UNIVERSITY OF CALIFORNIA • COOPERATIVE EXTENSION • GLENN COUNTY
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ORCHARD FACTS

April 11, 2003

Vol.V, No. 4

In This Issue

Bill Krueger
Farm Advisor

26th Annual Nickels Field Day

May 8, 2003
8:30 a.m. – 1:30 p.m.
Nickels Soils Lab
Marine Avenue – Arbuckle, CA - see map

8:30 a.m. *Coffee and Danish*
Courtesy of Colusa-Glenn Farm Credit

9:00 a.m. *Field Presentations*

Union Mild Etch Disorder of Almond
Dr. Jerry Uyemoto, USDA Plant Pathologist, Davis

Controlled Deficit Irrigation of Almonds
Dr. Ken Shackel, UCD Department of Pomology

Pollenizer Quality and Incompatibility Groupings
Dr. Tom Gradziel, UCD Department of Pomology

Almond Rootstock Evaluations
Joe Connell, UC Farm Advisor, Butte County

Almond Pest Management Alliance
Carolyn Pickel, UC IPM Farm Advisor, Sacramento Valley

Blow Over Problems in Almonds
Bill Krueger, UC Farm Advisor, Glenn County

Almond Leaf Scorch
Dr. Bruce Kirkpatrick, UC Department of Plant Pathology

Bloom and Leaf Diseases of Almond
Dr. Beth Teviotdale, Extension Plant Pathologist, KAC.

12:15 p.m. *Luncheon*

Almonds: Production, Shipments and Consumption on the Rise
Colleen Aguiar, California Almond Board Marketing Communications Manager

1.5 hours PCA Credit Applied For

Newslettters Available Electronically

Our newsletters are now available on the Internet. If you elect to receive the newsletter electronically, you will be notified via e-mail when new newsletters are available. You can then go to our website to view it or download the newsletter. The newsletter will not be mailed to you, thus reducing our costs. The advantages are it will be instantaneous, no waiting for the postal service to deliver it, and it will be in color, a feature not currently available in the mailed newsletter format. To receive the newsletter electronically, you need an Internet connection, an e-mail address and Adobe Acrobat, which can be downloaded free from the Internet. If you would like to receive this newsletter electronically, call our office at 530-865-1107 or log on to our website at ceglenn.ucdavis.edu and follow the links to orchards and then newsletters to enter your e-mail address.

CIMIS Weather and Evapotranspiration Data Available

Local weather data and evapotranspiration information will be available again this year via our website, ceglenn.ucdavis.edu/. The information is gathered through our CIMIS weather station located in the Orland area and is converted for specific crops. Evapotranspiration numbers can be valuable tools in planning irrigations.

To get to this data, access the ceglenn.ucdavis.edu/ website, click on the Orchard Crops icon and then Orchard Crops Links. The CIMIS choice will take you to the site where you can get weather data and the ET link will take you to Allan Fulton's weekly crop use ET reports.

If you don't have access to the internet and would like to receive this information, please call our office at 865-1107.

Water Budget Irrigation Scheduling

The water budget approach is a useful tool for deciding when and how much to irrigate. It involves keeping track of how much water is stored in the soil profile, subtracting water as it is used by the crop and irrigating when a predetermined amount of water has been depleted.

To use this system, several things must be known.

1. Evapotranspiration (ET) is a combination of evaporation from the soil surface and transpiration from leaf surfaces. Local ET values are available as described in the previous article.

2. Soil Water Holding Capacity is how much water is stored in the soil for plant use. The following table lists approximate available water holding capacity by soil texture.

SOIL TEXTURE	INCHES OF AVAILABLE WATER PER FOOT OF SOIL DEPTH
Sand	.5 - .7"
Fine Sand	.7 - .9
Loamy Sand	.7 - 1.1
Fine Sandy Loam	.9 - 1.6
Sandy Loam	.8 - 1,4
Loam	1.0 - 1.8
Silt Loam	1.2 - 1.8
Clay Loam	1.3 - 2.1
Silty Clay Loam	1.4 - 2.5

Clay	1.4 - 2.4

3. Water application = application rate x hours operated

Following are some conversion factors and formulas useful for calculating water applications.

