Growing Fabulous Citrus

UCCE Master Gardeners Santa Clara County

Key ideas

- *Citrus are long-lived, subtropical, ornamental, evergreen plants. Site them carefully!*
- *Citrus do not require pruning to be productive, but they respond well to pruning.*
- *Citrus require adequate irrigation during the dry months and regular fertilization.*
- *The key to controlling many honeydew-excreting pests is to exclude ants from trees.*
- *For best flavor, choose varieties suitable for your climate and ripen fruit fully on the tree.*

1. Site Selection

- Plant in sunniest, warmest location available.
  - Best SW exposure, near reflective driveway, pavement, building or pool.
  - Plant in spring, to avoid frost threat until established.
  - Protect from wind.
- Select a well-drained area, if planting directly in soil.
- Avoid planting in lawn, or maintain a grass-free area beneath tree. Water and fertilize lawn and tree separately.

2. Plant Selection

- Select best varieties for your climate
  - Oranges, grapefruit and blood oranges need heat for pigmentation and sweetness.
  - Limes and most lemons do not need full sun or long periods of heat to ripen fruit.
  - Frost hardiness from most tender to most tolerant: Mexican and Tahitian lime, Eureka and Lisbon lemon, grapefruit/pummelo, tangelo/orange, mandarin, Meyer lemon, kumquat.
- Choose rootstock to control size and impart cold hardiness.
  - Large trees will need at least 12-by-12 foot space, semi-dwarf 8-by-8 foot space.
  - Only true dwarfing rootstock is Flying Dragon. Tree will be 4-8 feet tall.
  - Some types naturally small: Improved Meyer lemon, Satsuma mandarin, some kumquats.
- Choose young trees in small containers; look for healthy leaves and roots, and no fruit.

2. Planting Citrus

- Planting hole should be twice as wide as root ball, and only as deep as root ball.
- Position top of root ball one inch above surrounding soil level.
- Do not add amendments or fertilizer to planting hole.
- Make watering basin around newly planted citrus; keep water away from trunk.
- Protect trunk from sunburn by painting with white interior latex paint diluted 1:1 with water.

4. Citrus Irrigation

- Keep rootball of newly planted trees moist, but not soggy**.**

- Newly planted citrus needs frequent watering, possibly 2-3 times a week in hot weather.
- For established trees allow top 3-6 inches of soil to dry before watering.
- Mature trees need deep watering 1-2 times per month in warm weather (4-6 inches of water/month in mid-summer), less frequent watering in cool weather, none during rains.
- Methods of watering: water under the canopy and slightly beyond drip line for established trees. Do not allow water to contact the tree's trunk. Handwatering, drip emitters, microsprayers, sprinklers, or soaker hose all can be used.
- Maintain 3 - 4 inch layer of mulch. Keep mulch 6-12 inches away from trunk.

5. Fertilizing and Nutrient Deficiencies

- New trees: use small amounts of nitrogen fertilizer (1 tablespoon) each month from May to August). Double the total amount of fertilizer used each year until the tree is 4-5 years old.
- For mature trees (5 years+) apply up to one pound actual N per year for a full size tree. Reduce proportionately for semi-dwarf and smaller trees. Read directions on package; do not over fertilize.
- Yellowing of older leaves may indicate a nitrogen deficiency. However, citrus roots do not absorb nitrogen efficiently from cold, wet soils. If adequate nitrogen is present, leaves will green up in spring as soils warm and dry out.
- Micronutrient deficiencies common in California citrus are iron, zinc and manganese.
    - Symptom: yellowing between veins on new growth
    - Treat by applying a complete citrus fertilizer with micronutrients.

