



CMG GardenNotes #512

Herbaceous Plants: Right Plant, Right Place

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Climate and Microclimate

Temperature

Plants generally have a specific range of temperatures in which they thrive. This information is usually listed in terms of hardiness or hardiness zones, although maximum daily temperature, minimum daily temperature, difference between day and night temperatures, average daytime temperature, and average nighttime temperature all have an effect.

Hardiness and Hardiness Zones

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

Because of these complex interactions, gardeners may want to experiment with hardiness, or take the zones with a grain of salt. Depending on the microclimate and the year, Colorado gardeners often find that they can grow plants that are supposedly not hardy here. At other times, a plant that “should be” hardy will not be.

Hardiness zone maps indicate the average annual minimum temperature expected for geographic areas. While this is a factor in plant selection, it is only one of many factors influencing plant hardiness.

In 2012, the U.S. Department of Agriculture released a new USDA Hardiness Zone Map. It can be found at <http://planthardiness.ars.usda.gov/PHZMWeb/>. The revised map has a large database correcting inherent problems with the 2003 version. It documents a climate zone creep, that is zones moving northwards in recent years. Zones are based on a 10°F difference in average annual minimum temperature.

Average Annual Minimum Temperature

Zone 4	-20°F to -30°F
Zone 5	-10°F to -20°F
Zone 6	0°F to -10°F

The Sunset Climate Zones claim to take into account the total climate, including length of growing season, timing and amount of rainfall, winter lows, summer highs, and humidity. This is a good concept, but there are not enough zones for Colorado—for example- Vail and Denver are shown in the same climate zone.

Figure 1. Hardy perennials, like tulips, are tolerant of the snow.



Heat Tolerance

This is the opposite extreme; how much heat a plant can tolerate during the growing season. For example, Colorado summers can be very hot and dry. In planting near stone, a south-facing wall, a driveway, or some other heat sink, the gardener might want to look for plants that “tolerate” or “thrive” in heat and drought. Keep in mind that this is not often listed in descriptions. If you live in an area with a cooler summer (such as higher elevations), heat-loving plants are not

necessarily a good choice. Phrases such as “*not a good choice for Desert Southwest*” suggests that the plant does poorly in dry heat. [Figure 2]

Figure 2. Begonias are generally considered shade plants. They are intolerant of heat and can be found in full sun in cool climates.



Microclimate

A microclimate is a variation of the climate within a localized area, usually influenced by hills, hollows, structures, or proximity to bodies of water. A microclimate differs significantly from the general climate of a region. These can be exploited to grow plants that would otherwise not be hardy (i.e., in garden beds against a facing south stonewall). Similarly, plants that prefer cooler seasons might benefit from being placed in areas that get dappled shade or only morning sun. [Figure 3]

Mountains and valleys create some rather complex microclimates. The bottom of a valley is cooler than hillsides due to cool air draining to low spots. Valley floors may be over 10°F cooler than surrounding gardens on hillsides. Air drainage and aspect (direction the slope faces) may change a growing season by one to two zones and blooming by two to six weeks.

A gardener can expand what is possible to grow by learning to create and exploit microclimates. For example, a south facing slope may be one or more hardiness zones warmer. In hot areas of the region, avoid plants that prefer cool temperatures. In cool areas of the region, grow tender plants or ones that need more heat to bloom on the south and west.

Gardeners can also note and take advantage of the microclimates on different sides of their houses. Sunny south and west sides will be warmer. The east side of a house is typically cooler than south or west, and it may be more protected from wind. Because of this, it is perhaps the most temperate side in which to garden. The north side of a house is the shadiest, coolest, and generally moist. Grow plants that are not heat or drought tolerant here.

Figure 3. This alpine garden features plants from the harsh microclimate of the high alpine meadows. Plants are small and quick to bloom, being tolerant of wind, cool temperatures, and short growing seasons.



Many places in Colorado are very windy, with gusts up to 100 mph. Wind desiccates plants, increasing mortality. It can also blow away mulch. Gardeners in windy places can either grow plants that are tolerant to wind, or create or take advantage of existing windbreaks. The ideal windbreak will be semi-porous, with a density of 40% to 60%. This will provide the greatest downwind area of protection. Snow also will build up on the lee side of windbreaks, so this can be a good spot to plant more tender plants.

