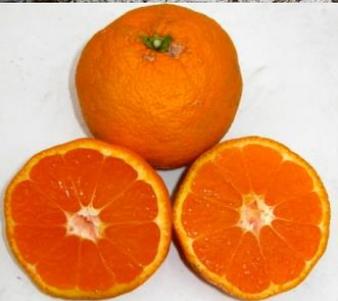




Rare Fruit for Climates with Freezing Winter Weather

MEHR NEWS AGENCY
Photo: Amir Alirezagani



- ❖ These fruiting plants survive temperatures well below freezing and will perform well in areas that have winters with long periods of freezing weather.



- ❖ Although all of these plants will survive freezing weather, some may not fruit well if late spring frost occurs after bud break.



- ❖ Some of these fruit may have heat requirements and/or **chill hour** requirements.



Minimum Temperatures and Heat Units

- Temperature (high and low) is one of the most limiting environmental factors for growth and production of fruits in the world.
- Minimum temperatures may injure or kill fruiting plants.
- If temperatures are too high plants may be injured or killed or fruit may not be produced.

Heat Units

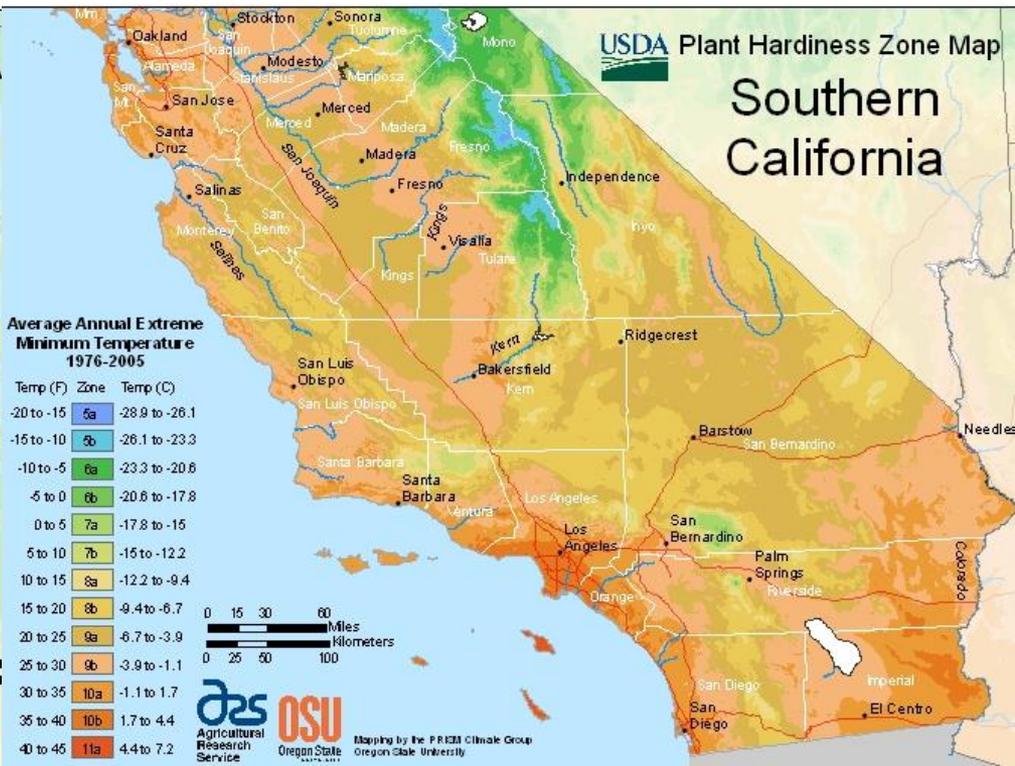
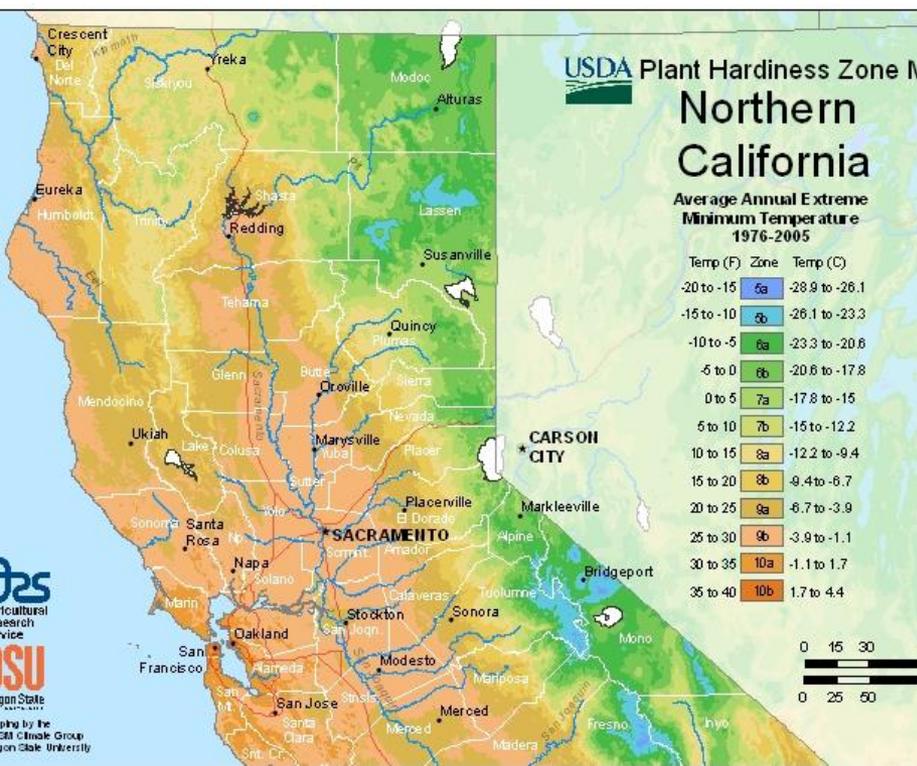
- Some fruit species may need higher temperatures to flower and fruit properly, to ripen the fruit, to produce pigments that color the fruit or to produce sugars that sweeten the fruit.
- These heat requirements may vary from fruit type to fruit type or even between cultivars or varieties of the same type of fruit.

Chill Hours

- A widely used model equates chilling to the total number of hours below 45°F during the dormant period, autumn leaf fall to spring bud break. These hours are termed “**chill hours**”.

Climate Zones

- Of the 20 climate zones defined by the United States Department of Agriculture (USDA), California has 16.
- Of 24 climate zones defined in the Sunset Western Garden Book California has 20.
- The USDA plant hardiness map divides North America into 22 hardiness zones. (California has 13). The map is based on the average annual minimum winter temperature and is divided into 5-degree F zones.
- In California, Zone 5a is the coldest (average min. is – 20 F); zone 11a is the warmest (average min. is 45 F).



