

GROWING CITRUS IN THE SIERRA NEVADA FOOTHILLS

Publication
Number
31-108

(Revised
November 2003)

AUTHORS: *Garth E. Veerkamp, Farm Advisor Emeritus, Jim Gibson, & Yvonne Fee, Placer County Master Gardeners. REVISED by Cindy Fake, Horticulture & Small Farms Advisor, Placer & Nevada Counties*

Citrus is native to South China, Vietnam, the Philippines, India, and surrounding areas. Today, however, it is grown around the world. Most is found within the approximate boundaries of 40° north and south of the equator. The northern boundary includes parts of California, Florida, Spain, Italy, Turkey, and on east as far as southern Japan. Because citrus of one type or another will grow where temperatures **do not** fall below 20° F, it can be planted with caution in the lower foothills of the Sierras.

CHOOSING A SITE

Although marginal — *not free from the risks of frost* — the south slopes and warm ridges from 1,000 feet in elevation and below are most suitable for citrus. In Placer County, this would be the area west and south of Auburn.

Citrus requires excellent soil drainage. Root systems are fibrous and shallow with most root activity occurring in the upper foot of soil. Sites offering protection from wind will increase available heat for citrus.

Heat sinks — *especially dark, south-facing walls next to citrus* — can mitigate the risks of cold at marginal sites. (See graphic below right). Flowers are the most sensitive to cold, followed by fruit, leaves and wood.

VARIETIES

Only the hardiest of citrus should be planted in the foothills. Most local experiences and successes have been with Owari Satsuma mandarins (*November to January harvest*), navel oranges (*December to February harvest*) and Improved Meyer lemon (*everbearing*). Other minor citrus, varying in cold hardiness, include calamondin, kumquat, orangequat, citrangequat, tangelo, blood oranges, and pummelo.



Semi-dwarfing rootstocks are preferred. Trifoliolate orange (*Poncirus trifoliata*) has been used for many years in the foothills for size control and cold hardiness. Preferred trifoliolate rootstock selections include Rich 16-6 and Rubidoux, among others. Trees on these rootstocks will be five to 10 feet, eventually topping out at 15 or more feet.

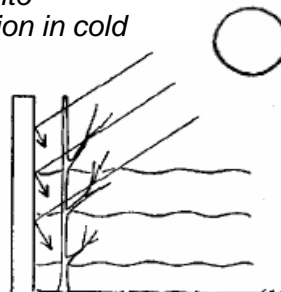
Containers — *tubs, wine barrels, etc. that can be moved next to south walls, indoors or into greenhouses for protection in cold weather* — offer limitless opportunities for growing citrus. Dwarf rootstocks such as Flying Dragon are particularly appropriate for container citrus.

PLANTING & TREE MAINTENANCE

Soils should be well drained. Do **not** plant where trees will get excessive water, such as in lawns. Dig the hole no deeper than the container and twice the width. Do **not** amend the soil in the planting hole with fertilizers or manures. Keep the rootball intact when planting the tree.

After planting, trees should not settle deeper than the level they grew in their containers or in the nursery. Plant on a mound or in raised beds if soil drains slowly or contains heavy clay. Tree spacing arrangements have varied over time and with grower objectives; however, 12-18 feet between trees are common spacings.

The best times to plant citrus are fall or spring after danger of frost has passed. Protect young trees from sunburn by whitewashing the trunk with a 1:1 solution of white interior latex paint and water, or by using paper trunk bands.



A WALL . . .

- *Reflects Heat by Day*
- *Radiates Heat by Night*



COOPERATIVE EXTENSION, UNIVERSITY OF CALIFORNIA

Placer County

WEB SITE: ceplacernevada.ucdavis.edu

Nevada County



11477 E Avenue (Bldg 306, DeWitt Center)
Auburn, California 95603
PHONE (530) 889-7385
FAX (530) 889-7397
E-Mail: ceplacer@ucdavis.edu

255 So Auburn (Veterans Memorial Bldg)
Grass Valley, California 95945
PHONE (530) 273-4563
FAX (530) 273-4769
E-Mail: cenevada@ucdavis.edu

The University of California, in accordance with applicable Federal and State law and University policy, does not discriminate on the basis of race, color, national origin, religion, sex, disability, age, medical condition (cancer-related), ancestry, marital status, citizenship, sexual orientation, or status as a Vietnam-era veteran or special disabled veteran. Inquiries regarding the University's nondiscrimination policies may be directed to the Affirmative Action Director, University of California, Agriculture and Natural Resources, 1111 Franklin, 6th Floor, Oakland, California 94607-5200. (510) 987-0096.

