

Citrus sp. and hybrids

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[nice haul!](#) [Walt Steadman and the CRFG 2006 Lindcove tour](#) we currently are not offering citrus for sale. While we feel citrus will always be part of the California home landscape, we are holding off until we see the the impact on our retail customers of pending state and federal regulations regarding Yellow Dragon Disease (Huang Long Bing, "citrus greening"). The information is provided as a free resource for professionals and home gardeners. rev 4/2015

Citrus are a large group trees and shrubs. The most commonly recognized categories (orange, lemon, grapefruit and mandarin) apparently originating in Asia from just three root species: the citron (*C. medica*), mandarin (*C. reticulata*), and pummelo (*C. grandis* or *C. maxima*). The resulting hybrids and backcrosses then radiated over thousands of years into the spectrum of hybrids and selections we now enjoy. All common citrus (exclusive of limes) appear to be hybrids and mutations of these original three types. Some, such as the mandarins, have been sold commercially for over 2300 years, while evidence of citron cultivation dates back to Babylonian times (~4000 BC). One statistic I recently heard at a UC Riverside gathering is that 60% of homes in California hav a citrus tree of some type. We offer a range of common as well as new and quite rare types.

Disease

Sorry folks, we have to start here. We here in California enjoy the very best quality citrus in the world because of the strict operating procedures and disease control efforts of UC Riverside, CDFA, and us commercial growers. Don't mess up!

There are a few really nasty diseases out there, and one of them is in the process of completely eradicating the Florida citrus industry. There fore: you will ALWAYS sterilize your clippers and tools with Lysol or bleach before you cut your citrus tree. You WILL learn what [Asian Citrus Psyllid](#) looks like, and also the symtoms of [Huanglongbing \(HLB, "yellow dragon," "citrus greening"\)](#) disease. You WILL contact your county ag inspector when you find them. You will never, ever, never, ever be tempted to try to bring in fruit or plants from outside California, let alone the US. You will now repeat after me, "YES MASTER I HEAR AND OBEY!"

Classification

In general I follow the UCR classification system, with my own spin. I like to keep it simple since citrus is such a complicated group. As far as some of the interesting new hybrids coming available, I am often asked by retail nursery buyers "So, is this a grapefruit? Or a mandarin?" Many of the most interesting new developments don't fall into these older, more established classifications. 'Cocktail' is a wonderful and mostly unknown hybrid of Siamese Sweet Pummelo by Frua Mandarin, and thus both pummelo and mandarin hybrid. Calling it a "hybrid citrus" doesn't get you any closer to forecasting what it will taste like, or how to grow it. So approach citrus with an open mind and be prepared to judge a variety on its own merits, not by its name, or what you group it happens to be listed with.

For more information on citrus varieties UC Riverside maintains a wonderful website (<http://www.citrusvariety.ucr.edu/citrus/index.html>) full of information. Another excellent, exhaustive and exhilarating site is Jorma Koskinen's 'Citrus Pages' (<http://users.kymp.net/citruspages>) which is easily the most thorough compilation of information I have seen yet. Jorma has consolidated information from a large number of print and personal sources. Be forewarned that much of what Jorma features will not be available (certified) in California. However his site is well worth checking for anyone interested in pursuing citrus.

Flavors and Aromas

The struggle with citrus is always over sweetness. As Gene Lester so aptly puts it, "The natural condition for citrus is acidic." That is how they started out, that is what all the wild citrus are, and most selection has been directed towards raising the levels of sugars, the size of the fruit, and the intensity of

color. Some citrus are best eaten peeled and sectioned, many are best eaten sliced, and some like pummelos have specific methods of dissection. My favorite quick way, and the way most citrus professionals test fruit, is to cut a vertical wedge.

Citrus display an amazing range of variation of flavor. They are inherently genetically unstable, and are known for the regular production of branch sports and other spontaneous point mutations. Apparently all citrus carry a gene for "redness," for example, so you can find red variants of lemons, oranges, pummelos, etc. popping up on a regular basis.

Flavors are subject to this spontaneous mutation effect as well. Citrus are members of the Rutaceae (Rue Family), distinguished partly by oil glands on the leaves, stems, and fruits. They exhibit an impressive range of fragrances, ranging from intensely floral ('Bergamot', Indonesian Lime), to the full range of familiar citrus (lemon, orange), to the exotic (Ginger Lime, the heavily vanilla scented Mato Buntan, Marrakech Basil Lime). Often these flavors and fragrances are complex and elusive. In many cases they only become evident when the fruit is consumed in some other fashion than fresh and out of hand. For example, Calamondins make perhaps the very, very best marmalade in the universe. (I know. I have tasted it. Who would guess?) When hybridized, resulting progeny can exhibit completely novel fragrances unknown in existing cultivated types.

Citrus also exhibit modest variation in physical appearance, with many being outstanding ornamentals for either flowers (Boquet de Fleur Orange, Meyer Lemon), fruit, or form and foliage (Variegated Calamondin, Variegated Pink Eureka Lemon).

Besides producing fruit used for eating fresh, many have rinds useful for marmalades, for bath scents or oils, for drying and grinding into spice, for being candied and then giving to me, or for adding to vodka or rum. Some fruit can be used for making syrups. Some species have leaves used as seasoning, either fresh or dried, and there is probably room for considerable experimentation there, especially with some of the new hybrids. There are a number of creative ways to use the fruits and leaves and your potential applications are limited only by your imagination. A chef, Robert Lambert, at his name dot com, offers an intriguing range of reduced syrups and marmalades, including some interesting and creative blends. The very best way to enjoy your own marmalade is to *give your fruit* to someone known for making marmalade, titling them proportionately for the great honor of receiving such a rare treasure. Or even more simply, you can just order it directly from Robert.

Rootstocks

The primary rootstock we use is some form of trifoliolate. In general, C-35 (citrange) is usually more dwarfing, Carrizo (citrange) is larger, and Troyer seems to be indistinguishable from Carrizo. Volkameriana (Volkamer Lemon, *C. volkameriana*) produces the fastest growing and earliest bearing trees, and Rich 16-6 trifoliolate is larger also and considered good for colder climates. Sour orange, which is another larger rootstock, is in rapid decline commercially due to susceptibility to *Phytophthora*.

But we aren't dealing with apples here, where M26 or M111 will produce essentially the same relative results on almost all varieties. So shed the idea that you can know how a rootstock performs unless you can keep *all* the best rootstock/scion combinations for all the varieties straight in your head. Because C-35 and Carrizo can produce different results or incompatibilities just within a group, such as the Mandarins, or even within a subgroup, such as the between various Satsuma Mandarins. The climate, soil, understock, variety interactions are exceedingly complex and often unpredictable. Sometimes a single variety will be incompatible with a rootstock that performs great on all the others in its class. The best combinations are the result of years of observation and experience.

I have personally walked mature demonstration blocks many times, and can verify that keeping it all the hundreds of citrus rootstock/scion results exactly straight in your head is a job for either a Vulcan or someone with way too much time on their hands. Our rootstock will usually be marked on one of the tags. We know that the budders, whose livelihoods depend on the results, have used understocks that give the best results for most consumers in most areas. If several understocks are used it is most often because they all work well and that the differences, either on mature size, fruit production, or soil/cold adaptability,

are minimal. We are always aiming for good quality fruit, small size for ease of picking and maintenance, good production relative to space, and good health and vigor.

How dwarf are our trees? Dwarf enough. I have included shots of trees on the same rootstocks we use, of known age, so you can judge for yourself. Remember that most trees shown grew in one of the most perfect citrus growing areas of California (Sunset zone 9) under the best commercial-type care (read "probably better than what you can do") and are unpruned. Trees that are not fed as much, are in more marginal climates, or that are pruned can be expected to be considerably slower or smaller. Trees in containers will be especially dwarf and will only grow as much canopy as the container will support.

In the images, many of the trees or closeup shots will show a whitish residue. This is simply kaolin clay, which is applied to commercial orchards as a thin spray in late spring to act as sunscreen, shielding the plants from sunscald during the hottest, brightest parts of the summer, mixed with a small percentage of copper to reduce fruit rot under wet conditions.

Climate and Nutrition

In general, the hotter the better. Citrus wants it hot. Hot equals sugar, plus conversion of acid to more sugar. So the acidic citrus, meaning lemons, most limes, the limequats and lime substitutes, don't need it very hot because they don't get sweet. They are relatively easy to grow in a cool-summer climate. If you want sweet citrus, either live in a hot-summer climate or be ready to choose your variety more carefully. Sometimes you can compensate for lack of heat by planting varieties that will hang longer until ripe, other times looking for the lower-acid varieties will be the right direction.

When some fruit are picked, such as bananas, starch will convert to sugar and the fruit will become sweeter. With citrus this doesn't happen, they have all their sugar when they come off the tree. Afterripening will cause acidity levels to fall, and that will make fruit seem to sweeter. Some varieties should absolutely be afterripened, some should never be, and the rest show varying amounts of tolerance or response to being held after picking.

A striking characteristic of hot summer/cool winter areas is that the fruit on trees grown there is substantially redder in color. Oranges in the thermal belts of the Central Valley are a redder orange, whereas along the coast they barely go beyond yellow. And some citrus, such as 'Indio' mandarinquat, or the "Golds" ('Shasta,' 'Tahoe,' and 'Yosemite'), and many of the mandarins are almost downright red, about the same color as a Cinderella Pumpkin.

Citrus are regular and rather heavy feeders. I saw when I worked in retail that it is very hard for the average home gardener to translate the recommended commercial feeding rates (2.5 lbs of actual nitrogen, per mature tree, per year) into home gardening equivalents. That 2.5 lb. recommendation means about half of a standard 20 lb. bag of ammonium sulfate lawn fertilizer.

So what is "mature size"? Is that for standard or semidwarf size? Where do you put it, under the canopy or more spread out? All at once, or in split applications? What form of nitrogen? How do you calculate 2.5 lbs. of nitrogen?

I have seen quite a few homeowners put ten pounds of fertilizer on a little, newly planted 5 gallon plant, no joke. They were just following instructions! Needless to say, that is far too much.

If you put on too much fertilizer the leaves are going to start turning a reddish brown from the tips and margins inwards, and with enough damage the entire plant will turn brown and die. Once you start seeing damage the only thing you can do is leach with stupid amounts of water. Even then, the nutrients are often in such a form that they are tightly adsorbed by the soil and won't be easily released, and so often all you can do is sit and watch your poor plant burn, and your "burn time" can be extensive. It is a tortuous experience. The best advice is to not go there in the first place by staying away from granules or dry powders until you are experienced, and your trees are large.

I have been growing plants for about forty years, and commercially for over thirty years, and I still use

dissolved fertilizers (Miracle Gro, Peters, etc.) on all my small and medium size plants. The solution-applied formulations are a degree of magnitude safer, work much more quickly, and can be repeated monthly or bimonthly. They are the most forgiving of errors. The only drawback is that it starts to get expensive with large plants. When your plants do start to size up you can start to try dry formulations, slowly. Go to your local high quality independent nursery or garden center for quality advice from someone who knows the story.

The second most common problem is trace element deficiencies, usually iron but closely followed by zinc in many soils. If you are using acid forming fertilizers it will drop the soil pH and make all those metals that citrus needs (iron, zinc, molybdenum, copper) more available. The sulfates in those fertilizers will help with sulfur needs. The best way to avoid a problem in the first place is to use fertilizer low in phosphate because the that ion is extremely efficient at tying up the metals citrus crave, and almost all soils in California have adequate phosphate anyway. If you still need a trace element treatment, use a complete formulation which supplies all micronutrients at the proper ratio. By applying only one you can mess up the rest, because they often interact with each other.

One reason to have both rich and mild citrus varieties in your collection is to account for yearly weather variation. In cooler years your milder citrus may shine and in the hotter years your more intense varieties may be at their peak. I have noticed quite obvious variation in flavor even in the Promised Land (Sunset Zone 9), where one would think every year was perfect. But even there I find my tasting standouts changing from year to year. So spread your bets. rev 1/2012

Now on to the varieties:

Citrons one of the three root ancestors of the primary citrus varieties, exclusive of limes. Highly fragrant, mostly sour, lemon-like things that actually have interesting rind uses as well as sometimes being useful for juice and pulp. All are very tender but many can be grown very close to the coast. They are more useful than their rarity suggests, most of their absence is probably related to climatic restriction and unfamiliarity with applications. All citrons have leaves that can be used in cooking. rev 2/2012

'Etrog' GREEK CITRON [sectioned](#) [shiny fruit](#) synonymous with 'Eshrog,' supposedly one Hebrew, the other Yiddish, and both meaning "Greek," most likely in reference to the 'Mediterranean' citron. This is therefore almost identical with the various citrons from the rest of the Mediterranean, such as 'Italian,.' This highly fragrant fruit is known primarily because of its importance of its fruits for use during the Jewish Feast of the Tabernacle. To meet the requirements the fruit have to come from non-grafted trees, be cosmetically perfect, and meet other special requirements. This is also a wonderful citrus just as an edible variety. The fruit are rather long, somewhat cylindrical, and produced during winter. It is highly fragrant, like all citrons, but it also has a reasonable amount of pulp and juice, so it can be used for many lemon applications. It is seedy though, and the flowery smell may not go with all lemon uses. The rind skin has a strong vanilla-lemon bubble bath fragrance but it isn't as overpowering as 'Buddha's Hand.' A bowl of the very shiny fruit, besides being visually attractive, will make a warm kitchen smell wonderful. Best of all is the very thick, moist white inner rind, which is quite good when sliced thin. It is moist, dense, sweet, slightly fragrant, cool, and refreshing. Now that I have tasted it I think many citrons may well be worth raising for their edible rind alone! The skins of citrons are much more tender and delicate than those of lemons, so the fruit don't last as long after picking. They can get very large, over 8" long by 5" thick for larger samples. Like all citrons it is less than attractive as a bush, with dull, small leaves clasping, open, gangly branches, and it is very frost tender. rev 2/2012

'Buddha's Hand' ('Fingered Citron', 'Dragon Finger,' Bushukan, Jeruk Jari Budha) [closeup](#) [more](#) [in arrangement](#), [HortiFair](#) [mature plant](#) [Westside Santa Cruz](#) I like this fruit. This citron has no flesh at all, just white pith and fragrant yellow skin. Its highest value is just to use its giant, hand-like fruits for display, to put in a bowl on the table in your kitchen or living room, to enjoy the fragrance and perhaps most of all to impress people with. They are even amazing when they first emerge from the very large flowers. When just used for display the fruit will give off this incredible lemon-vanilla-bubble bath fragrance that will scent a room. Plus they are such incredibly odd shaped things that you just can't resist constantly picking them up for closer observation and inhaling the

wonderful fragrance, which if not too strong is close to that of Brown Boronia, *Boronia megastigma*. They could certainly be used like Yuzus, for scenting bath water. A little bit goes a long way, because that rind is exceptionally perfumy. I have never heard of it being used for marmalade, and would guess it would be far too floral to use pure, by itself, but it would make an interesting experiment. I have heard from Lance Reiners that the white pith is shaved into thin thin sheets and eaten by Americans of Chinese descent, reportedly topped with Parmesan (!) cheese. Hmmm. This needs further investigation to say the least. It matures in late fall and holds until about late January, though a few late fruit will continue on the plant until March. It is not frost hardy, and can only be grown without protection where you can grow 'Lisbon' or 'Eureka' lemons. However it does fine in very cool-summer locations, including almost directly coastal exposure. Strangely, the large flowers are not very fragrant. Like all citrons, it is a gawky, awkward hard to handle shrub, with open, reaching growth, but when mature and heavily hung with fruit it is a traffic stopper. rev 2/2012