Microclimates

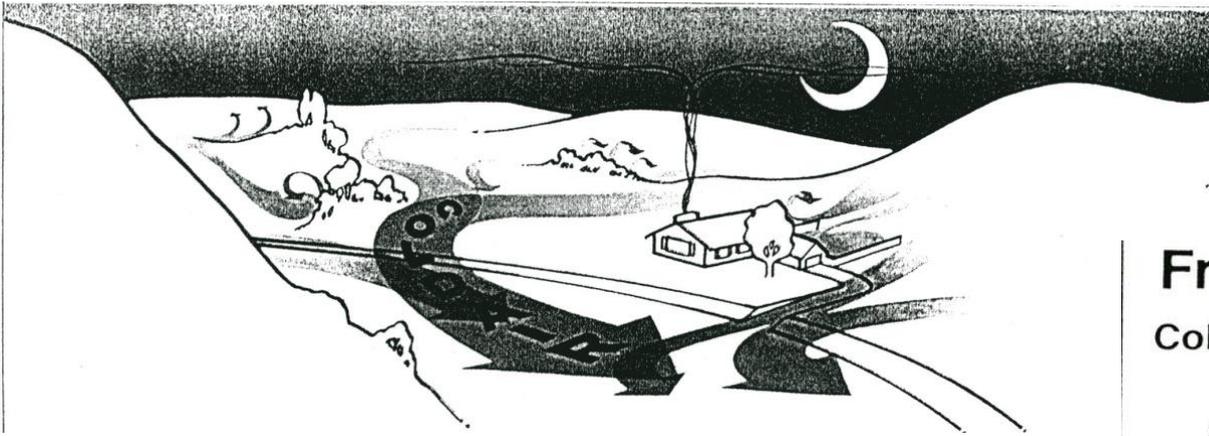
Microclimates exist within every garden.

- A microclimate is the climate of a very small or restricted area, especially when this differs from the climate of the surrounding area. The slope of the land can be important, as is the direction in which the slope faces.
- Local terrain can sharply modify the climate within any zone. South-facing slopes may get more hours of direct sun or more solar heat than flat land and north-facing slopes.
- The amount of shade, wind, exposure, and drainage will also impact the conditions of the microclimate within the area.



Microclimates and Cold

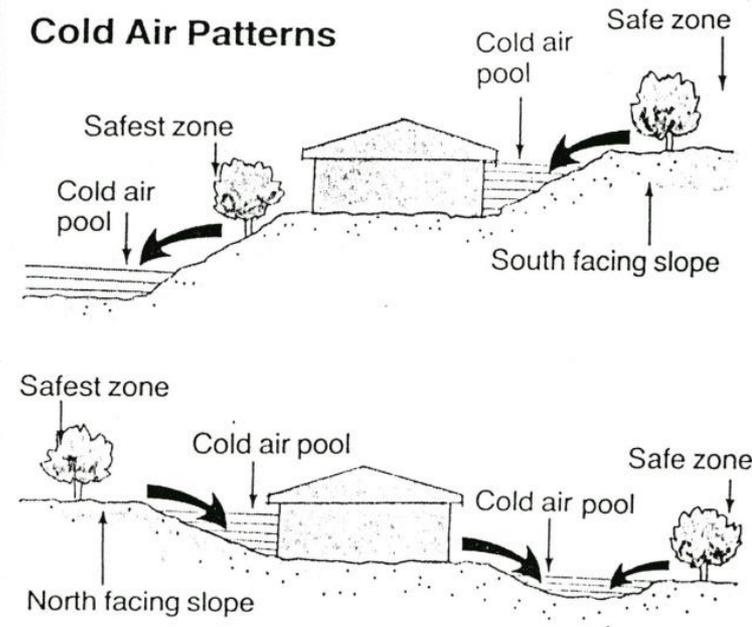
- Slope will affect airflow: warm air rises, cold air sinks.
- Because hillsides are never as cold in winter as the hilltops above them or the ground below them, they're called thermal belts. Lowland areas into which cold air flows are called cold-air basins.



- Cold air travels like water. Cold air flows down and away from sloping land, damming up behind objects and settling in low spots. Put cold sensitive plants high on slopes where cold air will drain away but not pool up near the bottom of the slope.

