



Redwood Barn Nursery

1607 Fifth Street Davis, California

Taking the bitter with the sweet and salty.

I ate something yesterday that transported me back fifty years. A lady brought me a jar of true marmalade: that is, marmalade made from Seville oranges.

My grandfather was a man of very, very regular habits. He ate the same breakfast almost every single day, prepared to his exact specifications by my grandmother. I almost hesitate to post it: six pieces of bacon, fried until just barely crisp. Two eggs, scrambled just hard. Half of a pink grapefruit, with the sections carefully loosened with a grapefruit knife, and served with a grapefruit spoon. He sprinkled it with salt. More on that later. Kellogg's corn flakes with half and half. Coffee with cream. Wheat toast with butter and marmalade.

This, as you can see, violates numerous dietary guidelines, and if he had eaten better perhaps he would have lived longer than 94. A lucky child who arose early enough might get a plate just like granddaddy's. Later arrivals got oatmeal and scrambled eggs.

Thanks to the intimate connection of taste and memory, one whiff of this richly aromatic marmalade carried me back to that kitchen, with the odd black-and-white art deco linoleum, the sunlight reflecting off the adobe walls in the courtyard and streaming in through the east windows, and my grandfather's dry chuckle at my facial expression as I watched him sprinkling salt on his grapefruit.

My grandfather loved marmalade enough that he planted a Seville orange in the corner of his front yard in Pasadena, right by the sidewalk on busy East California Boulevard. Sevilles are heavy producers and the fruit is bright orange and attractive. It amused him greatly to watch passers-by reach in to steal the fruit, peel it and take a bite, then pucker, grimace, and pitch it into the yard. You don't eat these right off the tree.

Classic marmalade is made from Seville oranges, grown in Seville, Spain. The fruit is richly flavored, but also sour and bitter. It exemplifies the range of flavor constituents in citrus: sweet, sour, and bitter, in varying degrees between species and varieties. People differ as to our perception and tolerance for bitterness in food, a difference which apparently has a genetic basis but which also changes as we get older. Coffee, Brussels sprouts, and grapefruits are grownup food. We can tolerate bitterness better as we age. I'm sure there's a suitable metaphor in there somewhere.

What makes citrus bitter?

Primarily a substance called naringin, that imparts the bitter flavor, which is present in the peel, pith, membranes, and sometimes the juice. If you juice any citrus and drink it immediately, you won't notice the bitterness. As it sits, juice of some types will be increasingly bitter as the substance is released into the solution from the membrane fragments.

Grapefruits

Grapefruits are notably bitter among citrus. Most kids frankly don't like them, and even for grownups they are an acquired taste. It is well known that you can mask bitter flavors with sugar. But salt? Yep.



Redwood Barn Nursery

1607 Fifth Street Davis, California

From Kenneth Chang in the New York Times:

“Get a bottle of tonic water. Take a taste. The bitterness is quinine, a compound derived from bark of the cinchona tree. There’s also a bit of sweetness from sugar or corn syrup added to offset the bitterness.

Add a bit of salt to the bottle. Take another taste. ‘It’s almost like sugar water,’ [food scientist Shirley] Corriher said. ‘You taste a little quinine, but it’s just the change is amazing, how the salt suppresses bitterness.’

Surprisingly, salt suppresses bitterness better than sugar.

That is why some people sprinkle salt on grapefruit, cantaloupe and other fruit. (It’s apparently not known how salt suppresses the bitterness, whether the salt somehow disrupts the bitter receptors on the tongue or whether it’s some sort of post-processing by the brain.)”

As usual, grandfather knew best. All that bacon probably helped.

Grapefruits grown where the growing season is long and hot, such as Arizona and Texas, have very high sugar content. Conventional varieties grown here in Northern California aren’t as sweet, so the inherent bitterness is more noticeable. We can also grow true pummelos here. Don’t like the bitterness of grapefruits, but like their balance of sweet and tangy otherwise? Try a pummelo. Or some of the pummelo-grapefruit hybrids that have come in to the grocery and nursery trade.

History note: the original grapefruit is thought to be a natural hybrid of a pummelo and an orange that occurred where they were cultivated together in Barbados. Look for the hybrids and the pummelos in grocery stores right now to sample the fruit and see if you like them. These newer hybrids, such as Oro Blanco and Cocktail, are often simply marketed as grapefruits. They are better garden choices for our area.

Grapefruit are reasonably cold hardy and easy to grow. The plants get bigger than other citrus, so give them room.

What makes the flavor?

There are about 17 flavor components in citrus, substances that make them bitter, sweet, and aromatic. These are in the peel, the flesh, and in the case of the bitter compounds they are especially concentrated in the white part under the skin (albedo) and the thin membrane (segment epidermis) surrounding the juicy parts.