Plant Evaluation

Gardeners have a wide range of plant material available to them. Garden centers, plant catalogs, and the internet provide exciting new choices. However, not all plants will perform equally well in a given area or in a specific garden bed. To evaluate a specific plant, gardeners must ask questions to determine whether it is a good choice for a site. This includes interpreting catalog, garden tag, and seed packet descriptions.

Developing this skill is critical to making the best choices because few garden catalogs are written for Western climates. Many gardeners did not learn to garden in the climate where they currently reside. The ability to evaluate plants helps gardeners plant the “right plant in the right place.”

Plant Descriptions

There are many pieces of information in a complete plant description that helps gardeners make good decisions. These include the scientific name, life cycle, preferred sun exposure, hardiness, mature size, soil preference, moisture preference and bloom period.

Catalogs, plant tags and seed packets generally include at least sun exposure and hardiness, but these are often not enough. Even if the description is more complete, interpreting what exactly is meant by these descriptions is often fairly tricky. This chapter helps the gardener to “read between the lines” of plant descriptions.

Scientific Name

Although the scientific name of a plant can be intimidating, it can be an important piece of information. Plants often have many different common names, and there is no way of ensuring you have a specific plant unless the scientific name is given. The name is also important if the plant description is not complete and the gardener needs to do more research.

Life Cycles

One of the most fundamental pieces of information about a plant is its life cycle. Because of this, nurseries and plant catalogs often divide plants into categories based on life cycle or life form. Categories often used include bulbs (including rhizomes and corms), annuals, perennials, shrubs, and trees.

Annuals complete their life cycle (from seedling to setting seed) within a single year. In other words, they will not come back next year, although some may self-seed. Annuals are useful in flowerbeds where gardeners prefer yearly change as well as in containers and as cut flowers. Annuals can also be planted in perennial beds to fill gaps in the succession of bloom. Summer blooming annuals typically bloom all summer long.

Biennials complete their life cycle within two growing seasons, germinating and growing vegetatively the first season and flowering the second season. The individual plant will not come back after flowering second year (although it may self-seed). Biennials can provide quicker color than perennials and are often more architectural than annuals.

Perennials live through multiple growing seasons. Most have a short blooming period of two to six weeks. Perennials readily add structure to the garden. While individual plants may be more expensive than annuals, the one-time investment may last for years.

Bulbs, corms, and tubers – Many herbaceous ornamentals fall into the category of bulbs, corms, and tubers. These plants are perennial in their native climate, but in regions with cool winter soils, some require fall digging and winter storage indoors.

Notes on Annuals, Biennials, and Perennials

Many of our annuals are actually perennials in warmer climates. Some of our more hardy annuals may live as short-lived perennials in protected areas.

Some plants are described as either being biennials *or* short-lived perennials. In a good spot, such a plant might last for three or more years – on the other hand, if it blooms extravagantly, and produces many seeds, it may “bloom itself to death” in only two seasons. Some factors to consider in choosing one of these plants for the garden would be does the plant self-seed? If so, is this a desirable trait? Self-seeding plants can be invasive.

Exposure

The amount of sun a plant needs to thrive is a critical factor in choosing a plant to fit a particular garden situation. The following are catalog terms used to describe the plant’s preference for sun exposure.

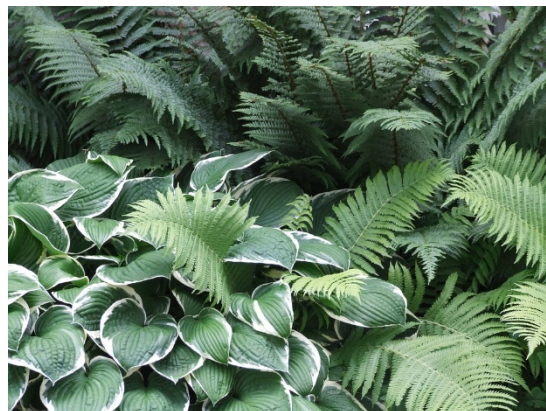
Full sun – Due to the strong sunlight in sunny, high elevations like Colorado, a garden that receives at least six hours of sun each day is generally considered to be full sun. Frequently, eastern catalogs (from areas with more cloud cover) will describe full sun as being eight to twelve hours per day.