United States Department of Agriculture, University of California, Placer & Nevada Counties cooperating.

It is essential to get citrus established as quickly as possible. The sooner the root system and canopy establish, the sooner fruiting begins. Optimizing nutrition for the tree will help with establishment. Young trees respond readily to nitrogen (N) applications.

Mature trees require about one to one and one-half pounds of *actual N* yearly. Actual N needs of young trees will be one-eighth to one-quarter pound in year 1, one-half pound in year 2, three-quarters of a pound in year 3, and one pound year 4 and thereafter. For young trees, split the yearly nitrogen recommendations into three equal applications — made in April, June, and August.

Whether using conventional or organic fertilizers, the actual N can be found by multiplying the percent N in the material by the weight of the material. For example: Ammonium sulfate (21-0-0) contains 21% N. Thus, five pounds of 21-0-0 contains 1.05 pounds of actual N ($.21 \times 5 = 1.05$). Blood meal contains 13 to 15% N; seven to eight pounds of blood meal contains approximately one pound of actual N (*nitrogen*).

Other amendments may include phosphorus applications to red foothill soils as well as zinc, iron, and other trace elements that are important to citrus. Complete foliar fertilizers with micronutrients provide micronutrients as well as essential nitrogen and phosphorus.

Mulching with high quality compost can also provide some nutrients. Keep mulch 4-6 inches away from the trunk, and no deeper than one inch to minimize root disease. The mulch serves as a source of nutrients over time, suppresses weed growth, and protects the root system from summer heat. In areas prone to

freezing, mulch should be removed in winter. Bare, moist soil will absorb more heat from the sun during the day, and reradiate it back to the tree at night, helping to protect the tree from frost.

Keep root systems moist but never overwatered or saturated, in which all soil pore spaces are filled with water. Oxygen is just as essential to roots as water.



Newly planted trees can be watered twice weekly or more if weather is hot. Keep in mind that the root systems of newly planted trees will be like those in containers. In time, roots will expand and have a greater area from which to extract water and nutrients. Established trees may do fine when watered every week to ten days.

Clay soils absorb more water than granitic or sandy soils, although the danger of waterlogging is greater due to the smaller pore spaces (see illustration below.)

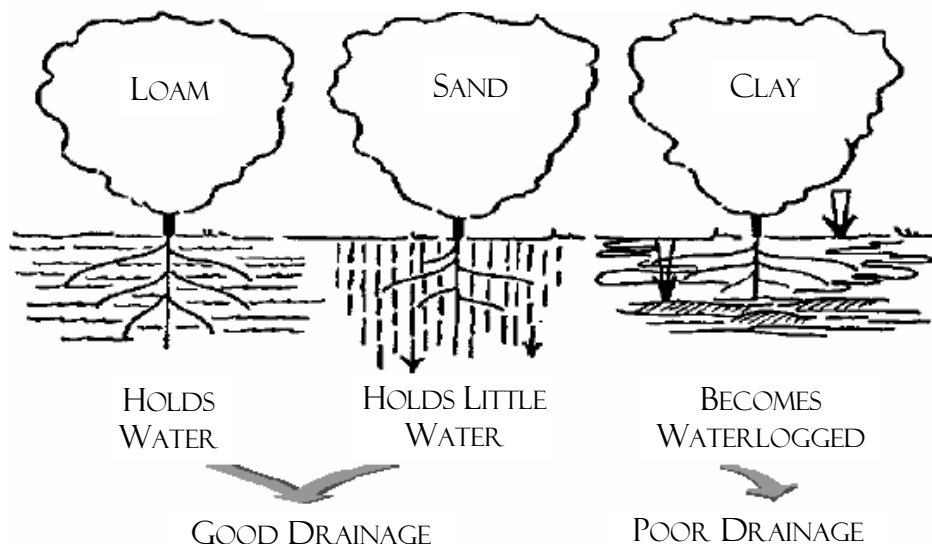
Citrus should be protected from the cold (*frost*). If prolonged cold is forecast, covering the tree may be necessary. One solution is to build a frame and cover it with rowcover, cloth, plastic, or another suitable material. Do **not** allow the covering to come in contact with the foliage. Trees will go dormant when 24-hour temperatures are below 55°F (see illustration on following page).