Grapefruit of multiple derivation, being any pummelo crossed with a sweet orange. First originated in the Caribbean on Barbados around 1750. Some people love grapefruit, like me. Some people truly hate grapefruit, almost entirely because of the bitterness found in the skin and thin membrane enclosing the segments, or the acidity, or both. Pick your side. Grapefruits all need depressing amounts of heat. The only good thing is that all will hold until ripe, more than a year if necessary. It is possible, *possible*, to ripen grapefruit in Sunset zone 17, in the warmer parts, if you let your fruit hang for two years, don't mind small fruit, don't mind very thick rind, don't mind tiny interiors, and don't mind having to add extra sugar on top when you eat it. The only exception is 'Oroblanco,' which lacks acidity, and which will still need to hang more than a year, but is at least an honest possibility. The very, very best grapefruit of all is the old 'Duncan,' which isn't sold or grown anymore because it is impressively seedy. However researchers are working on a seedless version and when it comes available expect it to quickly become the favorite again, even though it isn't red. And then if they can make it red Grow them in zones 8-9, 13, 16, 18-24/USDA zone 9. rev 2/2010

'Flame' (Red Flame) [sectioned](#) [on Carrizo, twelve years old](#) [on the tree](#) a seedling of 'Ruby Red,' and relatively new, discovered in 1973 and available only since 1987. It is a large grower, offers the dark red coloring as the difficult 'Star Ruby' but is more cold hardy and easier to grow. Fruit ripen in winter and early spring (hot summer zones only!!) and holds very well on the tree much later, though internal color fades. They tend to be smaller in size than other grapefruits but usually seedless, and the trees are precocious and heavy bearing. The better cold performance comes from the fact that the fruit hang more under the canopy of foliage and are a little better protected against freezing. rev 4/2014

'Redblush' [sectioned](#) [old tree on trifoliate](#) the first patented citrus, a moderately pigmented, light pink-orange fleshed sport found in 1929 on 'Thompson.' It is difficult to grow anywhere in California, as are all true grapefruits, but there is a constant demand from homeowners so we fill that demand. If you are in the thermal belts of the Central Valley or Southern California you should do fine with it. This has good flavor, few seeds (typically 1-3 per fruit), and will ripen quite late in almost all areas, meaning spring through fall, with fruit holding up to two years until ripe in cool areas. As with all grapefruit for best flavor the fruits should be harvested immediately after falling, or at least when they snap off easily when barely handled. If you have to pull it off, it is going to be sour. This forms a nice looking tree with medium sized, very dark green foliage. This has been called 'Ruby' but that only gets it confused with the much newer, much redder 'Star Ruby.' rev 2/2012

Kumquats and Kumquat Hybrids all are compact and make excellent ornamentals, in containers also. All kumquats, and to some degree kumquat hybrids, are prone to zinc deficiency, recognized in all citrus by indistinct, somewhat blotchy interveinal chlorosis, and tiny new growth that tends to emerge yellow-white with very short internodes (industry term is "little leaf"). Best to treat with a complete metal/trace element mixture lest you completely screw up your soil chemistry by applying too much zinc and inducing poisoning, or complexing some of the other metals. As befits very cold hardy plants, kumquats are highly seasonal growers and won't move at all under short day conditions because they have the sense not to be producing tender growth when they may suffer freeze damage. But the irrepressible rootstock will grow all year. Watch for rootstock overgrowth because of this! The rootstocks used for kumquats usually have larger leaves and large thorns, and their branches are noticeably more vigorous. If you have a kumquat examine

the bud union carefully and if possible hit it with colored spray paint when you buy it, then strip off everything below that has leaves that don't match. Kumquats are the most frost hardy of the common citrus, and can be raised down to Sunset zone 8/USDA zone 8a. A few can even be raised to USDA zone 8b (Portland) but only with protection, and in the coldest years you will lose them without extraordinary precautions. In cool summer areas true kumquats ('Nagami,' its seedless variant 'Nordman,' and 'Meiwa') usually fail to flower from lack of heat. 'Indio Mandarinquat' and 'Fukushu' are substitutes. rev 3/2011

'Indio Mandarinquat' [on C-35 at Lindcove, 12 years old](#) [fruit close up](#) this is a rather large, attractive and evenly shaped tree that produces far more kumquat-type fruit than you are ever going to eat. Thus it is useful that the tree is such an attractive ornamental, and very cold hardy to boot. This is the largest of the kumquat-type fruits, and the mandarin genes express themselves in the form of larger, redder fruits and larger foliage. This variety bears fruit to over 2" long by 1 1/2" wide (about three times the size of a typical kumquat), pear shaped with a small, distinct neck, deep red orange, profuse, and well displayed on the outside of the canopy. Suzy Brooks says her plant was just beautiful at Christmas, with a dark green, round canopy completely covered with brilliant fruit. She calls it "irresistible and heartwarming. Natural beauty at the right time of the year." This tastes very close to the sweeter of the two basic kumquat types ('Meiwa') but are even slightly sweeter, with low internal acidity (for a kumquat!) and a sweet rind. It does have a noticeable, slightly musky/bitter rind element from its Mandarin parent. They are also substantially redder than 'Meiwa,' which is really orange to golden orange depending on climate and maturity. I found this fruit to be at least as sweet at Gene Lester's (ocean side of the Coast Range) as it was at Lindcove (Visalia), and just as red. Under Gene's more moderate conditions the plant at twelve years was just 6' high by 7' across, and very even and dense. It was sweet enough, as a completely untended, unfertilized bush, to be considered a nice little *mandarin* in its own right. If you can grow a kumquat properly plant this last. If you are marginal for kumquat heat you will be much happier with this. However if you are in fog belt, or cool, windy coastal plain, many years your plant will not receive enough heat to ripen flowering wood and will thus fail to bear some years. rev 8/2011

'Meiwa' [closeup](#) [tree, about 10 years](#) [fruit](#) *Fortunella crassifolia*, notice it is a separate species from the more common 'Nagami'. This is a slower grower and I think needs high heat conditions. The fruit will hold until ripe. Fruit which hang until ripe also tend to ripen over a very long period, so you don't get buried all at one time. Suzy Brooks in Hollister has been harvesting her 'Meiwa' fruit from March until this past September. 'Meiwa,' like 'Nagami,' and like all properly cold-hardy plants, it is a highly seasonal grower, showing almost no buds or stem extension until the onset of long days. The fruit are sweeter than 'Nagami' but some attribute this to a thicker skin, which carries more of the sweet rind oil. The centers are still acidic and moderately seedy like 'Nagami,' but the skins are slightly darker orange and the shape is more rounded. Personally I like this variety much more than 'Nagami,' and feel the interiors are sweeter and more richly flavored, but it is noticeably less productive. Watch for chlorosis, as with all Kumquats and their hybrids, especially in clay, under less acidic conditions, or in especially cold, wet areas. This variety is exceptionally cold hardy for a citrus, but reported to be a little less hardy than 'Nagami.' rev 6/2011

'Nagami' [mature, on C-35](#) [closeup](#) *Fortunella margarita*. The most common variety, the one sold in stores. It has a moderate level of vigor but will still get the same size as more familiar citrus such as oranges, it just gets there more slowly. It has attractive, rather narrow, lance shaped leaves. It bears a heavy and quite ornamental crop of light to rich orange fruit to about 1" long, maybe slightly longer, with conspicuous oil dots in the rind. The rind itself is sweet, full of orange flavor. The sections are sour, and the taste experience is all about the play of sweet against sour, with aromatic orange flavoring suffusing everything. For the best experience let the fruit afterripen on the counter and lose more of their acidity. It bears better fruit in the hottest climates. Few seeds, but there is a seedless variant, 'Nordmann,' which is otherwise identical. Very frost hardy, to around 20F. rev 3/2011

Lemons and Lemon-like Varieties, Hybrids, or most anything sour and yellow [ornamental wall shrub, Filoli](#) lemons themselves seem to be descended from a citron, native to the foothills of the Himalayas, crossed with a sour orange. So there is really no such thing as a "true lemon." Just a "true citron." But that's okay, we know what you mean anyway. Extant varieties appear to be mutations of previous strains. They are tender, and don't take much frost, except for 'Meyer,' which is likely a hybrid

with a mandarin or orange anyway. Lemons are probably the most responsive citrus of all to fertilizer. They will let you know if they want more and they will let you know if they are happy. They also all have noticeable, large, fragrant flowers with a scent that carries well off the plant. Lemons are always afterripened, or "cured," before being brought to market, to allow breakdown of pectins, resulting in juicier fruit.

It is easy to take lemons for granted in California. You have to hear a Brazilian citrus grower wax on poetically about how much he loves lemons, how intrigued he is by them, how much he loves everything about them, to appreciate the difficulty of being able to grow a good lemon. They need it warm, but cool at night, a cool winter, but almost no frost, and relatively dry air most of the time. These conditions apply to a very small fraction of the Earth's surface. You can't grow them in the tropics, it is too hot and they get all kinds of leaf and fruit diseases. And they are famously frost tender. So only the warmer Mediterranean-climate areas can produce them well. In the tropics 'Bearss' ('Tahitian') lime is the substitute, being acidic and yellow at maturity, especially in tropical heat. It is not well regarded by those who lust after lemons. But that is why they call it "limon" in most of Central and South America, and accounts for much confusion. rev 11/2010

'Eureka' [sectioned](#) [fruit, with kaolin sunblock spray](#) [about 6 years, Carrizo](#) this is one of the two "true" lemons that is commonly encountered, the other being 'Lisbon.' The differences between the two fruits are so minimal that even experts probably couldn't tell them apart off the tree. But as a plant 'Eureka' will be wider, less evenly shaped, harder to control, a little less thorny, and tend to bear fruit all year instead of in two primary waves like Lisbon. The fruit are held farther out on the branches, making it marginally less adapted to frost since more of the fruit will become burned due to not being protected under the canopy. But the plant is equal in hardiness, or lack of hardiness, to 'Lisbon.' There are a number of minor commercial variants available (Allen, Limoneira 8A), all differing only in their bearing timing, by a week or two. The differences between them can be ignored unless you are a commercial grower. This originated in California as a seedling of an Italian variety. rev 2/2010

'Interdonato' [sliced](#) this is a mostly typical lemon, hard to distinguish from the common 'Eureka' or 'Lisbon' at first glance, whose primary features are that it is very early (often ready by fall) and that it has a tender, sweet and edible rind (as opposed to tough and bitter). It is reported to be a lemon-citron hybrid found in the late 1800's in Italy. The citron parentage would explain the sweet, fragrant (and good!) rind flavor. The tree is mostly thornless (yay!) and the fruit mostly seedless. It is heavily produced in Italy and Turkey for domestic use as well as export. I have read it has a faintly bitter taste, but I didn't notice that when I tested it for flavor. You can safely buy this lemon and use it for any lemon application as well as being able to eat the rind fresh or coat it with chocolate, etc. If you do coat the peel in dark chocolate please bring us some for evaluation purposes. rev 4/2011

'Lisbon' [as floral decorations, HortiFair](#) [typical fruit](#) [cut](#) [on Troyer \("standard,"\) 15 years](#) a seedling from fruit of Portuguese origin. This is the best lemon to plant if you want "true lemon" flavored fruit, as they call it, and you have the climate to pull it off. If you buy a lemon at the store this is almost certainly what you will get. It has a much more regular, pleasing form in the garden than its close competitor, 'Eureka,' which is a gawky, hard to handle mess. Lisbon also protects its fruit better from frost by holding them mostly inside the leaf canopy. 'Eureka' is classified as everbearing, but in the end 'Lisbon' produces just as much fruit, set in two major flowerings in spring and fall, and scattered bloom the rest of the year, and the fruit hold forever on the tree, so you won't lack for lemons with 'Lisbon.' And it is a much nicer plant to look at or live with. My own mature plant set so much fruit that I had one lucky-to-be-alive person regularly stealing them (also our persimmons), and selling them to local restaurants and markets, and we still always had enough (of the lemons, anyway). The fruit are ready to use when just turning yellow but I prefer them after they have held for a while and become deeper yellow. At that point the acidity is lower and the flavors are higher, leading to a richer lemon experience. Even russeted fruit are perfectly acceptable, though shippers would never send them to market. Starts to show damage below about 30F and really, really doesn't like going below 25F, showing its displeasure with extensive branch dieback, blackened leaves, broad, dead cankers on the trunk that ooze amber sap like open wounds, and other disgusting and unpleasant to look at symptoms. Young trees characteristically concentrate on growing for a year or

two before they settle down and start to bear fruit. rev 11/2010

'Meyer' [closeup](#) [mature plant at UCR Lindcove Research Station](#) [natural, untended plant at Gene Lester's](#) [fragrant flowers](#) a.k.a 'Improved Meyer,' but the only thing they did to improve it was to remove the latent Tristeza virus which had become embedded in trade material. Since this variety can be almost symptomless it will act like a Typhoid Mary for other, more sensitive varieties. This extremely popular, probable sweet orange-lemon hybrid was found growing near Beijing, which is a very cold area of China. For all the importance and mystery of this clone it is interesting no one has yet bothered with any genetic analysis to determine its true origins. It is always a compact, wide spreading plant, usually to no more than 4-5' tall by 8-10' wide at full, unpruned maturity. It is highly ornamental because of the continuous, heavy production of dark golden yellow fruit. Its compact habit, relatively small size, and heavy everbearing nature combine to make it a fine, fine container specimen, even in small pots. The flavor is mostly lemon, with orange-like components. If left to hang long enough it can be sweet enough to eat by itself, especially when grown in hotter inland locations. It is craved by many and I would guess half the population considers it superior to standard lemon varieties. One of its strongest attributes is its copious production of juice. Another is that the fruit will hold up to a year in cool climates, and is still good and usable at that age. Some find it not lemon enough to be a "true lemon," but of course from reading the preamble to the Lemons you know such a thing doesn't exist. You are either in one camp or the other from my survey results. Those in a warm winter, dry summer climate can choose either type. For those in colder climates it is the only really lemon-like option, since it will take temperatures to near 20F and still survive, and standard lemons are dead toast by then. It is a spectacular bearer, showy enough to be a first rate ornamental for the fruit display alone. In the Central Valley or other very hot-summer areas the fruit mature to almost orange. This variety also has famously showy and fragrant flowers, and they can be produced all year if it is irrigated. rev 12/2013

'New Zealand Lemonade' see *Limettas*

'Pomona' see *Limettas*

'Seedless' ('Seedless Lisbon') [mature plant, never pruned, 13 years old on Carrizo](#) [fruit sectioned](#) usually sold as 'Seedless Lisbon' but not actually derived from 'Lisbon.' The fruit and tree are so close you would think so though. All the same fine flavor and growth characteristics, but without the seeds. Strongly acid, high fragrance, on a robust and fast growing plant, a shameless 12' tall by 15' across at full maturity. Determined pruning can keep it at half that size. Like 'Lisbon' it can take a year or two to settle down and start producing fruit. Produces fewer lemons than the regular 'Lisbon,' but that is still certainly a peck more than you can ever use anyway. rev 2/2010

"Sweet Lemon" see *Limettas*, below

'Variegated Pink Eureka' [mature plant, zone 9](#) [foliage](#) [fruit](#) [sectioned](#) this interesting sport of 'Eureka' bears highly variegated foliage, with leaves broadly margined in ivory and splashed and streaked with ivory and light jade green. It also bears quite ornamental fruit, striped yellow and green when young, with salmon pink interiors. It isn't quite a clean enough pink to make proper Pink Lemonade by itself, but it is a start, and it has "true lemon" flavor. The acidity and flavor are substantially weaker than on a regular lemon. The tree's highly attractive color and form weigh heavily in making it a superior garden subject to the regular 'Eureka,' which is a gawky, difficult-to-control, vigorous grower. It doesn't produce quite as heavily but since it still provides probably a factor of ten times more fruit than the average homeowner can use anyway, its ornamental qualities makes it much more valuable. The variegated foliage tends to restrict branch growth and this variant is a handsome and shapely subject, much smaller than the straight green 'Eureka.' This variety is really a valuable landscape item in its own right, citrus or not. It is clean and striking and pleasant to view. The deep purple new growth makes for a tricolor effect and it is really good in containers too. As you can maybe tell, I like this variety a lot. The fact it produces such interesting and worthwhile fruit is just glazing on the lemon tart. rev 2/2010

Limes and Lime Hybrids "true" limes are somewhat of a puzzle, since their parentage isn't fully known.

