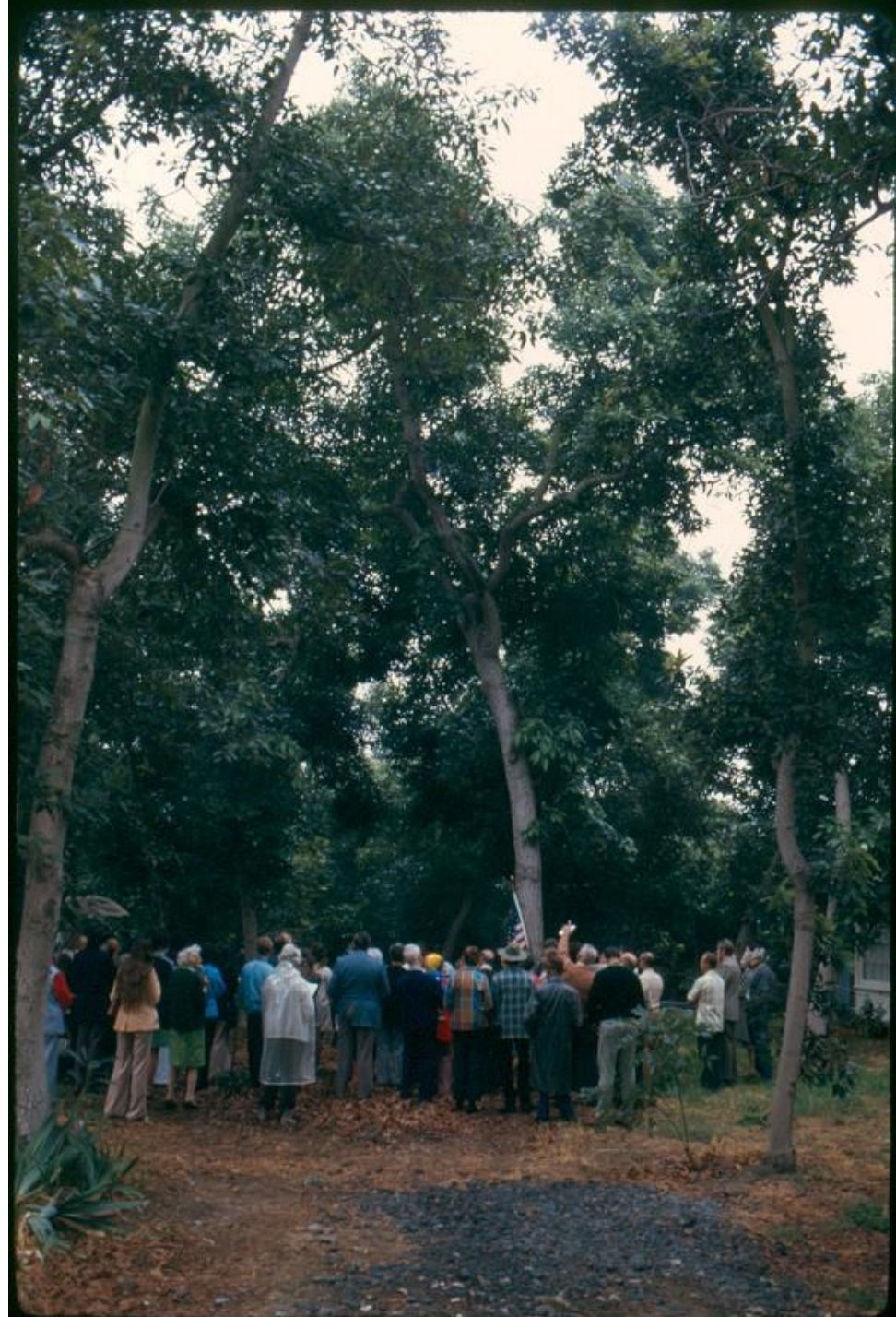


The Avocado Story

Part Uno



Alligator pear
Aguacate
Palta
Ahuacatl



Laurel Family – 2850 species



CA Laurel - *Umbellularia californica*



Persea steymarkii

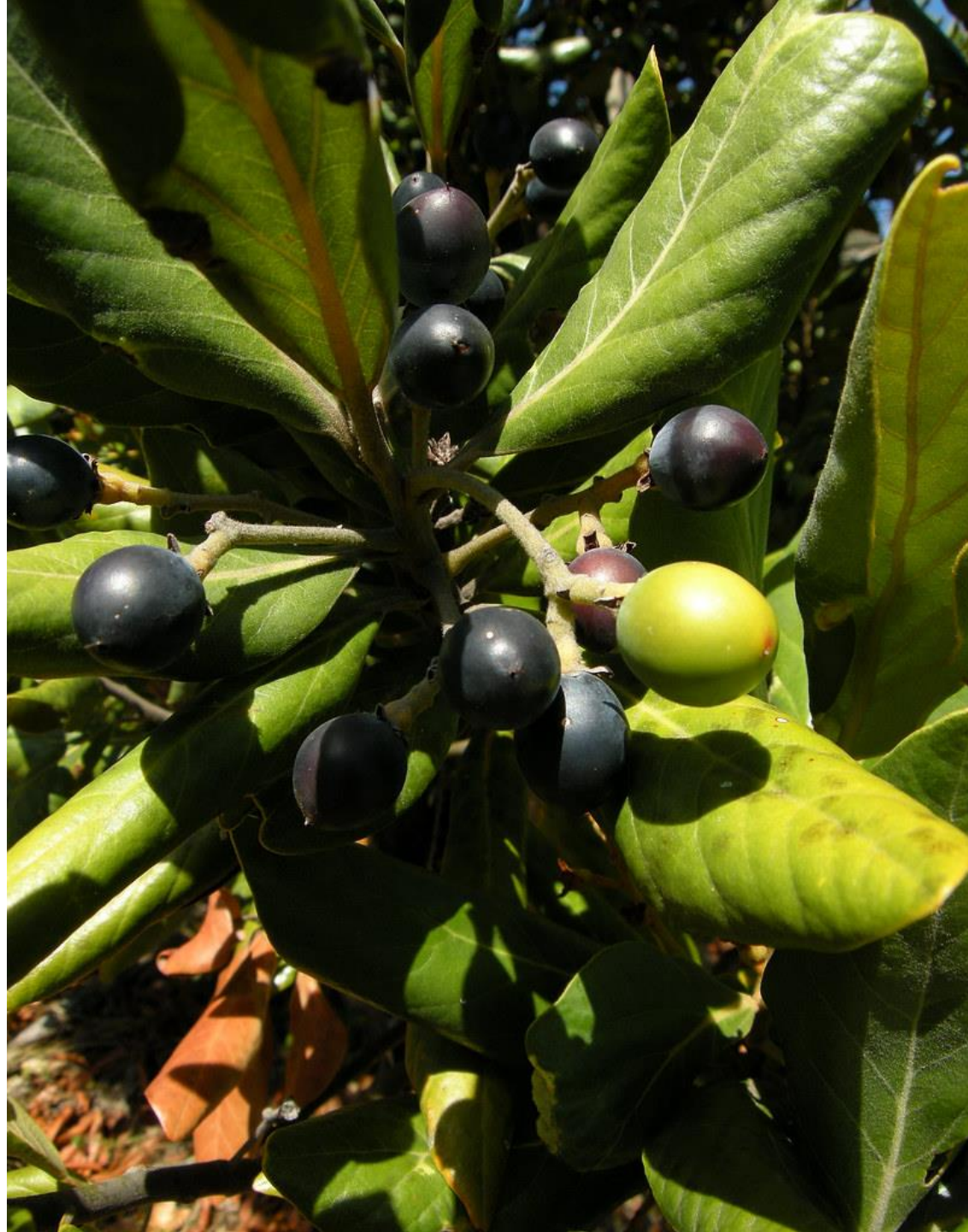


Persea americana

Mexican - anise leaf, thin skin

Guatemalan – round, thick skinned

West Indian – cold intolerant, sweetish flavor



Persea lingue

Avocados are an **unusual** fruit

Has good fats, has all amino acids,
vitamin C and many other minerals
and vitamins

