Growing Healthy Avocados in the Home Garden
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Backyard Culture is a Little Different than Commercial Culture
- We usually don’t use tractors
- We don’t use helicopters
  - (although some of us would like to)
- We don’t need “maximum” yields
- But, some things are the same
diseases
insects and mites
irrigation requirements
fertilizer requirements

Backyard Culture is a Little More Like This:
- Avocado leaves dropping in the pool
- Neighbors complaining about the tree blocking the view
- Just make sure you don’t pump the pool water onto the tree! (it is full of salt)
Things to Consider

- Site Selection
- Varieties
- Planting
- Watering
- Training, Pruning and Thinning
- Fertilizing
- Sanitation
- Pests and Diseases
- Harvesting and Storage

Site Selection-Avocados

- Select a warm location where frost is unlikely
- Avocados have different tolerances to cold:
  - Hass avocado fruit freezes at 29° F
  - Fuerte avocado fruit freezes at 26° F
  - Mexican race of avocado ('Mexicola', 'Stewart') freezes at 24° F
- Avocados do NOT grow well in clay soil - they need drainage (no standing water)
- Keep the leaf mulch on the ground under tree
- Keep the trees away from houses and pools - they drop leaves
- They grow tall without pruning!

Avocados and Citrus need Full Sun and Space, this can interfere with the neighbors!
If a neighbor doesn’t like your tree:

- Sometimes they knowingly (or unknowingly) retaliate
- The neighbor on the right was arrested and prosecuted for spraying herbicides at midnight on this woman’s trees and shrubs. (she had a night video recorder catch him doing this)

Three Avocado Races

- Mexican
  1. 6 months from flowering to fruit maturity
  2. Leaves are anise-scented
  3. Fruit are small, round or pear-shaped, thin skinned
  4. Most frost tolerant
  5. Least salt tolerant
  6. Large seed
  7. Doesn’t do well in the coastal environment
  8. Tree is semi-tropical, not expected to flower or set fruit in the tropics, most likely to survive a frost
  9. Examples:
     - Bacon
     - Zutano
     - Fuerte is hybrid Mexican
Three Avocado Races

Guatemalan
1. Fruit needs 12-18 months to reach maturity
2. Leaves do not have an anise scent
3. Skin is rough and leathery, sometimes woody and always thick
4. Relatively small seed
5. Most salt tolerant (usually)
6. Subtropical tree, not expected to thrive in the tropics or survive hard frosts
7. Examples
   • GEM

Three Avocado Races

West Indian
1. Fruit about 6 months from flowering to maturity
2. Leaves do not have an anise scent
3. Fruit skin shiny and leathery
4. Fruit have the lowest oil content
5. The least tolerant of cold temperatures and the least tolerant of low humidity
6. Tropical tree not adapted to California
7. Most tolerant of the three to soil salinity

Avocado Varieties - Hybrids

‘Hass’ and ‘Fuerte’ (and most of the better commercial varieties) are hybrids of Mexican and Guatemalan
The West Indian varieties are grown in the more tropical countries, and in southern Florida and Hawaii. They are large, have short harvest seasons, and are more watery in flavor.
A and B Flower Types

A flower type – opens as a female in the morning, closes overnight, then opens as a male in the afternoon of the second day

B flower type – opens as a female in the afternoon, closes overnight, then opens as a male in morning of the second day

Female vs Male

Flowering

“A” flowers – Hass, Reed, Lamb Hass, Pinkerton, Harvest, Holiday, GEM

“B” flowers – Bacon, Zutano, Fuerte, Nabal, Sir Prize

Avocado is a bee pollinated crop

Could we improve fruit set in a single tree in the backyard by providing a double-grafted tree?

