

UNIVERSITY OF CALIFORNIA COOPERATIVE EXTENSION

**Santa Barbara County**

# **CENTRAL COAST AGRICULTURE HIGHLIGHTS**

*From your Farm Advisors Serving you in the Areas of Vegetables, Small Farms, Strawberries, Field Crops,  
Livestock and Natural Resources*

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## ***New Website Address***

*Franklin Laemmlen*

The University of California website coordinator has requested that we (Santa Barbara County Cooperative Extension) change our website address to a more simple and standardized format.

Our old web address was

[www.sbceo.k12.ca.us/~uccesb1](http://www.sbceo.k12.ca.us/~uccesb1)

The new address is

<http://cesantabarbara.ucdavis.edu>

Please make the change in your bookmark file.

For the near future, the old web address will automatically switch you over to the new address.

All the Santa Barbara County Cooperative Extension staff thanks you for your patronage of our website, and we hope you continue to find the information there timely and useful.



## **Copper — A Plant Micronutrient**

*Warren Bendixen*

Copper was once regarded as a plant poison as it is toxic when too much is applied to the soil. A 5 percent solution of copper sulfate was one of the first spray formulations used for the chemical control of weeds.

Symptoms of copper deficiency of citrus were among the first to be recognized in the field and are fairly typical of symptoms on other tree crops. Primary symptoms of the deficiency are gum pockets under the bark, stained spots on the terminal twigs, and defoliation of the twigs. Other symptoms include the formation of multiple buds in the leaf axils and shortening of internodes, a dying-back of the twigs, and a characteristic staining of the fruit.

The symptoms on grains are a white tip, or yellow tip on the young leaves which may remain rolled. The head is dwarfed and distorted.

Leaves of copper-deficient lettuce plants become bleached and chlorotic. The stem of the leaf and the rim are the first parts of the plant affected.

Copper deficiency symptoms in tomatoes include very stunted growth of the shoots, and exceedingly poor root development. The plant is dark-bluish-green with curling leaves and absence of flowers.

Copper deficiency symptoms in garbanzo beans first show as small leaves on the upper part of the plant. As the deficiency continues, the leaves turn yellow and then die back at the margins. Blossoms fail to develop, and the seed size is small with low bean yields.

Copper is a constituent of the chloroplast protein plastocyanin and serves as a part of the electron transport system linking photosystem I and II.

Copper deficiency occurs mostly on very sandy or on peat or muck soils.

Copper sulfate or copper chelated materials are used to treat copper deficiencies. Five pounds of basic copper sulfate in 100 gals of water can be used as a foliar spray to treat 5 acres. Soil treatments with 5-10 lbs/acre of copper sulfate can be used to treat the soil.



## **Vine Mealybug**

*Franklin Laemmlen*



Vine mealybug is a serious pest of grapevines that has been present in California since 1994. Within the last year, it has been found in several locations in Santa Barbara and San Luis Obispo Counties. So far, the infestations have been isolated, and rigorous control and eradication measures are being instituted to eliminate these known hot spots.

The smaller the infestation at the time of discovery, the better. To improve growers' chances of finding infestations early, Mark Battany, Viticulture Farm Advisor for San Luis Obispo and Santa Barbara Counties, has developed a color poster about vine mealybug. The poster has excellent color photographs of vine mealybug and other mealybugs that attack grapes. Narrative for the photos is presented in English and Spanish. These posters can be used to train field workers about what to look for and what to do if they find this mealybug.

All persons who work with grapes should have this poster available at work sites on the ranch. Posters cost \$3.00 each and are available from the Cooperative Extension Office in San Luis Obispo or Santa Maria. Make checks payable to: U.C. Regents. Posters are also being made available at tailgate training sessions in Santa Barbara and San Luis Obispo Counties. If you cannot attend a tailgate meeting, contact our office to get posters.



## **Aster Yellows in Lettuce**

*Franklin Laemmlen*

Aster yellows phytoplasma affects a wide variety of wild and cultivated plants. More than 300 species of vegetables, weeds and ornamentals have been recorded as hosts.