6. Pruning

- Citrus can be productive without pruning, but opening center of tree to light increases production.
- During first 2-3 years of growth, prune only to remove suckers that appear below the graft and any highly vigorous, vertical shoots (watersprouts) that are too close to other branches (common on lemons). Remove any fruit that forms during this period.
- As tree reaches fruiting age (~5 years) prune to establish good tree form. Remove any dead, crossing, or too closely spaced wood that forms in the center.
- Prune off branches that touch the ground (the "skirt" of the tree) to help control snails, rats ants, and disease.
- Prune for ornamental reasons or to control size. Citrus tolerates pruning well.
- March is the best time for pruning in Santa Clara County. If ripe fruit is on the tree at this time (Valencia oranges, lemons), you can prune later, up to late summer.

7. Freeze Protection

- Citrus varies in cold tolerance, but most suffer when temperature drops below 28 degrees for more than a few hours. When frost is predicted:
    - Pick ripe fruit to prevent freezing.
    - Make sure tree is well watered.
    - Cover trunks of young trees with insulating material like burlap, newspaper.
    - Cover foliage of small trees with a light sheet, row cover, or frost blanket.
- Strings of outdoor lights (not LEDs) can be put in tree to provide some localized heat.
- If tree is damaged by frost, remove damaged fruit, but wait several months before pruning damaged leaves or branches.

8. Fruit Development and Harvesting

- It is normal for a tree to drop many, if not most, young fruit.
- Many varieties of citrus alternate bear, i.e., heavy crop one year, next year light. This can be partially remedied by thinning small fruit or picking ripe fruit early in the heavy bearing year.
- Allow fruit to ripen fully on tree. Fruit does not continue to ripen once picked.
- Taste fruit periodically and pick when it suits your taste.
- Color is not a good guide to ripeness. Orange color is a response to cold nights.
- Fruit of young citrus trees (under 5 years) is typically of inferior quality. Fruit from older trees may vary in taste from year to year. Total heat is an important factor in flavor.

5. Citrus in Containers

- Good for small spaces and border-line climates.
- Choose naturally smaller trees, e.g. kumquats, mandarins, Meyer lemon.
- Use half-barrels or at least 15-gallon containers for most varieties.
- Use potting soil and add slow-release fertilizer to soil or use liquid fertilizer once or twice a month. Use a complete fertilizer that includes micronutrients.
- Water regularly, when top two or three inches of soil dry out. Applying water slowly is best.
- Mulch the soil surface in the container.
- Be ready to re-pot as roots fill container and soil breaks down over time.

6. Common Citrus Pests

(For details see http://www.ipm.ucanr.edu/PMG/GARDEN/FRUIT/citrus.html)

- **Pests that suck juices from leaves and excrete honeydew.**
    - **Aphids** are most noticeable in early spring. Found on underside of leaves, particularly on new growth. Feeding can cause new leaves to curl. Populations decline when hot weather arrives.
    - **Whitefly** feeds in groups on the undersides of leaves. Name derived from the mealy, white wax covering the wings and body of adult insect. Nymph stage is wingless.
    - **Soft scale, such as brown soft scale, black or citricola scale**. Immature scales and adult females have a characteristic round or oval to elongate and flattened or humped appearance. Scales insert a tiny strawlike mouthpart into plants and suck fluids. Scales can occur on bark, fruit, or leaves.
    - **Mealybugs** are soft, oval, segmented insects that are usually covered with a white or gray mealy wax. This waxy covering is similar to that produced by cottony cushion scales. Colonies occur as white, sticky clusters among leaves and fruit.
    - **Note: Sooty mold**, a fungus, grows on the honeydew excreted by sucking insects. It does not harm plants directly, but if heavy may reduce photosynthesis.

- **Managing honeydew-excreting pests**
    - Control ants by putting a band of sticky material around the tree's trunk to prevent ants from entering the tree. Ants consume honeydew excreted by aphids, soft scale, whiteflies, and mealybugs, so they protect these pests from natural enemies.
        - Do not apply sticky material directly to the bark of young trees. Wrap the trunk with fabric or paper tree wrap or duct tape and apply sticky material to the wrap.
        - Prune out branches touching buildings, the ground, fences, or other trees to eliminate additional entry points into the tree.
    - Encourage predatory and parasitic insects that control pests. Do not use insecticides. Plant flowering plants to provide pollen and nectar for these "natural enemies."