And unusual in more ways than one

There's even a psychological
symptom linked to it

The Avocado Illusion

Paul E. Sandorff

Science

New Series, Vol. 250, No. 4988 (Dec. 21,
1990), p. 1646



You look up in the tree and can't
figure out the number of fruit
because they blend in with the leaves



They also alternate bear
1 – 300 pounds per tree



This was to be the fruit of the masses
because of yield potential and such
a nutrient dense food
but limited to only certain areas
by cold sensitivity (land \$) and
alternate bearing





It has a very shallow root system
(2 feet deep)
making it possible to grow on
shallow soils
but also makes for other problems

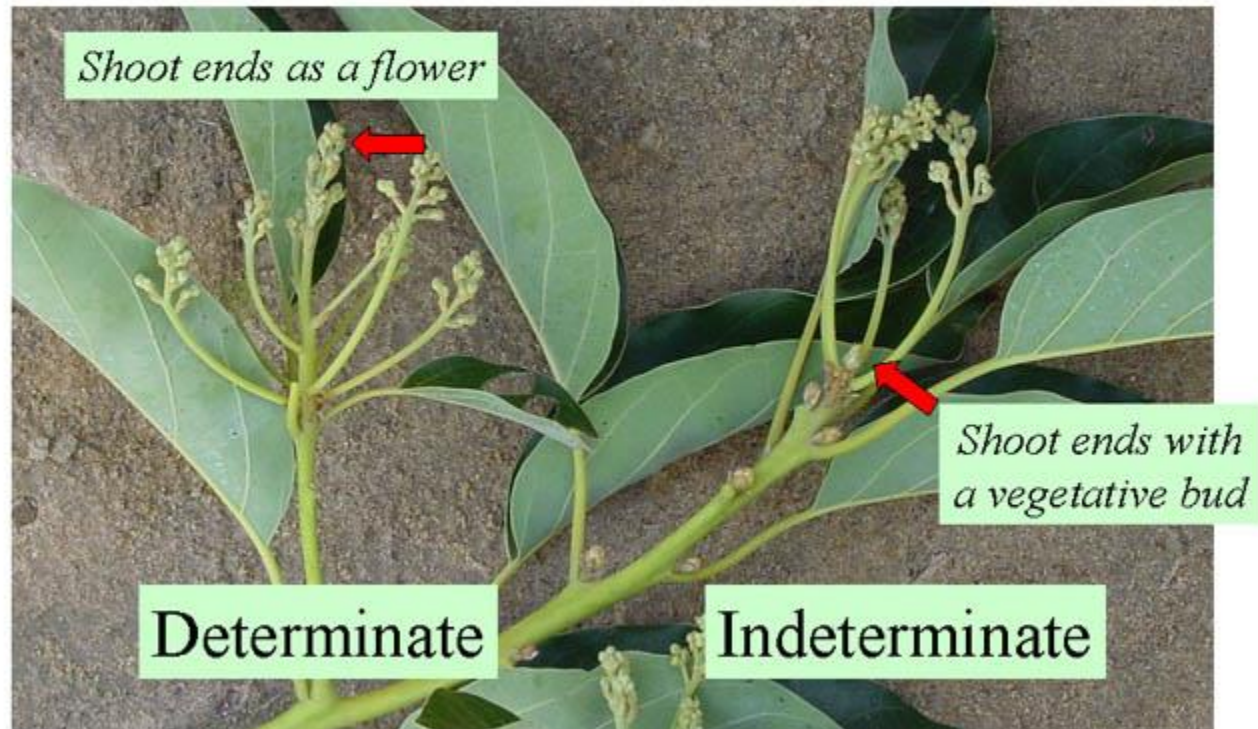
They are often grown on hillsides
because of reduced frost hazard,
better water drainage
and because it is one of the few
fruit trees which can grow on
shallow soils on hillsides

But that can lead
to other problems.....



Truly unusual is the flowering habit

Figure 1. Example of determinate and indeterminate inflorescences in avocado





THE AVOCADO FLOWER

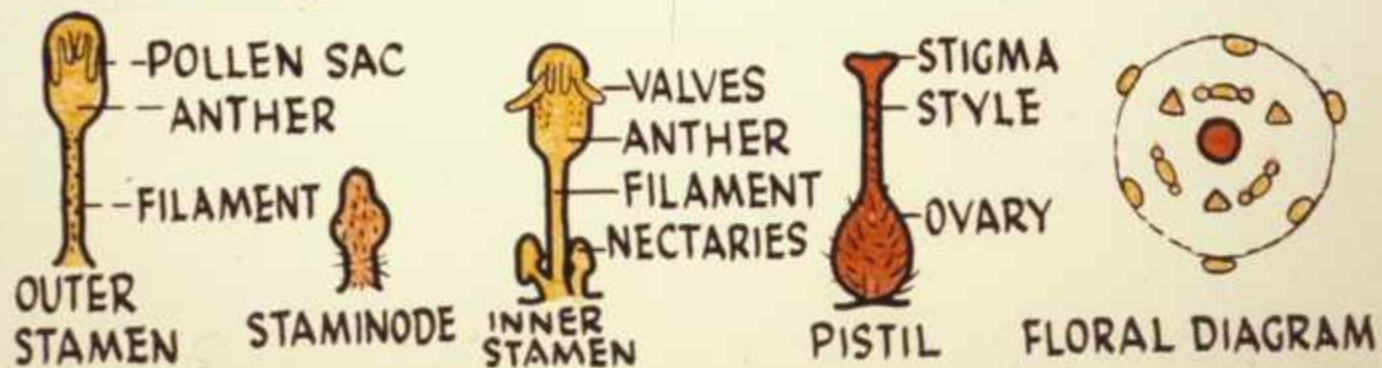


Figure 2. Examples of male and female phase flowers.