Part sun – In Colorado, a garden site that receives six hours of dappled shade from trees or approximately four hours of direct sun with shade either in the morning or afternoon is considered part sun. Frequently Eastern catalogs may say six to eight hours is part sun.

Part shade is used interchangeably with the term part sun.

Light shade is the shade produced from a one-story building or tree and is characterized by bright, indirect light. [Figure 4]

Figure 4. Hosta and ferns create a good textural combination for a north-side shade garden.



Medium shade is the shade under deciduous trees, unless the tree is large and dense. If the tree is very large, the shade may be considered deep shade. Thinning tree branches will not adequately improve sun levels for sun loving plants.

Dark shade is very dense and dark, and is found under evergreens and very large deciduous trees. The plant palette for these areas is limited.

Irrigation Requirements

Hydrozones – Plants should be grouped into areas requiring the same irrigation amounts. For example:

- **Routine irrigation** – Watered every 2-4 days
- **Reduced irrigation** – Watered every 5-14 days
- **Limited irrigation** – Watered during dry spells
- **Non-irrigated** – In sites where landscape irrigation is not desirable or possible, focus on natural growth.

Based on differences in annual precipitation, gardens with limited to no irrigation will thrive some years and decline other years.

In a semi-arid state such as Colorado, the amount of water a plant needs is a very important factor, although it is not always listed in catalogs. If this information is given, it is often through the use of symbols. Because the meaning of this varies, refer to the catalog or plant tag key for interpretation. If there is no mention of moisture requirements, and the plant or catalog is not from the west, assume that the plant in question cannot tolerate extremely dry soils.

Drought Tolerance

This is a relative term. Consider where the information is coming from. It will mean very different things if coming from New Mexico or Maine. This distinction is illustrated by the following catalog description “Thick roots drive down deeply, making it drought tolerant; struggles in the desert southwest”. [Figure 5]

Figure 5. “Drought tolerant” does not mean just cacti and desert -type plants.



What is a “Xeric Plant”?

“Xeric” is a relative term. Some sources consider a plant that needs no supplemental irrigation as xeric; others consider plants needing up to one-inch of water per week as xeric. Xeric plants tolerate conditions of low water, bright light, and warm temperatures. Adaptations include thick, waxy, fleshy, hairy, or light-colored leaves, small narrow leaves, and taproots. [Figure 6]

For additional information on xeric plants, refer the following Colorado State University Extension fact sheets available online at www.cmg.colostate.edu.

- Xeriscaping: Perennial and Annual Flowers, #7.231
- Xeriscaping: Ground Cover Plant, #7.230
- Xeriscaping: Creative Landscaping, #7.228
- Xeriscaping: Retrofit Your Yard, #7.234

Figure 6. A cacti and succulent garden can be a fun specialty garden.



Soil Requirements

Eastern catalogs will often describe soil needs of plants as being *woody* or *woodland soils*. Colorado soils seldom match that description. Woodland soils usually refer to moist, acidic soils that are high in humus. Plants needing a woody soil often do poorly in western soils even if they are hardy.

Similarly, woodland plants are usually adapted to a low light condition and soils rich in organic matter. They typically have large leaves and small flowers, and are often adapted to humid air. Again, they usually do poorly in much of the arid west.

Other soil requirement ‘red flags’ to watch for are “needs ordinary soil” or “good soil”. What is “ordinary”? Catalog writers are probably not referring to the typical western soils. In general, Colorado soils are either clayey, sandy, or gravelly, and are almost always low in organic matter and high in pH (alkaline)

If a catalog states the plant grows best in sweet soils, there should not be a problem, because ‘sweet’ means alkaline. If a catalog states a plant “needs well drained soil,” it may or may not be a good choice for gravelly soils. It depends on how well drained the soil really needs to be. For example, in an eastern catalog, a plant description reads “needs well-drained, evenly dry soil; struggles in desert southwest.” This indicates that western ‘well-drained and dry’ is probably more well drained and dry than in the east. [Figure 7]

Figure 7. Iris is an example of a flower tolerant of a variety of soil types as long as it well drained.