On the Central Coast we see this pathogen affecting romaine lettuce most often. Other crops have, to date, not been affected. At least the disease has not caused significant economic damage. In romaine aster yellow causes blisters filled with latex to develop on or near the midrib of leaves. These blisters are initially creamy white, but change to a tan or reddish brown when

the blisters burst or as the latex oxidizes. Latex may also ooze from the leaf blade, causing tan to reddish brown streaks down the leaf as the latex dries. The latex blisters and ooze may be found throughout the head or only on the outer leaves or only on the inner leaves. Because of this erratic symptom expression romaine fields with aster yellow are often abandoned because it is difficult to detect and eliminate all affected heads during harvest.

Aster yellows phytoplasma (AYP) has some unique characteristics, which make it quite different and potentially more destructive than the run-of-the-mill aphid-transmitted viruses. Lettuce mosaic and cucumber mosaic viruses are aphid-transmitted in a stylet-borne, nonpersistent manner. This means the aphid mouthparts are essentially a contaminated hypodermic needle. As the aphid feeds, the virus is slowly washed off the stylets, and the aphid is no longer a vector unless it again feeds on a virus-infected plant and is recontaminated.

With aster yellows the scenario is different. AYP is transmitted by leafhoppers. On the Central Coast the beet leafhopper and the aster leafhopper are known vectors. However, when these hoppers acquire AYP, they acquire it for life or nearly so. AYP is persistent in the body of the hopper once acquired. AYP can overwinter in the body of adult leafhoppers and in perennial and biennial host plants. Romaine is not a preferred host for the leafhopper, thus, they tend to probe this plant for "a taste" and then move on. Each time the hopper probes a new plant, transmission can occur as the salivary glands of the hopper hold a large supply of phytoplasma particles. Potentially very few leafhoppers could inoculate a whole field of romaine. This is why it is not uncommon to hear the grower or PCA say "we never saw any leafhoppers in the field." Another possible reason for the comment is that transmission often occurs while the hoppers are migrating. When the native, perennial weed hosts for the hoppers dry up in late spring or summer, the hoppers move to summer and fall hosts. If the romaine field is en route, some disease can be expected, but the hoppers may only be around for a day or two.

There are no known resistant or immune romaine varieties. Observations indicate that there are AYP hot spots on the Central Coast, i.e., aster yellows tends to occur in the same areas during the same time period each year. It appears that a few leafhoppers can do extensive damage. Therefore, use of insecticides for hopper control is impractical as timing the application to meet the unseen hopper migration would always be

With the above factors in mind, control of aster yellows can be addressed by: (1) Removal of weed reservoirs near lettuce fields, if these reservoirs can be identified; (2) the reservoir area can be sprayed to control the leafhoppers before they migrate, again, if the reservoir area can be identified, and (3) do not plant romaine in hot spot areas during the time period when the leafhoppers tend to be migrating.



## ***Guidelines for Planting Blueberries on Mineral Soils in California***

*Mark Gaskell*

Growers unfamiliar with blueberries should be aware of special considerations and precautions in establishing a new blueberry planting. There are several steps critical to successful establishment of a new blueberry planting. I have discussed in previous articles the selection of the appropriate cultivar or variety. Once the variety is selected and the plants ordered, other preparations are important.

### **Time to Plant**

In coastal growing areas, plants may be planted at anytime of the year, assuming irrigation is available. Inland areas should limit new plantings to the period from September to May. Nurseries should be contacted to secure plants as much ahead of time as possible. Plants are generally available from nurseries between November and April, depending upon the year and circumstances at the nursery. Some nurseries are set up to reproduce plants via tissue culture and, although the process is slow depending upon timing, they can have plants available at other times of the year. Many of the most important low-chill Southern Highbush blueberry varieties may be in short supply depending on timing of the plant order.