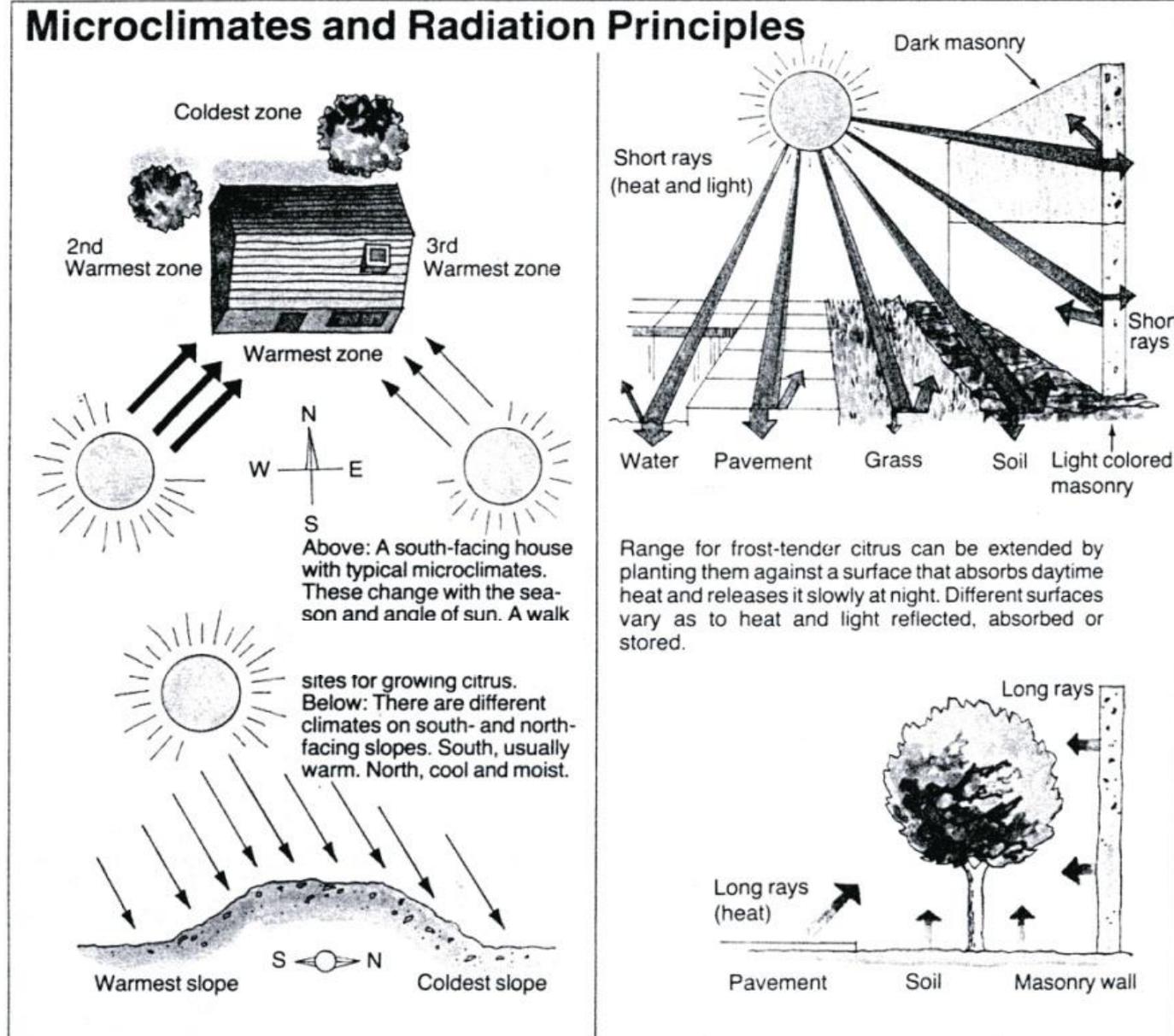
Frost Patterns & Protection

Cold Air Patterns



Microclimates and Heat

- Because the buildings, sidewalks, and pavements reflect heat; garden beds on the south side of an east-west wall will be much warmer than garden beds on the north side of the same wall.



What is a rare fruit?

A fruit is considered to be rare fruit because it is of unusual properties or is scarce , has fallen out of production or is no longer available

“MOUNTAIN ROSE RED FLESH APPLE TREE”

- Discovered near the town of Airlie in western Oregon, the Mountain Rose Red Flesh Apple displays profuse pink blooms in the spring.
- The large greenish yellow apples have crisp, dark red flesh, and a delicious sweet- tart flavor.
- The Mountain Rose Red Flesh Apple ripens in early October and can be stored until spring.



PINEBERRY STRAWBERRIES

(*Fragaria chiloensis* X *F. virginiana*)

- Pineberry plants are albino strawberry cultivars that yield fruit with white to pinkish-hued fruits that start out green, and have red seeds.
- Like common garden strawberries, plants like full sun, prefer a soil pH of 5.8 – 6.2, are susceptible to verticillium wilt and live & are productive for about 5 years. Fruit do not ripen after they have been picked.
- Plants have an everbearing fruiting habit.
- The pink blush may be more prominent on fruit that gets more sun exposure.
- The fruit has a pleasantly pineapple aroma and taste, and is smaller than most modern domestic garden strawberries.
- Plants are partially self-pollinating. Cross-pollination between a red strawberry variety and a Pineberry will likely increase fruit yield in both plants.



What is a rare fruit?

A fruit is considered to be rare fruit because it is of unusual properties or is scarce, has fallen out of production or is no longer available

- Quince, *Cydonia oblonga*, is a pome fruit related to apples and pears.
- For more than 4,000 years, quince trees have been grown in Asia and the Mediterranean. Today it is still widely grown in other parts of the world, especially the Middle East, the Mediterranean and South America, but is considered a specialty fruit in the U.S., having never caught on as a commercial crop.
- The firm fruit is aromatic and high in pectin. The fruit is typically cooked before it is eaten and it is popular for jams and jellies.
- Quince is subject to the bacterial disease fire blight.

“AROMATNAYA” QUINCE, or the “KARPS SWEET” QUINCE

The “Aromatnaya” Quince is an unusual quince that is sweet enough to eat fresh. Pineapple flavor with a citrus aroma, this beautiful large quince is picked in October and softens to a pear-like texture after harvest. Aromatnaya quince is excellent for cooking, jelly making, or adding to apple cider.

The “Karps Sweet” Quince is uniquely sweet, juicy and non-astringent, especially when grown in warm climates. The uncooked fruit grown in Southern California was sweeter and less woody than other quinces. Grown in the Pacific NW it was less sweet. It is unique and worth trying in your climate.



What is a rare fruit?

A fruit is considered to be rare fruit because it is of unusual properties

RAISIN TREE *Hovenia dulcis*

- A deciduous tree which grows to a height of 70 feet or more, but cultivated specimens typically reach a height of about 30 feet.
- Cold-hardy to about -10° F.
- The edible “raisins” are not a fruit at all but a short, swollen mature flower stalk or peduncle which supports the inedible seed pod. As the pod matures, the peduncle of stem attaching it to the cluster swells, becomes knobby and turns a translucent reddish brown.
- A pear-like flavor develops as the sugars increase, and the peduncle is ready to eat when it falls to the ground. Although the edible portions are small, close to the size of a raisin, the crop is copious.
- The brown pod which is actually the fruit is not used.



What is a rare fruit?

A fruit is considered to be rare fruit because it is a new fruit variety, species or hybrid that has recently been discovered or introduced.

- Breakthroughs by Zaiger Genetics and others in fruit hybridizing are yielding new fruit types (many are interspecific hybrids) and cultivars with especially desirable new flavors, aromas, textures, degrees of sweetness and appearances.
- Interspecific hybrids result from the cross-breeding of two or more species, usually through multiple generations.
- These new fruit types or fruit cultivars will differ in:
 - Their chilling requirements (both low chill and higher chill varieties are being introduced)
 - Their need for cross-pollination
 - Their susceptibility to insects or diseases
 - The pruning shape (open vase, modified open vase, central leader or modified central leader)
 - The type of fruit wood the fruit is produced on
 - Fruit season
 - Fruit color, flavor, size and other fruit characteristics

INTERSPECIFIC HYBRIDS

- **CHERRY PLUM** (Cherry X Plum)
- **PLUERRY** (Japanese Plum X Sweet Cherry)
- **PEACH-PLUM** (Peach X Plum)
- **NECTAPLUM** (Nectarine X Plum)
- **PEACHCOT** (Peach X Apricot)
- **PEACOTUM** (Peach x apricot x plum)



INTERSPECIFIC HYBRIDS

- **PLUM-COT** (Plum X Apricot)
- **APRIUM** (Plum X Apricot X Prunus sp.)
- **PLUOT** (Plum X Apricot X Prunus sp.)



TAYBERRY

Rubus fruticosus x R. idaeus

- Patented in 1979, a cross between a blackberry and a red raspberry.
- The plant has a growth habit similar to that of the blackberry. Fruit grow on short laterals on prickly canes 6 to 7 ft long.
- Frost is rarely a problem, as tayberries flower late in the season. Plants need protection below -15°F .
- The fruit can be up to $1\frac{1}{2}$ in. long. Similar to the blackberry, the "core" remains in the berry when it is picked. The fruit is sweeter, much larger, and more aromatic than that of the loganberry (another blackberry/raspberry cross.)
- The cropping period is long, from early mid to late summer. Fruit are dark maroon when fully ripe and are excellent eaten fresh or cooked into jams, jellies and desserts.



SHIPOVA (BOLLWILLER PEAR)

Pyrus communis X Sorbus aria



- A unique hybrid of Mountain Ash and Pear. Shipova is a small to medium-sized tree growing to 25 feet. Hardy to -10 degrees or lower.
- Trees are susceptible to fire blight.
- Self-fertile but produces larger crops with cross pollination. (Both pears and Mountain Ash will work as pollinators.) It is notoriously slow to start fruiting, taking up to 15 years if growing conditions are not favorable. Average fruiting time is 4-7 years.
- The fruit is about the size of a large apricot. Quite delicious, the seedless fruit has flesh that is semi-solid, buttery and sweet, with a delicate, rose-like aroma.