They are likely mostly of separate derivations. They are the only class of commonly available citrus that appear to have at least one ancestor outside of the three primary original species (mandarin, citron, pummelo). Limes may be a citron-lemon hybrid or be a hybrid of a citron with one of the wild lime-like relatives. The best feature of limes is their highly perfumed rinds. 'Mexican' ('Key') lime is tops for this, all others are measured against it for quality. Limes make great marmalade, but remove the seeds. rev 3/2011

'Australian Finger Lime' see **Weird Things and Ornamentals**, below

'Kaffir' or 'Kuffre' Lime see **Weird Things and Ornamentals**, below

'Bearss' ('Persian,' 'Tahitian') [sectioned](#) [fruit on the branch](#) [semidwarf, 12 years old](#) [Gene Lester's](#) this is probably best known as 'Persian,' because Bearss didn't really have anything to do with its origin. But then again neither did Persia, except that it passed through there on its way to Tahiti. As mentioned in the Lemon subject header, this is what is raised in much of the tropics where lemons can't be raised, and it is often referred to as "limon" because it is yellow at maturity, and sour, and is the closest thing they have. It probably originated near Tunisia. This is usually sold here primarily as a 'Mexican' lime substitute, and it can serve for that. In my moderate experience it is variable, but definitely most lime-like early in the season. Compared to 'Mexican' lime it has a more delicate, sweeter flavor, is less acidic, is shiny green to yellow green as it approaches maturity, then pale yellow when ripe, has seedless flesh (it is a probable triploid), is larger (to 2"), and is slightly hardier to frost. It can be green to pale yellow inside at maturity. This fruit will hold until fully ripe, then fall. Some people incorrectly assume this is a hybrid between a lemon and a lime, and they aren't far off as far as to where aroma, flavor and acidity can fall. For some this is a perfectly acceptable lime substitute, larger and more substantial than 'Eustis' Limequat, and truer in flavor than 'Tavares' Limequat. It even supports a commercial industry in Southern California. If it is big, and shiny, and green, and in a store, it is almost certainly 'Bearss.' The sweetened juice is pretty good, but nowhere near as floral and impressive as that from Mexican Lime. Makes a decent container plant but gets large, so needs regular pruning. This variety inherently carries a genetic disorder called Wood Pocket, and starts to decline after about 15 years. If you have the climate to grow "true" lemons, you can grow this lime. rev 11/2010

'Eustis Limequat' [sectioned](#) [10 year old plant](#) [on the branch](#) I am keeping this where it should be properly considered, not with the kumquats. This is an enormously useful little dynamo, almost completely ignored and definitely under-appreciated. They are passable as a kumquat, but with acid lime/sweet lime rind flavor as opposed to acid orange/sweet orange in true kumquats. And honestly, the rind never gets as wonderfully sweet as it can in kumquats, nor as fragrant as 'Mexican' lime. But its true value lies in application as a lime substitute: it may be the best lime-type citrus you can grow after 'Mexican' lime, which is iffy or worse in most of California for frost reasons, as well as a gigantic plant even on dwarfing rootstocks. I consider this one of the best citrus of all for home gardens, because it produces so much fruit from such a small plant and it can be tucked in almost anywhere. It bears clouds of small, 3/4" - 1" wide by 1" - 1 3/4" long fruit, almost as big as Mexican limes, that turn medium yellow at full maturity. When used as they just start to turn from green they have a good, true lime flavor, with about equal acidity in cooler areas and only slightly less where summers are very warm. Seeds are minimal. It can take about as much frost as a kumquat, which is lots (24-25F?) and keeps on producing, though it will lose fruit below 27F. It is climatically adaptable and cold hardy (grows pretty near anywhere), it fruits heavily and consistently and year-round, it is pale green inside (*never underestimate* the importance of color on perceived flavor!), it tastes close to a real lime, it has a similar, wonderfully spicy, almost allspice-like true lime rind aroma, it has few seeds, it is small and dense and attractive and willowy, and it can be grown handily in almost any size container. About the only drawbacks are that the fruit are small and they lack the true, heavy, floral/bubblebath rind fragrance of 'Mexican' limes. It makes good limeade, quite intense, and equally killer Margaritas. You just need to mix equal amounts of lime or limequat juice with Tequila, add a splash of Cointreau to taste (instead of the inferior Triple Sec), and then ice. Once you taste one of those you are going to need a long row of these useful little trees. Another of its higher uses is being dropped into my favorite Chardonnay (gin and tonic). I sold quite a few of these plants when I worked in retail, and I never once had a dissatisfied customer come back. In comparison, consider the competition: the 'Rangpur' is just a really sour orange, interesting for other uses, and acidic, but

lacking any true lime flavor. 'Bearss' is probably a better lime substitute for those who can *almost* grow real limes. But it is still very tender, and in cool areas the lime flavor goes lacking. 'Tavares' limequat is slightly larger, but often the wrong color (yellow orange at maturity, yellow inside) and has stronger orange/kumquat flavor that tends to overwhelm the lime essence. Zones 8-9, 13-24. rev 8/2011

'Mary Ellen Sweet Lime' see **Limettas**, below

'Mexican' MEXICAN LIME, KEY LIME [sectioned](#) [C35 and Carrizo, 16 years old](#) Mexican Limes have the best flavor of all limes. The rind aroma is quite floral in nature (but also righteously bitter), almost perfumy (their diagnostic feature), the flesh is strongly suffused with lime essence and is highly acidic. In the tropics they will mature to green skin (as will most citrus, including oranges) but in because of our cool nights California they color more strongly to a light, blond-yellow. The interior will still be light green though. Heaviest fruiting is mid winter but they are mostly everbearing. When the December-January crop is ripe it will positively rain off the tree. This is the small, usually yellow, dull, lumpy, humble thing you often find sold by the bag in ethnic markets, or even large supermarkets where there are lots of Central American or Asian immigrants. It is superior in almost every way to the bigger, much greener, shiny, beautiful looking limes ('Bearss') that most American shoppers gravitate to. Try using 2-3 fruit squeezed into a glass, with at least a tablespoon of sugar for each fruit, and 2-3 drops of vanilla extract, for a killer limeade. Use it in Margaritas. Make *real* Key Lime Pie using these *real* 'Key' limes (not 'Bearss'!) then bring me some because that is probably my favorite dessert! This is yet another citrus whose leaves are used in Indonesian cooking, referred to as *jeruk nipis*. (Zones 9, 13, 16, 19-24. rev 8/2011

'Mexican Thornless' MEXICAN LIME, KEY LIME [sectioned](#) [C35, 13 years old](#) the main problem with Mexican lime is that it is the most tender citrus, along with citrons. The second biggest problem is that they are depressingly thorny. The third problem is that they grow very large. A large, tender, *thornless* lime is better than a large, tender, *thorny* lime, except that this thornless version grows about 25% larger than the thorny version, and bears about half as much fruit. But since the fruit tend to rain off the plant heavily (heavily!) in late winter, I can guarantee you will have far more than you need anyway. Zones 9, 13, 16, 19-24. rev 8/2011

'Sweet Lime' see **Limettas**, below

Limettas a small group of slightly strange citrus, possibly the product of a sour orange crossed with a lime, with about six variants now available commercially. They vary in acidity, with some sweet enough to eat fresh, others being consistently sour, and still others producing completely acidless fruit. Often lumped with limes or lemons, they actually form a small but discrete cluster that is interesting to the fruit enthusiast, breeder, cook, and collector. Most have large, round, distinct, recessed distal nipples and very interesting and useful rind fragrances. rev 12/2013

'Mary Ellen Sweet Lime' SWEET LIME, LIMA DULCE [sectioned](#) [closeup](#) [5 years, C35](#) a "sweet lime," more properly an acidless limetta, since under very cool conditions the fruits have neither acidity nor sweetness, and therefore taste "like a drink of water," as Gene Lester so perfectly describes it. If grown warm enough they will develop enough flavor and lime essence to satisfy the craving in those who say they will *just die* without this fruit. This includes Mexicans and other Central and South Americans, Middle Easterners, Indians, and Southeast Asians. So pretty much this is everyone except Caucasians from North America and Eurasia. This fruit is so popular with our workers that they will cut slits into our plastic stock plant greenhouses and steal the fruit. As far as many of them are concerned, this is *the best* fruit of all on Earth. This grows as a large, rounded plant to about 7-8' high and can be extremely heavy bearing. It is somewhat more frost tolerant than Mexican Limes, but not much. This is a seedling selection of Mexican Sweet Lime, the similar Palestine Sweet Lime is essentially identical but has a sweet (as opposed to bitter) rind. That shouldn't be a major point of distinction, since our own seedlings were about half sweet, half bitter rinds. These sweet limes aren't true limes at all, but according to genetic analysis belong in a weird twilight zone hybrid grouping that was formed by the unnatural coupling of a sour orange with a citron. Zones 8-9, 13, 16, 19-24. rev 5/2010

'Millsweet' [sectioned](#) [afterripened, then sectioned](#) [heavy harvest](#) [closeup](#) [Maya and Dinesh look guilty! 6 year old tree, C35](#) often referred to as a sweet lemon, this is actually what is known as the 'Mediterranean' Limetta. It was brought to California by the (real) Padres very early and is therefore possibly the oldest citrus still in production here. General Vallejo is quoted as having eaten this fruit as a boy in Monterey as early as 1826, and the variety was resurrected by J.W. Mills at an old field station at Pomona in 1914, who budded from trees at the San Gabriel Mission. Likely these trees were started at some point between when Mission San Gabriel was founded (1771) and 1800-1810. This is a large fruit (2 1/2" across), golden yellow to actually pale golden orange at full, after-ripened maturity ("cured"), and slightly ribbed. It is *almost* acidless, being sweet, very mild and slightly lemony. Most of the flavor experience comes from the fragrant skins, which have a light, typical, "limonetta perfumy boquet" that is quite flowery and also has components of both lime and lemon. It has just enough acidity to be yet another candidate for one of the many Holy Grails of citrus, the "fresh-eating lemon." The fruits are light to medium yellow inside and they can be almost seedless to seedy, but the seeds are skinny and easy to deal with. It grows as a shapely, broad leaved tree, and can be very heavy bearing. It produces throughout the year but heaviest in winter to early spring, like almost all other citrus. This is yet another variety sure to be loved by peoples from the tropics, who long for low-acidity fruit. There is a reason Maya (Indonesia) and Dinesh (Sri Lanka) were loading up! rev 8/2011

'New Zealand Lemonade' [young tree, just beginning to bear](#) a limetta grown as a home variety in New Zealand, and recently released from the California "citrus health department." When properly ripe it can taste like a fresh-eating version of a lemon, just like regular oranges are the fresh eating version of a sour orange. I tasted it in mid-spring and was tangy, sweet-tart but still mostly tart, lemon-like in flavor and overall "good." It is a very close analog of both 'Pomona' and 'Millsweet.' Like other limettas it has somewhat ribbed fruit but lacks the prominent distal end nipple. The young plant pictured was growing in a restricted area of the UC Citrus Research Station. It appears to be capable of reaching 7-8' tall and wide on dwarfing rootstocks (C35, Carrizo, Troyer, etc.). In New Zealand fruit ripen mostly late winter to early spring, with some summer fruit following. Most likely this variety will vary in sweetness and acidity depending on the year, location, and possibly soils and irrigation, just like its two aforementioned cousins. All seem to be very consistent, extremely heavy bearers. Without at least modest summer heat this is likely to be tart. Zones 8-9, 13, 16, 19-24. rev 12/2013 **NEW for 2014!**

'Palestine Sweet Lime' [sectioned](#) [shape, 22 years on standard rootstock](#) this is functionally identical with 'Mary Ellen,' but it has a sweet (edible) as opposed to bitter rind. The dried rind is used as a delicacy in Mexico, eaten directly in small pieces almost like candy, or shredded and used over fish with dill and olive oil (gotta try that!). Besides its lime-like flavor it has vanilla/coumarin essences as well. It is of Middle Eastern derivation as opposed to Central American origin, but almost certainly this is the same variety as 'Mary Ellen,' as seedlings I once raised from fruit sourced by my workers from a local farmers' market sorted out to half bitter/half sweet rinds. Like 'Mary Ellen' this fruit will turn deep gold, almost light orange when fully ripe, often shows a large, rounded, distal nipple, and can hold on the counter for a couple of months after picking, becoming even sweeter and more flavorful. This variety can bear very heavily. I have seen a tree so completely packed with fruit the branches were splitting the main trunk. It tends towards a spreading habit. Like 'Mary Ellen,' this sweet limes isn't a true lime at all, but according to genetic analysis belongs in a weird twilight zone hybrid grouping that was probably formed by the unnatural coupling of a sour orange with a citron. I have seen specimens undamaged by a freeze that cut back Mexican limes and citrons, but it isn't going to like much more cold than those varieties will tolerate. Zones 8-9, 13, 15-16, 19-24. rev 2/2012

'Pomona' this is possibly the best version of the "fresh eating lemon" we have, i.e. something that has lemon taste and aroma but has the same sugar/acid balance and rich intensity of an orange. It has typical limetta characteristics, such as a prominent distal nipple and coarse longitudinal ribs, but I don't remember if it has the distinctive, floral rind aroma though the the UCR Variety website says it does. It was originally collected by the famous Tom Spellman when he was working for La Verne Nursery, from a very old tree in the city of that name. I have tasted it and it is very good, sweet,

lemony, and with just the right amount of zing. It will probably need some heat but certainly calls for testing in cooler climates. Grow it too cool and I suspect it will start to resemble a real lemon. It survived the 1990 freeze with temperatures below 20F, but the plant was of course very mature. This may be a seedling, hybrid or sport of 'Millsweet.' Sunset zones 8-9, 15-17, 21-24/USDA zone 9. rev 2/2012

Mandarins and Hybrids (Tangelos, Tangors, etc.) *C. reticulata*, one of the three basic roots of the citrus family tree. Also generally known incorrectly as "tangerines," a term properly reserved as a trade name for 'Dancy' Clementines imported from Tangiers. Mandarins are usually small and basically orange-like, but are almost always very sweet, intensely flavored, and heavy bearing. Gene Lester observes, "There are hundreds of mandarins, and they are almost all very good." The one drawback common to almost all mandarins, *all* mandarins, is that they will tend to fall into an alternate bearing pattern. One way to handle this is to have two varieties, and strip one tree the first year and the second tree the next. That way you always have one tree with a crushing level of production while the other is saving its strength. With single trees you must thin. Also important is stripping old fruit before next year's flowering because held fruit will strongly inhibit bloom. In its most severe form, known as "Murcott collapse" after the outstanding and extremely heavy bearing 'W. Murcott' variety that is particularly prone to this malady, the entire tree just dies from carbohydrate exhaustion. It puts everything it has into one fantastic, ultimate, blow-out, mother of a branch-breaking fruit party, then has nothing left, and so dies. Mandarins have a distinctive odor, hard to define, complex, a mix of several critical essences, but variously musky, orangey, wine-like, and often rue or caper-like as well. The varying levels of these aromas are what make them such an interesting group by themselves and for breeding. rev 3/2011