## Land preparation

The field site should be selected well ahead of time and representative soil and irrigation water samples sent off for analysis. The soil should be analyzed to determine fertilization requirements and also for any needed pH adjustment. Of special importance with blueberry establishment is the soil pH and the need to acidify the soil to have a pH below 5.0.

Fields should be laid out with 4 ft wide raised, rounded beds or berms where the plants are established, and with a 4' to 6' row middle between beds. Plant spacing for Southern Highbush blueberries traditionally varies from 30" to 48" between plants in the row. The higher planting density (30" spacing) produces higher yields with no apparent adverse effect on fruit quality. Plants should be planted on a bed or rounded berm approximately 4 ft wide. Between row spacing can vary from 8 ft to 10 ft from plant row to plant row depending upon whether the wider space is needed to accommodate tractor driven cultivating or spraying equipment. An acre planted 30" between plants and 10 ft between rows will require approximately 1742 plants. Studies are underway in different parts of California to determine the optimum planting density and row configuration for blueberries.

The row middles are typically not irrigated or amended. If wood waste or other mulch materials are available at reasonable cost, the middles may be mulched. The middles can be cultivated and kept bare or seeded with a permanent cover crop such as white clover. For blueberries planted on sloping sites, the preparation of beds on a contour will prevent soil erosion and stabilize the hillside.

## Soil amendments

Elemental sulfur is most commonly used to modify soil pH, and the soil laboratory can provide a recommendation for the amount of sulfur to apply to acidify the soil. Soil sulfur materials vary widely with respect to how quickly they change the pH. Two products that break down relatively rapidly are Tiger Sulfur (distributed by Farm Supply Co., San Luis Obispo and Santa Barbara Counties) and Dispersul (distributed by Fruit Growers Supply, Camarillo). Mix the sulfur as uniformly as possible into the soil in a four-foot wide band under the plant row. The sulfur should be incorporated to a depth of 6"-10" and can be combined with the wood waste for mixing into the soil along with

any fertilizer indicated by the soil test. The plants will establish quicker and show new growth earlier if the sulfur is uniformly mixed into the planting area. Sulfuric acid can also be injected into the soil with specialized machinery, and there are companies that perform this service on a contract basis.

Beside the pH adjustment, blueberries often require additional soil amending for best results. On heavy clay soil, coarse wood waste chips should be incorporated to loosen up the soil and help improve porosity and drainage. It is especially important to prepare beds 8-12" high on the heavier clay soils to further assure adequate drainage. Blueberries grow best in a medium with high organic matter, and they will also benefit from the wood waste application on most mineral and sandy soils. The fertilization program should be modified to increase the rate of nitrogen applied to compensate for any tie up of soil nitrogen by the woody material.

Many municipalities in California have initiated yard waste recycling and composting operations, and these are an economical source of wood waste. Any coarse, clean, organic woody product can be used. Compost may be beneficial as an additional organic amendment, particularly on sandy soils, but wood waste should also be used for aeration and as a longer term source of soil organic matter. The wood waste is also used to mulch the surface of the soil after the blueberries have been planted. The bedding up operation may not be needed on sandier soil with adequate drainage.

## Planting

Plants come from the nursery as bare root or container-grown plants. Sizes can range from rooted 6-8" cuttings to 24-30" two-year old plants. Larger plants are more costly, but they establish more quickly and easily and come into production sooner.

Blueberry root systems are very fibrous and tend to grow near the soil surface once the plants are established. The roots are somewhat fine and fragile and must be handled carefully. The roots of bare root plants should be flared outward prior to planting. With container-grown plants the root ball should be repeatedly scratched and opened up for planting if the roots are bound at all in the container. If container-grown plant roots are not spread out, the blueberry plants in the field may continue to grow in the small area defined by the prior container. The plant roots can

eventually double over and restrict further growth. Problems from improperly planted plants may not develop until one or two years later when the restricted root area will not support additional top growth and the plants become stressed or die back. Plants should be planted at the level they grew in the pot or nursery. Plants planted too deeply are more susceptible to soil diseases.