The answer is yes, but we have to be careful because Zutanos and Bacons will usually out-grow Hass and shade it out. Flag the Zutano and Bacon and keep pruning it back.
Harvest Seasons

- **Hass**: Jan-July/Aug in San Diego
- **Lamb Hass**: May-Nov
- **Reed**: May-Nov
- **Fuerte**: Nov-Mar
- **Bacon**: Nov-Mar
- **Zutano**: Oct-Feb
- **GEM**: Nov-Mar
- **SirPrize**: Nov-Mar

Bender’s Favorites

- **Hass** for flavor and long season
- **Fuerte** for best flavor, but strong alternate bearing
- **Reed** for best flavor in a late summer fruit
- **Lamb Hass** for heavy fruit production, June – August season

Planting

- Best time to plant is during the Spring
- Dig the hole twice as wide as the root ball
- Plant at the same depth as the container
  1. If the graft union is planted too low the scion may become infected with Phytophthora and cause a trunk canker
  2. If planted too high the roots might dry out

Use the native soil to backfill and tamp it in slightly with the shovel handle to get rid of air pockets and improve water infiltration.

*Don't add mulch to backfill*  Why?  High in salt and ammonia
Establishment

- Avocado feeding roots are in the upper 8-12 inches of soil with a preference for roots on the soil surface under the leaf mulch.
- Establishment is enhanced by applying a mulch around the tree but not up against the trunk.

Watering

- Young tree – situate drippers close to the root ball and gradually move them out as tree ages.
- Mature tree – may require 4-6 inches of water per month in the summer (36-48 inches annually, either rainfall or irrigation).
  - Water less in Clay soil
  - Water more in Sandy soil (at least once a week and more frequently)
  - Mature tree may need 6-8 drippers per tree, or one mini-sprinkler (do not sprinkle on trunk)
  - Bubblers-difficult to contain water inside the berm

Location of Water

- Move drippers out to the drip line as tree ages
- Mini-sprinkler should be located on the uphill side of the tree
- Mini-sprinklers usually work best because they spread the water out to evenly distribute to the shallow feeder roots
Special Challenges in Avocado Irrigation

The root system is shallow, 80-90% of the feeder roots are in the top 8-10 inches of the soil
- The feeder roots have few root hairs and are inefficient in extracting water
- Many groves are on hillsides with decomposed granite soils, these drain rapidly (good) but don’t store water very well (bad)
- Soil moisture should be checked to determine frequency of irrigation
- Leaching salts below the root zone

Avocados do not tolerate clay soils very well
- Trees may have to be planted on a mound to improve drainage.

Irrigation Requirements
- Mature tree uses 8 gallons of water per tree per day in January
- Up to 50-70 gallons of water per day in July-August
- Most growers irrigate 350 gal/week, more or less depending on the weather

Commercial Growers:
- Irrigation frequency, determined by tensiometer or soil probe
- Irrigation amount determined by tables or website: http://avocadosource.com/tools/irrigation scheduling calculator
Poor leaching = Tip-Burn (salt damage)

Landscape situations:
Water coming from all directions but not enough for the tree.

Fertilization – Avocado

- Trees require nitrogen every year
- First application in late Jan-Feb before bloom
- Second application in May
- Third application in June
- Possibly potassium during the summer for fruit filling
- Trees usually need a zinc spray in May (especially with too much manure for an organic nitrogen program)
- Or apply 5 lbs zinc sulfate/tree every 3 years

- Suggested application rates of nitrogen
  - (Divide into 2 or 3 applications)
  - 1st year: 1 tablespoon nitrogen fertilizer 3 times per year, per tree.
  - 2nd year: 0.25 lb actual nitrogen per tree
  - 3rd year: 0.5 lb actual nitrogen per tree
  - 4th year: 0.75 lb actual nitrogen per tree
  - 5th year: 1 lb actual nitrogen each year
  - Into maturity: up to 2 lb actual nitrogen per tree per year
Fertilization – Avocados (another method)
- Mature tree uses 1.5 to 2 lbs actual nitrogen per tree per year
- Split monthly into 8 applications
- Or, 2/3 applied before bloom and 1/3 applied in June
- Or, (Bender suggestion),
  - 6 lbs triple 15 applied late Feb, 3 lbs calcium nitrate in June and 3 lbs calcium nitrate in September = 1.87 lbs actual N