Clementine encompasses a wide a range of bud mutation cultivars, of varying difference from the parent clone. They all taste very good but they all taste very much alike. If you have tasted one Clementine, you will recognize any other. The most important distinguishing feature is that they are very mild; that is, they are very sweet and when ripe are low in acidity and this is a feature that consumers greatly value. They resemble Satsumas but are slightly firmer, slightly stronger in flavor, slightly more acidic, usually quite seedy, and often a little more or very much more difficult to peel. This is probably the most important mandarin group in the world from a production standpoint. Clementines are considered the finest mandarins for many. They are distinguished by deep, deep red orange colored fruits that are moderately small (1 1/2" - 2 1/2" across is typical), a heavy, strong, orange flavor with just a small amount of the winey, pungent, musky and slightly bitter "classic mandarin" essence. They fruit very heavily, adapt to a range of climates, are well shaped and have ornamental value, and are rather frost hardy. One quirk is that although they are all very sweet and low in acidity at maturity, they often fail to ripen properly when grown in cool coastal regions, going quickly from acidic to puffy, dry and overripe. They will be very seedy if planted near other citrus, and they need thinning/shaping or the fruit tend to be small. Like all mandarins they can drop into a strong alternate-year bearing pattern. Spain exports heavily to this country from November through January, and Clementines have kicked butt on two other strong favorites available at the same time, navel oranges and Satsuma Mandarins. That says something, and I think what it says is that consumers prefer sweeter, less acidic citrus that is easier to peel than much of what has been offered in the past. rev 6/2010

'Caffin' [sliced at Gene Lester's](#) a smaller variety, both in size of fruit as well as overall plant height, that bears very sweet, mildly flavored fruit with a thick but really easy to peel rind. The fruit is usually about 2" across, deep red orange, and seedy like all other Clementines. It is earlier and a little juicier than other Clementines. The tree is highly ornamental, being very compact, with large leaves, and bears more lightly also. What this means is you will have less fruit to clean up off the ground since the crop will still ripen faster than you can eat it or force it on your friends and neighbors. Zones 8-9, 13, 15-17, 21-24. rev 6/2010

'Fina Sodea' [fruit](#) an important early variety, ready after Satsuma but before the important later types like 'W. Murcott/Tango.' Sweet, easy to peel, seedless in isolation but seedy in most home situations, it is of fine flavor and produces heavily. The fruit are of a convenient size, and as long as you are away from the fog belt you should produce excellent quality fruit and be very happy with giving up space in the garden to this one. Low in acidity, dark orange outside, light

'Nules' [fruit sliced](#) [on the tree](#) [in the box](#) [5 years old, on C-35, with reps feeding faces](#)

this is a perennial favorite at the CRFG tasting tour of the UC Citrus collection, consistently ranking in the top ten of *all* types of citrus tasted on the tour, from year to year, even in competition with the large range of every other type of citrus tasted (sweet orange, pummelo, mandarins, etc.). It might not only be one of the best of the Clementines for California (or for the Central Valley at least), but its popularity even extends worldwide. It consistently has a strong, rich flavor in most countries where it is grown. It has an extended bloom, which of course leads to extended harvest, from roughly December through April for most areas. It has a shiny, deep red orange fruit, a red orange interior, it is almost as easy to peel as a 'Satsuma,' has a modest number of seeds, and gets about 1 1/2-2" across. It is blessed with a very sweet and rich flavor along with strong fragrance and aroma, strongly mandarin, slightly musky, hints of pineapple. It is also quite juicy. Highly recommended for almost all regions. rev 6/2010

'Dancy' TANGERINE [have a slice!](#) [heavy crops](#) [nice tree](#) a medium size fruit of American origin grown for its rich flavor, ease of peeling, intense color, and the fact it was ready for the holidays. The seedling tree was of fruit from trees originally from Tangiers, and hence the name, which has become loosely synonymous with "Mandarins." A tangerine (Clementine) is a mandarin but most mandarins aren't tangerines. This is a typical Clementine with sweet flavor, low acidity, round shape, soft texture, very juicy flesh, seedy interiors, and early ripening period. One difference is that it has a slightly pine-like flavor, similar to Retsina, as an undertone. This was formerly a very important commercial variety but it has been replaced recently by less handling-tender varieties. A medium size, dense plant, it produces flattened round fruit, and very small neck and indented base. The tree is compact and quite showy when in full fruit, and is a typical alternate bearer. This variety is best in the hottest areas and like other Clementines it tends to be acidic in cool, coastal regions. rev 6/2010

'Daisy' [whole](#) [sectioned](#) [box](#) big (your eyes say 4" across, easy but the ruler says just over 3 1/2"), deep red orange, almost round, but slightly flattened. The sections are filled with large textured, firm vesicles that are moderately juicy. This is a large, moderately strongly flavored mandarin-type hybrid that should be intense enough to please the citrus pro, but not so much that it overwhelms the amateur afficianado (me, you). It is more mild when fully ripe, especially when afterripened (cured), very juicy, with strong mandarin flavor but also good sweetness, and with a faint and pleasant mandarin bitterness. It can be successful in near coastal-environments, growing and ripening well for Gene Lester in Watsonville. The section membranes tend to be a little tough in homage to its pummelo parentage, but is low in seeds. This is a good one to eat sliced into vertical sections. UCR says this is a hybrid between 'Fremont' and 'Fortune' and better than either parent, and having tasted all I would agree. The rind has vanilla, pineapple, tangerine fragrance and a faint, pleasant musky undertone close to that of soursop or other Annonaceous fruits. It grows as a large plant, with large leaves. There will be a seedless version released around 2014. rev 2/2012

'Fallglo' [fruit](#) [5 years, Carrizo, at Lindcove](#) this large (an honest 3" across), slightly flattened mandarin matures to a light, almost yellow orange color. It has a very interesting, wine-like flavor, with a touch of lime, and a hint of typical musky mandarin on top of the usual "tangerine" flavor we expect from mandarins. It is very sweet, moderate to low in acidity, and moderately seedy. The fruit are very heavy and the fruit fill well. Due to its mild impact we could probably sell lots, since low/moderate intensity citrus are so widely popular. The name comes from the fact that supposedly you can begin to harvest it in October. I haven't had it before January, and it was pretty good then, so I wonder how acidic early fruit is going to be. The tree is a quick grower and is about the same size on either C35 or Carrizo. It is dense, fine textured, evenly shaped and makes a good ornamental. rev 11/2010

'Fremont' [sectioned fruit](#) this is a very interesting mandarin hybrid, very much like the sublime 'Nova.' It has an intriguing, musky, very rue-like rind odor, and a very strong, sweet, classic tangerine/mandarin flavor (as opposed to orange flavor) with another distinct component very much like balsam or pine. It is usually noticeably red in late winter, especially where fruit are sunlit, most

especially where it receives good summer heat as well as fall-winter "refrigerator" conditions (NorCal interior valleys, Central Valley). The fruit are medium size, 1-1/2" - 2 1/2" across, round to slightly flattened, moderately to very seedy, and quite juicy and therefore heavy for their size. The rind is thin, shiny, and smooth but with a distinctive circular ring around the base like Page. In all but the coolest areas it is very heavily productive and of good quality. rev 9/2011

'Gold Nugget' [sectioned](#) [fruit](#) [12 years old, unpruned, C-35](#) this is a relatively new UC Riverside breeding program release (1999), bred from two obscure parents ('Wilking' and 'Kincy'), that is small in size (to about 1 1/2"), round, medium orange to yellow orange, with coarse, poorly defined vertical ribs, seedless or almost so (even in mixed groves), has an intense flavor, high sweetness, and an excellent sweet/sour balance. The originators state that taste test panels rate it "one of the very best flavored citrus in the world," from recent info referring to late season fruit in particular. I like it, but I don't think it is that much better than many other mandarins. I can personally report that what is most enjoyable about this variety is that it is a nice, smallish size, it is easy to peel, it is of only moderate acidity, the orange-tangerine essences are quite intense, and it has the distinct, additional sprightly flavor of pineapple. The skin is low in Mandarin muskiness. It is usually identical in size on either C-35 or Carrizo, somewhat large in hot summer areas and substantially smaller in coastal inland valleys. It is very heavy bearing, and heavy fruit set on long branches can induce a semiweeping habit. It is quite useful also since it ripens beginning in March, which is very late, and holds well on the tree until May or June in Riverside and much, much longer in cooler Northern California climates. In fact Gene Lester reports it will hang and remain good for over a year at his zone 16 Watsonville location. This is one variety that *likes* to be pruned, rewarding you with larger, better quality fruit. rev 2/2012

'Honey' ('California Honey') [sectioned](#) [peeled](#) [mature tree](#) [at the Lester Estate](#) [heavy fruit set in Watsonville](#) this thing needs a new name because it gets confused with the other citrus that stores sell as "Honey," which is actually straight 'Murcott,' not to be confused with 'W. Murcott,' which is different again. Got that? So this is best known as 'California Honey.' This is an *almost round* (instead of flattened), 2 1/2 - 3" fruit that is light yellow orange, with a *rough skin* (instead of smooth, and shiny, and often mottled green) that is thick and easy to peel, sometimes coming off in one piece. Inside are segments with large vesicles that are almost chewy, have a low juice content, and an almost bland, almost straight orange flavor. In flavor and texture the two "Honeys" are actually rather close. The pummelo influence is clearly evident in the vesicle size and lack of juice and the lack of acidity. This is a good variety to try in coastal areas just because it starts with low acidity, and so should be a little more tart and interesting in cooler areas. rev 11/2010

'Kishu Seedless' [four years, C-35](#) [closeup](#) [sectioned](#) this is currently a heavily promoted and quite popular variety. Its positive attributes are that it is heavily productive, moderately sweet, of very low acidity, has a moderately strong orange flavor, is easy enough to peel that you can do it with one hand, and can be eaten by the armload. The puffy skins on the small, 1-1 1/2" wide fruit sometimes are so loosely filled by the segments that they are baggy, and look stepped on. But inside there is a little round fruit rattling around that you can easily pop into your mouth in one bite. This is being recommended as a great fruit for children since it is seedless and so easy to peel and not that intense or overpowering in flavor. And you don't have to bite into it to start to peel it and thus irritate the edges of your mouth with rind oil. Its one big drawback, that it will neither fall nor hang. It starts to rot from the stem end when it has passed maturity, and sometimes you won't know it until you open it. However if you are hitting your tree hard at harvest time they will likely be coming off as they deepen in color, and so staying too long on the tree will never be a problem. If you don't eat all the fruit right away, the old pieces should be stripped from the plant. A compact grower, slightly larger on Carrizo. rev 11/2010

'Minneola' [fruit](#) [on the table](#) [sectioned](#) [12 years old, C-35](#) one of my personal favorites, a hybrid of a grapefruit ('Duncan', the very best flavored, though very seedy) with 'Dancy' tangerine. It isn't new, it was developed in the 1930s, but it has only risen to produce market prominence relatively recently. It often develops to a deep red orange color, though the interior is always medium orange, and has at least some kind of defined neck, though other tangelos can also show this last characteristic. When perfectly ripe it has a good balance of sweet and sour, with heavy, tangy

pummelo and mandarin flavors, hints of chardonnay, and a slightly musky aroma. It tends to be very soft and juicy at full maturity. My first experience with a GOOD 'Minneola' was at Bob "The Pecan Man" Winters' home orchard, on sandy loess soils on the north side of Fresno. Bob walked up to his tree and carefully looked the fruit over, then selected one and handed it to me. Then he stood back to watch my reaction. I peeled it and tried a section and right then and there everything just instantly stopped. I heard harps playing, and the sun shone on golden clouds against a pure sapphire blue sky, and for about thirty seconds I was overwhelmed with the powerful flavor and with the realization of just how good citrus can be when they are done really right. Then the hands of the clock began to move again and I came back to reality and there was Bob standing there, grinning at me. The primary problem with 'Minneola' is that it is inconsistent. As often as you find good fruit in the store you find mediocre or bland fruit. Even worse is when it is underripe and acid, because it can be memorably acidic if it isn't ready. In the home garden it will vary more than most citrus from year to year. But at least there you can let it hang to full maturity for best results. And full maturity rarely comes before February or March and can extend into April, even in the Central Valley. I tasted Bob's fruit late enough that in the Sierras, snow was melting at around 6,000'. Avoid early fruit, and choose those that are heavy, with very smooth skin, where the pores have almost disappeared. This variety is often recommended paired with a pollinator, which is a waste of time for most home gardeners. Though the plant sets more fruit with a pollinator, in fact it sets too much, and then it just needs to be thinned for proper size and sweetness. Plus the pollinator initiates seeds, because it is seedless if planted in relative isolation. The fruit will be bigger with seeds, but again you are probably going to have more than enough anyway. Avoid the pollinator. It makes a reasonably good variety for zone 17, though it will always be a little more of what they call "sprightly," but just let it hang and hang and hang and it will continue to sweeten. With experience you can intercept it before it gets overripe (segments dry and puffy), and thus it makes a valuable addition to the limited list of varieties suitable to cooler areas if handled properly. Also, being half pummelo, it definitely benefits from afterripening to lower the acidity and bring out the more subtle flavors. rev 11/2010

'Murcott' ('Honey,' 'Florida Honey') [Clark with his tree, October](#) [fruit on a plate](#) the real McCoy,' but often a different fruit from what is sold as 'Murcott' in grocery stores (which can be 'W. Murcott Afourer,' a related but separate offspring, with distinctly different fruit, that is itself hugely important to growers and produce vendors the world over - see below). This, the true, parent 'Murcott,' is a top secret variety - so don't tell anyone about it! You know it from the store as that very shiny, slightly flattened, medium sized mandarin of light orange color, often with rough or green blotches on the outside, with very sweet, very firm and "dry" flesh (as opposed to soft textured, squishy, and squirting juice all over you when you bite into it). It is usually quite seedy. Commercially it is not well-suited to California growing conditions and is really only grown for market in Florida. In stores it is usually labeled "Honey" or "Florida Honey." The reason it is top secret is that almost no one recognizes how spectacular it is as a California home variety. It is one of a very few citrus that will ripen from spring through fall for most of California, and gives great quality fruit in the home garden. Most people live in cooler, more coastal regions than where citrus are commercially grown. Those cooler home growing conditions are exactly what make this original 'Murcott' so valuable and useful. Cooler days and nights will maintain higher acidity and give the fruit a much better sweet/sour balance, as well as accenting the various essential oils and flavors. This is a very good quality eating fruit when grown in home gardens. The cooler conditions also delay fruit ripening, such that fruit hold for more than one year, past the spring bloom, then start ripening from March until as late as October or November in Northern California. I think my friend Clark pulls fruit from his tree about ten months of the year, and he reports that it flowers over an extended period. Is that useful, or what? Did I mention it produces heavy crops of those excellent fruits? Plus it makes a very good ornamental, forming a dense, narrow, upright plant with nice, clean glossy foliage. It doesn't get much respect due to the less-than-spectacular quality of what is available as produce. I think that is why it doesn't have almost any presence in retail nurseries, because people tend to buy what they see and enjoy in grocery stores. But I recommend this as a very important home variety, and I even think it has commercial possibilities for production outside the traditional citrus-growing zones. rev 9/2011