The planting hole can be opened by hand on smaller plantings or by using an auger off of the tractor PTO unit on larger plantings. The hole should be wider than deep, and sphagnum peat moss should be incorporated into the soil in the hole. Plan to use 1-2 gallon of peat moss per hole depending on the size of the plant. The peat should be soaked in water prior to planting, or special care should be taken to assure that the peat is wetted thoroughly when the plants are watered in.

After planting, the plants should be watered in well, and the bed should be top-dressed with 2" of wood waste as a surface mulch.

The following are additional references to assist with questions regarding blueberry planting procedures.

Commercial Blueberry Production in Florida, Pub# SP179 by Jeff Williamson and Paul Lyrene, U. of FI – IFAS, Gainesville, FL. To order call (800) 226-1764.

Suggestions for Establishing a Blueberry Planting in Western North Carolina by Bill Cline and Gina Fernandez. Revised 11/98 HIL-201. Available online at:  
<[www.ces.ncsu.edu/depts/hort/hil/hil-201.html](http://www.ces.ncsu.edu/depts/hort/hil/hil-201.html)>

Highbush Blueberry Production Guide. NEAES-55. Northeast Regional Agricultural Engineering Service Cooperative Extension, NEAES, 152 Riley-Robb Hall, Cooperative Extension, Ithaca, NY. To order call: 607/255-7654, or available from Fall Creek Nursery.

Highbush Blueberry Production, PNW 215. To order: Publications Orders, Agricultural Communications, Oregon State University, Administrative Services A422, Corvallis, OR 97331-2119, or available from Fall Creek Nursery.

Blueberry Growers Guide, Fall Creek Farm and Nursery, Lowell, OR. To order call: 541/937-2973.



## ***Bovine Tuberculosis Update***

*Wayne Jensen*

As many of you know, Bovine tuberculosis was confirmed in a Tulare County dairy herd this spring. Since that time I have received updates from our Agricultural Commissioner regarding the status of the efforts to eradicate the disease in this herd and the testing of other herds in the state. The following is a recent update I received regarding the status of these eradication efforts. It illustrates the seriousness of this disease and its potential impact on the cattle industry.

Bovine Tuberculosis is a common, slow-growing disease that has affected animal health throughout recorded history. The state of California has been involved in eradication programs since 1917. The last known case here was in 1991. Cattle in the states of Michigan and Texas recently have also been diagnosed with bovine TB, and the disease is commonly found in Mexico.

In May 2002, bovine tuberculosis was confirmed in a Tulare County dairy herd. At that time the California Department of Food and Agriculture (CDFA), United States Department of Agriculture (USDA) and the cattle industry established a task

force and began working together to control and eradicate the disease from California.

In November, the affected herd was sent to slaughter and the owner was compensated. Recently, a complete herd test on another dairy herd in Tulare identified a single reactor animal. While preliminary results were positive, final results from a USDA laboratory are pending. As a precaution, the dairy has been quarantined. Additionally, CDFA/USDA officials are tracing the source of a TB-positive animal found this month at a California slaughterhouse.

To date, 135,435 cattle in California have been tested for exposure to bovine TB since this investigation began. The following is a summary of these efforts as of May 13, 2002.

Herds tested	89
Herds retested	1
Number of new herds positive and quarantined	2
Animals tested	135,435
Initial TB skin test responders	2,587
Reactors	132
Suspects	194
Reactors & suspects destroyed	478
Trace-outs destroyed	345
Exposed animals destroyed from affected herd	7,015

The affected herd was quarantined by the CDFA in May. This dairy was tested for TB on two-month intervals, and test-positive animals were removed from the herd. In November, the herd was sent to slaughter, and the premises were thoroughly cleaned and disinfected.

All cattle sold from or associated with the affected herd over the last five years are being traced and tested. Efforts to purchase and

slaughter all cattle that left the affected herd are underway. As a precaution and to protect other states, all dairy breeding animals leaving California that are more than six months of age require a negative TB test within 30 days of movement. At this time, this requirement does not apply to beef cattle.