CONVERSION FACTORS

Volumes: One Acre Inch = 27,154 gallons

Flow Rates: One Cubic Foot Per Second = 448.83 (Approx.) 450 gallons per minute
= 0.992 (Approx. 1) acre inch per hour
= 1.984 (Approx. 2) acre feet per day

One Acre Inch Per Hour = 452.6 (Approx.) 450 gallons per minute

Area: One Acre = 43,560 square feet

CALCULATING THE APPLICATION RATE IN INCHES PER HOUR

$$\text{INCHES PER HOUR} = \frac{\text{Gallons Per Minute}}{452.6 \times \text{acres}}$$

$$= \frac{\text{C. F. S.}}{1.01 \times \text{ACRES}}$$

$$= \frac{\text{EMITTERS/PLANT X FLOW/EMITTER}}{.623 \times \text{PLANT SPACING in square feet}} \text{ in gallons per hour}$$

$$= \frac{\text{GALLONS/PER MINUTE/SPRINKLER X SPRINKLERS /ACRE}}{452.6}$$

$$= \frac{\text{GALLONS PER MINUTE/SPRINKLER X 96.3}}{\text{SPRINKLER SPACING in square feet}}$$

4. System Efficiency - How much of the water applied is available to the plant. Following are some approximate efficiencies for different types of irrigation systems.

SYSTEM	**EFFICIENCY**
Drip/Microsprinkler	90-95%
New, well maintained sprinklers	75-85%
Older sprinklers	65-80%
Flood, small basins	75-80%
Contour flood	60-65%
Furrow	40-60%
Furrow with return system	60-75%

5. Root depth. What is the effective rooting depth from which water would be depleted? In most crops, 75% of maximum rooting depth is the effective rooting depth.

6. Allowable depletion. It is not advisable to deplete all of the available moisture between irrigations. In most crops we only want to deplete 50-75% of available moisture before irrigating.

EXAMPLES OF IRRIGATION SCHEDULING

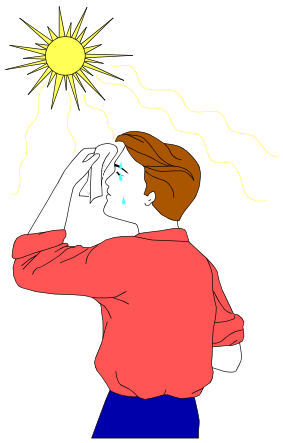
1. Sprinkler irrigated almonds

Crop ET = .25 inches/day
Available water - 1.5 inches/ft.
Effective rooting depth - 4 feet
Application rate - .1 inches/hour
Application efficiency - 80%
Allowable Depletion - 50%

In this example we have a total of 6 inches available (1.5 inches/ft. X 4 ft. effective rooting depth). Of this, we only want to deplete 50% or 3 inches. If daily ET is .25 inches, it would take 12 days (3 inches/.25 ET/day) to use this amount. To refill the soil profile, we would need to apply 3.75 inches (3 inches/.8 efficiency). At an application rate of .1 inch per hour, we would need to run the sprinklers 37.5 hours. If we did not want to run our sprinklers this long, we would not allow this much depletion to occur. For example, if our maximum run time was 24 hours, we could only allow 1.9 inches depletion to occur (24 hours x .1 inch/hr x .8 efficiency = 1.9 effective application).

2. SURFACE SYSTEMS - Flood Irrigation

1. An orchard has a rooting depth of 4 feet and is on a relatively uniform sandy loam soil which holds an average of 1.1 inches of available water per foot. When this 4 feet of soil is wet to capacity, it holds approximately 4.4 inches of available water. To apply an irrigation when 50 percent of the water is still available, the orchard should be irrigated when 2.2 inches of water has been used. According to published ET data, crop water use the previous week was 1.4 inches and 0.8 inches the week before. This totals 2.2 inches indicating the orchard should be irrigated. Since the orchard's furrow irrigation system is 60 percent efficient, the grower should apply a 3.7 (2.2 ÷ .60) inch irrigation to replenish the available water in the soil reservoir.



2. Silt loam soil
Available water = 1.5 inches/foot
Rooting depth = 4 feet
Allowable Depletion = 50%
Crop ET = .25 inches/day

This is a soil with a low infiltration rate and we are only able to wet to a depth of 1.5 feet. Although we have an allowable depletion of 3 inches (1.5 inches/ft x 4 ft. = 6 inches x .5 allowable depletion), we are only able to apply 2.25 inches (1.5 inches/ft x 1.5 ft.). This then becomes the limiting factor and we would have to irrigate in 9 days (2.25/.25 ET).

Depth of penetration on most soils can be determined by using a 3/8 to ½ inch steel rod sharpened on one end with a "T" handle welded on the other end. In most soils, this probe can be pushed in the soil as far as the water penetrated following an irrigation. This allows for rapid, repeated estimate of penetration.