What is a rare fruit?

A fruit is considered to be rare fruit because it is not normally grown in a particular area.

An Apple may be rare in the tropics but not in North America, Citrus may be rare in areas with freezing weather but not in areas that are relatively frost free.)

Citrus for Climates with Freezing Winter Weather

- Many types of cold hardy citrus are now available. Although some are familiar, others are very scarce (or rare) or are new introductions.

Kumquats and Kumquat hybrids are among the most cold hardy citrus. Trees can withstand temperatures from 15-5 degrees F. (Dependant on specific cultivar, duration of cold, age of tree and other factors.)



Eustis Limequat –
Kumquat X Lime



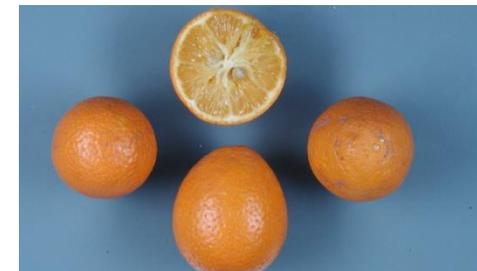
Rio Grande Valley Lemonquat –
Kumquat X Lemon



Indio Mandarinquat -
Mandarin X Kumquat



Nippon Orangequat –
Mandarin X Kumquat



Thomasville Citrangequat - Kumquat
X Sweet Orange X Trfoliate Orange

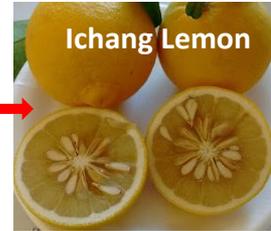
Citrus for Climates with Freezing Winter Weather

The following citrus are some of the most cold hardy of the citrus varieties. Actual cold hardiness is dependant on specific cultivar, duration of cold, age of tree and other factors.

❖ Fruit loss may occur but the established trees will survive. (The minimum hardiness temperatures are approximate .)



- **Ichang Lemon** - almost grapefruit sized fruit. (1/2 Ichang papeda and 1/2 Pummelo Trees are thorny and hardy to around 20 F.)
- **Improved Meyer Lemon** - a hybrid of lemon and orange. Thin skinned, moderately seedy, juicy, and acidic with a distinctive aroma and flavor. Cold hardy into the low 20's F.



- **Bloomsweet Grapefruit** - called Citrus Kinkoji in Japan. Produces large delicious grapefruits. Cold hardy to around 15 F.
- **Yuzu** - a hybrid between Ichang papeda and Satsuma mandarin. Highly fragrant rind and flesh. Flavor is acidic and tart, resembling that of grapefruit, with overtones of mandarin. Juice and rind used in drinks and flavorings. Cold hardy to 15 F. or below.



- **Owari Satsuma Mandarin** - sweet, seedless and zipper skinned. Hardy down to around 12 F.
- **Orange Frost Mandarin** - very sweet, easy to peel, nearly seedless and more cold hardy than Satsuma.
- **Arctic Frost Mandarin** - sweet-tart in flavor , easy to peel, nearly seedless. Cold hardy to 12 to 15 F.



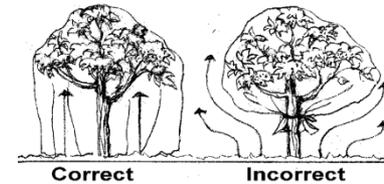
- **Ten Degree Tangerine (Clem-Yuz 2-2 or Clem-Yuz 3-3)** - thorny but with a sweet/tart flavor. Cold hardy to below 13 F.
- **Citrange:** Citrange is a hybrid between sweet orange and trifoliate orange. Very cold hardy and will grow and produce fruit where other citrus trees fail. Cold hardy to 0 F.



Citrus for Climates with Freezing Winter Weather



- In areas that get only occasional temperatures this low, enterprising gardeners can shelter the small tree with a covering of fabric and/or a clear plastic tarp. **Coverings should be vented or removed during warm days to prevent excessive heat build up which can damage or kill plants.**
- Coverings are weighted to the ground when freezing temperatures occur forming a tent to gather and trap heat from the earth. Placing trash cans filled with water inside this structure can help to maintain warmer temperatures inside of the structure until the water turns into ice.
- Another strategy is to include a few incandescent light bulbs or old-fashioned, heat-producing Christmas tree lights underneath the covering to add a few degrees overnight.
- Growing these plants next to a south-facing wall or under a bit of high shade will also offer a degree or two of protection. The use of an anti-transpirant will also help.
- At some point plants get too large to cover. Older trees do withstand cold temperature drops more easily.



STRAWBERRY GUAVA

Psidium cattleianum & *P. cattleianum lucidum*

- An evergreen shrub or small tree with new foliage that is copper-red in color. Tolerant of heavy pruning and shaping it is cold hardy to the low 20's F.



- Small white flowers are attractive and abundant.
- Fruit can be dark red or yellow. Yellow varieties are sometimes called lemon guavas.
- Fruit have hard seeds and are either eaten fresh or are made into fruit pastes, jams or jellies.
- Often more than 1 crop of fruit are produced each year.

PINEAPPLE GUAVA (FEIJOA) *Acca sellowiana*

- A shrub or small tree to 20 to 25 ft. tall. Plants prefer cool winters and moderate summers (80° to 90° F). Mature plants are cold hardy to about 15° F.
- Plants are very tolerant of severe pruning



- Flowering occurs in May and June. The beautiful flowers have edible petals.
- Some varieties require a pollinizer to set fruit. Superior varieties have been developed for fruit quality and fruit size.
- Fruit fall to the ground when ripe in late summer or fall. The fruit flesh is scooped out of the rind, is very juicy and has a flavor of pineapple mixed with pear.
- Mature fruit can be stored in the refrigerator for about a week, but after that the quality declines. Fruit are mainly eaten fresh as a dessert or in salads, but can also be cooked in puddings, pies, etc.



LOQUAT *Eriobotrya japonica*

- Native to southeastern China, it was introduced into Japan where it has been cultivated for over 1,000 years.
- A large evergreen shrub or small tree 20 to 30 ft.
- Well established trees can tolerate a low temperature of 12° F.
- The killing temperature for the flower bud is about 19° F, and for the mature flower about 26° F. At 25° F the seed is killed, causing the fruit to fall.
- Extreme summer heat is also detrimental to the crop, and dry, hot winds cause leaf scorch. High heat and sunlight during the winter often results in sunburned fruit.
- The trees are drought tolerant and are susceptible to the disease Fire Blight.
- Some varieties require a pollinizer to produce fruit.