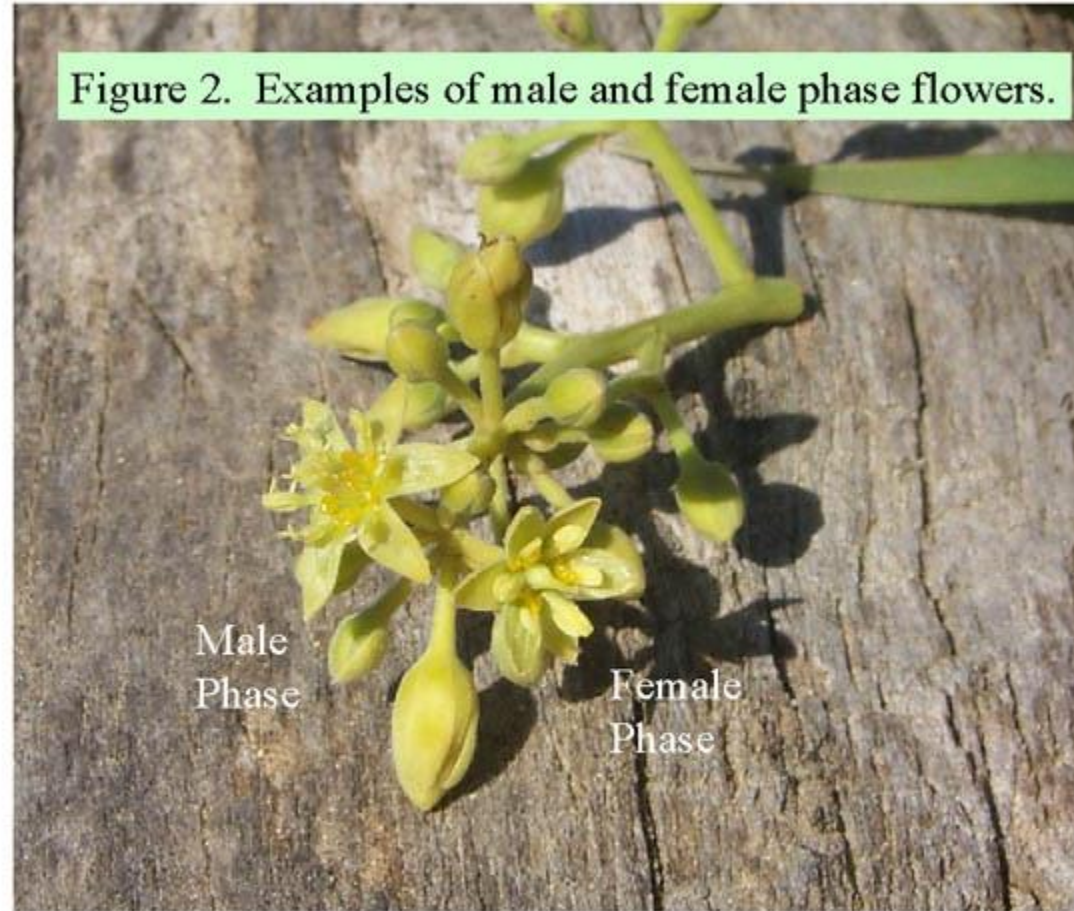


Figure 4. Timing of avocado flowering for “A” and “B” flower types.

		<u>DAY 1</u>		<u>DAY 2</u>	
		MORNING	AFTERNOON	MORNING	AFTERNOON
Flower-type cultivar	“A”				
	“B”				

Synchronous dichogamy

Table 1. Avocado varieties and flowering types.

"A" Varieties

Hass

Gwen

Lamb Hass

Pinkerton

Reed

GEM

Harvest

.Stewart

Mexicola

"B" Varieties

Bacon

Ettinger

Fuerte

Sharwil

Sir Prize

Walter Hole

Zutano

Marvel

Nobel

Dry Matter %	Varieties
--------------	-----------

17.7	Bacon
------	-------

19.0	Furete
------	--------

18.7	Zutano
------	--------

21.6	Pinkerton
------	-----------

20.8	Hass
------	------

19.3	Jim
------	-----

18.4	Susan
------	-------

20.4	Rincon
------	--------

24.2	Gwen
------	------

18.7	Reed
------	------

18.7 other fall/winter varieties.

20.8 other spring/summer varieties.

