



Linking Edible Arizona Forests

Growing Edible Arizona Forests, An Illustrated Guide

Excerpt from leafnetworkaz.org

Edible Tree Guide

CHOOSE Planting Site and Design

- Cold Air and Chill Requirements

Cold Air and Chill Requirements

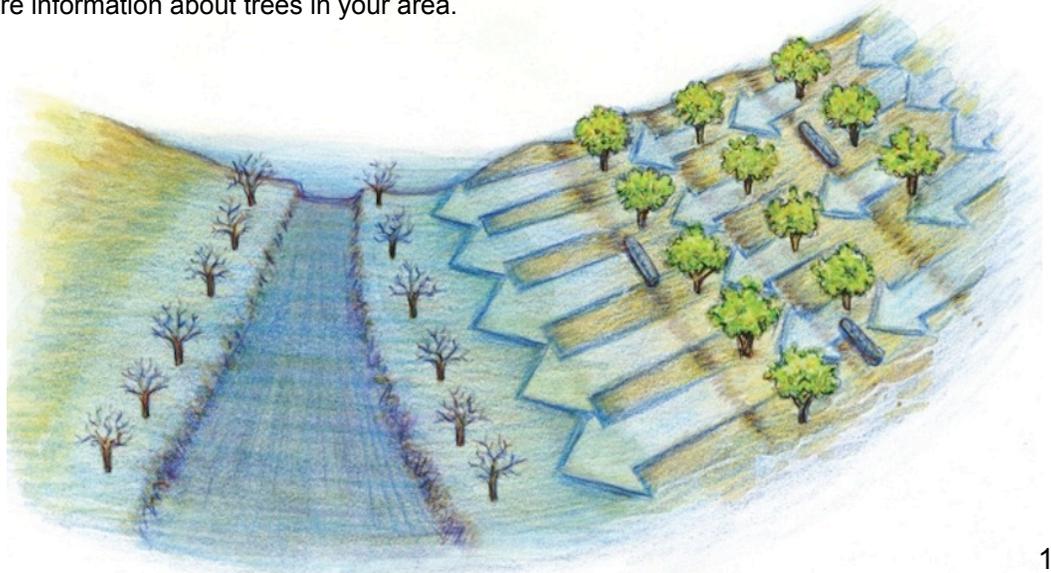
At a local scale, cold air tends to sink while warm air rises. When night approaches, especially in fall, winter and spring, cold air from higher elevations of a landscape can flow slowly downslope and collect in low areas at the bottom. Valleys carry “rivers” of cold air. Is your site located at or near the bottom of a drainage, canyon or wash? Do you occasionally or frequently have frosts or heavy freezes? Accumulations of cold air can be a problem for trees that are cold sensitive. Since this cold air may cause late spring freezes, do not place cold-sensitive trees in low-lying areas. If your site is in a low-lying area, place trees in warmer locations such as the south side of buildings where heat absorbed by walls on sunny winter days can re-radiate to nearby plants at night. Other built and natural features can moderate cold temperatures, such as rainwater harvesting tanks, pavement, walls, thick vegetation and ponds.

Cold air flows down slopes to pool at the bottom. If your site has an elevation gradient, to increase fruit production place cold-sensitive trees higher on hillsides—if soil is deep enough to support them. A vertical distance of a few feet to a hundred feet above valley floors can make a difference in cold conditions and frost events. Placing cold-sensitive trees on south-facing slopes will provide them with warmer winter temperatures than nearby north-facing slopes would provide. In contrast, desert locations where cold air accumulates can benefit trees that need a certain number of chill hours to bloom and fruit. Planting fruit trees on north-facing slopes in desert areas may lengthen chill hours, delay spring bud break and help avoid damage from late spring frosts.

Climate change could result in decreasing chill hours in Arizona regions in the future. However, having fewer chill hours does not necessarily mean having fewer freezing nights and less frost risk, so continue to protect vulnerable trees from cold. To increase reliable harvests, local food security and ecosystem resilience, carefully select tree types that tolerate the temperatures, chill hours and heat conditions in your region. Many edible trees have multiple varieties/cultivars that produce better in warmer or colder areas, as shown on the table **Cold Sensitivity Information for Selected Edible Trees** below.

To see **Chill Hour Requirements for Selected Edible Tree Species and Low Chill Varieties** and instructions on how to calculate chill hours for your region, go to leafnetworkaz.org **LEARN – Chill Requirements**. The **Edible Tree Directory** at leafnetworkaz.org provides a range of information on edible trees and understory plants including chill requirements and frost sensitivity. In addition, you can consult your local nurseries or Cooperative Extension specialist for more information about trees in your area.

Cold air drains down slopes and pools in low areas. You can plant citrus and other cold-sensitive trees on slopes if they need protection from cold air. In desert areas, plant deciduous fruit trees that need more chill hours in locations where cold air pools.