'Nova' [fruit](#) [16 years Carrizo \(front\)](#) [C35 back](#) really, really good, consistently one of my favorites. This is a wonderful hybrid of a Clementine ('Fina') with 'Orlando' Tangelo, and is quite similar to 'Page.' It is a very intense, moderate acidity, high sugar level, high essential flavors type of fruit, mostly orange-flavored in nature but with a good, sprightly mandarin bite. Another of its important features is that the fruit are highly ornamental, tending to be very highly colored outside, often

showing a very deep red orange. This is most obvious in the citrus areas of the Central Valley but also occurs along the cool coastal plains of Northern California, which is highly unusual, since everything (including blood oranges) tends to ripen there to yellow or very pale yellow orange, at best. The rind has intriguing aromas, especially when just becoming ripe, involving licorice, fennel, and wintergreen, or some other minty component, along with mandarin and the typical musk. It is usually mostly seedless, unless grown in highly mixed blocks, and characteristically very firm, to the point of being almost hard, but dissolving into lots of juice when eaten. There is something very satisfying about the hard nature of this fruit coupled with the intense flavor. It is the opposite of a citrus that is quite soft and wet in nature and thus dissolves into a mess of liquid dripping all over your chin, then shirt and sleeves when you try to peel it. It is small, rich medium orange inside, mostly round to somewhat flattened, 2 - 2 3/4" across, with a slightly indented base and a miniscule neck when very ripe. It is very easy to peel once you get it started but the skin clings tighter than others. It does best cut into vertical wedges. I have had high quality fruit that were grown under relatively cool conditions, and of course it does even better in hot summer climates. The fruit appear to hold really well until ripe. They also hold extremely well after picking due to its partial pummelo heritage. I have had excellent fruit up to two months after picking, and they will last even longer in a cool location than sitting on my warm kitchen counter like my test samples did. This is an excellent home garden variety and grows the same size on either C35 or Carrizo rootstocks. According to Lance Waldheim, it often does not produce really good fruit until several to five years old, and Gene Lester reiterates this, and reminds us this is actually common for mandarins in general. The seedless variety will be released by UCR in 2013-2014. rev 11/2014

'Orlando' [beautiful sections](#) [Ken Brizzi and Keith Miner help out an overburdened tree](#) a mandarin/pummelo hybrid (tangelo) with a strong, tangy orange flavor and just a hint of mandarin. It is sweet, and most importantly I have had fruit from relatively cool locations that has been of very good quality. This would be a good orange substitute, or would be another mandarin for those looking for varieties for near-coastal regions. The fruit are small, not over 2 1/2" across, deep orange, with a flat bottom and a vestigial navel. Sometimes have they have ridges, and there is a puckered top but no neck. It is very "wet" (juicy), moderately seedy in mixed blocks, and tough to peel. That's okay, because I eat almost all citrus sectioned vertically into eighths, being the fastest and most efficient way to process a bag of fruit. It is easier to remove the seeds that way, and involves the least amount of chewing effort. rev 11/2014

'Ortanique' [fruit](#) [typical yield](#) [untended tree at Gene Lester's](#) this is a compact, very nice looking tree that arose as a presumed natural hybrid in Jamaica, classified as a "tangor," or tangerine (Mandarin) x orange hybrid. It produces medium size fruit, with a short neck, that has a very good, strong, rich, intense (i.e. both acidic and very sweet at the same time) and distinctive mandarin flavor, and is very juicy. Late in the season it is low in acidity, high in sugar, and still very juicy. It is a little difficult to peel, and of variable seediness (depends on its neighbors), so my favorite way to eat it is - again! - to cut it into vertical wedges. It is late ripening, February and March in Central Valley and Southern California locations. This is a fruit I had heard about for years and never tried until last year in Gene Lester's garden. I didn't expect much, thinking it would be just another sour, tangerine-like thing. I was wrong - and quite impressed. This was a very good variety, especially since the fruit had been ripened in a somewhat heat-challenged area. I don't know why this fruit isn't almost ever offered in stores except for the recurring sad fact that there just isn't room on the produce shelf for many of the great citrus varieties out there. If a buyer adds something, then something else has to go. When it is offered, it is often under another name so as to not confuse consumers or to limit the sales resistance normal for unknown varieties. The fact that it is hard to peel and also has seeds probably relegates it to second rank in the produce world, but this should be a great home garden variety. The tree looks good (compact, dense) and bears heavily. rev 11/2014

'Page' [sectioned](#) [Ranulfo and Alona with stock tree](#) [heavy fruit set](#) [characteristic distal rings](#) I have always liked 'Page' when I have tasted it, inland or coastal. I don't think I have ever had a bad one, ever, anywhere. That is an important observation. This is a 'Clementine' mandarin crossed with a 'Minneola,' from the Forties. It produces almost perfectly round, red orange fruit to about 2-2 1/2" across that show a distinctive ring around the distal end, as do a few other varieties. It has an interesting, rich, tangy, tangerine-type flavor, a combination of its two outstanding parents. It is very

juicy, usually only moderately seeded at most, well filled as opposed to being loose in the skin, and easy to peel. It is also quite firm, almost hard, as opposed to soft or tender. This is one of the more intensely flavored mandarin-like hybrids, and as such often shows up on citrus experts' list of "favorite citrus." Roger Smith of Tree Source says flat out, "This is the best tasting citrus fruit." I have tasted it at Lindcove, where it is outstanding, intense and hard hitting, with high numbers for both sweet and sour, plus intense orange and mandarin essences, as well as near the coast, where it was still quite good and not very acidic considering the cool conditions. It was also quite rich in flavor there, though tending towards a smaller mature fruit size. Fruit hold well on the tree, hold well on the counter (since it has some pummelo in it), and make lots of juice. I don't know a single citrus person who dislikes it. It is such a reliably flavorful selection that you just have to include it on your list of home garden winners. Just remember to prepare it my favorite way, sectioned vertically, where the seeds can be flicked out and no peeling is necessary. It grows with about equal height and spread to 8' or more with good vigor, and makes a good looking tree, well shaped, dense, even, compact, and quite showy when well colored with its prolific crop of intensely colored fruit. rev 11/2014

'Pixie' [fruit](#) [heavy bearing](#) [12-14 years](#), [C-35](#) this is usually an average size mandarin, to 2" across, but is often less, with a very short, puckery neck, of medium orange color, very sweet flavor, seedless, and quite easy to peel. It gets good after the first of the year, and achieves a very high sugar-acid ratio, and so is very popular because it is so sweet. It is very, very good, but usually not what you would call "intense," just very sweet. It has high consumer appeal, especially with children (small, seedless, easy to peel, very sweet). It is very sweet. (There is a message here - can you figure out what it is?). It produces heavily, on a large tree, and can hold well into summer. This is a UCR development released in the mid Sixties. rev 3/2012

'Ponkan' [fruit](#) [28 years old](#), [trifoliate](#) [big fruit!](#) this is a wonderful fruit, the most popular variety in China the very home of the mandarin. The relationship to the Satsuma group is clear, with its, subacid flavor and loose, baggy skin. It is a substantially larger, more open grower than any Satsuma however, and quite vigorous. It is also heavy bearing, with gobs of shiny light orange fruit hanging off it. The fruit on young trees is also larger, large enough to fill your hand. The skin is light orange, characteristically baggy, dimpled, puckered at the top, and with a short neck. The base is indented. When you section it horizontally it shows a distinctive star shaped center. It has a few seeds. It is always sweet, often extremely sweet, with excellent, high quality flavor, and after eating about a shopping bag's worth at one sitting I understood why it is "the most popular mandarin in China." Fruits are best eaten peeled and sectioned. The tree shown was stumped off in 2008 and had partially grown back at the time of my visit in 2009. The fruit were not very numerous because of that, but they were about twice as big as those borne by the previous aged canopy. In China this is very much valued, and it has been repeatedly used in breeding in an attempt make use of its superior sweetness and size. rev 3/2012

Satsuma the parent strain of this Japanese mandarin seems to go back to 550 A.D. according to James Saunt's excellent "Citrus Varieties of the World." The modern range of selections and variants all emulate from the original US introduction, 'Owari,' but differ mostly in bearing time. A few show small differences in flavor, sweetness or sweet/sour intensity, or peeling qualities. In its original country fruit from trees less than ten years old is considered clearly inferior. I can personally attest to the increase in quality as trees age. Growers here also notice that their best Satsuma variety is often the one that is the oldest tree, though for cooler areas Owari usually shines over the "improved" varieties. There are some new introductions that also may offer improved cold hardiness, but they haven't been properly evaluated yet. Semidwarf rootstock yields plants in the 8-10' range at *old* maturity, unpruned. They are usually clothed in broad, ornamental foliage held on somewhat long, weeping branches. rev 11/2010

'Owari' [on Troyer](#), [12 years old](#), [Lindcove](#) The standard since the Sixties, and the most familiar variety to nursery personnel and homeowners. Recently it is being replaced commercially by close derivations, many of which maintain higher acidity levels under the hotter conditions found in the commercial production areas or, mostly, vary slightly in bearing period to help spread out the crop. Rather light colored, with a distinctively loose skin, mild mandarin flavor, and low acidity. Dependable. Ornamental. Sweet. Good on the coast, good inland. Frost hardy. Usually

seedless. Beloved by children. Beloved by adults. Ornamental. Compact. Large, dark green leaves with a beautiful pendant habit. Do I need to keep going? The fruit can be somewhat bland some years in very hot climates, but in the coastal inland valleys and directly along the coast our cooler conditions maintains higher acidity. And while less sweet the fruit have more character, plus they are always juicy. This is one of the types you plant if you are someone who finds some citrus just too intense and overwhelming. The fruit can be up to 2 full inches across, but almost always smaller in home gardens, somewhat flattened in shape, with either tight or loose, almost baggy skin. This is one of the very easiest to peel citrus on the planet; often I can do it with one hand. The drawback is that they tend to pull a hole in the top when you try to get it off the plant, and so should be cut (Lysol those clippers first!) if you want them to hold for a while. In all climates this will be one of the first of all citrus to ripen but will hold reasonably well in coastal climates, much less so inland. In Santa Cruz my tree produced from December through March and they never got puffy and dry because we ate them all first. This is the variety that trained my son and daughter to love citrus. To 5-7' after many years on semidwarf rootstock, unpruned. One of the best for containers because of its attractive foliage and habit, and slow growth. rev 2/2010

'Shasta Gold'® PP 15,461 [fruit](#) [Carrizo rootstock, 17 years, with Maya](#) another UC release, this one TDE-2 (they go in order, and #1 hasn't been released yet). Deep red orange fruit have an attractive, knobby appearance. Fruit are somewhat flattened, 3" across ("Mammoth" in the California Mandarin standards), deep orange inside, seedless or almost so due to being triploid (which also means thorny), quite juicy, and heavily produced in an alternate bearing pattern. They are easy to peel and section into segments, and are best eaten that way as opposed to being sliced into vertical wedges or horizontally because the segment skins can be tough and chewy in the center. The flavor on this one is solid, very sweet, with only moderate acidity at full maturity, and with a noticeable and quite pleasant flavor somewhat like pineapple. It is almost seedless. Fruit holds very well on the kitchen counter. The plant resembles all the others, with broad, deep green leaves and a somewhat pendant, compact habit. Gene Lester, growing in a "warm" coastal environment says his fruit is ready 3-4 months after that of Lindcove, so figure cooler areas will be even later. rev 2/2012

'Tahoe Gold'® PP 15,461 [Carrizo rootstock, 15 years](#) [fruit sectioned](#) should be called "Tahoe Red." Another new, upcharged UC release (1992), used to be TDE-3. Quite similar to 'Yosemite' and 'Shasta,' (and also TDE-1, the only unreleased seedling) being a high intensity, high acidity/high sugar fruit with a large (to 3") deep reddish orange, shiny, flattened exterior, with orange, almost seedless interiors that are very juicy. The fruit is heavy for its size, and heavily produced on a compact, spreading, thorny triploid plant. Like the other two Golds it is probably best used only in hot-summer areas since I have only heard one opinion from someone west of the inland coastal valleys (Gene Lester) who said it was "just okay." I have tasted it at Lindcove and liked it quite a bit, but then I had also tasted about 75 other citrus that day and the exact memory of this fruit eludes me, except that it was excellent, quite intense, and similar to the other Golds. When I tasted it again during a photo shoot I decided I like the vanilla/coumarin flavor of this one very much, along with the strong, strong mandarin flavor and even grape-like tones. I also like the lack of segment membrane toughness found in the other Golds. It ripens in January and February in warm climates and doesn't hold long, but it lasts well after picking. One very striking aspect is how red and shiny the fruit are. This tree makes a first class ornamental if you have the climate (read "high summer heat" and "cool winter nights") to redden the fruit properly. Like all the Golds it will want to alternate bear. Gene Lester says his variety does the poorest for him of the three "Golds." rev 2/2012

'Tango' [reach for a piece!](#) [16 years, C35 rootstock](#) if you have a good citrus climate, and you want one citrus, this is probably the one to pick! Here it is, the long-awaited, virtually completely seedless version of 'W. Murcott' mandarin, the second hottest citrus on the market today. Tests reveal less than one seed per ten fruit under heavy pollen pressure. Consumers love the reliable sweetness, the rich flavoring essences, the convenient size, the ease of peeling, and now it is available almost completely without seeds. Growers like the ease of culture, the wide climate adaptability, heavy crops and the extended harvest period. This is best suited to areas with at least *some* summer heat, but I don't have enough reports from the fog belt to decide if (or its seeded parent original) really ripens poorly or maybe just needs more hang time. rev 7/2012

'Temple' interior [on C35, thirteen years old](#) a large, very deep red, very strongly flavored hybrid, technically a "tanger" or tangerine (mandarin) x orange hybrid. It is definitely a warm-climate grower, needing both less frost and warmer growing conditions than most mandarins. When well grown, and even as importantly well cured (stored after picking), the acidity levels drop, the relative sweetness increases, and the fine quality of the intense flavor components is evident. The fruit are very fragrant, with vanilla (coumarins), musk, and floral aromas quite evident. When grown in cooler areas, if at all underripe, or if eaten too soon after picking, it is what we refer to as "highly zingy." It has been used as a parent for the excellent UC "gold" series, contributing size, interior and exterior color, and flavor. It grows as a moderate size tree with large leaves, ornamental fruit, and compact habit. Zones 9, 13, 16, 21, 23. rev 6/2010

'USDA 88-2' sectioned fruit this is a very reliable, consistently good performer at the Lindcove trials. It has been outstanding every time I have eaten it. It is a cross between Lee and Nova, two very good parents, and ripens from January through March. Fruit are medium size, 3" across by 2 1/2" tall, deep orange, dimpled to almost knobby, often with a short, puckered neck and are very easy to peel. Very-low-acidity fruit are completely seedless, very sweet, and very heavy with juice. This is a nice, inoffensive, pleasing, kind, gentle, child-friendly citrus that is just the right size for eating out of hand. This very well may be a very good Clementine-like substitute for cooler areas. rev 1/2013