The fruit **matures** on the tree but **ripens** off the tree

**Holds longest on the tree of all
varieties**

Hass



**Reed – excellent summer fruit, hangs
well on tree, more salt resistant than most**

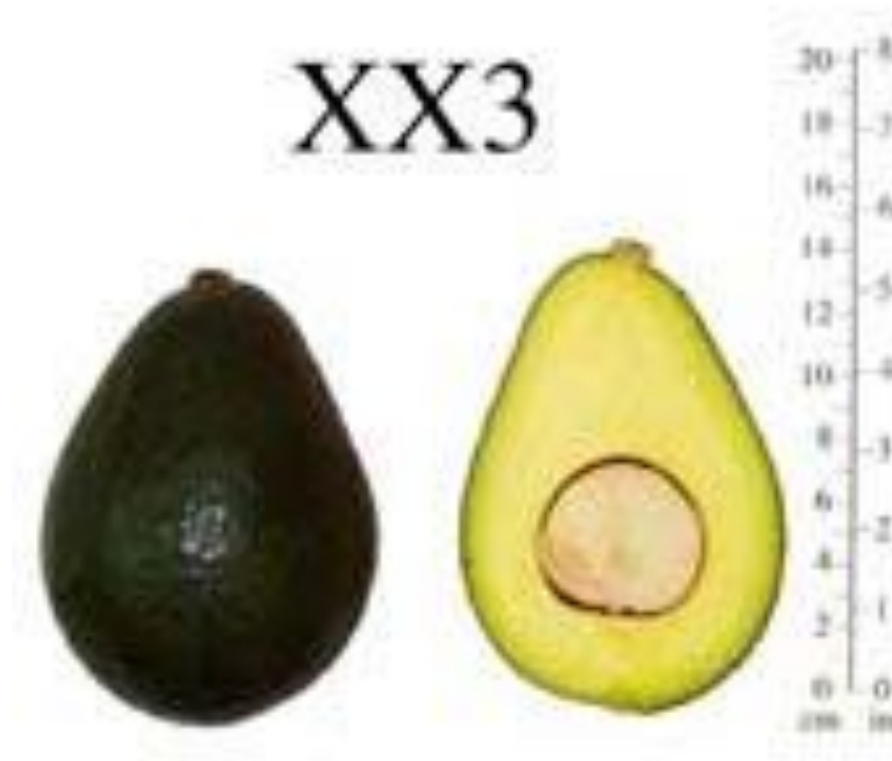


Excellent spring/summer fruit

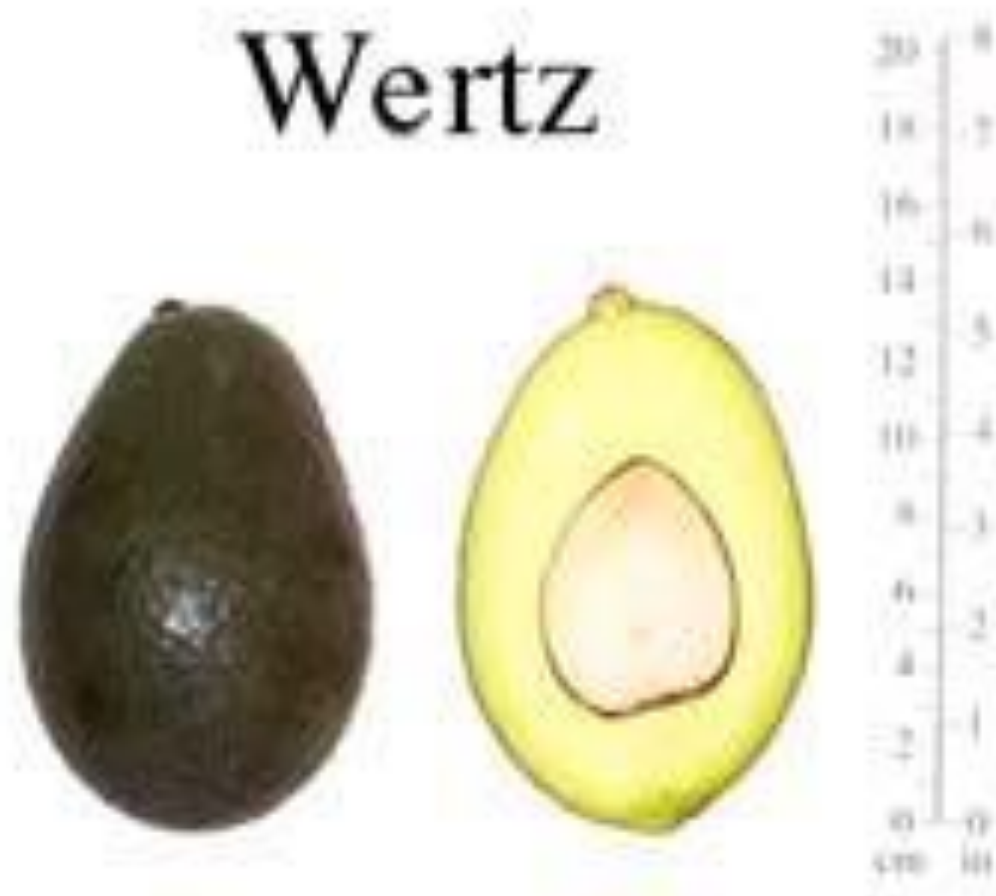
Gwen



**‘Holiday’ – excellent winter fruit,
smaller tree.**

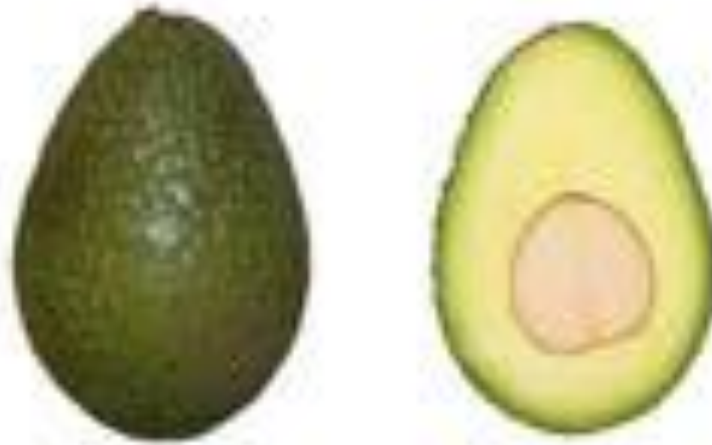


**‘Littlecado’ or ‘Minicado’ – small tree,
summer fruit.**



Small tree, excellent winter fruit

**Kona
Sharwil**

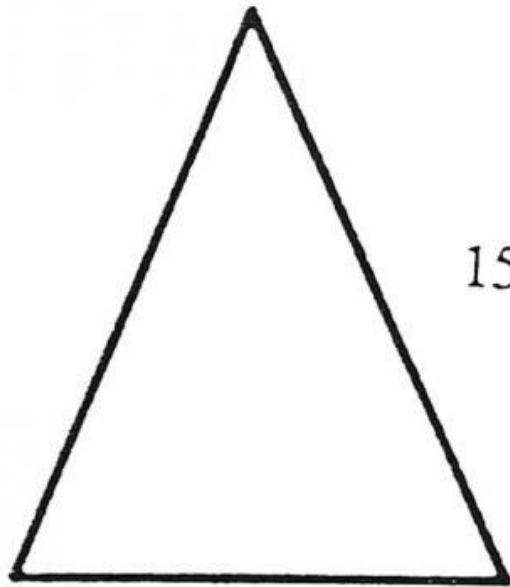


Because of the flowering habit of the tree (terminal on branches)

Narrow Pyramid

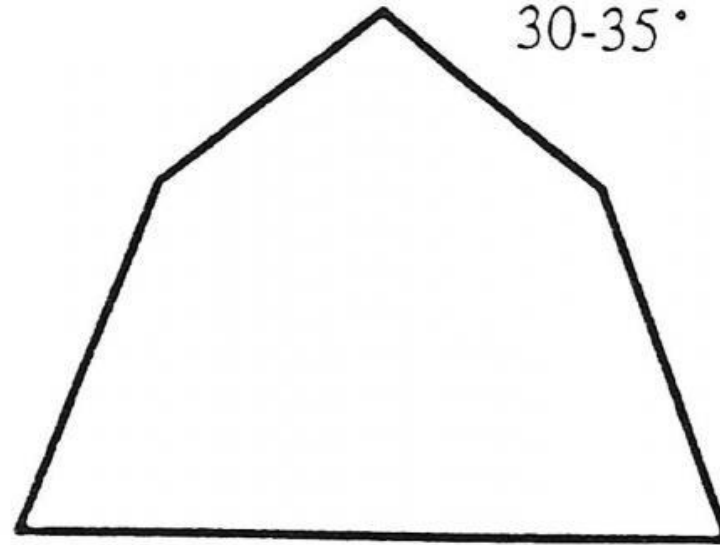
e

Tent



15-20°

Bacon, Reed



30-35°

15-20°

Hass, Gwen

If the tree is crowded,
the bearing surface goes up
and the tree increases in
height to get more light

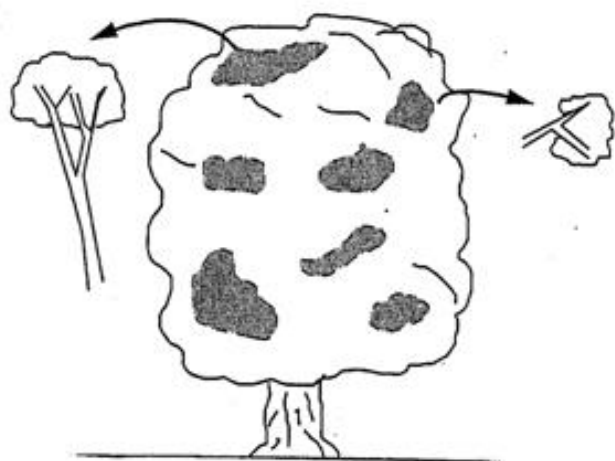
Ideally, it is best not to prune
avocados, as long as their
is enough room for them to
grow.

Just one of the smaller trees
like Holiday or Wertz.

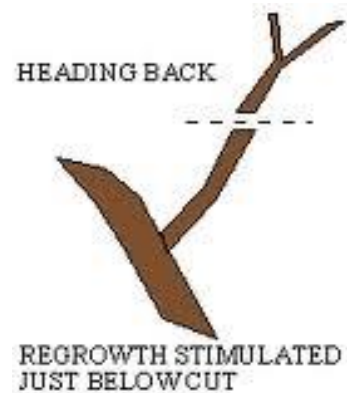
If you must prune, do it before it gets out of hand (the lowest branches with leaves are higher than 4 feet from the ground)



A low canopy keeps leaf mulch on the ground, Very Important for disease control



Selective branch removal with thinning cuts





Lynette Evans / The Chronicle

Unmanageable
regrowth from
heading cut

Limit nitrogen application to reduce growth

1 oz per tree per year for new tree

then 2 oz the next year, 3 oz the third year,

4 oz, the fourth year, 5 oz the fifth,

6 oz the sixth, 7 the seventh and by the time you have a dense leaf mulch you can actually start cutting back and by the time the tree is 10 years old with a dense mulch you might need to add any fertilizer N