- Fruit are 1 to 2 inches long with a smooth or downy, yellow or orange, sometimes red-blushed skin.
- The succulent, tangy flesh is white, yellow or orange and sweet to subacid in flavor. Each fruit contains three to five large seeds.
- Thinning of flowers and young fruits by clipping off all or part of the flower and fruit clusters will enhance fruit size.

POMEGRANATE *Punica granatum*

- A single or multi-trunked shrub or small tree to 20 ft., branches are often spiny.
- Very drought tolerant, has a strong tendency to sucker from the base.
- Pomegranates prefer a semi-arid mild-temperate to subtropical climate. Best adapted to regions with cool winters and hot summers. A humid climate adversely affects the formation of fruit. Cold hardy to about 12° F.
- Beautiful scarlet, white or variegated flowers. Flowers are self-pollinated as well as cross-pollinated by insects.



POMEGRANATE *Punica granatum*



- Fruit from 3-6 inches or more in size, in colors from white or yellow to pink or dark red.
- Inside the fruit are sacs filled with sweetly acid, juicy, red, pink or whitish pulp or aril. In each sac there is one seed which may be soft and chewable or very hard.
- The flavor of the fruit ranges from very tart to pure sweet and many have sweet-tart or tart-sweet flavors. High temperatures are essential during the fruiting period to get the best flavor.
- The fruit is eaten by breaking it apart and lifting out the clusters of seeds and juice sacs. The tough outer skin and white inner membrane is not eaten. Pomegranate fruits are most often consumed as juice.
- The juice can be used as a fresh juice, or to make jellies, sorbets, cold or hot sauces, wine or as a flavoring for food. Pomegranate syrup is sold as grenadine.
- Over 90% of the pomegranates grown in this country are the single variety 'Wonderful' although many new varieties are becoming widely available.



ORIENTAL PERSIMMON

Diospyros kaki

- Native to China, more than two thousand different cultivars exist.
- Deciduous trees to 35 feet or less.
- Oriental persimmons do best in areas that have moderate winters and relatively mild summers. Under mild autumn conditions the leaves often turn dramatic shades of yellow, orange and red.
- Trees can tolerate temperatures of 0° F when fully dormant and do not produce well in the high summer heat of desert regions, where high temperatures the bark may also sunburn the bark.
- Ripe fruit hold on the tree long after the tree has lost all of it's leaves.



ORIENTAL PERSIMMON *Diospyros kaki*

- The shape of the fruit varies by cultivar from spherical to acorn to flattened or squarish. The color of the fruit varies from light yellow-orange to dark orange-red. The size can be as little as a few ounces to more than a pound.

Persimmons can be classified into three categories:

- Those that bear **non-astringent** fruits which can be eaten when it is crisp as an apple (these cultivars need hot summers, and the fruit might retain some astringency when grown in cooler regions).
- Those that bear **astringent** fruit until they are soft ripe (these must be jelly soft before it is fit to eat and are best adapted to cooler regions).

Astringent persimmons will ripen off the tree if stored at room temperature. Freezing the fruit overnight and then thawing softens the fruit and also removes the astringency.
- Those whose fruits are influenced by pollination (**pollination variant**). **Pollination-variant** cultivars have dark flesh around the seeds when pollinated.
- **Pollination-variant non-astringent (PVNA)** fruit are edible when firm only if they have been pollinated.



AMERICAN PERSIMMON

Diospyros virginiana

- Trees grow 30-80 feet in well-drained soil. Cold hardy to -25 degrees F.
- Fragrant flowers are produced in summer.



- Trees are normally dioecious, (produce either male or female flowers on separate trees) Both male and female plants are often needed to obtain fruit.
- **Some cultivars are parthenocarpic**, setting seedless fruit without pollination.
- The American persimmon is more cold-hardy than the Oriental persimmon. It is also softer and dryer than the *D. kaki*, but has a richer flavor. The American persimmon is also higher in nutrients like vitamin C and calcium.
- Fruit are about 1 to 2 inches in diameter. The unripe fruit is extremely astringent. The fruit is sweet and luscious when soft ripe and may be eaten raw, made into persimmon puddings, cookies, cakes, custards, ice creams, sherbets, and preserves or dried.



FIG *Ficus carica*



- A deciduous tree 10 - 30 ft. Often grown as a multiple-branched shrub, tree size easily controlled with pruning. Roots are invasive and greedy. Cold hardy to 12° - 15° F.
- The bark is unusually sensitive to heat and sun damage, and should be whitewashed if exposed to full sun in hot climates.
- The sap contains copious milky latex that is irritating to human skin.
- Freezing weather may kill plants to the ground. Dormant buds are more susceptible to freezing than wood and freezing may also create a trunk without live buds. Sprouts from the roots result in trees that produce only the main crop on the current seasons growth.
- Figs grow best and produce the best quality fruit in dryer warm-temperate climates. Rains during fruit development and ripening can cause the fruits to split.
- Figs are capable of producing 2 crops of ‘fruit’. The first crop, (**the breba crop**) in the spring on last season's growth and a second crop in the fall on the new growth (**the main crop**). In cold climates the breba crop is often destroyed by spring frosts.
- The “fruit” is actually a hollow-ended stem containing many flowers.

FIG

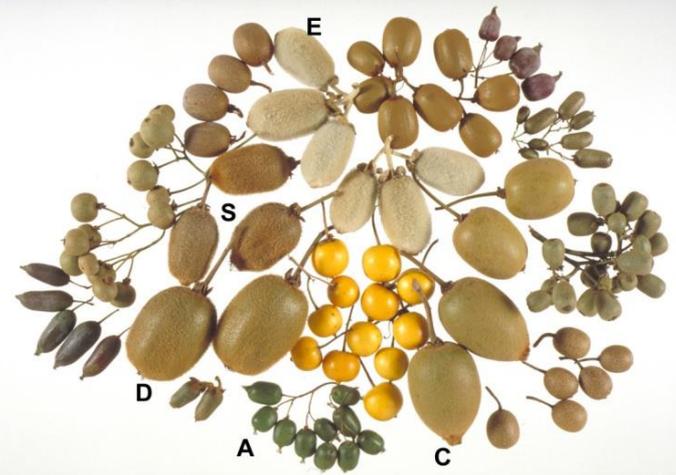
Ficus carica



- There are 4 types of fig: **The caprifig** which has male and female flowers and requires pollination by a tiny wasp; **The Smyrna-type fig** which requires cross-pollination by caprifigs in order to develop edible “fruit”; **The common fig** which needs no pollination and **The San Pedro fig** which its first crop needs no pollination and its second crop which is dependent on pollination.
- **Common-type figs** are by far the most prevalent fig grown.
- Unpollinated fruit does not have true seeds. Only pollinated fruit have true seeds which provide the characteristic nutty taste of dried figs.
- The skin of the fig “fruit“ is thin and tender, the fleshy wall is whitish, pale-yellow, or amber, or more or less pink, rose, red or purple; juicy and sweet when ripe, gummy with latex when unripe.
- Figs must be allowed to ripen fully on the tree and will not ripen if picked when immature. A ripe fruit will be slightly soft, usually have small cracks in the skin and start to bend at the neck.
- Figs can be eaten fresh, used in jam-making or baking and some fig varieties are delicious when dried.
- Over 160 cultivars of common figs are in the University of California at Davis’s germplasm collection.