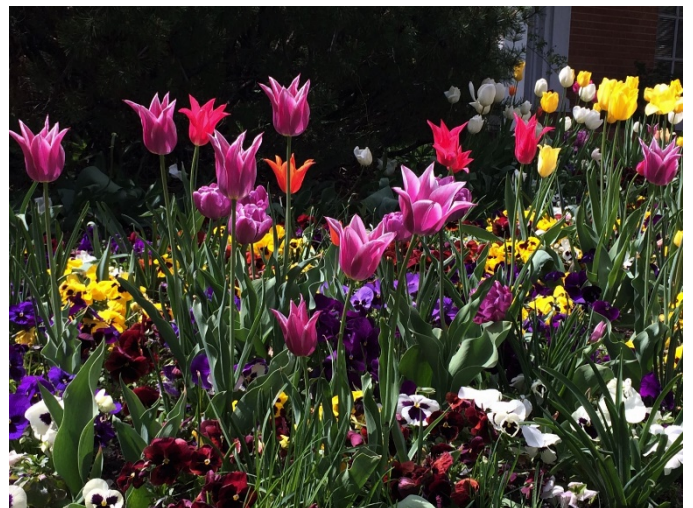


Bloom Period

Another factor often listed on plant descriptions is the bloom period. This becomes of greater importance when planning a garden from catalogs in January, as opposed to going to a garden center where merely seeing what is in bloom at the time of purchase can be a guide. Consider when you want your plants to bloom. Does the whole garden area flower only in June or is there color throughout the growing season?

Usually plants are described as blooming in spring, late spring, early summer, summer, late summer, or fall. Gardeners living at higher elevations or elsewhere with a short growing season may find the term misleading. Here, the seasons are more compressed and most late summer or fall blooming plants never get a chance to flower before frost. [Figure 8]

Figure 8. Tulips and other spring flowering bulbs are popular, easy to grow, spring bloomers.



Length of Bloom

The number of days a plant bears flowers is generally not listed in catalogs, but this can make a big difference in the garden. Perennials bloom for a period of a short-but-showy one week to six weeks or more. These long-blooming perennials can become the “backbone” of a perennial bed, unifying plants that bloom around it. Annuals can help increase the amount of color in a garden, as they tend to bloom all summer, reaching their peak at the end of summer.

Consider whether you want a changing palette of plants, or fewer, longer-blooming plants. Keep in mind that the former will be hard to accomplish in a small garden, and a small number of plants in bloom at one time may end up looking “spotty” in the garden. [Figure 9]

Figure 9. Daylilies are a popular perennial with a long bloom period.



Mature Size

An important consideration in choosing plants is the overall size it will reach at maturity. Often, catalogs only give information on height, which can determine whether it is better for the front or back of the border. Width is less frequently listed, but should be given as much consideration as height. Because the final size of the plant is hard to visualize, it is easy to plant too closely, especially when starting with smaller plants. The bed should be measured and planted to take into account the ultimate size of each plant. Annuals can be used to fill in the empty space in the first season.

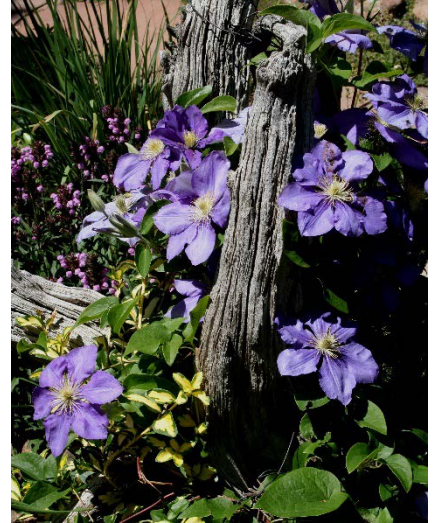
Growth Form

Frequently, catalogs will describe something about the growth form of a plant. These terms include the following:

- **Clumping** – Individual plants form clumps rather than spreading evenly to fill the bed.