The MOST critical activity is irrigation

Not too much and not too little
and frequent enough

Remember it is a shallow root system
without access to a lot of soil water

Too little=problems

Too much =problems



There's more to the Story

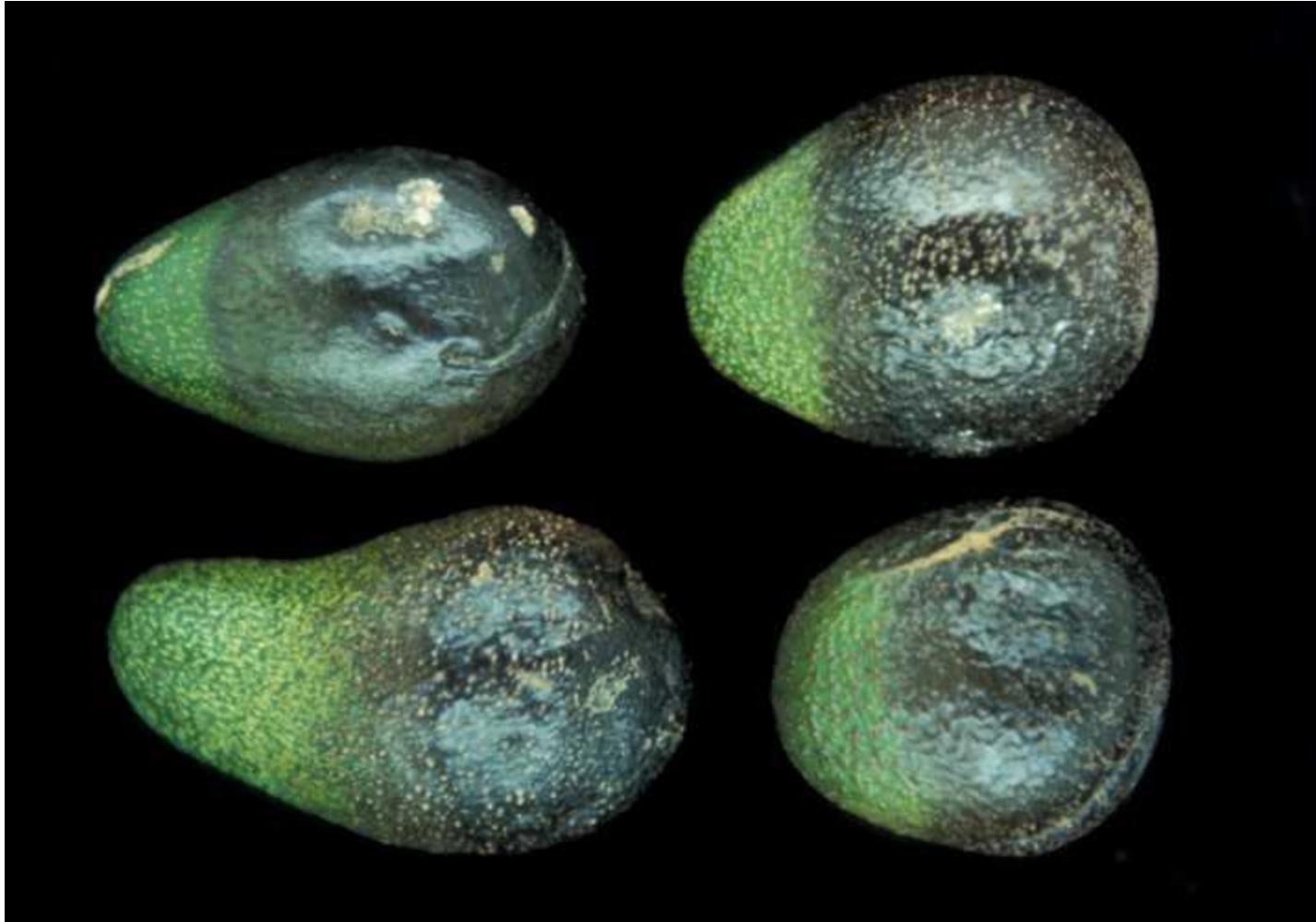
Avocado Story

Part Deux

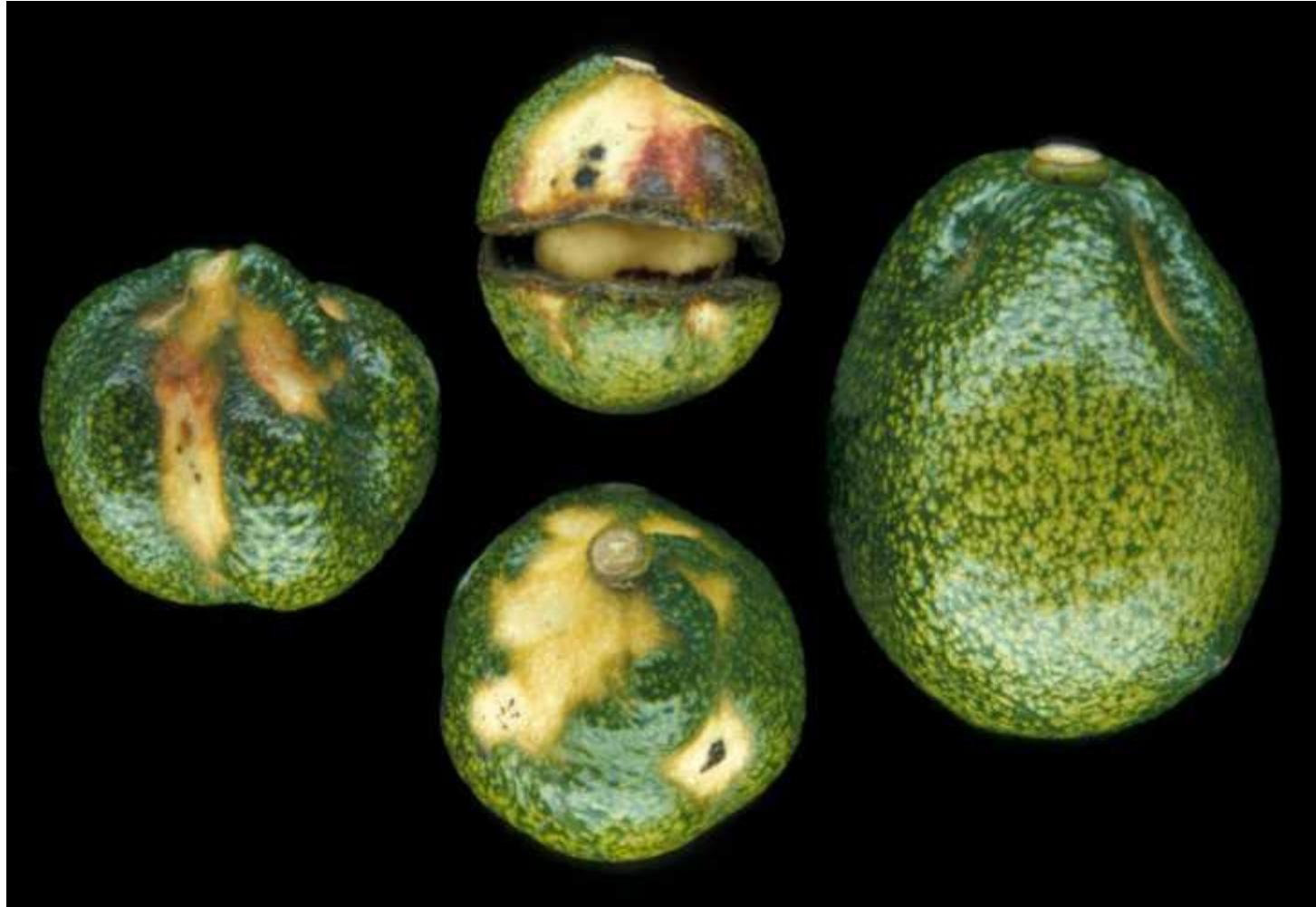


The 4 Fs and S of Avocado





Dothiorella Fruit Rot



Sunblotch



Black Streak

Verticillium Wilt



Avocado Root Rot



Root Rot Control

1. Proper irrigation
2. Resistant rootstock
3. Mounding
4. Gypsum
5. Phosphite

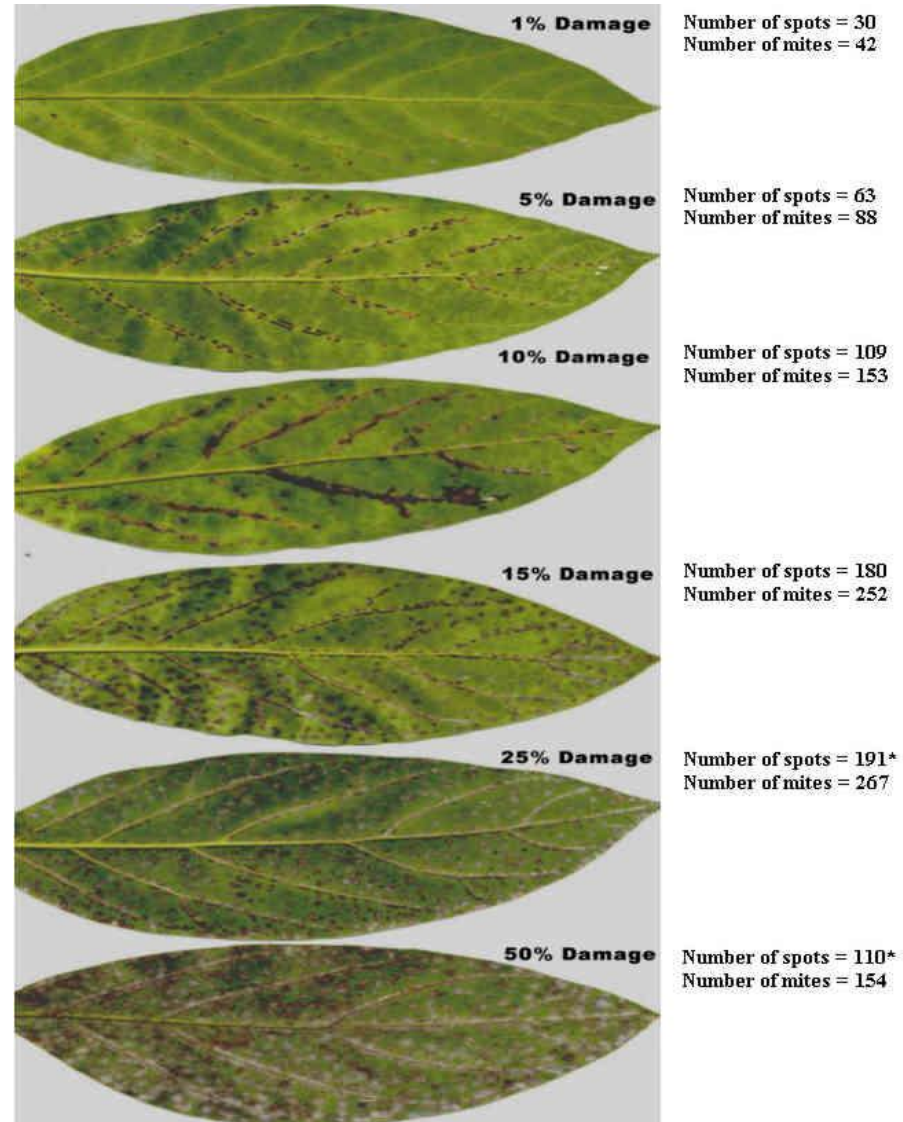




Don't plant any tree
in a lawn setting
Especially not avocado
They don't like the
watering schedule of
grass



Persea Mite
Oligonychus perseae





Avocado Thrips

Scirtothrips perseae





Lacewing larvae



Six spotted thrips

Biological Control



Frankliniella thrips



Minute Pirate Bug



Black Hunter thrips



Polyphagous Shot Hole Borer - PSHB
and a Fusarium fungus

Goes to over 200 tree
species



Pest-Disease Complex

Ambrosia Beetles (>34,000 species world-wide)

order: coleoptera

Characterized by boring into trees and forming galleries in the sapwood.

