

Colorado Gardening: Challenge to Newcomers

by J.E. Klett and J.R. Feucht¹ (1/07)

Quick Facts...

- Low humidity, fluctuating temperatures, heavy calcareous soils and drying winds often restrict plant growth more than low temperatures.
- Selecting plants that tolerate our soil and climatic conditions is key to Colorado Gardening.
- Colorado grows excellent vegetables and lawns.
- Gardeners who are patient, know how to select plants that will do well, and manipulate the soil and microclimate, will be amply rewarded.

Gardening in Colorado can be challenging. The average elevation of the state is 6,800 feet above sea-level. Three-fourths of the nation's land above 10,000 feet is within its borders. Due to the high elevation, sunlight is frequently of high intensity and the humidity generally is low. These features, along with rapid and extreme weather changes and frequently poor soil conditions, make for challenges in growing plants.

Newcomer's Dilemma

Newcomers to Colorado often have trouble getting plants to survive let alone thrive. More often than not, they previously Gardened where "you stick a plant in the ground and it grows." Typically, those from northern states such as Minnesota or Michigan are puzzled why certain trees that did well for them there but do poorly in Colorado.

However, low temperature due to northern latitudes is not the only factor that determines plant survival in Colorado, for rarely is extreme cold the limiting plant growth factor in Colorado. Combinations of low humidity, drying winds and physical properties of the soil influence how well plants perform here.

Soil Properties

Many of our population centers are on heavy, clay soil. These soils have poor aeration that limits root growth. Thus the ability of plants to replenish water loss brought about by low humidity and prevailing winds is limited. Adding more water to such soils further complicates the problem because the water that is added reduces the amount of air in the soil and causes oxygen starvation to the roots. Little can be done to modify humidity and wind, so the obvious solution is to improve the soil.

High soil pH can also negatively affect plant growth. Basically, pH can be described as the measure of acidity or alkalinity of soil. pH is measured on a scale of 1 to 14 where 7, which is neutral, is the optimal level for most plants. Numbers lower than 7 are considered acidic and numbers higher than 7 are considered alkaline or calcareous (high in calcium carbonate). Garden soils in Colorado that have never had amendments added may have a pH value of up to 8.5, which is higher than most plants can tolerate – especially acid-loving plants such as rhododendrons.

Why Not Rhododendrons?

Newcomers, particularly those from coastal states such as California, Oregon, New York and the Carolinas, frequently express surprise and disappointment in the lack of broad-leafed evergreen plants such as mountain laurel, rhododendron, pittosporum and similar plants. The highly calcareous soils are partly responsible for this and the rapid changes in our winter temperatures. However, the primary limiting factors are the low humidity, drying winds and intense winter sunlight.

Mountain laurel, rhododendrons and similar types of plants can grow in Colorado where the soils are carefully amended to make them more acid and where the plants are protected from winter wind and sun. Even broadleaved evergreens that can tolerate the more alkaline soils and lower humidity, such as wintercreeper, English ivy, kinnikinnick and Oregon grape holly, will perform best in a shaded north or east exposure.

Salt Accumulation

Soil modification or amendment is a problem in our semiarid, highly alkaline soils. Organic matter, if added in large amounts all at once, can provide for a more porous soil. However, this practice can lead to the accumulation of natural, soluble salts. Unless the soil is porous so that salts can be leached away with water, the salts tend to accumulate in the amended soil layer. The soluble salts may remain in the organic matter much like water remains in a sponge. Rapid evaporation may concentrate the salts in the root zone, where they can injure plant roots.

A solution to this problem is to slowly, over a period of years, improve the soil tilth. Tilth refers to the physical properties of soil which make it able to support plant growth. An alternative to leaching the salts and improving the soil tilth is to choose plants that are more tolerant to saline soil conditions. For instance, instead of planting a pine knowing that it would do poorly under high salt conditions, one may have to settle for a juniper. Look to Colorado native plants native to your life zone and soil conditions for more options.

For more information on native plants see fact sheets

- [7.421, Native Trees for Colorado Landscapes;](#)
- [7.422, Native Shrubs for Colorado Landscapes; and](#)
- [7.423. Trees and Shrubs for Mountain Areas.](#)

Iron Problems

The name Colorado comes from the Spanish words "color rojo," meaning color red, referring to the dominant red soils. The red color is due to high amounts of iron in the soil. Yet, a yellowing condition in certain plants, known as iron chlorosis, is brought about by an iron deficiency in the plant. Colorado's highly calcareous soils tie up the iron in a form unavailable to the plant.

Trees with high iron requirements such as pin oak, silver maple and Washington hawthorn perform poorly in Colorado's calcareous soils.

Making iron more available is not easy and usually not economical. Adding available forms of iron such as iron sulfate to the soil is, at best, a temporary measure. Normal chemical reactions in the soil will quickly cause much of the added iron to become unavailable. The best alternative is to select plants tolerant of Colorado's alkaline soil. Instead of pin oak, choose bur oak or Norway maple instead of silver maple, etc.

Untimely Snows

On the Front Range, early, heavy, wet snows in the autumn occur about once every five years. Trees, shrubs and perennials are caught in full leaf or just at the peak of bloom. These "limb-breaker" storms cause severe natural pruning that leaves permanent scars and tends to keep trees to smaller-than-normal size.