- Do not overfertilize, as it encourages rapid, tender growth that attracts pests.
- Rinse tree off with strong stream of water to wash off some pests, honeydew and sooty mold and to reduce dust, which favors a number of insect pests.
- Learn to tolerate some pests. Healthy citrus trees can tolerate low levels of pests.
- Insecticidal soap or summer horticultural oils specifically recommended for summer spraying of citrus are a last resort, if all of the above methods have not provided adequate control. Follow label directions exactly. In deciding whether to use these materials, recognize that they will also kill natural enemies of the pests you are trying to control.

- **Other citrus pests**
  - **California red scale,** an armored scale. Armored scales do not produce honeydew. Encourage natural enemies such as parasitic wasps. Prune out severely infested branches, or consider one spray with summer oil Jul-Sept for severe infestations.
  - **Snails and slugs** chew holes in leaves and fruit. To control, prune skirt of tree off ground to limit access. Trap snails and slugs under boards and/or handpick them at night. Wrap trunk with strips of copper. If necessary, use an iron phosphate control.
  - **Citrus leafminer** is a small, light-colored moth whose larvae feed between the tissues of tender young leaves and are most common after a flush of new growth. When the larva pupates, it curls the edge of the leaf around itself for protection. Sprays are unnecessary, damage is cosmetic. Avoid heavy pruning in summer or fall, which will stimulate new growth that attracts this pest. Encourage parasitic wasps that help with control.

Asian citrus psyllid, a brown insect the size of an aphid, can vector a bacterium that causes a devastating, incurable citrus disease, Huanglongbing (HLB). Psyllid nymphs feed on young tissue and produce curly, waxy tubules that can be used to identify this invasive pest. The psyllid is established in southern California and has been found a number of places in the Bay area, which are now under quarantine. As of February 2020, about 2000 trees in southern California home gardens have been confirmed to have the disease and have been removed and destroyed. At present, our best hope of controlling the spread of the disease is to control the insect. Visit the following website to see how to inspect your citrus trees: http://californiacitrusthreat.org/pest-disease ***. If you suspect you have this pest, call the CDFA hotline 800-491-1899 or Santa Clara County agricultural commissioner (408) 918-4600 immediately***.

7. **Some Varieties of Citrus**

- **Choosing varieties for your garden**
  - Climate determines whether a particular type of citrus will produce quality fruit in your garden. Santa Clara County's climate is best for navel and Valencia oranges, some mandarins, lemons, limes, Meyer lemons. kumquats, and oroblanco grapefruit.
  - Choose citrus on rootstock that will work for the space available.
  - Extend your harvest by choosing varieties that ripen at different times.

- **Sweet oranges**
  - **Navel** - Standard tree 20 to 25 feet high, dwarf 8 feet. Cool nights and warm days ideal for development of good flavor and bright colored rind. Taste to determine optimal time to harvest. Fruit holds well on tree. Juice turns bitter soon after squeezing. Easy to peel, seedless.

        - **Washington Navel –**harvest Dec – May.
        - **Other varieties:** Robertson, Lane Late, Trovita, Cara Cara (pink flesh)
    - **Valencia –** large tree, harvest Apr - Oct. Thin skinned, very juicy, few seeds. Fruit stores well on tree, improving in flavor, but may re-green with summer heat.

- **Blood oranges –** medium-size tree, slow to start bearing. Extent of color depends on climate and maturity of fruit, as well as variety. **Moro** recommended for SCC, harvest Feb - Apr. Tendency to alternate bear.
- **Sour oranges** – often used for landscaping as well as marmalade or perfume. Fruit not palatable for most people. Varieties: Chinotto, Sevelle, Bouquet de Fleurs, Bergamot.