Beetle carries and fungus which digests the wood disrupting the flow of water and nutrients

The adult and larvae feed on the mycelium and spore clusters of the fungus

Typically attack trees under stress (e.g. drought)

May or may not be pests of specific host plant species

It only takes one beetle to cause the infection

Known Suitable Hosts: Box Elder (*Acer negundo*), Castor bean (*Ricinus communis*), Avocado (*Persea americana*), English Oak (*Quercus robur*), California coast live oak (*Quercus agrifolia*), Big leaf maple (*Acer macrophyllum*) silk tree (*Albizia julibrissin*) Liquidambar (*Liquidambar styraciflua*), Coral tree (*Erythrina coralladendron*), Titoki tree (*Alectryon excelsus*), California sycamore (*Platanus racemose*) and Blue Palo Verde (*Cercidium floridum*).



Whew!!!!



what a relief

Citrus Part duo



First mentioned in China 4,500 years ago

Incredibly complex botany
hybridizes easily and has
natural mutations (chimera)

13 genera, 1600 species and 100s of commercial varieties
20 named satsumas (thin skinned, early Mandarin)

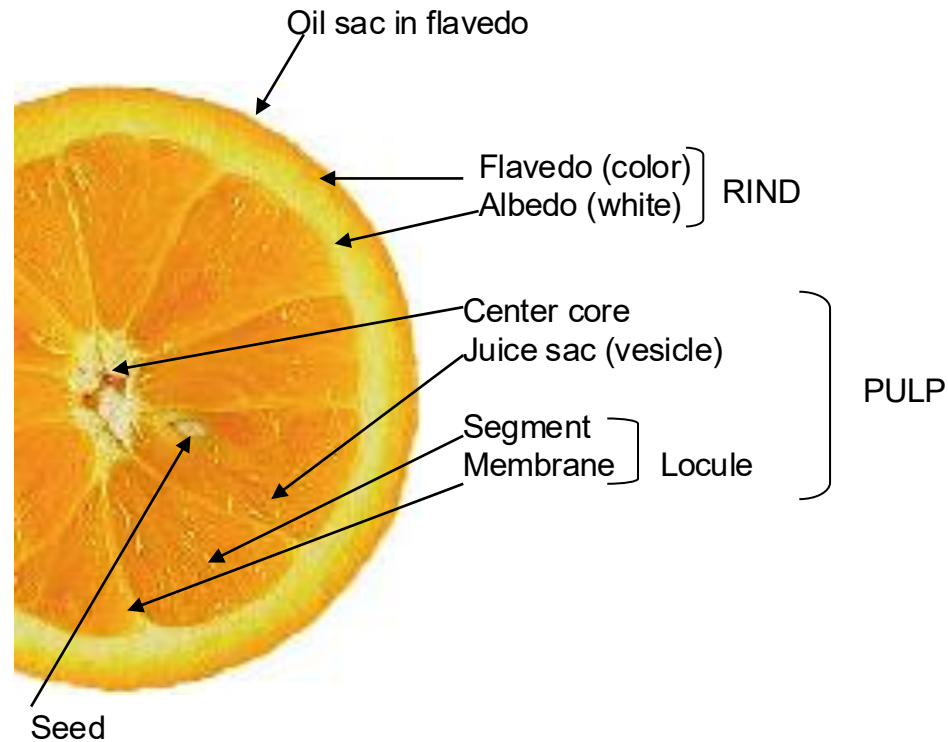
Which is more acid,
an orange or a lemon?

