
      2. Shrubs.
      3. Vines and ground covers.
   B. Herbaceous plants
      1. Flowers and foliage plants.
      2. Vines and ground covers (that do not develop woody stems).
   C. Grass/Turf

3. **Potted Plants, Houseplants, Gift Plants**
   A. Flowering Plants (grown primarily for flowers).
   B. Foliage plants (plants that may produce flowers, but which are grown for their foliar characteristics).

*Note: Do not confuse the multiple uses of the word ***fruit***. In reference to cookery (fruits and vegetables), “fruit” refers to crops primarily used in some European cuisines as a dessert (e.g. peaches, apples, strawberries, and raspberries) whereas “vegetables” refers to crops served as part of savory dishes (potatoes, carrots, spinach, etc.). In this frame of reference, tomatoes are vegetables. In taxonomic or anatomical classification, “fruit” refers to a seed-bearing structure – in this sense, tomatoes and squash are fruit. Potatoes are rhizomes (modified stems), carrots are roots, spinach is leaves, etc.

Classification by Climatic Requirements

Tropical plants originate in tropical climates with a year-round summer-like growing season without freezing temperatures (but possibly with wet and dry seasons). Examples include cacao, cashew and macadamia nuts, banana, mango, papaya, and pineapple.

Sub-tropical plants cannot tolerate severe winter temperatures but often need winter chilling to grow and produce correctly. Examples include citrus, dates, figs, and olives.

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

Tender plants are intolerant of cool temperatures, frost, and cold winds. Examples include most summer annuals, including impatiens, squash, and tomatoes.

Hardy plants are tolerant of cool temperatures, light frost, and cold winds. Examples include 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 zones** are determined by the USDA and refer to the average annual minimum temperature for a geographic area, and thus the average minimum temperature that a plant can tolerate. Temperature is only one factor that influences a plant's winter hardiness.

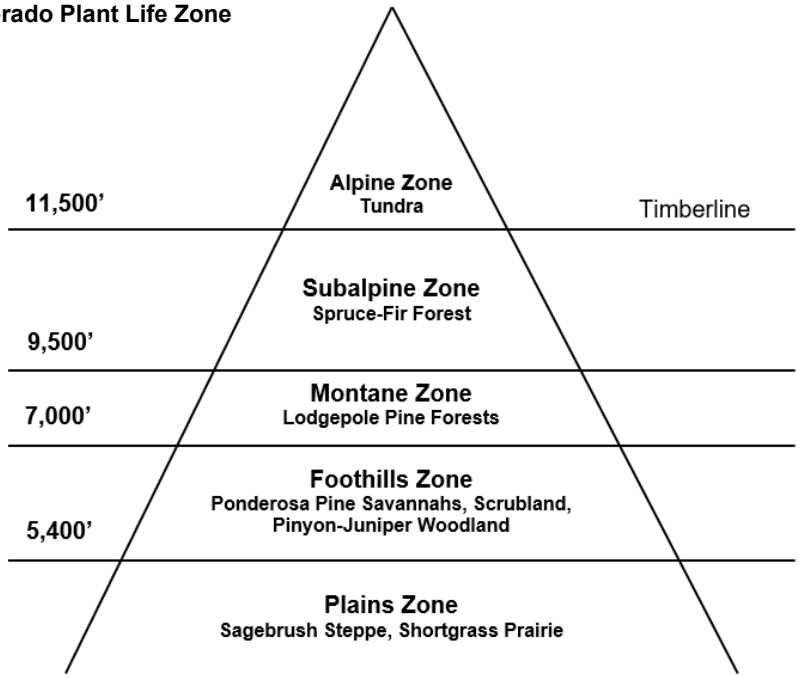
Classification by Elevation and Plant Life Zones

Plants can be classified by plant communities in which they usually occur. Environmental characteristics determined by elevation create “zones” dominated by distinguishable plant communities. Examples of these communities include pinyon-juniper woodlands, sagebrush steppes, high plains grasslands, montane and subalpine forests, and the alpine tundra. Matching plants’ life zones to garden conditions can be a great way to pair the “right plant” with the “right place.” Plants grown outside of their life zones may require mitigations like extra water, more (or less) shade than they might tolerate in their natural habitat, special soil modifications, etc.

The elevation of life zones shifts downward as latitude increases. A climb of 1,000 feet is equal to a trip around 600 miles northward. Plant life zones will remain in the same relative position regardless of latitude, but the absolute elevation of each zone decreases as you move northward, for example the alpine tundra above 11,500 feet in Colorado is similar to the artic tundra near sea level on the north coast of Alaska and Canada. Higher elevations have increasingly shorter growing seasons due to colder temperatures. High elevations tend to have poorly developed soils, stronger light, persistent winds, and greater temperature fluctuations than lower elevations of the same region. Due to this harsh environment, plants of the alpine tundra tend to be compact in form. [**Figure 1**]

Figure 1 on next page.

Figure 1. Colorado Plant Life Zone



Classification by Ecological Adaptations

Related to life zones are ***ecological adaptations*** of plants. For example, characteristics of the Colorado high plains include low humidity, limited rainfall, and alkaline soils low in organic matter. Plants from environments with similar growing conditions will do well on the high plains, in general.