'W. Murcott Afourer' fruit [16 years, C35, typical crop](#) usually just called "Murcott," sometimes "W. Murcott." A seedling found growing in row "W" of a 'Murcott' orchard in Afourer, Morocco. The first and more important thing to remember here is that 'W. Murcott' is distinct and quite different from its parent, straight 'Murcott,' another interesting and very good home mandarin that is familiar to Californians as the flattened, shiny, thin-skinned, orange/mottled green, seedy, mild flavored "Honey Mandarin" from Florida found in supermarkets in spring. 'W. Murcott' is one of the top two or three mandarins being sold today based on consumer acceptance. It is often marketed as "Delite." It is highly rated by consumers and valued by the industry for its quality and late season. It is a small, deep orange, easy to peel mandarin of a nice, moderately small size that is intense orange color inside and has a very good sweet/sour balance over strong, typical mandarin-essence flavor. It is only mildly musky and tends to be even in quality. It ripens from late winter to early spring and the trees are often alternate bearing. The plant is highly ornamental when full of ripe fruit because of the deep red orange fruit that are well displayed. It is juicy, easy to peel, and just generally wonderful in all its aspects. Its most serious drawback is that it has seeds. Not lots, just some, if grown near any other citrus. And as far as consumers are concerned that is always bad. Mike Roose of UCR nuked this variety with X-rays to make them effectively sterile (11 seeds out of 50 fruit in highly mixed plantings) and UC has released it as 'Tango.' So 'Tango' will eventually render 'W. Murcott Afourer' obsolete. 'Tango' is just becoming available to retailer customers now, it will take a little longer for us to get our hands on it. If you want to get the same results with W. Murcott Afourer, just cover your plant with lightweight frost cloth during the flowering period to exclude bees. Both need a little heat (zone 15-16), meaning not a directly coastal experience (zone 17 = too tart) and are later in ripening, bearing in February and March. rev 2/2012

'Yosemite Gold'® PP 16,289 [fruit color Carrizo rootstock, 16 years, with Maya and Cintia](#) should be called "Yosemite Red." This is another new release from UC and comes complete with an extra royalty charge. I have tasted it and it is quite good, strong in every way. It is very sweet, with good acidity, and with a very strong mandarin-like flavor, but a little different from a straight mandarin. It probably needs high summer heat to balance its quite considerable zinginess, but it might prove out in cooler areas as well, given a generous amount of hang time. It is too new to fully understand where it *won't* do well, but it should at least be fine in all the hot summer areas and probably all of Southern California except again maybe in the fog belt regions near the Oxnard/Ventura area. It was originally evaluated as TDE-4, one of a series of UC hybrids (the Temple-Dancy-Encore series). It bears a very large (usually 3-3 1/2" across), rather flattened fruit that is seedless. It isn't gold at all, but a deep, intense, shiny red orange outside and deep red orange inside, thin skinned and easy to peel. The plant is stocky and compact, leaves are big and dark green, and it is easy to maintain, but triploid and therefore thorny. It tends to alternate bear. Fruit ripens January through April in hot-summer areas like the Central Valley. Gene Lester, growing in a "warm" coastal environment says his fruit is ready 3-4 months after that of Lindcove, so figure

cooler areas will be even later. rev 2/2012

Oranges the result of a mandarin crossed with a female pummelo, ancient. Californians are mostly familiar with just two oranges, Washington Navel and Valencia, which are both excellent, excellent varieties. As Gene Lester says, "They don't make a bad navel orange." There are also other Sweet Oranges, but all are basically the same in flavor. If you have tasted one sweet orange you have tasted them all, and all are good. There is little difference in flavor until you get into the bloods and pink oranges. Most variations on Valencia and Washington marketed today revolve around differences in ripening period. Oranges are also valued for their large and highly fragrant flowers. rev 3/2009

Blood Oranges a generic term, includes 'Moro,' 'Tarocco,' 'Sanguinelli,' 'Ruby,' and 'Red Valencia.' The individual varieties are treated alphabetically here, with all the other oranges. Blood oranges arise spontaneously in all oranges, just as red variants can in most citrus. Many claim they taste better than regular oranges. *Never underestimate the value of color on perceived flavor.* Personally I find blood oranges to be a little more acidic than regular oranges, and a little bitter, but then I often like bitterness. The berry-like flavor might come from the fact that berries are mostly colored and probably flavored by the very same anthocyanin pigments. Claimed health benefits for these pigments will jump start their commercial availability and popularity. Be ahead of the trend for once by planting one now! Now! Good for your brains and good for your veins! Personally I love Blood Oranges and buy them whenever they are available, which is much more often recently. The industry has struggled to find a less gory descriptive label to market them under. Lately they have just given up, and either sold them under their varietal name ("Moro Orange") or as plain, old, regular "Blood Oranges," where they sell perfectly well. rev 3/2011

'Boquet de Fleurs' [nice form at Chestnut and Laurel](#) did you know that until about the early 1500's all oranges in the Western world were bitter and/or sour, and were used for fragrance and decoration only? Then a sweet form was brought via the trade routes from the east, and that was the start of a new age. I thank John McPhee for that particular nugget of information, which I found contained in his wonderful book, his first book I believe, titled 'Oranges.' It is about oranges, and nothing but oranges. It is a good read if you are interested in McPhee, or in citrus, though hopelessly Floridaphilic in tone. California actually grows better oranges for eating. But his wonderful book puts varieties like this one in perspective. This is my favorite ornamental orange, and it is not just sour but yes, bitter. It features perhaps the nicest foliage probably of any citrus, with wonderful glossy, rounded, dark green to dark olive green leaves that grow with a distinctive curl. The flower clusters are condensed and borne at the tips of the branches and are highly fragrant. The fruit are similarly clustered, glossy, slightly flattened, and showy, and are also used for superior marmalade by a few. This is one of the best container varieties for ornamental purposes as well as outstanding marmalade. Against the proper color background it is classy, formal, and sharp looking. It reaches 6-8' in height and spread at full maturity but is slow growing. I personally like this variety very much. rev 3/2011

'Cara Cara' [fruit sectioned 12 years, C-35](#) a pink navel, but not a true blood orange, because it isn't pigmented by anthocyanins. Its coloring instead comes from *lycopenes*, the same ingredients tinting watermelon and grapefruit. It is deep salmon pink, quite attractive, and a better eating experience just because of the color. *Never underestimate the value of color on perceived flavor.* Most people will say they truly taste different from regular orange navels. Kids will eat them by the armfuls. In spite of not being new (1976) it is still mostly unknown among the general public. It still is not widely available commercially. A friend of mine reports this to be a very satisfactory, sweet orange for his cool Santa Cruz garden, and that it holds extremely well on the tree, into September believe it or not. This was named for the Caracara Ranch in Venezuela, where it was found. A Caracara is a crested omnivorous bird found from the American Southwest through northern South America. rev 9/2010

'Fukomoto Navel' [12 years old on C-35](#) [reddish fruit sectioned](#) a Japanese import via UCR, this is about a month earlier than the industry 'Parent Washington,' fall to early winter in commercial districts. It is a real nice looking tree, lush, dense, compact, dark green, with noticeably redder fruit, substantially darker in rind color than any other navel oranges I had ever seen around, at least as long as they have high heat/cool night conditions. *Never underestimate the value of color on*

perceived flavor. One problem with this variety is it seems picky about rootstocks. Typical outstanding Navel Orange flavor. rev 3/2009

'Jincheng' [12 years, C35 rootstock](#) [sliced](#) this is the most popular sweet orange in China, good for both fresh eating and juice. The American variety it most closely resembles would be Valencia, but it is mid-season bearing (December-February) instead of late bearing (March-summer). It is oblong, often with a slight neck, usually with one or two thin, vertical longitudinal ridges, typical in coloration inside and out, and with minimal seeds. The first time I tasted this variety it was noticeably and pleasantly distinct from the other sweet oranges I tasted that day, with an extra lift from some component I couldn't quite identify. Pineapple? Mandarin? Anyway it was different enough that I made a note to try a crop if available, and it was, so I did, and here it is. Subsequently I have not found it to be noticeably different from other sweet oranges but I have also been tasting it much later, which leads me to believe it is possible that distinctive flavor is more evident early in its ripening period. I have noticed it ripened very well in a container here at our nursery when other varieties failed to adequately sweeten, so it very possibly could have application for cool-summer climates. There should also definitely be a strong ethnic interest in this variety that can be exploited by those retailers alert enough to feature it. Like almost all oranges it makes a really nice looking large shrub or small tree. It keeps for a very long time on the counter. rev 2/2010

'Lane Late Navel' [sectioned fruit](#) [14 years old, Troyer rootstock](#) this import from the Australian industry was selected because it ripens four to six weeks after 'Parent Washington.' It holds very well on the tree. Otherwise it is just about identical except it has a smaller navel. A friend of mine reports this to be an excellent, sweet variety in his cool Santa Cruz garden. rev 9/2010

'Moro' [fruit on Troyer, 14 years, 10'](#) [more fruit](#) the smallest commonly available blood orange variety, with the most reliable coloring. In warm areas the outsides can become deep burgundy red, almost violet. In the Central Valley they can get so deep red they don't even look like oranges, they look like purples. The insides are often flushed dark burgundy but can be light orange, or streaked, and they have very few seeds. When peeled and sectioned, the segments can almost look black under the membrane of each section. In cooler summer areas coloring tends to be less intense. The flavor is typical orange but definitely more acidic, with a slightly more complex flavoring, and more bitter as the redness increases. The interior color gives it an immediate ten bonus points in taste tests. *Never underestimate the value of color on perceived flavor!* Many people will say they taste like raspberries or pomegranate. The rind has typical orange fragrance but does have a few subtle additions, licorice (!) is one I can pick up but the others are harder to identify. This variety is quite valuable as an ornamental, if you can resist picking the fruit, because they are so highly colored and showy. Harvest is from January through March or April if you are in a normal, typical inland-hot-summer growing area. If you are along the coast, the good news is that they will ripen nicely if you let them hang long enough, unlike such almost worthless varieties for those of us on the cold, foggy coast as Washington Navel and its ilk, which can rain off the tree by the bushel in winter and early spring whether they are ripe or not, refilling your recycle bin with slimy, fruit-fly encrusted, bland, watery, mildewed, almost worthless fruit. The bad news, to quote my friend Clark Magruder, is that Moro will take "a full year and three quarters of hang time to fully, fully ripen," in a typical coastal fog growing climate. But that truly is the better option, since they can bear quite a bit of fruit, and the long hang lets you store the fruit on the tree until you want it. So expect to have two crops on the tree most of the time, the younger crop in its first year, and the older crop closer to maturity. The habit is rather broad and the plant can be open. Usually to 8' on semidwarf rootstock. rev 2/2010

'Powell Navel' this is functionally identical to 'Parent Washington Navel' except it bears later. An Australian import. Typical dense foliage and attractive habit. rev 3/2009

'Red Valencia' ('Smith Red,' 'Valencia Blood') [fruit](#) [7 years old, C35 left, Carrizo right](#) this is a new introduction by UCR, a seedling of a branch sport found in Southern California. I have tasted it and can guarantee it can taste very good. It is deep, dark red, with few seeds, and purplish red to orange red skins. Coloration is at least as dark as 'Moro' and seems quite a bit more dependable. The tree is compact, nice looking, very ornamental, heavy bearing, and holds fruit well. This should be an excellent, excellent blood orange for cool summer areas since 'Valencia' itself is a good fresh eating

orange there to begin with. But note that this is a winter ripening orange, as opposed to summer ripening like its source tree. I don't have any direct reports yet on whether it will hold until ripe. rev 3/2012

'Sanguinelli' [sectioned tree fruit](#) a Spanish Blood Orange, a branchsport of Sanguigna Doble Fina. Not to be confused with 'Sanguinello,' an Italian variety, or its plural form which is, of course, 'Sanguinelli.' It is about the same size as 'Moro,' but not as intensely colored. It is slightly easier to ripen though. The trees I have seen have been productive but open and arching in habit, of moderate size. rev 2/2010

'Tarocco' [typical coloring 11 years. Carrizo at UCR](#) this is usually rated as the best tasting of the Blood Oranges, though Walt Steadman, the former Principal Superintendent of the UC Lindcove Research Station thought that was simply because it was the sweetest. I agree with him, and think 'Tarocco' is the best blood orange I have tasted so far. It is not as deeply colored inside as 'Moro.' This variety forms a consistently larger fruit and bears well. It can have a highly colored exterior but the interiors are usually only half red. This is actually more attractive in many cases because the darker a blood orange is the blacker it appears. The sliced sections of 'Tarocco' look especially nice against a white plate, glowing warmly with ruby red, for example, whereas 'Moro' sections just look very, very dark, almost black. There are several variations, 'Bream Tarocco' is by far the most deeply colored, especially on the outside, and is the strain offer. rev 2/2011

'Trovita' [Roger and Solomon check quality](#) this is an orange recommended by the late George Vashel as a good variety for coastal climates. It is not a navel orange, and it has seeds. This is the only variety of any plant I know of that is named in Esperanto, "found," which it was, growing in the ground at UCR in 1916, presumably as a seedling of 'Washington.' It is less acidic than 'Washington,' another factor in its favor in cool climates. The fruit are smaller than navels, very juicy, and the trees tend to alternate bear, like almost all citrus. It can grow in desert climates and of course the fruit is higher in quality there. The trees are compact, dense, and good looking. This is supposed to be a great substitute for Valencia in cool summer areas of Northern California, but I have heard reports it fails to get sweet and has a thick rind. rev 1/2013

Valencia [backyard tree with September fruit, Santa Cruz](#) the standard summer orange, and a much better orange for juice than Washington Navel because of flavor, higher fluid content, and the absence of bitter *limonin* after juicing. In California, Valencias will start to ripen late in the warm season and continue into fall and winter. With the warmer weather it is often easier to achieve adequate brix levels, even though the tree is holding two crops at once since . Also Valencia will hold until ripe whereas Washington Navel tends to rain off the tree in late winter to early spring, ready or not. The fruit will need 12-15 months to ripen here, and is usually ready March through September or October, so it almost perfectly complements most home citrus collections that will usually be primarily winter-ripening. It makes a good fresh eating orange though it is harder to peel than Washington Navel, and of course it has those a few of those seeds, though typically very few (5-6/fruit). But there are so few late-ripening choices it is still an important arrow in your backyard orchard quiver, plus Valencia really does have great flavor. There are several commercial variants, including one blood ('Red Valencia'), but most are distinguished only by subtle differences in ripening period. Valencia has a strong, true, sweet orange flavor. For cool coastal areas of Northern California, Valencia is often disappointing and 'Trovita should be used instead. rev 9/2010

'Midnight Seedless' [sectioned fruit 12 years, C-35](#) an old South African import, ripening about a month before the industry standard 'Frost Valencia,' January to February in commercial growing areas. The earliness combined with the usually seedless nature make it a good choice for home gardens. It makes a typical shapely, dense, attractive, highly ornamental tree. If you are going to grow a Valencia it might as well be seedless (or red, see below). rev 2/2010

'Vaniglia Sanguigno' [fruit 20 years, Carrizo rootstock](#) [Chiqa likes them! Lily likes them! I like them!](#) "Vanilla Blood" would be the translation, and it does taste like vanilla, like sweet vanilla perfume in fact. This is an acidless blood orange, and is unlike any other citrus I have tasted. It is is

either my favorite citrus or is tied with one of the pummelos (Sarawak/Tahitian, or Mato Buntan) for first place. There is almost no true orange flavor at all. It is quite distinct even from the other acidless citrus like the sweet limes and sweet lemon, though anyone who craves those will like this even more. They are strongly addicting, unfortunately, because you can't buy them, so you have to grow them yourself. It isn't a true blood orange because it is pigmented by lycopene, instead of anthocyanins. Lycopene is the same coloring agent found in grapefruits and Cara Cara Orange, the pink navel variety. It is usually just lightly blushed on the outside if it is colored at all. The fruits are slightly smaller than a navel orange, about the size of a Valencia, very round, and heavily produced. The main drawbacks of this variety are that it is prone to rather large seeds, that the segment skins are rather tough and chewy, and that the plant is rather thorny, especially when young. I usually eat the fruit sectioned vertically, so I can easily exclude the seeds. I can eat 10 or 20 at a sitting (fruits, that is, not sections!), if I have that many around. Usually I ration myself to one or two a day because I like them so much and they are so hard to get. They can ripen as early as fall in a warm summer climate and hold on the tree well into spring and on the counter forever. It grows and ripens well at Gene Lester's house in Watsonville, as well as at Axel Kratel's house in the banana belt of Santa Cruz. rev 1/2013