They are about the same, pH 2.5 - 3
It's just that oranges have sugar
that masks the acidity

Citrus fruit have a very complex chemical makeup and one of
the first uses was as a medicine



C. medica – citron was first citrus in Europe



Every part of the fruit has been
used for medicinal purposes
Flavors and chemical compositions can
change depending on growing environment.

The major species and hybrids:

Key Lime



Pomelo



Persian lime



Mandarin



Citron



Kumquat



Sweet orange



Sour orange



Lemon



Rangpur



Grapefruit



Adding to the confusion is that the same fruit can have multiple names

Bearss/Tahitian/Persian lime

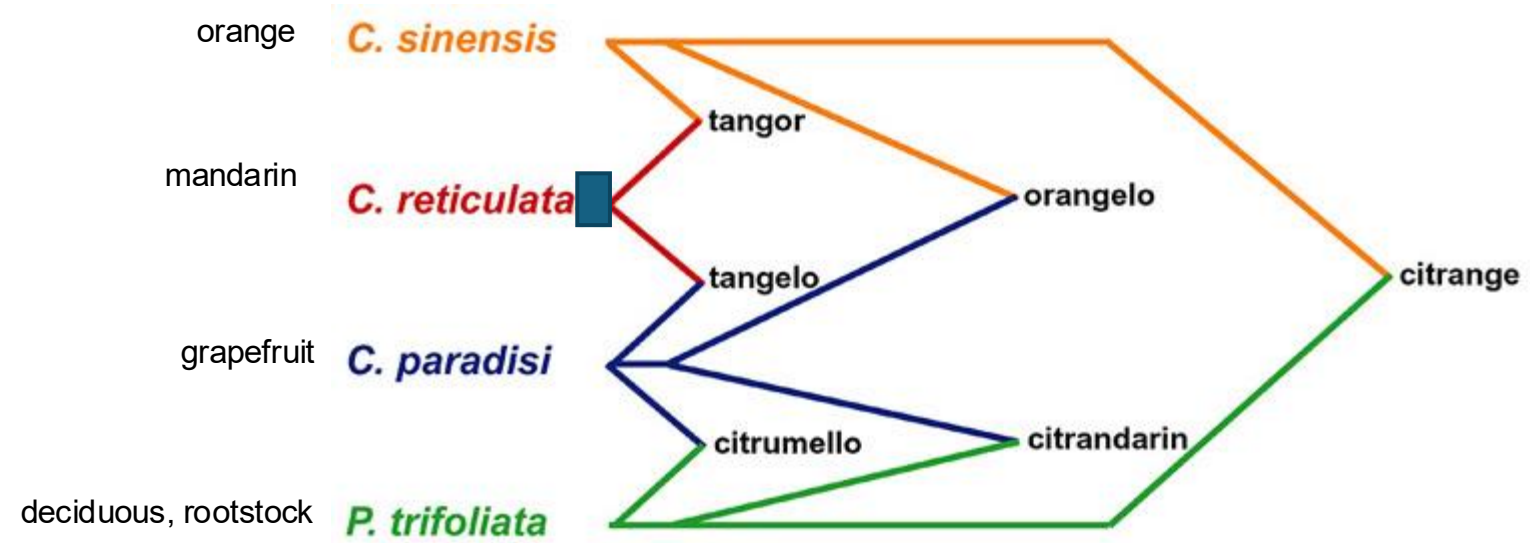
Mexican/West Indian/Key/Kaghzi lime

Palestine sweet/Indian sweet lime is sweet

Rangpur lime is not a lime, but it's sour

Shamouti/Jaffa/Palestine orange

They hybridize readily



And they form chimeras
spontaneously, which is
often how new varieties
are found



'Buddha's hand' citron



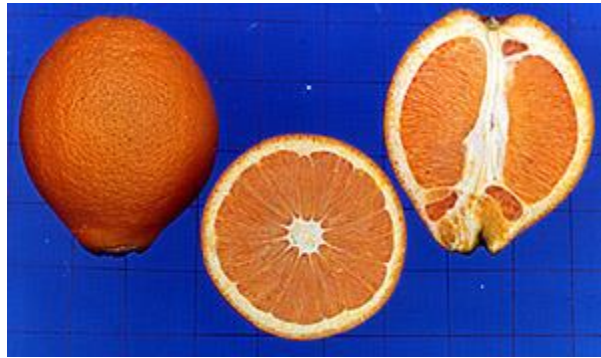
'Variegated pink eureka' lemon
from Moorpark

All commercial citrus (fruit trees)
are grafted

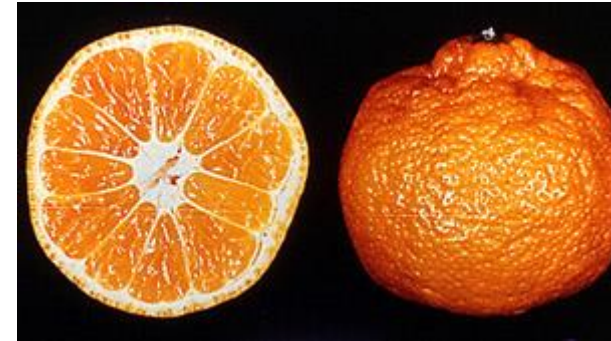


Homeowners are not normally given a choice,
other than dwarfing – ‘Flying Dragon’

Some citrus don't need to be
pollinated and produce seedless
fruit - parthenocarpy

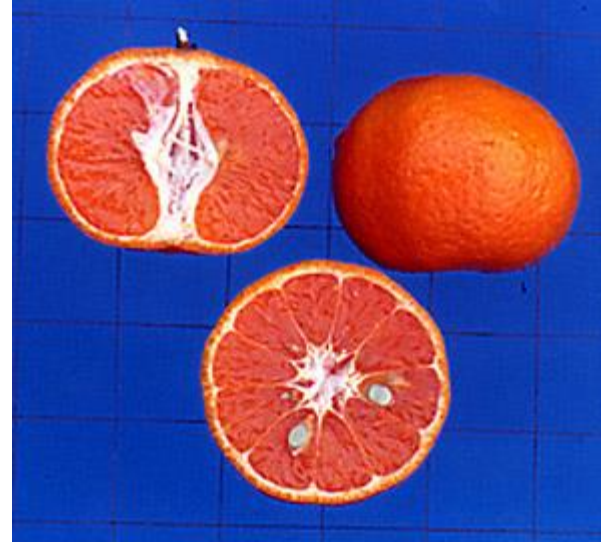
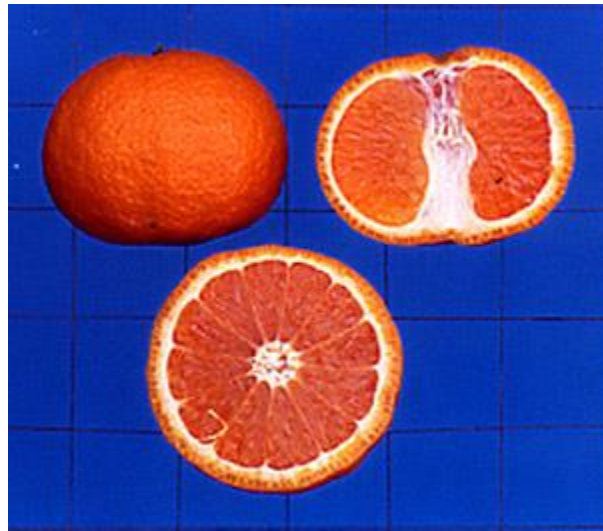


'Washington' navel orange



'Satsuma' mandarin

And some varieties produce seed if there's another variety near, or if the weather is unusual at fruit set



'Kara' mandarin

They are mandarins, not tangerines.