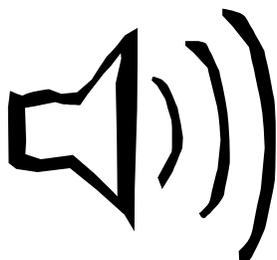
### Will the outbreak of TB in the Tulare dairy herd affect all of California?

Dr. John Maas, Extension Veterinarian, UC Davis, answered this question as follows; the short answer is, yes. It may very well affect all of California, both the dairy industry and the beef industry. California was officially designated to be free of bovine TB in 1999 by the USDA. Before that time (1999), the last case of bovine TB in the state was in 1991. If another cattle herd is found to be infected, our official status will drop to "Modified Accredited Advanced." Also, if the affected dairy in Tulare County chooses to try to "test out" of the current infected status versus depopulating the herd, California would lose its TB Free status. To maintain the current TB Free status, the USDA requires that the affected dairy herd be depopulated (all cattle go directly to slaughter) and there be no spread of TB in California (no new cases in cattle). If we lose our TB Free status, that change would probably occur in early 2003.

The change to "Modified Accredited Advanced" status would mean the following: all of California's breeding cattle more than 6 months of age and older would be required to have a negative TB test within 60 days of interstate movement OR be from a TB "Accredited Free Herd" OR move directly to slaughter. This would include the cattle herds moving to neighboring states on the "pasture to pasture" permits. Even though these "pasture to pasture" permit herds move as a single herd, TB testing would be required. It is important to realize that TB testing takes 3 days. The intradermal (in the skin) injection of tuberculin is given, and the result is "read" by an accredited veterinarian at 72 hours (plus or minus six hours). So the beef cattle have to be held after the injection and run through the chute again 3 days later. The TB test usually costs 5-10 dollars per head, depending on local conditions. Currently, breeding age dairy cattle (6 months of age or older) leaving

California for other states are already being TB tested before being shipped. The discovery of more TB infected cattle herds could lower our

status further to "Modified Accredited" status with further requirements for testing and additional movement restrictions.



## ***Announcements . . .***

- ◆ The **Fourth Integrated Pest Management Symposium/Workshop** is being held in Indianapolis, Indiana, from April 8 to 10, 2003. The theme is "Building Alliances for the Future of IPM." For more information about the symposium log on to: <<http://www.conted.uiuc.edu/ipm>> If you have questions, e-mail the University of Indiana at: <[ipmsymposium@ad.uiuc.edu](mailto:ipmsymposium@ad.uiuc.edu)>
- ◆ **Cost of Production Guidelines** are available for a number of crops. Recent studies have been done on strawberries, walnuts, spinach, head lettuce, and romaine. These and other cost studies can be obtained online at: <<http://coststudies.ucdavis.edu>> You can also get a printed copy by contacting our office at 805.934.6240.
- ◆ **Varietal Winegrape Production** is a three-day viticulture short course that will be held in Freeborn Hall at U.C. Davis. The time is February 4-6, 2003. For more information about the course call 805.934.6240.
- ◆ The **23rd Annual Ecological Farming Conference** will be held at the Asilomar Conference Center in Pacific Grove, CA. The dates of the conference are January 22-25, 2003. For more information, log on to <[www.eco-farm.org](http://www.eco-farm.org)> or call us at 805/934-6240.
- ◆ Do you have or know a high school junior or senior who is interested in **Marine Science?** The **John D. Isaac Scholarship Program** is looking for applicants. The scholarship provides \$3,000 per year for four years (\$12,000 total). This program is sponsored by the California Sea Grant College Program. Application forms are available online at <<http://www.csgc.ucsd.edu>> Follow the education link to [Isaac Scholarship](#). You may also contact California Sea Grant College Program, Attn: Isaac Scholarship Program, at 858.534.4442.
- ◆ The **44th Annual Turfgrass and Landscape Institute** is being held on December 11, 2002, from 6:30 a.m. to 3:30 p.m. at the Sequoia Conference Center, Buena Park, CA. Six hours of PCA, QAL or QAC credit are offered. Registration fees at the door are \$100 to \$150, depending on your membership status.
- ◆ We have a listing of **"Choose and Cut Christmas Tree Growers"** for California. Local Christmas tree farm locations are available on request. Call 805.934.6240.