Following such a storm, tree diseases tend to increase because of raised levels of plant stress. To minimize damage, choose less brittle trees such as lindens, oaks and conifers instead of silver maple, Siberian elm and willow. This, however, brings about another dilemma. The less brittle ones are also the slower-growing ones.

Heavy, wet snows on the other end of winter can also be a problem. Late spring snows can come quickly and be very deep. Even trees that have not leafed out yet can succumb to the excessive weight of too much snow. Broken limbs and central leaders can cause problems for trees for many years down the road.

What About Freezes?

Occasionally, Colorado will experience frosts when plants aren't ready to cope with them. It is not uncommon for mountain communities to have an already short growing season interrupted by a killing frost.

In Leadville with an elevation of 10,177 feet and whose average growing season is about 25 days (compared with over 150 in many areas on the plains), a frost may occur in July. Yet, with careful selection of plants, even Leadville can flaunt colorful Garden flowers, vegetables and hardy trees and shrubs.

Table 1 lists average frost-free periods for selected cities at several elevations in Colorado. While growing seasons tend to be shorter at higher elevations, use caution when interpreting this table. Note that some higher elevations have a longer season than lower elevations. Compare, for instance, the average growing seasons of Dillon, elevation 9,800 feet with that of Fraser, elevation 8,560 feet. Fraser is lower than Dillon, but they average a shorter growing season. A primary reason is air drainage; Fraser has shorter seasons because of cold air drainage from surrounding mountains.

The same air drainage phenomenon can make a difference in the location of a Garden. Gardens in areas where cold air is trapped may have earlier frost kill than Gardens even a short distance away. Cold air may be trapped by any obstruction on the down-slope side of a Garden, such as a hedge, wall or solid fence. To avoid early cold injury to Gardens, do not put hedges, fences and other landscape features where they may obstruct the flow of air.

The real killers, however, are the infrequent but rapid changes from warm, balmy weather to cold, subzero temperatures. In 1949, a 90 degree F change was recorded near Fort Collins in less than 24 hours. The change from 50 degrees F to -40 degrees F resulted in the ear-popping fracture of entire trees and virtually wiped out the sour cherry industry. On October 19, 1969, Denver experienced a temperature drop to -3 degrees F, which was preceded by balmy 85 degree weather. Similar rapid temperature changes occurred on September 17, 1971, and October 28, 1991 as well.

Such freeze injury leaves crippling marks on trees and shrubs for years and serves to eliminate many plants with borderline hardiness. Most severely injured in such freezes are the lush, rapid-growing trees because they have a higher internal moisture content than the slower-growing, more solid wood species. To help reduce injuries from such sudden temperature changes, gradually reduce water in late summer and avoid late applications of fertilizers high in nitrogen.

Table 1: Elevation and average growing season for selected Colorado cities.		
Location	Elevation	Average Frost-Free Days
Alamosa	7,536	95

Aspen	7,913	88
Bailey	7,733	82
Boulder	5,444	156
Burlington	4,167	153
Center	7,668	96
Colorado Springs	6,090	152
Craig	6,247	98
Crested Butte	8,855	37
Denver	5,280	155
Dillon	9,800	25
Durango	6,554	110
Eagle	6,497	86
Fort Collins	5,004	142
Fraser	8,560	9
Grand Junction	4,597	183
Gunnison	7,694	62
Idaho Springs	7,569	93
Leadville	10,177	26
Meeker	6,242	91
Mesa Verde	7,070	148
Monte Vista	7,665	97
Monument	7,400	150
Norwood	7,017	108
Pueblo	4,639	158
Salida	7,060	109
Steamboat Springs	6,770	46
Trinidad	6,030	152
Walsenburg	6,221	148

From: The Western Regional Climate Center www.wrcc.dri.edu/summary/climsmco.html
accessed 11-17-2006.

The Brighter Side

Up to this point, Gardeners might want to throw up their hands and say, "What's the use?" But there is a brighter side. Colorado's many days of sunshine, while leading to some problems already mentioned, enables Gardeners to grow some

of the best flowers in the nation. The high light intensity produces strong-stemmed plants and flowers with extra brilliance.

Winter sunlight melts snows at lower elevations, reducing snow mold diseases in lawns. The cool, crisp nights and warm days of summer produce healthy lawns. These same climatic conditions enable the home Gardener to produce excellent potatoes, cabbage, lettuce, broccoli, cauliflower and other cool-season vegetables.

The lower humidity not only helps to make the cold days seem less cold and hot days less hot, but discourages many landscape plant diseases that are common in more humid areas. Perhaps the brightest side lies in the challenging problems in growing plants. Gardeners who are patient, know how to select plants that will do well, and manipulate the soil and microclimate, will be amply rewarded.

Obtaining Help

Colorado State University Extension has county offices (<http://www.ext.colostate.edu/cedirectory/countylist.cfm>) prepared to help with individual Gardening needs. They have a supply of fact sheets similar to this one that can provide detailed information on the selection and care of trees, shrubs, perennials, vegetables and lawns. Go to www.ext.colostate.edu to view these fact sheets on the web.

To find your local Colorado State University Extension office in the white pages of the telephone book, look under the heading "Colorado State University" or under the county government listings.

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