

WEEKLY CROP EVAPOTRANSPIRATION (ET) ESTIMATES (INCHES PER WEEK)

For the week June 8 through June 14 2001

West of Sacramento			East of Sacramento	
Weekly Water Use	Accumulated Seasonal Use	Crop (Leafout Date)	Weekly Water Use	Accumulated Seasonal Use
2.01	20.32	<i>Pasture-Turf</i>	1.90	19.54
1.94	19.77	<i>Alfalfa</i>	1.83	18.97
1.51	15.36	<i>Olives*</i>	1.43	14.75
1.94	18.09	<i>Almonds (3/1)*</i>	1.83	17.36
1.94	17.39	<i>Prunes (3/15)*1.03</i>	1.83	16.75
1.94	15.34	<i>Walnut (4/1)*</i>	1.83	14.75
0.00	4.04	<i>Rainfall (3/1)</i>	0.00	3.88

Example of How to Use this ET Report with Microsprinkler or Drip Irrigation: (Next week an example for hand move or solid set sprinkler)

Situation: 7th leaf walnuts located west of the Sacramento River, 18ft x 11 ft tree spacing, microsprinklers averaged 5.4 gph. There is one sprinkler per tree.

Useful Conversion Factor: An acres of land covered with water one inch deep equals 27,154 gallons of water.

Step 1 – How was the water application rate measured?

Sprinkler discharge was measured on 20 sprinklers along 5 different lateral lines at four locations down each line (beginning at the head of the line, then at approximately one-third and two thirds distance down the line, and near the end of the line). It required a stop watch, a hose to slip over the microsprinkler, a 16 ounce measuring cup in one ounce graduations to measure sprinkler discharge in one minute from each sprinkler, and notepad to record the ounces of water collected in one minute for each sprinkler, and about 2 hours of a person's time. The average measured discharge rate was 11.5 ounces per minute. Multiplying 11.5 ounces by 60 minutes per hour resulted in 690 ounces per hour, then dividing by 128 ounces per gallon resulted in an average discharge rate of 5.4 gallons per hour for the sample of 20 sprinklers.

Step 2 – How uniform are the microsprinklers applying water?

Identify the five sprinklers from among the 20 sampled that discharged the lowest volume of water in one minute. Calculate an average discharge rate for these 5 sprinklers. In this case, the five sprinklers with the lowest discharge average 10.4 ounce per minute or 4.9 gph. Then by dividing this average discharge rate for the five microsprinklers with the lowest output by the average for all 20 sprinklers (11.5 ounces per minute or 5.4 gph) and multiplying by 100 the water application uniformity can be determined. **In this case, the water application is 90 percent uniform.**

Step 3 – What is the Water Application Rate in Inches per Hour?

An orchard design of 18 ft by 11 ft has 220 trees per acre. This equals 198 square feet per tree. An acre equals 43,560 square feet, so 43,560 sq. ft. divided by 198 sq. ft per tree equals 220 trees per acre. So if each tree is irrigated with one sprinkler at an average rate of 5.4 gph, the average hourly water application rate per acre of walnut trees is 1,188 gallons of applied water per hour per acre by the conversion factor of 27,154 gallons of water per acre-one inch deep, **the average water application rate in inches of precipitation per hour** (just like thinking in terms of rainfall) **equals 0.044 inches per hour.**

Step 4- How long should I have run my irrigation system this past week?

Looking at the second to last line on the left hand side of the table provided above, the estimate of soil moisture loss from June 8 through June 14, 2001 was 1.94 inches per acre. By dividing the estimate of soil moisture loss(1.94 inches per acres) by the average hourly water application rate of 0.044 inches per hour, **the weekly hours of operation time equals 44 hours per week** does not allow for the non-uniform application of water in the orchard. Since sprinkler discharge evaluation revealed a 90 percent water application uniformity, the actual hours or weekly sprinkler operation should be increased by 10 percent from **44 to about 49 hours per week.**

FINAL STEP – Should I apply the water in 49 hours straight operation or should it be split up?

You can probably best make this decision based upon what you observe in terms of runoff and what you know about the rooting depth. In general, I would recommend splitting the total weekly run time into two or three applications, (16 to 24 hours) but not more than four applications per week (12 hour sets). More frequent application such as daily applications (7 hour sets) may increase evaporation losses and reduce depth of water penetration into the soil particularly on slowly permeable soils. Applying the water in one long set may result in a significant fraction of the applied water escaping the root zone, particularly in sandy loam soils.