- ◆ University of California **Integrated Pest Management Pest Notes** are now available online at <http://www.ipm.ucdavis.edu/PDF/PESTNOTES/index.html> New and revised Pest Notes are continually being added to this website. Call us if you have questions (805.934.6240).
- ◆ The State of California has issued **new state regulations**, effective June 7, 2002, concerning agricultural sales and use tax exemptions on purchases of liquefied petroleum gas (LPG) for household activities or agricultural use, and on purchases of farm equipment and machinery. If you want more information on these regulations, call 805.934.6240 to receive a bulletin.
- ◆ **California Agricultural Highlights 2001 brochure** is now available. California agriculture's gross cash income for 2000

was \$27.2 billion. For more details and other interesting facts about California agriculture, call 805.934.6240 to receive a copy.

- ◆ On Saturday, January 11 and 18, 2003, we have scheduled the **Quality Assurance Program (QAP I)** in cooperation with the Templeton Livestock Market, Templeton Sales Yard. The training will provide producers (regardless of the size of their operation) with the tools to improve the health and well-being of the live animal and to avoid practices which cause damage to the carcass. The meeting will begin with registration at 7:30 a.m. and conclude by 12:00 noon. The meeting is split into two sessions, so participants will have to attend both sessions in order to receive certification for successful completion of the training. For additional information or if you have questions, call Wayne Jensen at UCCE, Santa Maria office, 805.934.6240.



## Some Interesting Facts about California Agriculture

Franklin Laemmlen

### CALIFORNIA'S TOP 10 AGRICULTURAL EXPORT MARKETS, 2000

	Value of Principal Exports <i>Millions</i>	Leading Exports
1. Canada	1,191	Lettuce, Table Grapes, Processed Tomatoes
2. Japan	1,036	Rice, Cotton, Beef and Products
3. Mexico	392	Milk and Cream, Cotton, Table Grapes
4. South Korea	262	Cotton, Beef and Products, Oranges
5. United Kingdom	250	Wine, Table Grapes, Raisins
6. Taiwan	238	Cotton, Peaches, Table Grapes
7. Hong Kong	226	Oranges, Table Grapes, Almonds
8. Germany	210	Almonds, Walnuts, Prunes
9. Netherlands	138	Wine, Almonds, Walnuts
10. Spain	108	Almonds, Walnuts, Garlic

### CALIFORNIA'S TOP COMMODITIES FOR 2000

	<i>Millions</i>
1. Milk and Cream	\$3,704
2. Grapes, All	\$2,836
3. Nursery	\$2,247
4. Lettuce, All	\$1,484
5. Cattle and Calves	\$1,267
6. Tomatoes, All	\$ 951
7. Cotton Lint	\$ 898
8. Flowers & Foliage	\$ 842
9. Strawberries	\$ 767
10. Hay, All	\$ 730
11. Almonds	\$ 682
12. Broccoli	\$ 537
13. Chickens, All	\$ 471
14. Avocados	\$ 362
15. Carrots	\$ 347
16. Oranges, All	\$ 346
17. Celery	\$ 310
18. Walnuts	\$ 289
19. Onions, All	\$ 263
20. Peppers, Bell	\$ 257



*Franklin Laemmlen*

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*Franklin Laemmlen  
County Director and Vegetables/Pest  
Management Farm Advisor*

*Warren Bendixen*

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*Warren Bendixen  
Strawberries/Soils and Water Farm Advisor*

*Mark Gaskell*

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*Mark Gaskell  
Small Farms and Specialty Crops Farm Advisor*

*Wayne Jensen*

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*Wayne Jensen  
Livestock and Natural Resources Advisor*

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