PRUNING

Leaves manufacture carbohydrates and other compounds essential to growth — part of a process called photosynthesis. The more leaves, the greater the food reserves available for tree growth and development above and below ground.

Keep pruning to a minimum on young trees, although an occasional wild shoot may be pruned to keep trees in balance. Prune out suckers that arise below the graft from the rootstock. Most flowering and fruit production will be on lower branches. Trees in gardens can be pruned to shape as desired over time, including espaliers.

SOIL TEXTURE AND WATER



PESTS & DISEASES

Citrus are subject to a variety of insect pests — *scale, aphid, mites, thrips* and *mealybugs*. *Snails, slugs* and *earwigs* will eat leaves. Try to maintain an environment favorable to natural enemies of these pests by planting cover crops for beneficial insects, avoiding broad-spectrum pesticides and using low toxicity sprays or baits.



Ant populations should never be allowed to develop in trees. Ants prey on natural enemies of pests and will actually farm and protect honeydew-secreting pests. To help avoid ants, keep the *skirts*, or lower branch tips, from touching the ground and use sticky bands around trunks.



Few disease problems occur in the foothills if soil drainage is adequate and trees are not over irrigated. Using recommended rootstocks will help prevent disease problems.

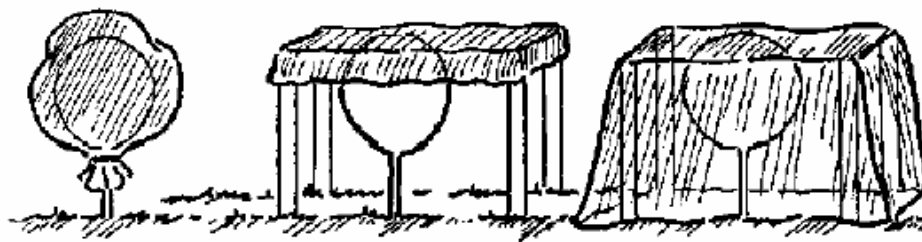
Following is a list of references on citrus, which will provide additional information for those interested.

REFERENCES

Citrus Fruit for Home Planting. ANR Publication 2160, 20 pages. University of California, Division of Agriculture and Natural Resources, Oakland, California. Revised 1977.

Citrus Growing in the Sacramento Valley. ANR Publication 2443, 16 pages. University of California, Division of Agriculture and Natural Resources, Oakland, California. Revised 1977.

COVERS FOR FROST PROTECTION



WRONG

GOOD

BETTER

The Cultivar, Vol. 14, No. 1. University of California, Santa Cruz. Winter 1996.

Micronutrient Deficiencies of Citrus. ANR Publication 2115, 12 pages. University of California, Division of Agriculture and Natural Resources, Oakland, California. Revised 1981.

Mulching Citrus and Other Subtropical Tree Crops. ANR Publication 2445, 4 pages. University of California, Division of Agriculture and Natural Resources, Oakland, California. 1974.

Protecting Citrus from Cold Losses. ANR Publication 2372, 20 pages. University of California, Division of Agriculture and Natural Resources, Oakland, California. 1979.

Pruning Citrus Trees. ANR Publication 2449, 8 pages. University of California, Division of Agriculture and Natural Resources, Oakland, California. 1976.

Reader's Digest Illustrated Guide to Gardening. Reader's Digest, Pleasantville, New York. 1989.

Sunset Western Garden. Sunset Publishing Company, Menlo Park, California. 1995.

Illustrations from *Western Fruit Gardening.* Authors: Reid M. Brooks, Claron O. Hesse. Illustrations: Beverley Farmer. University of California Press, 1953.

WARNING ON THE USE OF CHEMICALS

Pesticides are poisonous. Always read and carefully follow all precautions and safety recommendations given on the container label. Store all chemicals in the original labeled containers in a locked cabinet or shed, away from food or feeds, and out of the reach of children, unauthorized persons, pets, and livestock.

Confine chemicals to the property being treated. Avoid drift onto neighboring properties, especially gardens containing fruits and/or vegetables ready to be picked.

Dispose of empty containers carefully. Follow label instructions for disposal. Never reuse containers. Make sure empty containers are not accessible to children or animals. Never dispose of containers where they may contaminate water supplies or natural waterways. Do not pour down sink or toilet. Consult your county agricultural commissioner for correct ways of disposing of excess pesticides. Never burn pesticide containers.