- **Mandarins and mandarin hybrids –** the largest, most varied group of edible citrus. Most varieties alternate bear. Good varieties for SCC include:
    - **Satsuma –** a group of varieties including Owari. Early ripening and very cold hardy. Harvest Dec - Apr, depending on variety. Rind may still be green when fruit is ready to eat. Seedless. Fruit does not hold well on tree. Small, slower growing tree.
    - **Clementine –** a group of varieties. Seedless if grown without a cross-pollinizer. Fruit holds well on tree. Harvest Jan - Apr.
    - **Encore –** very late ripening (May - July)
    - **Nova –** cross between Clementine mandarin and Orlando tangelo, harvest Jan - Feb.
    - **Page –** cross between Minneola tangelo and Clementine mandarin. Small fruit holds well on medium to large tree. Harvest Feb - May.
    - **Shasta Gold –** harvest Jan – Mar**.**

- **Lemons**
    - **Eureka –** vigorous tree requires pruning to keep under control. Fruit holds well. Some fruit year- round, but main harvest in late winter and spring. Frost tender.
    - **Pink variegated –** attractive variety with variegated leaves, striped rind, pink flesh. A sport of Eureka.
    - **Improved Meyer –** naturally occurring hybrid between a lemon and mandarin or orange. Improved Meyer free of tristeza virus. Frost hardy into low 20s. Small, ornamental tree, good container plant or hedge. Fruit holds well on tree and is borne almost year-round; harvest heaviest in late winter and spring.

- **Limes**
    - **Tahitian or Persian limes –** Bearss variety recommended for SCC. Hardier than Mexican/West Indian (Key) lime, not as hardy as lemon. Attractive small tree. Seedless, ripens to yellow; doesn't hold well on tree once ripe. Harvest Aug-Mar.

- **Kumquats –**Fortunella genus. Eaten whole, including rind. Fruit is cold-sensitive, but plant can withstand temperatures down to 20° F. Small, compact trees make excellent ornamentals, container plants. Bloom late, in summer; harvest Jan **–** Apr. Fruit holds well on tree. Varieties: Meiwa **(**round fruit), Nagami **(**oval fruit).

- **Other unusual citrus for SCC gardens**
    - **Buddha's Hand** citron – fragrant fruit, mostly rind. Thorny tree, very cold sensitive. Everbearing.

- **Oroblanco –** a hybrid between grapefruit and pummelo, lower heat requirement than grapefruit. Large attractive trees. Harvest Jan – Apr.
- **Kumquat hybrids – limequat, orangequat**, the highly ornamental **calamondin**
- **Makrut lime –** leaves, as well as fruit, used in Thai food. Also known as Thai or Indonesian lime.

- To see many interesting new varieties of citrus you may wish to try, view the following article from UC Riverside: Tried and True or Something New? Citrus variety listing from UC Riverside, online at http://anrcatalog.ucanr.edu/pdf/8472.pdf.

Print Resources

Books and UC Publications:

- *California Master Gardener Handbook*, University of California Agriculture and Natural Resources Publication 3382
- *Pests of the Garden and Small Farm: A Grower's Guide to Using Less Pesticide*, Mary Louise Flint, Publication 3332
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Other books:

- *Citrus- Complete Guide to Growing More than 100 Varieties for California, Arizona, Texas, the Gulf Coast & Florida,* Lance Walheim

Internet Resources

- Master Gardener website: mgsantaclara.ucanr.edu
- UC ANR Integrated Pest Management website: www.ipm.ucanr.edu
- UC IPM for Citrus http://www.ipm.ucdavis.edu/PMG/GARDEN/FRUIT/citrus.html
- UC Riverside Citrus Variety Collection http://www.citrusvariety.ucr.edu/index.html
- Tried and True or Something New? Citrus variety listing from UC Riverside: http://anrcatalog.ucanr.edu/pdf/8472.pdf

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