'Washington Navel' [sectioned fruit](#) [Hans, Chiga and Lily like oranges! 12 years, C-35](#) [excellent small tree for the garden - Los Gatos](#) known as 'Parent,' to distinguish it from the school of slight variants that are used by commercial growers. Imported from Brazil, 1870. This is the standard navel orange you expect to find in stores. Often you are actually eating on of its subtly different sport mutation offspring, but you would never know it even if you could taste the two side by side. This old battle axe is still an excellent choice if you have a warm summer climate and Roger Smith of Tree Source, a huge commercial citrus propagator, says it is still the best fruit of all the navel varieties. For all inland coastal valleys, the Central Valley, Southern California, and the desert this is a good selection. I disrecommend it in cool summer climates from personal and second hand experience. With enough summer heat, and left to full maturity, it is outstanding. Picked from trees in the fog belt, or undermature, or in the fog belt, or grown under less than excellent conditions, or in the fog belt, or from trees that are yellow and suffering, it is lackluster. It only holds a little while on the tree, which is one reason it is an underperformer in cool areas, because this means it can't hang to ripen further. The worst offender is the old variant 'Robertson Navel.' But the failure to hold well along the coast may be also be partially a function of climate. The trees are not that vigorous, which means they benefit from TLC but also that they make good container subjects and stay small in the landscape. rev 2/2010

Pummelos ("buntan" in Thai, "jeruk bali" in Indonesian) of southeastern Asian in origin, the main concentration of varieties is found in Indonesia, Thailand, and Malaysia. Most have a craving for very warm, humid conditions. They are sorted into three groups: Chinese, Thai, and Indonesian. They are recognized by their often immense fruits, reportedly to over 20 lbs. in some tropical varieties. They are known to tolerate salty water, and in fact growers in Thailand farm them in areas subject to tidal flooding and they believe salty water is important for quality. I have tasted very high quality fruit from Sunset Zone 9, so it is possible to finish pummelos properly in California at least there and certainly also in most if not all of populated Southern California. Clark Magruder assures me that my personal favorite ('Tahitian'/'Sarawak') can be ripened in Santa Cruz but that it takes two years of hang time. (They are worth the wait!)

Besides being gigantic many varieties are quite sweet and almost acidless, valuable traits if you want to cross with highly flavored but small or acidic partners. They are all moderately ornamental due to their often quite large foliage but many varieties I have seen have been gawky, somewhat uneven growers, and mostly low to spreading or rounded in their habit. Some are more attractive. Still the fruit is of only spotty availability in stores, and the best types aren't offered commercially, or are only found at a handful of local farmers' markets. If you want the best, you are going to have to grow it for now and the foreseeable future, since citrus imports from where the best kinds grow well (tropical Asia) are likely to continue to be out of the question for disease reasons, and rightfully so. Most of what are sold in stores as "pummelos" are actually grapefruit hybrids and more closely resemble the grapefruits Americans are accustomed to.

I love pummelos. I have found from experience the best fruit quality for almost all varieties comes after they have been allowed to afterripen on the counter for a few to many weeks after picking. This

characteristic holds true for all hybrids with pummelo background as far as I can tell. You should wait until the skin becomes sticky outside, if you can stand it that long, and the rind stays indented when you press your fingers into it. At this point acidity is lower and many of the more subtle flavors and aromas are at their strongest. Also pectins have broken down and the fruit are considerably juicier. This advice applies to pummelos purchased from the store as well. In fact one Chinese variety reportedly will keep a year if well wrapped in paper. Every pummelo I have tried so far except one, which includes Chandler, Reinking, Thong Dee, Kao Phuong, Kao Pan, Hirado Buntan, Ban Peiyu, Sarawak, and Tahitian have all increased in quality with time on the counter. I have held all those varieties as long as three months after ripening and I would say all were better than when freshly picked. The main problem is controlling yourself and being able to wait that long to eat them. The only exception I have found so far is Mato Buntan, which is so low in acidity that it becomes a different fruit with counter time, but not necessarily better.

When they are ready, cut off the ends flat, then score the rind vertically and shell it away, then section the fruit vertically into four quarters. Shave off the inner core where the segments meet in the center, then peel back the thin translucent membrane which encloses the actual vesicle mass and flick away any seeds that are visible. Then just eat the exposed vesicles. Repeat. The process is part of the experience, just like eating an artichoke. After you have eaten a few you will probably become an addict like me. If pummelos aren't my very favorite *group* of citrus of all they are very high on the list. rev 6/2014

'Chandler' [sectioned](#) [tree](#) [fruit](#) a California hybrid of 'Siamese Sweet' and 'Siamese Pink' produced in 1961. It has a wonderful, sweet, almost acidless flesh that has a light, fragrant aroma. The pulp is an attractive pink color. Holds for a long time after picking. In California it has one main winter harvest. I have had fruit ripened from a warm coastal climate; they were edible and just okay. They might have been better with more hang time but you could tell they were never going to rival those grown in the Central Valley. This is one variety that can be found in stores. rev 3/2009

'Mato Buntan' [fruit](#) a large, light yellow variety with whitish to pale yellow or yellow green flesh. The flavor is exceptionally mild, resembling pear trending towards vanilla lime. The most notable characteristic about this variety though is that its fruit are highly fragrant, and when ripe give off the intense aroma of vanilla, either in the field or in your kitchen. I always smell the fruit before I see the plant. This variety is completely unavailable in stores or farmers' markets and is yet another undiscovered treasure. It is quite large, pear-shaped, with a long, thick, slightly puckered neck. Enjoy them fresh or wait 2-4 weeks after picking to allow the minimal acidity to fall even further and the more subtle flavors to emerge. It will last several months after picking. The plant is low, with large, dark green, tropical looking leaves on a compact plant (for a pummelo, at least). Sound good? If you want it, you gotta grow it! Fruit are ripe when they detach at the slightest touch, or wait for them to fall before collecting. "Buntan" means "pummelo" in Thai, so this is simply "Mato Buntan," not "Mato Buntan Pummelo," which would be redundant. This variety is a big deal in Taiwan and Japan, where pummelos are rightly treasured. To about 5' tall, 8' across. Sunset Zone 9, 16, 21-24/USDA zone 9-10. rev 3/2011

'Melogold' [sectioned](#) [3 years](#) [Carrizo rootstock](#) [halved](#) [on the tree](#) a sister seedling of 'Oroblanco,' for some reason it is much less widely known. Every time I have tasted them when grown side by side this variety has been sweeter and generally more desirable. It is slightly darker yellow, slightly smaller, just as heavily productive. Excellent flavor. Culture and history notes are the same as for 'Oroblanco.' Sunset zone 8-9, 16, 21-24, USDA zone 9. rev 12/2010

'Oroblanco' [four years old](#) [Carrizo](#) [sectioned](#) [on the plant](#) all one word, notice. This was originally promoted by UCR as the best thing for commercial citrus growers since they invented ammonium sulfate. The intent was to create a less acidic grapefruit that would let California growers compete with the growers in the Southeastern US. The reality was that it has mostly been a commercial disappointment, partly because early crops were shipped unripe, and the variety got a bad reputation, and partly because it has physical characteristics that make it difficult to use as either a true, sliced grapefruit or a true, peeled, eat-out-of-hand fruit. Also the skin tends to be thick. So it didn't quite work out as expected, but we home growers reap the benefits. It was created in 1958 but not released until 1980, and I well remember the anticipation surrounding its arrival. It has excellent application in the home garden, since other grapefruits really only ripen properly in southern

Texas, where the heat, especially nighttime heat, and winter heat, and humidity levels, are all about perfect. If you aren't in southern Texas, this is almost certainly one of the best grapefruit-type varieties for homeowners. And if you are any distance away from the coast at all, you can get very good quality fruit. It is pale yellow inside and out, and is the result of an almost acidless pummelo ('Siamese Sweet') crossed with a white tetraploid grapefruit. It has a sister seedling, 'Melogold,' which is almost identical, and probably a little better under all conditions, but is less well known. Both are large, often upright growers, and bear their 3-5" light yellow to yellow green fruits in winter, though they both hang very well (good thing!) to ripen longer under less than perfect conditions. I have tasted fruit from rather near the coast and if everything is perfect, full sun, good fertilizer and trace elements, long hang time, it is not bad, but not great. Move to the next valley in from the coast, and it is very good. Sunset zone 8-9, 16, 21-24, USDA zone 9. rev 12/2010

'Reinking' [sectioned](#) [15 years](#), ["standard" \(Troyer\) rootstock](#) with a slight neck, and sweet, yellow flesh. Like all pummelos it is seedy. The flavor is like sweet grapefruit, mostly acidless, with a distinctly lemony, vanilla musk fragrance when allowed to afterripen to perfection on the counter. It is substantially better at this stage than earlier. It holds pretty well and hangs until ripe, which is good if you are trying to grow it outside the optimal pummelo zones. It makes a more shapely plant than many other pummelos, rather even and compact, with vigorous growth. It originated at the UC Indio Research station as a seedling of 'Kao Phuong' pummelo ('Siam,' 'Siamese', Thai group). It behaves like a Thai pummelo, meaning it can set several crops a year in hot climates. This is the second variety that can often be found in stores. rev 3/2011

'Sarawak' [sectioned](#) [typical plant](#) closely related to 'Tahitian' pummelo, my very favorite citrus of all. They can *almost* be considered synonymous, and are unfortunately confused in the trade. 'Tahitian' is just a seedling of 'Sarawak' (Borneo), grown on in Tahiti. Very large fruit (to 6" across) are quite fragrant, pale yellow green, quite seedy like all pummelos, and taste like Stewart's Classic Key Lime Soda - intense, sweet, vanilla-lime. The best way to eat it is to just stand over the kitchen sink with a sharp knife and eat it like an animal, because it is extremely juicy, especially after curing. It can also be skinned, shelled, and have the segments cut out for eating politely if you are having dinner with The Queen. You can't buy them in a store, but you might occasionally find some for sale if you happen across the very few farmers' markets that sell them. If you do find them, buy them. Buy many. Buy them all. They are not easy to find and I wouldn't expect that to change any time soon. And the ones you buy will keep for a very long time - months. The only reliable way to get your proper fair share of this incredible fruit is to grow it yourself. Luckily I have recently found from Clark Magruder that he ripens this and 'Tahitian,' and several other pummelos ('Mato Buntan,' 'Small Buntan') in cool Santa Cruz, but the fruit need to hang for a full two years to mature. Not all pummelos will ripen this way. In late winter of the second year you will find the ripe fruits starting to fall by themselves, or detaching when you barely touch them, and this means they have ripened as far as they can on the tree and so quality will be high. Let it afterripen (see pummelo notes, above) for at least 2-4 weeks. Then try one and make sure everyone hears how very sour, and intensely bitter, and of poor quality the fruit is. Then enjoy them secretly without competition. It forms a highly ornamental, short, spreading bush to about 6' tall by 8-10' across. Its tropical looking foliage is quite attractive but it needs shaping or else it can look a little rough. The very large flowers are heavily scented and smell like gardenia. rev 3/2012

'Thong Dee' [fruit properly afterripened](#) [shelled, sectioned, ready to eat](#) [11 years](#), [Carrizo rootstock](#) a classic, large, rounded pummelo with a slight pear shape, to 5-7" across in California. This is the third pummelo variety I would raise because it is very good, and distinct from what you can buy in a store. It has a flavor between 'Chandler' (more grapefruit-like) and 'Tahitian' (sweet lime and musky vanilla) but also has a distinct, pear-like flavor much like Mato Buntan. It is also about halfway in between for juiciness, not as dry as many pummelos but not dissolving into juice when afterripened like 'Tahitian'/'Sarawak'. The rind has a moderately strong vanilla/coumarin aroma, especially when afterripened, and becomes a deep golden yellow, almost orange, when ready to eat. I don't know how this one will ripen in cooler areas. Gene Lester grows it in his mostly-coastal influenced garden but can't remember how it does. Don't blame him, he has several hundred varieties in his amazing collection, it is okay if he loses track now and again. He promises to get back to me. But it obviously will do fine in zones 9, 16, and 21-24. I have enjoyed fruit kept two months (so far!)

on my kitchen counter that showed no signs declining quality. rev 3/2010

Valentine [cut](#) [sectioned](#) [whole fruit](#) a very pretty half-pummelo hybrid from UC Riverside involving the very interesting acidless 'Siamese Sweet' pummelo crossed with a Dancy-Ruby Blood Orange hybrid. I'm including it here because everyone is going to consider it a pummelo due to its major characteristics. The fruit is blushed deep rose red to warm salmon red inside and has a fragrant, very sweet, acidless, grapefruit-like flavor. The name comes both from the color of the interior but also from the shape, which is heart-shaped when vertically sectioned, and from the harvest period, which is prime around Valentine's Day in the most favored areas (but figure later under cooler conditions). The very large, dark golden yellow fruit are slightly pear shaped, usually with a wide neck, and have soft skins that come off rather easily. This is a very warm, friendly variety to eat and should be very popular, since everyone I passed samples around to raved about it. The only drawback is it has some degree of bitterness from the intersegmental skins and it has copious seeds like all most other pummelos. It should be heavenly when juiced. This is not really "new," having been created back in the 1950's along with Oroblanco and Melogold, and selected back in 1986. But was only recently released and is just now becoming available and being marketed. Sunset zones 9, 16-17, 21-24/USDA zone 9. rev 1/2013

Weird Things and Ornaments

Australian Finger Lime *Microcitrus australasica* [ripe fruit](#) [Mary with unreleased seedling stock plant, UC Riverside CCRP plot](#) [6 years, Carrizo rootstock, UC Lindcove Research Block](#) [heavy fruit set](#) [fully ripe](#) [late winter fruit drop](#) [cute little pink flowers](#) one of several wild, essentially unimproved species currently being sold, don't confuse this one with its closely named relative *M. australis*. That would be the Australian Round Lime, another form of Ozzie "bush tucker" that is also quite good and the subject of much current investigation and development. This particular species grows as a small, tree-like shrub or small tree to about 6-8' tall and 5-6' wide, growing compactly and slowly in cool climates, more openly and quickly under hot growing conditions. It is easily recognized by its very dense, twiggy habit and tiny, tiny, glossy green leaves closely set along the thin, rather whippy, prickly stems. Flowers are small, pink, and are scattered along the branches. Its fruit are composed of four skinny segments wrapped in a thin, leathery skin, about the thickness and length of your little finger, and green aging to red brown when ripe. The fruit don't hold long after ripe and are mostly dropped by midwinter. Fruits can be split and the interiors scooped out, or more simply you just cut one in half crosswise, roll the fruit between your fingers while you squeeze from the end (like toothpaste) and the tiny, very firm, caviar-sized vesicles pop out from the leathery skin shell so you can eat them like caviar or harvest them for other applications. The vesicles are sour and lime-like, comparable to pummelo or grapefruit in some strains, with a rind odor that is heavily lime-like with a strong pine fragrance thrown in. Marketing types keep trying to incorporate "caviar" into the common name somewhere and once you try it you can see why. Much of the joy of eating this wonderful little fruit comes from the spritz of flavor that comes from crushing each hard little vesicle, the rest comes from keeping your fingers occupied. The small fruit sell for \$1.00 each in Australia right now because they are in such high demand. When fully ripe the fruit detach easily and the flesh ranges from pale green through blush pink and even deep salmon coral, at least in the only strain currently available to growers or gardeners here in the US. In the wild it ranges from deep green through deep red. Australian Finger Lime mostly flowers in spring and bears in late fall to early winter, but it does show scattered flowers almost all year and thus at least a few fruit are usually available almost all year. Those irrepressibly spunky Australians have planted thousands of seedlings and selected a number of amazing cultivars, like giants, red or black skinned varieties, lemon flavored ones, etc. It offers the most interesting possibilities as a hybridizing parent. The small plant (3' tall) at Gene Lester's citretum bore over 100 fruit in 2006. It survived the 1990 frost temperature of 18F. rev 6/2014