‘Dancy’ is a tangerine because it came from Tangiers. The others are loose skinned, bright orange. Zipper skin, easy peeler.

Satsuma – *C. unshiu*

Mediterranean – *C. deliciosa*

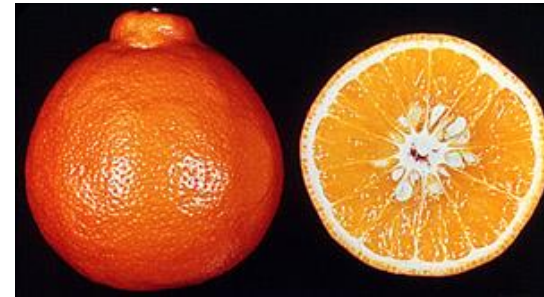
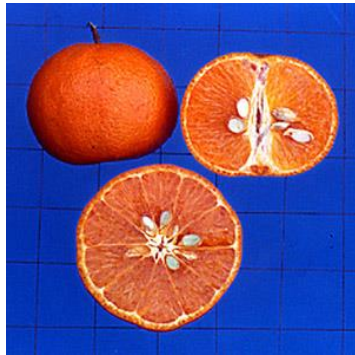
King – *C. nobilis*

Common – *C. reticulata*

Satsuma – ‘Satsuma’, ‘Owari’, ‘Miyagawa’
‘Kishu’

Common – ‘Clementine’, ‘Pixie’, ‘Ellendale’
‘W. Murcott’

Hybrids – ‘Gold Nugget’, ‘Tango’, ‘Page’,
‘Nova’



Dekopon (shiranui) – trademarked as ‘Sumo’
big, sweet, seedless, easy peel and \$4 a piece



Needs HEAT to be really SWEET !!!!!

Sweet orange

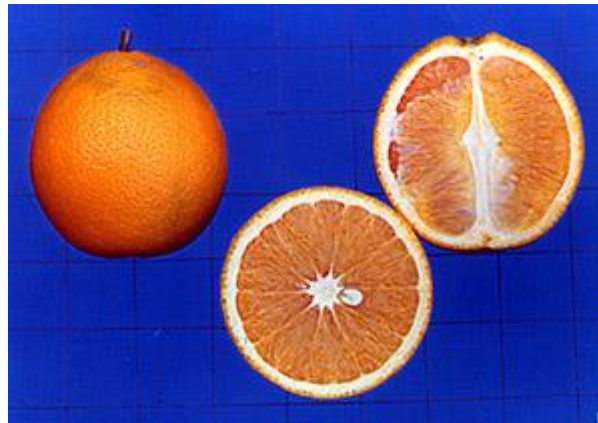
Navel – winter Valencia - summer

‘Midnight Valencia’ – late

‘Lane Late Navel’ – spring /summer

‘Cara Cara’ Navel – early

‘Trovita’ Valencia-like – few seeds, early



Pummelo (pomelo)/grapefruit

‘Oroblanco’



‘Melogold’



Cuisine Citrus



Citrus hystrix/'Kaffir' Lime



Australian finger lime

'Yuzu'



'Sudachi'





Fertilizer

triple 15/16 – 3 pounds

total from spring – summer

10 pounds good compost/manure

Don't fertilize new plantings

Trees are full from nursery

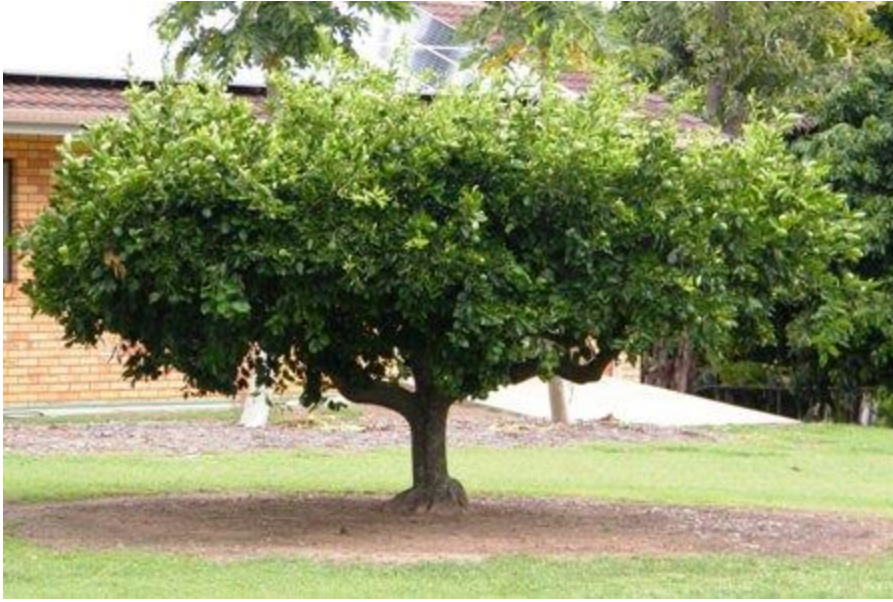
Overfertilization leads to lots of “Hay”
that needs to be pruned more frequently

When trees are older they can often get by
with little or no fertilization



Watering

In August can use as much as 10 gallons per day. Less when short days and cool. Check soil with trowel.



Washington Navel Orange
Riverside, CA

Plant it in the right place. Orange/mandarin to 18 feet. Don't prune. Lemon to 30 feet. Open center and bring height down. Flying Dragon rootstock.



Citrus bud mite



Red Mite



Citrus silver mite

Common Mites



6-spotted mite



California red scale



Armored Scales



Purple scale



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Aphids



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Whitefly



UF

Others



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Mealybugs



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Brown garden snail

Controlling ants controls most pests





Applying and maintaining 'Tanglefoot'
controls ants

Citrus leaf miner



Diaprepes Root Weevil





Phytophthora root rot

Crown rot

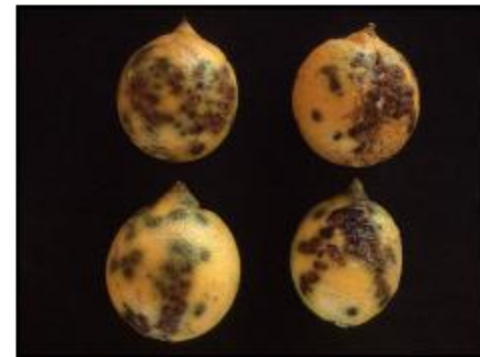


Brown rot





Dry Root Rot



Citrus Canker (in Florida and Mexico)



Citrus greening
In Florida for sure and
throughout S. California
Now in Santa Paula

Asian Citrus Psyllid ACP



Adult



Twisted leaves from feeding



Nymphs



Sniffers for finding infected trees



Dispenser for spreading fungi
to kill ACP

Biocontrol?



Tamarixia



Diaphorencyrtus

For more information on avocado
and citrus pests and diseases:

<http://www.ipm.ucdavis.edu/>

For more information on citrus:

<http://www.citrusvariety.ucr.edu/>

<http://lib.ucr.edu/agric/webber/>

More reading:

<http://ceventura.ucdavis.edu/>

[newsletterfiles/newsletter653.htm](http://ceventura.ucdavis.edu/newsletterfiles/newsletter653.htm)

<http://ucanr.org/blogs/Topics/>

Thank you

????????????????????