How bitter are grapefruit? In chemical analysis, mandarins, Valencia oranges, and lemons contained almost no naringin. Navel oranges and kumquats had a very small amount. Yuzu and pummelo were somewhat higher. Next was our Seville orange. At the very top of the list? Marsh grapefruit, with the highest naringin level of all 42 species tested. Overall, bergamot (sometimes used for soaps), sour orange, and grapefruit are much higher in bitter compounds than other types of citrus. Seville orange also contains some other, unique compounds that give it that special aroma and flavor.

Even a small content of naringin affects the flavor and quality of citrus juice. Some varieties contain small amounts that are barely discernible, but enough to affect their use for juice other than fresh-squeezed. The bitter flavor increases if the juice sits for any amount of time.



Redwood Barn Nursery

1607 Fifth Street Davis, California

Despite being bitter, the peel contains special aromatic compounds and oils that we appreciate. Seville sour orange peel contains very rich aromatics, and classic marmalade actually celebrates this unique flavor. It is essentially a process of simmering the peel and seeds and pulp together to extract the pectin, removing the seeds and pulp, candying the peel, blending it with the juice, and letting it set.

Marmalade deals with the bitterness by masking it with massive amounts of sugar: about a 2 to 1 ratio of sugar to peel in recipes that I looked at. You can make great marmalade from any citrus – Meyer lemons and kumquats are especially good – but none has the unique aroma and flavor intensity of the Seville.

Which are sweetest?

If you are sensitive to bitter flavors, you may prefer those without naringin. It is likely that your kids' tastes will lean toward the sweeter, less bitter fruits. Some citrus have very little bitterness at all, and others have very low acidity. The range of consumer preference to sweetness, tartness, and bitterness of citrus is quite broad.

Much of the success of the Cuties™ mandarin program was due to their consumer studies that showed what kids wanted: easy to peel, sweet, seedless, not-too-overpowering fruit. WE may prefer satsuma mandarins, but they liked the milder, sweet types.

If your preference is for sweet flavor with less acidity, and you don't want any bitterness at all, you will probably prefer Clementine and Murcott mandarins. These are the mainstay of the Cuties™ marketing program, along with the seedless Tango variety that they use later in the season. Other mandarins, in my opinion, have richer flavor, primarily because they have more of a balance of acidity with the sweetness. Satsuma, Dancy, Kishu, and Gold Nugget mandarins have probably the richest flavors of any citrus you can grow or buy (and those four planted together would give you fruit over about seven months).

Mandarins are among the hardiest citrus for this area, easy to grow and compact growers with dense, attractive foliage. Plant in full sun. They are easily kept under ten feet.

Sweet but mild

There are "sweet limes", also called limettas, that are very popular in Mexico, Palestine, and India, which are sweet but not tart at all. To many people they taste insipid, but they make excellent fresh juice that is sold by street vendors. Unlike Mexican limes (also called Key limes) and Persian limes (Bearss variety), limettas contain a small amount of naringin. So, the juice doesn't store well because the bitter compounds are gradually released into the juice and make it unpalatable within a day. Handed to you straight from the squeezer by the vendor, it is excellent. True limes are not bitter, but are, of course, much more acidic.

Limes are at the frost tender end of the citrus spectrum for our region, so plant them in a protected area near the house. Bearss lime is the hardiest.

The best for juice

Valencia oranges have no naringin, so their juice stores well enough to make that variety the foundation of our orange juice industry. Navel oranges contain a little bit more. It isn't noticeable when you fresh-squeeze them, but don't try to store the juice. Both Valencia and navel oranges are excellent choices for back yard gardeners. Valencia is unique among citrus as



Redwood Barn Nursery

1607 Fifth Street Davis, California

it ripens in the late spring and summer here, whereas most other ripen in winter, so it extends your citrus harvest.

Citrus trees are best planted when the soil is warm. Plant in a sunny location, protect the young trees from frost the first winter if we're unusually cold, and plan to fertilize them for the first few years. Deep, infrequent watering is best. You'll start harvesting after about three years.



An assortment of citrus harvested from the backyard collection of Marta Matvienko. She prefers Cocktail (the large yellow fruit at the bottom) to Oro Blanco. Usually sold as a grapefruit, Cocktail is actually "1/4 King mandarin, 1/4 Dancy tangerine and 2/4 Siamese Sweet



Redwood Barn Nursery

1607 Fifth Street Davis, California

pomelo” according to the estimable online reference at <http://citruspages.free.fr/>. It is sometimes called a Mandalo (mandarin x pummelo).





Redwood Barn Nursery

1607 Fifth Street Davis, California

Savoring the bitter. Shown here is a Chandler pummelo, with one segment removed and the segment epidermis removed from the interior juice sacs. You have to peel pummeloes twice to get at the good part. Also shown is a jar of Seville sour orange marmalade, and a Texas Ruby Red grapefruit.