ACTINIDIA *sp.*

- There are 40–60 species of Actinidia native to temperate eastern Asia. Most of the species are dioecious with separate male and female plants, but some are monoecious (such as A. arguta var. 'Issai').
- The fruit is a large berry containing numerous small seeds.
- Most Actinidia are very vigorous vines that require a sturdy trellis system and proper pruning for good fruit production.
- Cold hardy to temperatures of 10°F. or lower.
- The main species in this genus that are grown for their fruit are A. deliciosa and A. chinensis (Kiwifruit) and A. arguta (the Hardy Kiwi).
- Plants need a long growing season which will not be hampered by late winter or early autumn freezes. (At least 240 frost-free days for Kiwifruit and about 150 frost-free days for the Hardy Kiwi.)





ACTINIDIA sp.

KIWIFRUIT

Actinidia delectiosa and *A. chinensis*

- Vines require a winter chilling period of an average of 350 hours to over 800 hours depending on the variety. Kiwifruit is not recommended for the hot desert climates of the Southwest.
- New Varieties of Yellow and Orange Fleshed Kiwifruit are becoming available.
- Green, yellow and orange fleshed varieties often do not bloom synchronously. Male and female plants of the same colored fruit are often required for pollination.



HARDY KIWI

Actinidia arguta

- Hardy kiwi prefer well-drained, somewhat acid (pH 5 - 6.5) soils. The plants will not tolerate salty soils.
- To date, all cultivars that have been grown in both high chill and low chill areas have produced equally well.
- Hardy kiwifruits are generally sweeter than regular kiwifruit and have a thin fuzz-less skin. The fruit can be eaten skin and all.



MULBERRY *Morus nigra*, *M. alba*, *M. rubra* and Hybrids

- Deciduous, fast growing trees frequently reaching 30-70 feet in height or more. Quite tolerant of drought, pollution and poor soil, the root systems can be invasive and greedy.
- Cold hardiness varies with species and cultivar. Mature trees are cold hardy to at least 0° F.
- Berries can be eaten fresh or used in pies, tarts, puddings or sweetened and pureed as a sauce. They can also be made into wine and make an excellent dried fruit, especially the black varieties.

WHITE or RED MULBERRY

Morus alba, *M. rubra* and Hybrids

- The largest trees, fruit can be white, lavender, red or very dark purple. Fruit color, size, flavor and season can vary by variety. Fruit generally ripen in spring – mid summer.
- There are many named varieties available. Sometimes insipidly sweet, the best clones have a flavor that almost equal to that of the Persian mulberry.

PERSIAN MULBERRY

Morus nigra

- A smaller slower growing tree that reaches an average mature height of 25 feet.
- The fruit of Persian mulberries ripen in summer to late summer.
- The dark purple fruit are large and juicy, with a good balance of sweetness and tartness giving them more of a boysenberry-like flavor. Many consider them the best flavored species of mulberry.



ELDERBERRY *Sambucus nigra*, *S. canadensis*, *S. caerulea*, *S. glauca*.

- The black-berried elder complex is variously treated as a group of several similar species or as several subspecies of *Sambucus nigra*.
- Deciduous somewhat sprawling, multi-stemmed shrubs or small trees growing to 20 ft. Cold hardy to -15 degrees F. or lower.
- A large number of smaller cultivars featuring purple foliage, variegated foliage, double flowers or berry colors other than black have become popular landscape plants. Plants spread by root suckers to form colonies.
- The flowers are in flat corymbs, Although plants are self-pollinating, fruit yields can be increased by planting more than one cultivar together.
- The flowers of the elderberry can be batter coated, fried and served as a dessert.



ELDERBERRY *Sambucus nigra, S. canadensis, S. caerulea, S. glauca.*

- The ripe, **cooked** berries (pulp and skin) of most species of *Sambucus* are edible. **However, most uncooked berries and other parts of plants from this genus are poisonous.** The leaves, twigs, branches, seeds and roots of *Sambucus* plants can contain a cyanide-inducing glycoside. Ingesting a sufficient quantity of cyanide-inducing glycosides can cause a toxic buildup of cyanide in the body.
- *Sambucus nigra* is the only variety considered to be non-toxic, **but it is still recommended that its berries be cooked slightly for culinary purposes.**
- Elderberries fruit are black to glaucous blue and are popular for their unusual taste in pies, jellies, and jams. They are occasionally used in winemaking.
- Black elderberry is used for its antioxidant activity, to lower cholesterol, to improve vision, to boost the immune system, to improve heart health and for coughs, colds, flu, bacterial and viral infections and tonsillitis. Bioflavonoids and other proteins in the juice destroy the ability of cold and flu viruses to infect a cell.



JELLY PALM *Butia capitata*



- A small palm with slow to medium growth rate to 20'.
- The hardiest feather-leaved palm currently in wide cultivation, withstanding low temperatures of at least 15° F. It is moderately drought tolerant.
- Attractive flower spikes are produced in mid-late summer. Flowers are pink in color.
- Each spike produces hundreds of fruit that ripen approximately 1 month after flowering.
- The fruit has 1 large, hard seed and a sweet flavor that resembles the flavor of apricots and pineapple.
- The delicious fruit can be eaten fresh or used to make jam or jelly.



JUJUBE

Ziziphus jujuba

- Originating in China where they have been cultivated for more than 4,000 years and where there are over 400 cultivars.
- An attractive deciduous small tree to approximately 25 feet.
- Hardy to a wide range of temperatures; virtually no temperature seems to be too high in summertime. Cold hardy to about -28° F.
- The fruit ripen in fall and change in color from green to brown. mahogany-red. Shortly after becoming fully red, the fruit begins to soften and wrinkle. Fruit can be eaten fresh or dried.
- Fresh fruit are crisp and sweet and resemble a small apple in texture and taste.
- The fruit dries easily and stores well when dried. Dried fruit becomes sweeter and resembles a dried date in texture and flavor.



CHE *Cudrania tricuspidata*

- Che is native to many parts of eastern Asia. It was introduced into the U.S. around 1930.
- A deciduous shrub or small tree to 25 feet tolerant of heavy pruning. Plant is tolerant of drought and poor soils similar to that of the related mulberry. It can withstand temperatures of -20° F.
- Plants are usually dioecious having male and female flowers on separate trees. Only the female tree produces fruit.
- The ripe fruits, 1 to 2 inches in diameter, have a juicy, rich red flesh. Inside are 3 to 6 small brown seeds.
- Fruit ripens for a month or more in fall. When fully soft ripe the fruit has a watermelon-like flavor that can be quite delicious. The sugar content is similar to that of a ripe fig.