- **Creeping, underground runners** – These usually refer to rhizomes. Plants with this growth form can be aggressive, and may need to be divided or contained (such as mints or yarrows).
- **Trailing or climbing** – These are usually vining or semi-vining plants, and are usually used as a groundcover or hanging basket. [Figure 10]

Figure 10. Clematis is a popular flowering vine in shades of blues, purples, pinks, and whites



Other Important Considerations That May or May Not Be Listed in a Catalog

Fragrance

Gardeners may be interested in having fragrant plants near paths, patios, windows, or doors. Even if the species as a whole is considered to be fragrant (i.e., roses), bear in mind that not all cultivars *within* a species are fragrant. Check individual listings to see whether “fragrant” is in the description. If not, it is probably not fragrant. [Figure 11]

Figure 11. When it comes to fragrance, not all roses are created equally. Some were bred for fragrance, while color patterns were the attractive features of others.



Wildlife Resistant Plants

Wildlife can make gardening difficult. Everything from deer to chipmunks eat cultivated plants. While there are no guarantees on what a very hungry animal will avoid, in general, most wildlife will avoid plants that are very aromatic, have prickles and spines, tough leathery leaves, milky sap, or are toxic. Further, some catalogs will actually include a little symbol or statement if, in their experience, the plant is wildlife resistant. These are only tendencies, however, and are not foolproof.

Wildlife Attracting Plants

Many gardeners select plants to attract wildlife, such as butterflies and birds. A large variety of pollen and nectar bearing flowers attract butterflies. In butterfly gardening, give attention to plants for the adults and plants to feed the caterpillars (larval stage of the butterfly). [Figure 12]

Figure 12. A wide variety of pollen and nectar producing flowers attracts butterflies and hummingbirds.



Insect and Disease Resistance

Certain species are prone to insects or diseases, which has led to the development of resistant cultivars. Sometimes you only will notice a problem if you read through description of *all* of the cultivars. For example, bee balm (*Monarda*) is known to be susceptible to powdery mildew. However, in one catalog, the species description of bee balm says nothing of this susceptibility, nor do two of the cultivar descriptions. However, the cultivar ‘Red Shades’ is listed as “very resistant to powdery mildew.” You must read between the lines to discover that the genus *Monarda* is susceptible to powdery mildew.

Hail Resistance

Big or soft leaved plants such as hosta are very vulnerable to hail. In areas with frequent hailstorms, choose narrow and tougher leaved plants, as they are more resilient. [Figure 13]

Figure 13. Hail can be destructive to large-leaved plants, like Hosta.



Need for Staking

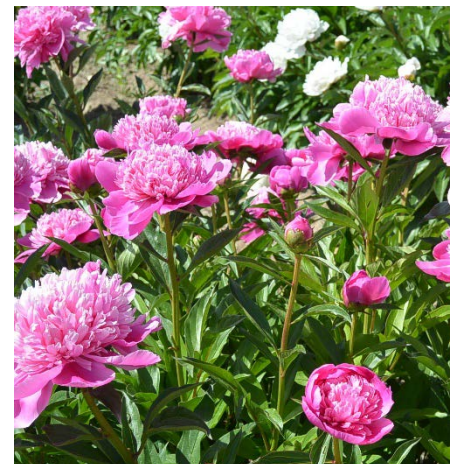
Many places are very windy, which means that top-heavy and tall plants may need staking. If gardening in a windy location, consider looking for shorter or lighter cultivars. For example, “a mid-size delphinium that never needs staking... the choice for smaller gardens.”

Need for Division

Some plants need to be divided more frequently than others. For example, ornamental grasses like blue fescue requires frequent division as the center dies out. Peonies can go many years without the need for division. Plants needing frequent division would be considered “high maintenance”. On the other hand, plants that need division frequently are good sources of plants to share with others.

Information on plant division will rarely be found in catalogs, but may be looked up in other reference materials. [Figure 14]

Figure 14. Peony is an example of a plant that rarely needs division.



