

# Irrigation in a Dry Year (Again)

21 April 2009

## Introduction

1970s  
 1990s  
 2005 & 2006 wet years  
 2007 08 09

		Rainfall Seasonal 2005 09						
		Oct	Nov	Jan	Feb	Mar	Apr	May
	Total Inches	Dec Cumulative						
<b>2005</b>	24.7	10.4	3.2	3.3	3.5	1.4	1.3	
<b>2006</b>	23.7	7.1	5.4	1.1	5.2	3.8	0.8	
<b>2007</b>	12.1	4.6	0.27	4.3	0.6	2.3	T	
<b>2008</b>	13.6	4.5	7.3	1.8	0.1	0	0	
<b>2009</b>	13.8	4.0	1.9	5.3	1.9	0.7*	-	

To  
Date

## Irrigation Strategy and Scheduling

### When to Start?

“Average” year - as soon as water is available from the District or just prior to bloom.

“Dry” year - a Winter irrigation in December or January, especially if a dormant spray is to be applied. Usually several inches of rain have occurred, so a good irrigation of two or three acre inches may be needed to wet the soil profile. This helps with leaching of normal increase of salinity, depending on water source. The Leaching Requirement (LR) is usually low in most years, because we receive fair rainfall and have low salinity water sources in most orchards.

A quick estimate of LR can be estimated by the following formula:

$$LR = \frac{EC_w}{5(1.5) - EC_w}$$

See Western Fertilizer Handbook for a more detailed discussion.

### How Much?

- 1) Productive Minimum – 70% ET<sub>c</sub> ≈ 26.5 acre inches minus soil water (50% rainfall?)
- 2) Reduced yield – 50% Etc about 19 acre inches minus rainfall stored in soil
- 3) Minimum – 10 to 12 acre inches total applied and soil. Some problems possible, with a year to recover.

An acre inch is equal to an inch of rainfall. A conversion to use for acre inches and gallons of water use is: **gallons per tree** per time period = **0.623 x square feet per tree in feet x ET<sub>c</sub>** (per period).

*Note that a cover crop will use 20 to 30% more water in addition to what trees need.*

A plant based threshold or trigger to start irrigation is discussed at

[www.ucmanagedrought.ucdavis.edu](http://www.ucmanagedrought.ucdavis.edu)

### *How Frequently?*

Trees don't care how they get the water as long as they have access to it when needed as canopy develops, temperatures increase and soil dries out.

Irrigation system output, depth of soil and soil texture will determine the optimum. In general, full coverage sprinklers should have intervals of two weeks or less, and when hot, probably 5 to 10 days between irrigation.

Microsystems depending on micro-sprinklers or drip systems may need sets as frequently as every day when extremely hot, but 3 to 5 days early in the season and when cool work well.

### *What about switching from flood to Microsystems or drip?*

Again, trees don't mind how they get the water they need. The switchover from flood to drip is no problem as long as the change is early, before high demand and before soil profile has dried excessively.

For the most part water salinity is not a problem for orchards in most areas of the County. One consideration to make in both dry and wet years is how much nitrogen may be applied with each irrigation. This can save some money for N, reduce potential leaching of Nitrates (NO<sub>3</sub>) and avoid problems of high N availability, which can make trees susceptible to hull rot or other problems. Another formula that can be helpful for nitrogen balance of trees is:

$$\mathbf{1 \text{ ppm NO}_3\text{-N in water} = \mathbf{0.23 \text{ pounds of N per acre inch applied water}}$$

Well water can be checked with first irrigation. Run the pump for 30 minutes, collect sample, store in refrigeration or under cool conditions and deliver sample within 24 hours to the testing lab.

### *Summary for Dry Year Irrigation*

Start early consider mid-winter irrigation if water is available.

Early water stress is more negative than mid to late season for yield.

Moderate stress can maintain near normal yields.

Severe stress reduces yields this year and next.

Shorten irrigation set intervals when extreme heat occurs.

### Resources

[www.ucmanagedrought.ucdavis.edu](http://www.ucmanagedrought.ucdavis.edu)

[www.fruitsandnuts.ucdavis.edu](http://www.fruitsandnuts.ucdavis.edu)

[www.ipm.ucdavis.edu](http://www.ipm.ucdavis.edu)

[www.almondboard.com](http://www.almondboard.com)

*Almond Production Manual*, ANR publication 3364

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