3. Drip Irrigation

Crop - Prunes
Crop ET = .25 inches/day
Tree spacing is 18 ft. on a diamond or 155 trees/acre.

$$\frac{\text{ET (inches/day) x 27,154 gallons/acre inch}}{\text{trees/acre}} = \text{gallons/tree/day}$$

(.25 x 27, 154)/155 = 44 gallons/tree/day

Assuming 90% efficiency, you would have to apply +49 gallons to get 44. If you have 4 one gallon/hour emitters per tree, it would be necessary to run the system 12 hours per day.

This method of irrigation scheduling will give you a place to start. It must then be verified with field checks using devices such as tensiometers, gypsum blocks, soil probes or a shovel.

Luncheon Reservation Form

Please return this form and your check by May 1.

Cost: ***$10.00/person (Prepaid Reservation)***
$15.00/person at the door
Make checks payable to: ***Pierce Youth Foundation***
Mail to: **P.O. Box 1349**
Arbuckle, CA 95912

Name:		
Address:		
City:	**State:**	**Zip:**
Phone:		
Name(s) of Attendees(s):		
Total Amount Enclosed:		

COOPERATIVE EXTENSION
U.S. DEPT. OF AGRICULTURE
UNIVERSITY OF CALIFORNIA
OAKLAND, CA 94612-3560

OFFICIAL BUSINESS
PENALTY FOR PRIVATE USE $300

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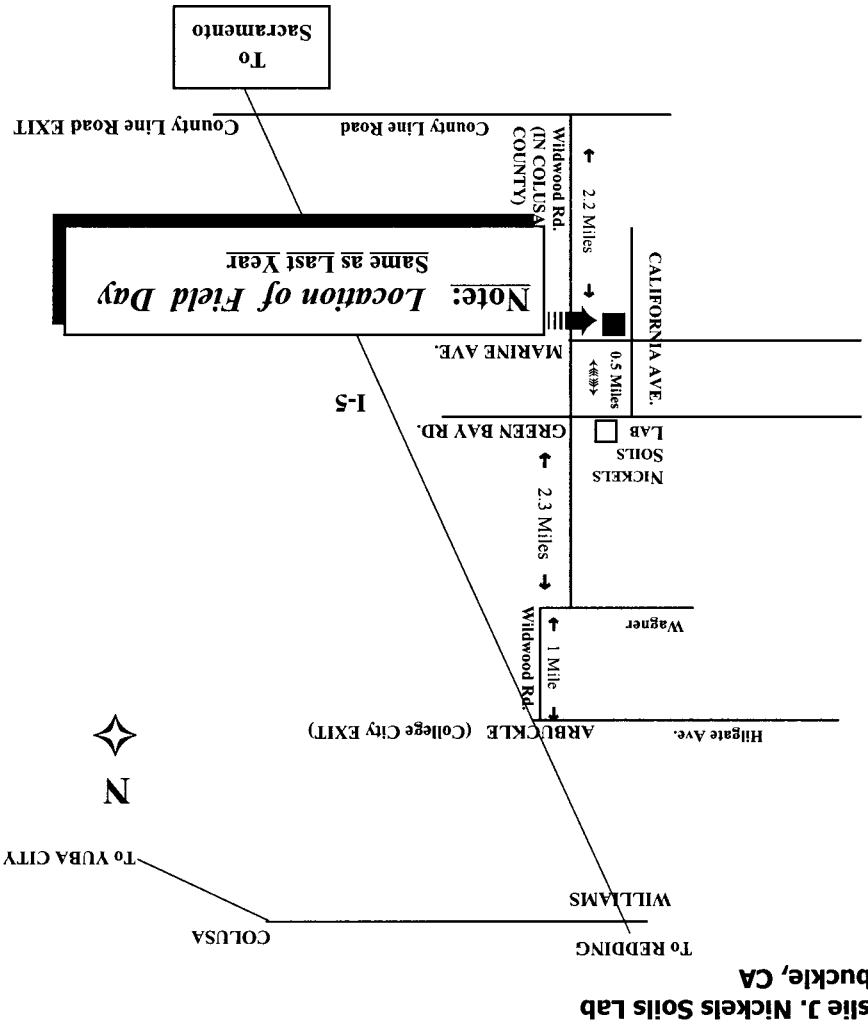

Leslie J. Nickels Soils Lab
Arbuckle, CA