Organic Nitrogen Fertilization
- Commercial growers often use a 50 lb bag of EZ Green (composted chicken manure) per tree per year, ½ applied before bloom and ½ in late summer
- EZ Green is about 3% nitrogen
- Animal manures usually make zinc deficiency worse, due to the high phosphorous content
- Animal manures are typically high in salts and thus you need to leach salts. Best to apply when rains are expected.
- Do not apply a heavy rate during bloom, you may drop the flowers and new setting fruit

“Actual Nitrogen”
- 1 pound of actual nitrogen equals about 5 lb of 21-7-14 per year, or 100 lb of composted cow manure each year. Organic fertilizers such as manure, bloodmeal, etc. could be applied in the fall under the tree canopy.
- 15-15-15 has 1.5 lbs N in 10 lbs
- Do not use ammonium sulfate! It makes the soil too acidic.
Zinc Deficiency, Mottling between Veins (this example is citrus)

Pruning - Avocado

Single Leader vs Cal Poly Style
High Density Planting

- University Trial currently in progress
- 10’ x 10’ spacing for Hass with a B-flower (Zutano) in the middle of 9-tree units
- Trees kept at 8’ high by topping twice a year
- The issue is: when do you prune? Pruning in the summer cuts off fruiting wood for next spring.
- The trial is comparing two pruning styles done early in the season
- First harvest (trees are 2 ½ years old) was 13,600 lbs/acre on Hass and 1200 lbs/acre on Zutano

Avocado Root Rot

Infection starts at the root tips
Root Rot          Healthy

Avocado Root Rot

- By far the most common avocado disease
- Found in almost all of the older avocado areas of Fallbrook, Escondido, Vista, Carlsbad, Encinitas, Lemon Grove, La Mesa, El Cajon (formerly commercial groves)
- Fungus spreads as water flows or on soil in picking bins, shoes, shovels, equipment, and ladders

Avocado Root Rot - Treatment

- Easiest – Replace with a non-host, like citrus or cherimoya
- Injection of trunk with phosphorous acid twice a year for life, registered as a fertilizer but not a fungicide
- Mulch heavily with greenwaste, must be a wood-based mulch
- Replace with a better rootstock – ‘Dusa’ is the best on the market now – Sold only at Brokaw Nursery in Ventura, Eli’s Nursery (formerly Persea Tree) in Fallbrook, and C & M Nursery in Nipomo
  - Both Brokaw and C & M will sell to a garden club with one order put together
Avocado Root Rot Avoidance

- Plant trees with healthy roots
- Don't plant trees until you have checked the roots! Once planted, you cannot bring them back to the nursery and you have doomed your soil!

Clean shovels, clean boots, clean ladders, etc.
Don't let water run down the hill from your neighbors, they may have root rot.

Phytophthora mengii Canker

Avocado Sunblotch (sunken yellow lesions)

Other symptoms: stunted weeping growth, crocodile bark, yellow streaking on young branches. Symptoms will often appear after stress, topworking or freeze damage.

In severe cases, no or little fruit production

Spread by infected graft wood, infected rootstocks, root grafting, pollen, and possibly pruning.
What can you do about Sunblotch?

- Remove the infected trees
- Make sure the nurseries are not using budwood and seeds from infected trees.

Polyphagous Shothole Borer/Fusarium Complex

- Fusarium Dieback Pest/Disease Complex
- Slow dieback of canopy
- Localized to LA, Orange, Ventura and San Diego Counties

Avocado Fruit Set
Avocado Thrips

Beneficials – Predatory Thrips
Franklinothrips adult and larvae
Persea Mites

Persea mite colony
Predatory Mites  
*Amblyseius californicus*

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Avocado Brown Mite Damage

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Spider Mite Destroyer  
*Stethorus* beetle
Looper damage

Amorbia damage similar to looper damage

Harvesting and Storage

- The best place to store the fruit is on the tree.
  - **Avocado:** Pick in the proper season when fruit is mature, let it sit a few days to soften, put it in a paper bag with an apple to speed up the ripening.
  - **Harvest fruit with a clipper.** Unless you want to eat the fruit immediately, do not pull the fruit off the tree because it may injure the peel leading to rot.