Attractive or Contrasting Foliage

Consider how the plant will look out of bloom; will the foliage still look attractive? Using a range of colors, sizes, and shapes of leaves will help add interest in the garden even when nothing is blooming. Choosing plants that have colorful fall foliage will add an extra season of interest to the garden. Planting for foliage over blooms is a new design trend. (Figure 15)



Figure 15. Caladiums (right) and coleus (left) are two examples of plants used for foliage color. A trend in landscape design is to replace short blooming flowers with plants that have attractive foliage.



Plant Evaluation Programs

There are many different ways that new plants are tested. One example is the Annual Trial Garden on the Colorado State University campus in Fort Collins (the Annual Trial Gardens and PERC Trial Gardens). [Figure 16]

Plant Select®, (a collaboration between Colorado State University, Denver Botanic Gardens and the Green Industries of Colorado) is a program to designed to seek and distribute the very best plants for gardens of the high plains and intermountain region (refer to www.plantselect.org).

All America Selections is a national program evaluating new cultivars (refer to

<https://all-americanselections.org/>

Figure 16. Annual Trial Gardens at Colorado State University



Ecological Adaptation

The goal is to plant “the right plant in the right place.” For example, the ideal perennial for Colorado will require low water, prefer the local clayey, sandy, or rocky soils, be hardy, be long-lived, and will self-sow before dying. However, there is a fine line between choosing plants that are well adapted and plants that are so well adapted that they become invasive. Invasive plants can become noxious weeds, escaping from gardens and taking over native vegetation. [Figure 17]

Clues to Overly Well-Adapted Plants

Plants that are aggressive in one region may not be a problem in another. These words should give clues that a plant may become a problem in some regions.

- “Naturalizes readily”
- “Quickly spreads to give blanket of color”
- “Resist the temptation to crowd plants too closely. They will spread of their own accord soon enough”
- “Vigorous spreader, but that’s no vice with looks like these.”
- “Give this plant lots of room”
- “Plants are typically short-lived but they seed themselves quite freely, so you’ll always have plenty around”

How Aggressive Plants Spread

Aggressive plants spread by runners or seeds. They can just be aggressive within a landscape (such as a garden), spread into neighboring gardens/natural areas, or could be a Colorado Noxious Weed.

It is important to note that not all plants are aggressive in all climates. What is aggressive in New England may not be aggressive Colorado, and vice versa. For example, *Euphorbia myrsinites* (donkey-tail spurge) is a plant on the Colorado Noxious Weed List A. It has many ornamental and xeric qualities and was even recently promoted in Colorado as a rock garden plant. Its invasive qualities only became apparent afterwards. Because it is not a problem in the east, it is still offered for sale in many catalogs.

Similarly, in Colorado’s climate, blackberries have marginal hardiness, and will be killed in winters with lots of temperature swings. However, on Vancouver Island in Canada, blackberries thrive and have invaded thousands of acres of roadsides and native lands.

Not all catalogs will bother to find out where a plant is illegal to sell in various states. Therefore, the responsibility is on the consumer to find out which plants are illegal to grow in their state or region.

Weed Terminology

Alien is a plant that is not native to the country or state. This term is synonymous with non-native.

Aggressive usually means that it will spread widely in a garden. These plants can take over a garden, or might escape into wild areas.

Invasive is loosely used, but generally means that a plant escapes into native habitat, crowding out native plants. However, it can also mean invasive within a garden only.

Noxious weed is defined by state law. Noxious weeds are always aliens, and have proven to escape into native habitats or agricultural lands. Plants with this designation must not be sold or grown in Colorado. For information on Colorado Noxious Weeds, Google the Colorado Department of Agriculture. Examples of escaped ornamentals on Colorado Noxious Weed Lists include:

- Bouncing bet
- Oxeye daisy
- Yellow toadflax and dalmation toadflax
- Chicory
- Common tansy
- Dame's rocket/sweet rocket
- Purple loosestrife
- Scentless chamomile
- Donkey tail spurge (myrtle spurge)
- Orange hawkweed
- Russian olive trees

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Revised September 2018