GOJI BERRY (CHINESE WOLFBERRY)

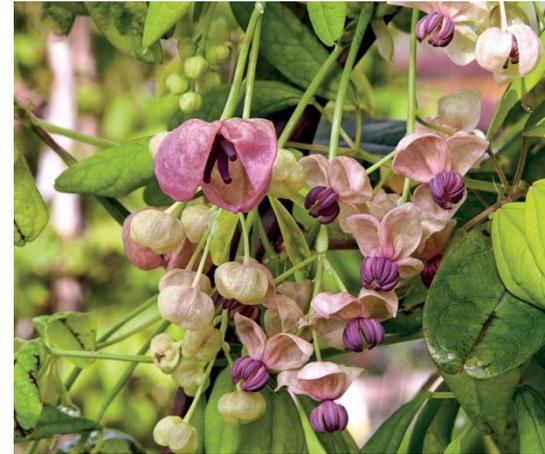
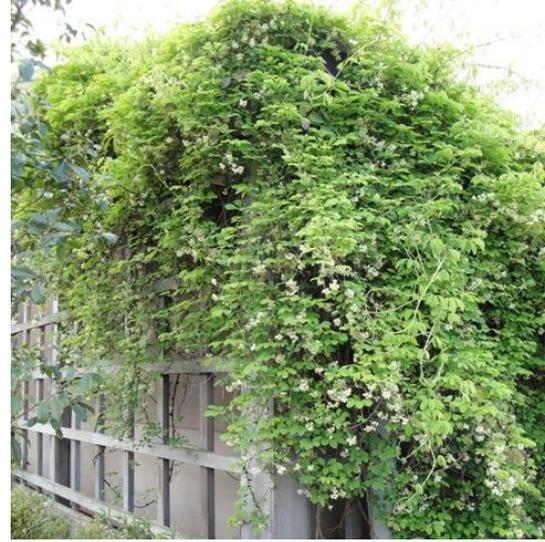
Lycium barbarum



- Un-wieldy deciduous shrubs 8-10' in height native to subtropical regions of Tibet and China. Plants spread by root suckers and can become invasive.
- Tolerant of heat and drought, established plants are cold hardy to -15 degrees F. Plants are very susceptible to powdery mildew.
- Self-pollinating. Flowering occurs from June through September and berry maturation from June to October.
- Where frost does not occur fruiting can be continuous and plants do not lose their leaves.
- Fresh berries have some of the highest concentration of antioxidants of any food in the world; 2 to 4 times as much as blueberries.
- They contain up to 21 trace minerals and are a complete protein source; they contain all 8 essential amino acids and 18 additional amino acids.
- Fresh berries have a sweet and mildly tangy taste. Dried berries have a raisin like chewy texture.

CHOCOLATE VINE *Akebia Quinata*

- A twining shrub that grows to (30 ft) or more. Hardy to -25 degrees F. Plants can be invasive.
- Foliage is semi-evergreen in warm winter climates.
- Prefers full sun, but tolerates close to full shade.
- The flowers are chocolate-scented and occur mid-late spring . For best fruit production, plant more than one vine to facilitate good cross-pollination. Many experts recommend hand-pollination.
- In fall, sausage-shaped, violet fruit pods (to 4" long) split open to reveal small black seeds imbedded in a whitish pulp.
- The whitish gelatinous pulp is edible pulp with a sweet flavor and is delicious in jams and jellies.



MAYPOP *Passiflora incarnata*

- Very hardy, native to the eastern U.S., the maypop is one of the hardiest passion flowers and grows wild in regions that commonly freeze during winter. Cold hardy to about 0 degrees F.
- The vine dies back to the ground and pops back to life the following season, hence the name "may pop". Flowers and fruits each season are born on the current seasons growth. Flowers are lemon-musk scented. Light green fruits have a tart apricot flavor.
- The fruit is of comparable size and juice yield to the *Passiflora edulis* and can be eaten fresh out of hand, made into a delicious drink with the unmistakable passion fruit flavor, or can be used for jam and jellies.



PAW PAW

Asimina triloba



- A 12-20 foot deciduous tree, cold hardy to temperatures of -25° F or lower. It requires a minimum of 400 hours of winter chill and at least 160 frost-free days. Sensitive to low humidities, dry winds and cool maritime summers.
- Does best in fertile soil that is moist, but well-drained and slightly acid (pH 5-7). The young plant is very sensitive to full sunlight and requires filtered sun for the first year or two. Once established, pawpaws prefer full sun.
- Trees are prone to producing root suckers producing the single-clone pawpaw patch.



- Flowers are perfect, having both male and female reproduction parts, but they are not self-pollinating. In addition pawpaws are self-incompatible, requiring cross pollination from another unrelated pawpaw tree. **Hand pollinating is recommended to obtain reliable fruit set.**



- The largest edible fruit native to America, individual fruits weigh 5 to 16 ounces and are 3 to 6 inches in length. The fruit usually has 10 to 14 -1/2 to 1 1/2 in. seeds.
- Fruit ripens mid August – October. The ripe fruit is soft and thin skinned and has a pronounced perfumed fragrance. The skin of the green fruit usually lightens in color as it ripens and often develops blackish splotches which do not affect the flavor or edibility.
- The yellow flesh is custard like and highly nutritious. The best fruit has a complex, tropical flavor unlike any other temperate zone fruit. Ripe fruit is very perishable, the primary use is for fresh eating.

ARONIA BERRY

Aronia melanocarpa



- A deciduous shrub 3-6' tall. Cold hardy to -20 degrees F. or lower. Spreads readily by root sprouts.
- Plants tolerate waterlogged soil with slow drainage and are resistant to drought when established. They grow best in full sun to partial shade with a soil pH between 6 and 6.5.
- Plants are self-pollinating, a second variety is recommended for optimum fruit production.
- Creamy white flowers in spring, ink-black berries in fall, and vibrant-red fall foliage.
- Commonly called black chokeberry, the fresh fruit is tart –sweet and astringent. When frozen and then thawed, the fruit is delicious with a unique red wine flavor and loses most of its astringency. The fruit is commonly added to a dairy product such as in smoothies, cereal, and on ice-cream, used in baking or to make sauces, sorbet, juices, wines, and jellies.
- According to USDA studies, Aronia fruit has 2-4 times more antioxidants than that of acai berry, goji berry, blueberries, strawberry, cherry, cranberries and pomegranate. It is a rich source of vitamin C.
- Agents in the fruit are anti-bacterial, anti-viral, and anti-diabetic. They fight the formation of arterial plaque, lower cholesterol, help to lower blood sugar and improve the body's own natural production of insulin and protect the liver.
- Several of the compounds are natural cancer fighters, and protect against the development of tumors of the bladder, breasts, colon, lungs, ovaries and skin. In addition, these compounds fight Crohn's disease, inhibit HIV, reduce symptoms of PMS and fight herpes. Preliminary studies have also shown that aronia may prove helpful in slowing the growth of glioblastoma – a form of fatal brain cancer.