'Bergamot' [fruit](#) [plant](#) this has recently been a highly confused issue, since 'Bergamots' (there are at least three closely related strains) can look like lemons and are often called that. I even got conflicting info from UCR and our commercial propagator for the first iteration of this section. This is its own thing, neither a lemon nor an orange, but a separate hybrid between a sour orange (juiciness, flavor) and very likely an acid lime or limetta (distinctive floral aroma). This highly fragrant fruit is used for its rind oils, which were the basis for the original 'Eau de Cologne' and are the flavor and

smell that make Earl Grey tea so distinctive. They are wonderful for just putting on the counter so they scent the entire room. I tried 'Bergamot' lemonade on a tip from Axel Kratel and it was fantastic. It was so good I would plant one in my yard *just for the juice*, and that is a strong statement since I have lived with a mature Lisbon lemon and found making lemonade to be hardly worth the trouble. Good, but nothing special, and barely different from what comes frozen out of a can. The second time I tried with 'Bergamot' was with younger fruit from a different location, and it was the most bitter citrus I have tasted yet, and that is another strong statement because I have tasted everything that has crossed my path in the interest of saving you the trouble, and believe me there has been some memorably bitter fruit. This time I got four long hours of horrible, clinging aftertaste. I have found that the secret is that you have to make sure you don't get your oily fingers into the pulp when making the juice or it carries that bitter essential oil into the drink. Slice it cleanly, once, and just juice the pulp, and 'Bergamot' lemonade is probably the best citrus drink I have tasted of all. 'Bergamot' fruits are quite distinctive, being mostly flattened and round to dumpy pear-shaped things, often with characteristic, rounded, longitudinal ridges and a persistent, post-like calyx remnant at the distal end. These characteristics are easily recognized even in old paintings and woodcuts. They get large, to 3" across. The aroma is flowery, perfumy, intensely lemony, and complex, herbal-like. When sectioned the fruits are well filled, slightly grayish at the center, and very juicy. The plant is upright, dense to somewhat open, with an attractive, full shape and dark green, luxuriant foliage. It can be quite ornamental, with its broad, glossy, dark green leaves that have characteristic winged petioles. Moderately heavy bearing, almost completely thornless and bears tiny, sterile remnant seeds. rev 3/2011

'Calamondin' [fruit tree, about 10 years, at Berghuis Nursery](#) more properly we would call this *Calamonci*, or *Calamonding*, which is the way most Filipinos know it, and where it is native to. Sometimes listed as a hybrid species, *C. (x) madurensis*, this is thought to be natural hybrid of Chinese origin, probably representing a kumquat-mandarin cross. This is a highly ornamental citrus, growing as a compact, small textured, dense, upright, mostly narrow shrub to 5-8' tall unpruned. The fruit are small, to about an inch long and across, deep orange inside and out, smooth and shiny outside and somewhat seeded inside. This makes a wonderful landscape shrub with very shiny, show fruit well displayed on the outside of the plant, whether or not its fruit are used. It flowers and sets fruit all year, and tends to color strongly, making it an ornamental worth considering. It is extremely valuable as a container plant because of its dense green foliage, clean habit, and fruit display. Add enough sugar to the juice and it makes a nice orange-flavored drink. It finds more interesting application in Filipino or other styles of Asian cooking because of its highly complex rind flavors. The fruits most notably make the very, very best marmalade of *all* citrus according to Robert Lambert, Gene Lester and me. I have also had good success using Calamondins as kumquat substitutes, in spite of warning that they were too acidic for such use. I find that if you wait until they are very ripe before cutting them off the plant, then let them afterripen on the counter, they are about as sweet as true kumquats. But the much thinner skin is much less oily, slightly and pleasantly bitter, and with a much more interesting flavor. I detect essence of ginger, pineapple, curry, rue, and more. Just wait until they are beginning to show a little drying of the rind if the fruit are too acidic when you first try them. I have even had decent quality fruit from Gene Lester's cooler, "mostly coastal climate" garden, which is important since the list of interesting citrus for cool areas is always short and every addition is appreciated. The skin is very tender though, and tears a hole if you pull the fruit off, so make sure you cut the stem and handle the fruit carefully while harvesting. rev 2/2010

'Calamondin Variegated' [at Martin Berghuis' Nursery. Woodlake closeup](#) quickly recognized by its wonderfully variegated foliage and neat, clean habit. They are lightly striped when young, orange when mature and quite attractive against the ivory and green foliage. It tends to repeat bloom/bear throughout the year. Gene Lester complains it hardly bears for him but Karen Runyon of Monterey told me her tree is always so completely loaded with fruit it might as well be considered a weeping plant. Same great fruit uses and flavor as the unvariegated form. Overall a very interesting and useful plant. rev 3/2009

'Chironja' [sectioned 20 years, on Yuma Ponderosa Lemon rootstock](#) this is a very interesting hybrid, found wild as a seedling in Puerto Rico (and so should probably be pronounced "chironya"). It is thought to be a hybrid between an orange and a grapefruit, or more likely a pummelo. This is

another version of the concept of a lemon sweet enough to eat fresh like an orange. It is a modest sized plant, with large, dark green leaves, dense foliage, and a compact upright habit. The fruit are large, larger than an orange but smaller than a grapefruit, dark yellow to almost yellow orange in color, and with a deep rich gold flesh. It has a wonder sweet-sour, lemon flavored taste, but is very mild. I can eat a lot of these. The fruits are also highly ornamental either on the plant or on the table. They are easy to peel, with a thick, rather loose skin. The fruit can be eaten sectioned or sliced. They are moderately seedy but their primary fault is that they suffer from tough inter-segmental skins. For now there is no better alternative for the niche they fill, so if you want to add something quite distinctive and very good to your yard this is still an excellent choice. It is quite rare and I guarantee you will probably be the only person in your city or even county to own one unless you happen to live in Riverside County (home of the UC Riverside Citrus Collection) or Tulare County (home of the Lindcove UC Citrus Collection). It is probably about as hardy as an orange. rev 8/2011

'Cocktail' [12 years old, C-35](#) [fruit sectioned](#) [in clusters](#) Siamese Sweet Pummelo by Frua Mandarin. This is usually called a "grapefruit" because it is close to the original grapefruit cross (pummelo x sweet orange) and has a similar musky, vanilla scent to the rind. It also has some of the intersegmental membrane bitterness of a grapefruit. But it is yet another of the citrus often thrown into a jumbled category bin labeled "hybrid" because it represents a new direction for taste or other characteristics. It is large, usually growing to 3-5" across, almost round, with shiny, deep golden yellow to light yellow orange skin. It has a wonderful vanilla-grapefruit rind aroma that I would suspect would make great marmalade, candied peel, or syrup. To be completely "hip" (sixties lingo, means "aware of current trends") you would cut a nice, curled piece of that rind and drop it into vodka for a flavored version you can't buy off the shelf at any price. For fresh eating it is superb. This is one of the fruit I like to give to people with the comment, "This is a sample of the things coming in the New Age of citrus varieties." Peel it and section it and enjoy the interiors, which have rather large segments with a moderate number of large seeds and lots of sweet, very mild, almost acidless, fragrant, vanilla-pummelo flavor. Luis Marquez says "you expect it to be sour, but it fills your mouth with warm friendliness!" After consideration I have come to the conclusion that this tastes the closest to an Orange Julius of any fresh citrus I have tasted. It is very soft textured and extremely juicy. I enjoy it best eaten like a pummelo (see instructions, but in short you shell out the moist vesicles) because the only drawback is that membrane bitterness, which I actually enjoy sometimes. If you hate grapefruit, try this but don't eat the segment skin. It is quite easy to peel the fruits, the thick rind is very soft and comes off easily. It is quite productive, bearing its fruit in clusters, with large textured foliage and a very compact, dwarf habit to just 5-6' tall in twelve years on C-35 and 6-8' on Carrizo. The fruit hold very well on the tree so it is growable in cooler areas, where it hangs until it is edible but closer to a grapefruit in eating experience. Fruit from container trees here at our nursery were of good eating quality. With more heat they would have been even better. rev 2/2010

'Purut Lime' (a.k.a. 'Kieffer Lime,' 'Kaffir Lime,' 'Kuffre Lime,' 'Makrut Lime') [fruit](#) [young leaf detail](#) [mature foliage](#) [mature plant \(left\)](#) this is a straight, unhybridized species, botanically *Citrus hystris*, though over time certainly there must have been some selection for a better tasting or more heavily producing strain. We like best the name from the country of its largest natural distribution and certainly its greatest use by volume, Indonesia, where it is called "*jeruk purut*" (*jeruk* means citrus). The attractive mature-phase leaf is large, broad, rather strange and tropical looking, being divided into two almost even pieces: a proximal petiole lobe and larger distal lobe. It has value as a foliage plant as well as for culinary use. The leaf is used as a spice in cuisines of Southeast Asia, primarily Thailand, Indonesia and the Philippines, though almost always limited to what my interns call "wet" dishes, meaning soupy or stew-like. The leaf smell is distinctly and strongly lime, cleaner and less musky than the foliage of 'Mexican' Lime. It bears knobby, convoluted, deep green fruit with green interiors, from 1 1/2 - 2 1/2" across, that ripen to lemon yellow, often borne in clusters, but not produced very heavily, at least in our climate. The fruits are quite attractive and ornamental as table decorations, especially when mixed with a variety of other citrus. The rind has more of that intense aroma. The fruit is sour and authentically lime in flavor, with a touch of grapefruit, moderately juicy, seedy, and intensely and persistently and quite memorably bitter, leaving the inside of your mouth coated with an obnoxious oily residue that doesn't go away for a good four hours if you make the sad mistake of actually putting it into your mouth. Supposedly the juice is quite good at removing leeches, or for treating hair lice. I believe it. My interns have straightened me out

on how this variety is used, and say the fruit of this plant is *never* used in Indonesian cooking (makes sense from my experience), just the leaves, and that the leaves. *Jeruk purut* is a large, somewhat open, ropy grower if unpruned, to 6-8' tall, sprawling, and mature foliage gets at least 6-7" long, with a tough, leathery texture. This seems about as hardy as a 'Bearss' lime. A plant did survive at Gene Lester's during the freezes of 1998 and 1990, with temperatures at 25F and 20F (or lower!) respectively. But protect it if you can. Zones 8-9, 13, 16-17, 19-24. rev 6/2014

'Sudachi' [sectioned](#) [mature fruit](#) an "Ichandarin," a name give to a series of crosses of a what may be the very hardiest true citrus, a *Papeda*-section species (*Citrus ichangensis*, syn. *C. cavaleriei*), crossed with Sour Mandarin, *C. reticulata* v. *austera*. This one is much juicier and much less seedy than the more commonly recognized and currently-in-vogue 'Yuzu.' It is also very similar to 'Kabosu,' which apparently is commercially unavailable in California at this time. 'Sudachi' rind fragrance is more towards pummelo and less towards the lemon or grapefruit essence I detect in 'Yuzu.' It makes a pretty good juice, close to Meyer Lemonade in flavor if sweetened with sugar, though it is substantially more cold tolerant than Meyer Lemon. It is used exclusively for its juice in Japan, and is harvested green, though I liked the fruit at full maturity. Several references call it "marble sized" but at Gene Lester's, and at our facility, the fruit reach about 1 1/2" across. In warm summer locations it can bear a very heavy crop of its deep golden yellow fruit (at maturity) and therefore makes an attractive ornamental shrub or dwarf tree. It is extremely cold tolerant for a citrus and also disease and root borer resistant. It will get 6-7' tall by twice as wide and has an acceptable shape. rev 2/2014

'Wekiwa' [5 years](#), [Carrizo](#) [doing well at Gene Lester's](#) [sectioned](#) [clusters](#) also known as 'Lavender Gem.' A hybrid of a grapefruit and a tangelo, this unusual fruit is small (2 1/2" across by 2" tall), light yellow, and quite pale inside. The rind has a pleasant arôme of vanilla-grapefruit and lemon. Suzie Brooks described it as "another fruit in a citrus body, peach maybe." Fruits are very heavily produced on a chunky, very compact, very dense, naturally dark green plant with small, glossy leaves. This is a very attractive bush! It will stay quite small, to only about 6' tall in many years. The firm fruits peel easily, with a thin skin and almost no cotton. Eat it like an orange, cut into vertical wedges, or sliced horizontally. Segments are buff yellow, faintly blushed pale salmon. The flavor is very mild, low in acidity and not intensely sweet, but sweet enough. This is a fruit you can eat a great deal of because it isn't a lot of work to prepare and isn't a strong experience. I like this one very much along with 'Cocktail,' some of the acidless limes, and Satsuma/Kishu mandarins, as very good fruit for people who find most citrus too intense to enjoy. It is usually almost seedless (1-2 very small seeds per fruit, more sterile remnants) even under the heavy pollination pressure found in mixed blocks. I have had fruit from near-coastal environments and found it to be of good quality, and even fruit from cold, underfed, left over containers here at our nursery are quite good but suffer from a very bitter rind. The trees maintain good color even in cool soils. Gene Lester reports it makes very good marmalade. rev 8/2011

'Yuzu' [sections](#) [fruit on tree](#) [untended tree](#) another "Ichandarin, "Yuzu" is actually the common name of the fruit, not a true clonal variety moniker, but we will use it as such anyway. It is a very cold hardy, lemon-like fruit grown and favored by the Japanese, and mostly used for cooking, where rind and sometimes juice are called for. Other interesting Japanese Ichandarins are *Sudachi*, and *Kabosu*. Its juice tastes close to a 'Lisbon' lemon but the rind has a few fragrances that set it apart, principally that it can have a pleasantly musky, pummelo smell under certain conditions and an almost spicy herbal fragrance under others. Of course to the Japanese nothing else compares, who use it in a number of ways including drying the rind to use as a spice. It can be tried in almost any recipe calling for lemon. The fruit tend to be scant and very seedy though. For juice it will be fine except you will need many, since you only get about a teaspoon per fruit, plus lots of seeds, plus it tastes more like lemon-grapefruit juice, plus it has a distinct bitterness. This fruit can be dropped into your bath, after you poke holes in it, as a kind of aromatherapy, especially for your traditional winter solstice bath. Makes you smell lemony fresh! It is mostly grown because it is very cold hardy, and would make a better lemon substitute than 'Meyer' if you aren't a 'Meyer' fan or if you are in a very cold area like Oregon. It ripens in late winter in California. This is another potentially interesting vodka flavoring candidate. Do a search for "yuzu recipes" and you'll be amazed at how hungry you will get. rev 8/2011