In higher mountain communities, the short frost-free season and low summer growing temperatures significantly change what plants can be grown well there compared to on the plains.

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. Growing alpines at lower elevations takes special gardening techniques and care and has led to the development of Rock Alpine gardening as a horticultural movement.

Prairie plants are adapted to the open sun and winds of the plains. These plants are further classified into dry, mesic, and wet categories, or as tallgrass or shortgrass prairie plants. Many prairie plants, particularly tallgrass prairie plants, are very competitive in deep, nutrient-rich soil that you would find in the American Midwest.

Woodland plants are adapted to low light conditions either by shade avoidance (spring and winter growth and summer dormancy) or by shade tolerance. They tend to do best in soils rich in organic matter.

Wetland plants tolerate continually moist soil conditions of a bog or a pond. Some will tolerate drier soils, but most make poor choices for standard garden conditions. Some wetland species, like cattails, will spring up in overwatered, compacted soils in landscapes, and can serve as an indicator of irrigation issues.

Xeric plants tolerate dry conditions. They are often also tolerant of bright light and warm temperatures due to a variety of adaptations such as succulent, waxy, hairy, or small leaves, taproots, and succulent stems. Growing xeric plants in too wet conditions can result in poor plant performance.

Native and Adapted Plants for the Urban Environment

Native (indigenous) plants refer to plants growing in a given area during a defined time period. In The United States, the term often refers to plants growing in a region prior to the time of settlement by people of European descent. Many gardeners mistakenly consider *native* plants as *xeric* plants, and *xeric* plants as *native* plants. The two terms are not interchangeable – many native plants in our region are xeric, for example, but many others are not.

In gardening, the concept of native should not refer to political boundaries, such as state or country, but 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. Between 500 million and 300 million years ago, what is now Eastern Colorado 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 plants are those that reliably grow well in a particular 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. In the context of gardening, **Adapted Plants** usually refers to non-native plants from similar ecological contexts. Some adapted plants have become noxious weeds.

The urban environment, for gardening purposes, needs to be recognized as a unique ecosystem, with challenges beyond what could be expected in the native natural environment. Characteristics of the urban environment include:

- Soil compaction.
- Reduced rooting areas.
- Increased surface runoff creating significant water quality problems.
- Higher temperatures and lower humidity.
- Air pollution.

Characteristics of an urban environment cultivated by humans (a garden) may include:

- Reduced wind.
- Increased availability of water due to irrigation.
- Increased organic matter and soil fertility.
- Different insect communities, both pests and beneficials.
- Increased soil stability.
- Slower temperature fluctuations.

The unique challenges of the urban environment and site-specific features should be considered when planning gardens with native or adapted plants.

Classification by Stem and Leaf Texture

- **Herbaceous** plants have non-woody stems.
- **Woody** plants have woody stems that usually live for several years, adding new growth each year.
    - **Deciduous** trees and shrubs shed all leaves at approximately the same time annually. Deciduous plants can be conifers (e.g. larch or bald cypress) or flowering plants (most shade trees), broadleaf or narrowleaf.
    - **Evergreen** trees and shrubs 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. Evergreens can be broadleaf or narrowleaf.
    - **Semi-evergreen** plants may retain their leaves year-round, depending on the winter temperature and moisture, losing them only in harsh winters.
- **Broadleaf** plants have a broad leaf blade, such as ash, maple, lilac, and beans.
- **Narrowleaf** plants have needle-like leaves such as pine and spruce, or awl-like leaves such as junipers.
- **Grass-like** plants or **graminoids** have narrow leaves, usually arising from the base of the plant. Grasses, rushes, and sedges are all graminoids.

Classification of Woody Plants 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 2**]

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

Many landscape plants can be considered small trees or large shrubs. The terms tree or shrub is applied based on the general appearance of the plant – some say, “you walk under a tree, and around a shrub.” Trees can be further classified by canopy shape.

A thorough understanding of growth habits is important to make knowledgeable decisions regarding plant placement, selection, pruning, and maintenance.

The species, cultivar, and/or marketing names of plants sometimes indicate a particular characteristic of growth habit – for example, *Pinus ponderosa* roughly translates to “big [heavy/significant] pine,” and Mini-Man™ Viburnum is a dwarf variety.

Figure 2. Tree Forms

Columnar Oval Vase Weeping Pyramidal Round

Classification by Life Span

From a horticultural perspective, life span is a function of inherent plant characteristics, climate, and usage. Garden plants including tomatoes and geraniums that are grown as annuals in Colorado, are 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 in subsequent growing seasons only from seeds.

> **Summer annuals** germinate from seed in the spring and complete flowering and seed production by fall, followed by plant death. Their growing season ranges 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 in summer. Their growing season is from fall to summer. Examples include winter wheat, cheatgrass, redstem filaree (*Erodium cicutarium*) and annual bluegrass.

Biennials complete their life cycle within two growing seasons. Biennials germinate from seed during the first growing season and produce foliage and storage organs the first summer. Quite often, they maintain a rosette growth habit the first season, meaning that all the leaves are basal, or close to the base of the plant. They flower and develop seeds the second season, followed by death.

In the garden setting, we grow certain biennials as annuals - carrots, onions, and beets, for example, because we are more interested in the root than the bloom. Some biennial flowers, such as hollyhocks, may persist as short-lived perennials.

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.

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