HONEYBERRY (HAKSAP) *Lonicera caerulea*

- A deciduous shrub, 4 - 6ft. Cold hardy to -40°F., flowers can withstand 17°F and still produce fruit.
- 1st introduced to the US in the 1990's with named cultivars first being licensed and propagated in 2015.
- Plants require full sun, can survive a large range of soil acidity, from 3.9-7.7 (optimum 5.5-6.5), require and well drained soils high inorganic matter and are more tolerant of wet conditions than most fruit species.
- Plant is susceptible to Powdery mildew which usually occurs after fruit maturity in mid- to late summer.
- At least two compatible varieties are needed for cross pollination and fruit set.
- The late blooming varieties are better adapted to cool maritime growing conditions. Earlier blooming varieties generally set less fruit because of the lack of bees and other pollinating insects.
- Unripe fruit turns blue on the outside before it is ripe but the inner layer is will be green and has a sour flavor. The berries are ready to harvest when the inner layer is dark purple or blue.
- Each berry has approximately 20 small seeds which are not noticeable during chewing. Sweet and tasty blueberry-like fruit are great for fresh eating and can be used in various processed products, such as pastries, jams, juice, ice cream, yogurt, sauces, candies or wine .



SEA BUCKTHORN (SEABERRY) *Hippophae rhamnoides*

- The most widely grown, northern hardy, fruiting plant in the world.
- A thorny small tree or shrub 6 to 15 feet tall. Cold-hardy to at least -40 degrees F. and resists freeze damage at fruit set.
- A nitrogen fixing plant, plants are intolerant of shade and are dioecious, requiring both male and female plants.
- Rich in genetic diversity , plants vary size, form and shape, and in fruit size, shape, color and maturity.
- Fruit ripens from July to November and is cultivar-specific. The fruit lack of an abscission layer which makes fruit removal very difficult.
- Fruit are juicy, tart to tart-sweet with a pleasing citrus flavor and are somewhat astringent. Freezing helps to reduce the astringency. Fruit have a tough protective skin.
- It is a nutritional powerhouse rich in vitamins A, C, E and K. Nutritional values can vary among cultivars.
- Fruit is used in juices, sauces, jams, jellies, wine, tea, candy, ice cream and sorbet.
- Seaberry juice and its oils are said to heal burns, eczema and radiation injury.



GOUMI

Eleagnus multiflora



- A deciduous to semi-evergreen shrub typically to 6-10' tall. Cold hardy to below -20 degrees F.
- Goumi is both an insectory and nitrogen fixing plant.
- Silvery-white flowers which bloom in spring are not particularly showy, but are pleasantly fragrant.
- Considered to be partially self-fertile. Yields will be increased with cross-pollination.
- Fruits are juicy, with a sweet-tart flavor and slight astringency when fully ripe.
- Fruit are eaten fresh or dried or cooked or used in sauces, pies, jellies, juices and perhaps wine.

CORNELIAN CHERRY *Cornus mas*



- A member of the dogwood family, this fruit has been used for 7,000 years as a food crop in ancient Greece.
- A shrub-like small tree, 15-25 feet, they are covered with yellow flowers in the spring before the leaves appear, and have red and yellow fall foliage.
- Trees appreciate soil with high organic content and full or partial sun.



- Trees thrive where summers are cooler, are cold hardy to -25 degrees F. and the bloom tolerates temperatures as low as 18 degrees F. They are susceptible to dogwood anthracnose.
- Two varieties are required as pollinizers for fruit production.
- The unripe fruit is astringent. The fruit only fully ripens after it falls from the tree. When ripe, the fruit is dark ruby red or a bright yellow.
- 1-1/2 inch fruit are sweet-tart and aromatic with a flavor which is best described as a mixture of cranberry and similar to a tart cherry. Pits are relatively large and adhere tightly to the flesh. Fruit are eaten fresh and are used as a fruit drink, syrup, jelly, jams, pies, wine and in baked goods.



KOREAN DOGWOOD *Cornus kousa*

(CHINESE DOGWOOD)

- A beautiful deciduous shrub, 15-30 feet, cold hardy to -20 degrees F. It is resistant to the dogwood anthracnose disease.
- Best grown in organically rich, acidic to neutral, medium moisture, well-drained soils in full sun to part shade.
- The Fall foliage is a showy red color.



- The fruit is a compound berry 1-2 inches in diameter. It has a delicious, sweet, tropical pudding like flavor. In addition to hard pits the skin is tough and gritty.



MEDLAR

Crataegus germanica



- Revered for their ornamental value and for their delicious, unique fruit.
- Medlars like 1/2 day to a full day of sun and well-drained soil and is hardy to -25 degrees F.
- The fruit is hard at harvest time and must be allowed to ripen for a few weeks in a cool, light place where it becomes soft and juicy. This process is called bletting.
- Fruit is about 2 inches in diameter, soft brown in color and is born from large, beautiful white flowers. It has a flavor reminiscent of spiced applesauce and pear and can be eaten fresh, cooked, roasted or in pies and jellies.



MAYHAW *Crataegus aestivalis*



- A relatively unexplored and underutilized indigenous fruit tree of the lower southern U.S.
- A shrub or small round-topped tree, 15-20 feet, often armed with thorns. Cold hardy to -25°F
- The tree is very ornamental with attractive foliage, showy blossoms and clusters of brilliantly colored fruit.
- Fruit is a small pome fruit about 1/2- to 3/4-inch in diameter, yellow to bright red, fragrant, acid and juicy, resembling cranberries in appearance and crabapples in taste. The fruit is used in marmalades, butters, preserves, jellies, condiments, syrups, wines, desserts.
- Many consider mayhaw jelly among the finest, most delicious in the world. Its many colors can range from yellow to light pink, to bright red, to a reddish-brown. The jelly has a unique aroma and indescribably delicious, wild-fruit flavor.



CHINESE HAWTHORN

Crataegus pinnatifida

- A deciduous 10 to 20 foot tree , cold hardy to -10 degrees F. or below. The leaves turn brilliant shades of red and gold in autumn.
- Self-fertile. Can take wet or dry soil and is somewhat drought tolerant when established. Full sun for best fruit set.
- 1" fruit are tart-sweet and flavorful. They are eaten fresh or dried, used in pies, for preserves, as a tea, or sold on skewers by Chinese street vendors in the fall. Hawthorn fruits are dipped in boiling sugar water to make a candied snack .
- Chinese hawthorn fruit is antibacterial and contains numerous bioactive constituents . Recent trials have demonstrated its efficacy in lowering blood cholesterol, and improving blood circulation. The fruit is also being reviewed for its anti-tumor properties on skin cancer lesions.





Rare Fruit for Climates with Freezing Winter Weather

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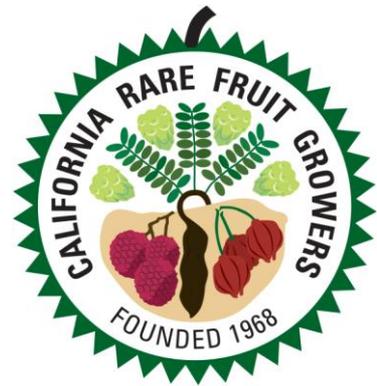
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