COLD SENSITIVITY INFORMATION FOR SELECTED EDIBLE TREES

Edible Tree	Notes on Cold Sensitivity
Almond	Almond blossoms are very cold sensitive in spring. They should be planted in high desert regions, or protected if frosts are anticipated.
Apple	Apple trees can withstand winter temperatures of -20 to -30°F, though this depends on the cultivar. Apple cultivars in later pollination groups (late-blooming) may be better suited to cold regions, while those in early flowering groups and requiring few chill hours are better for desert areas.
Apricot	Apricot trees are hardy to -40°F, however the blossoms are susceptible to late spring frosts, so not suited for higher elevations.
Bay laurel	Suited to low to mid desert areas, bay laurel is hardy to about 30°F, though it can stand brief periods below freezing. <i>Laurus nobilis angustifolia</i> is slightly more cold tolerant.
Carob	Carob trees are hardy to about 20°F and only suited for desert regions.
Cherry	Hardiness varies depending upon the cherry cultivar, but many can receive winter injury at temperatures below -20°F.
Cherry, wild black	Trees are cold hardy to -35°F.
Citrus	Citrus are hardy to 23°F-26°F, though this depends on the species and cultivar. Citron trees are highly frost-sensitive, while kumquats can withstand brief periods of 10°F.
Date palm	Date palms can withstand brief periods down to 20°F.
Elderberry	Very frost tolerant, suitable for a wide range of elevation.
Fig	There are considerable differences in hardiness between cultivars. Fig trees are generally cold hardy from 10-20°F, depending on cultivar and planting site.
Guava	Guavas are highly frost-sensitive, best if temperatures do not drop below 27-28°F. Overhead protection and planting on the warm side of a building recommended. A frame over the plant covered with fabric will provide additional protection during freezes, and electric lights can be hung for added warmth.
Hackberry, netleaf	Trees are hardy to -20°F
Hawthorn	Some cultivars are highly frost tolerant, others more suited for subtropics.
Ironwood	Ironwood are frost sensitive; young stems are damaged below 20°F
Jujube	Frost-tolerant, hardy to below -10° F.
Juniper	Frost tolerant
Loquat	Well-established trees can survive low temperature drops to 12°F. The killing temperature for flower buds is about 19°F, and for the mature flower about 26°F.

COLD SENSITIVITY INFORMATION FOR SELECTED EDIBLE TREES, continued

Edible Tree	Notes on Cold Sensitivity
Medlar	Trees suited for colder Arizona regions, however, they are susceptible to frost damage in areas with severe winters, and blooms may be killed by late spring frosts.
Mesquite	Mesquite trees are tolerant to temperature drops well below freezing at high desert elevations.
Mulberry	Some species are hardy to 0°F.
Oak	Cold tolerant to below 0°F
Olive	Olives are frost tolerant to 20°F. If temperatures drop lower they will suffer stem damage, and trees will be killed to the ground if temperatures drop to 10°F. Young trees will be killed if temperatures drop below 25°F.
Palo verde	Palo verde are hardy to 10°F.
Peach, nectarine	These trees are widely adapted; some cultivars are tolerant to winter temperatures down to -22°F, however the blossoms are sensitive to spring frosts and do not reliably produce in mountain regions.
Pear, Asian pear	Common varieties are cold hardy down to -25°F
Pecan	Cold hardy to -15°F to -20°F, though trees produce best in mid to high desert elevations.
Persimmon	Asian persimmons hardy to 10°F; American persimmon hardy to -20°F; Texas persimmons are hardy to 0°F. Hardiness depends on species, variety and rootstock. Persimmons bloom late, usually escaping spring frosts.
Pinyon pine	Hardy to -31°F.
Pistachio	Young trees are sensitive to frost. Cold hardiness ranges from 5°F-15°F, though reportedly down to 0°F in Iran. April frosts can kill flowers.
Plum	European plums hardy to -30°F; Asian plums hardy to -20°F. Wild plums are hardy to -40°F.
Pomegranate	Pomegranates are hardy to 15°F. Pomegranates bloom late and are unlikely to be damaged by spring freezing, but early fall frosts can damage fruits. Whitewashing trunks can give some protection during cold spells.
Quince	Hardy to negative -15°F (Flowers are susceptible to -15°F, though trees may withstand up to -20°F).
Saguaro	Hardy to about 14°F.
Sapote, white	Sapote trees are only suited for low desert regions though they can survive some frost. Young trees damaged or killed at temperatures at or below 24°F; mature trees at 26°F.
Walnut	English walnuts can tolerate temperatures to -16°F; Arizona black walnuts are cold hardy to about 0°F.

ADDITIONAL RESOURCES

- California Rare Fruit Growers: Recommended Low Chill Fruits for San Diego.
<http://crfgsandiego.org/FruitsforSanDiego.HTML>
- Dave Wilson Nursery: Fruit Tree Chilling Requirement.
<http://www.davewilson.com/product-information-general/special-topics/fruit-tree-chilling-requirement>
- University of Arizona Cooperative Extensions: Deciduous Fruit and Nuts for the Low Desert.
<http://cals.arizona.edu/pubs/garden/az1269/>
- University of Arizona Cooperative Extension, Yavapai County: Fruit Tree Chilling Requirements.
<https://ag.arizona.edu/yavapai/anr/hort/byg/archive/chillingreq.html>
- University of California: The California Backyard Orchard: Tree Selection.
http://homeorchard.ucanr.edu/The_Big_Picture/Tree_Selection/