University of California Cooperative Extension ■ Tulare County

# Orchard Notes

May 2002

## Tree Water Use

*Kevin R. Day*

The total subject of irrigation and water management is exceedingly vast and of great potential complexity. In order to best address the subject it is important to have an understanding of tree water demands. To that end, Table 1 illustrates tree water use on a monthly basis broken down by several categories. This information is based on historical tree water use patterns and is valid for stone and pome fruit trees growing in the southern San Joaquin Valley and without cover crops or heavy weed populations.

These figures serve as a reference or starting point to estimate and/or evaluate irrigation need and strategies. Several other points to keep in mind include:

- **Crop Presence** – Numerous studies have demonstrated that tree water needs do not appreciably increase by the presence of a crop. Consequently, the data in Table 1 can be used for early-, mid-, or late-season varieties. However, water stress when fruit are on the tree will reduce fruit size, so be careful not to underirrigate in the presence of a crop. Keep in mind too that the effects of overirrigation while fruit are on the tree include reduced fruit size. For this reason soils should not be constantly saturated to the point where tree function is impaired.
- **Irrigation Efficiency** – Irrigation efficiency varies with system, soil type, length of run, and many other factors. In general, furrow/flood systems are of 60-80% efficiency, while drip/microsprinkler systems can have efficiencies greater than 85% when properly designed and operated. In order to accurately estimate tree water need, these efficiencies must be considered. For example, an orchard with a system that is 75% efficient must receive an additional 25% of the plant water requirement in order to fully meet tree water needs.
- **Postharvest** – For those interested in saving on water costs the postharvest period represents the best opportunity. After harvest, irrigation can be reduced significantly without harm. The greatest concern here is that peach and nectarine trees MUST NOT suffer from water stress during the approximate period from August 20-25 to September 5-10. Stress during this time will cause or increase the number of double fruits on the tree the following year. (This, however, is not a problem with plums. Cherries should be considered in the same category as peaches and nectarines.) Also, trees should never be stressed to the point where defoliation occurs.
- **Hot/Cold** – Since these data are based on historical data, slight modifications may be necessary to adjust for unseasonably hot or cold periods.
- **Spring/Fall** – Because of the potential threat of phytophthora root rot, care should be taken not to overwater in early spring or late fall. And during these periods it is particularly important to adjust for seasonal variations and deviations in temperatures.

Finally, the data in Table 2 is useful in estimating applied water. For example, a pump with an output of 452.5 gpm will pump 2 acre-feet in 24 hours (or 24 acre-inches). If this entire output is applied to a 10 acre block, that block will receive 2.4 inches of water per acre. Conversely, if you want to apply a 4 acre-inch

irrigation over a 10 acre block (40 acre-inches), the above-described pump must run for 40 hours (40 acre-inches needed ÷ 1 acre-inch per hour).

Again, the information presented here is not necessarily intended to address precisely the issue of irrigation scheduling. Rather, it is presented as general reference in exploring overall irrigation practices, strategies, and timings, and is especially useful in determining if orchard needs are adequately met.

**Table 1. Historical patterns of fruit tree water use in the Southern San Joaquin Valley**

| Month | Tree Evapotranspiration | | | | | |
|---|---|---|---|---|---|---|
| | **in/day** | **in/month** | **monthly % of annual total** | **total cumulative inches** | ***gal/ac/day** | **gal/tree/day @ 134 tr/ac** |
| March (16-31 only) | 0.054 | 0.87 | 2.3 | 0.87 | 1465 | 10.9 |
| April | 0.100 | 2.98 | 7.9 | 3.85 | 2715 | 20.3 |
| May | 0.148 | 4.58 | 12.1 | 8.43 | 4020 | 30.0 |
| June | 0.217 | 6.49 | 17.1 | 14.92 | 5890 | 44.0 |
| July | 0.255 | 7.90 | 20.9 | 22.82 | 6925 | 51.7 |
| August | 0.220 | 6.81 | 18.0 | 29.63 | 5975 | 44.6 |
| September | 0.163 | 4.89 | 12.9 | 34.52 | 4425 | 33.0 |
| October | 0.090 | 2.76 | 7.3 | 37.28 | 2445 | 18.2 |
| November (1-15 only) | 0.033 | 0.52 | 1.4 | 37.80 | 895 | 6.7 |
| Total | | 37.80 | 100 | 37.80 | | |

*** Note** – Daily ET in gal/tree per day is calculated by dividing the figures in this column (gal/ac/day) by the per acre tree density.

**Table 2. Units of water measurement - flow rates and volumes**

- 452.5 gpm (gallons per minute) = 2 acre-feet per 24-hour period
- 452.5 gpm = 1 acre-inch per hour
- 1 cfs (cubic foot per second) = 448 gpm
- 1 acre-foot = 325,851 gallons
- 1 acre-inch = 27,154 gallons

# Summer Pruning of Young Cherry Trees

*Kevin R. Day*

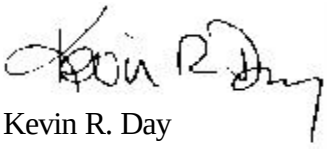
The rapidly growing shoots of young cherry trees exhibit a great degree of apical dominance. For this reason, those shoots often fail to branch and develop spurs to an adequate degree. Selective summer pruning can be used to overcome these tendencies and bring the trees into production more quickly.

The strategy involved here is making heading cuts in the summer, rather than waiting until winter to make the same type of cut. Heading cuts at this time will be much more effective in inducing branching, reducing tree vigor, and aiding in spur development and flower formation for the following year.

In general, any shoot that has insufficient branching may be headed—these can be upright shoots or those that are laying out to the side of the tree. In order to get the best response about one-quarter to one-third of the shoot must be removed. The rough rule of thumb that I use is that when a branch has grown 2 to 3 feet, remove one-third of it. Timing of this operation is any time that this much growth has occurred, and while the trees are still actively growing.

Additionally, other spur-bearing fruit trees—most specifically to our area certain varieties of plums—which exhibit a great degree of apical dominance can benefit from this practice also. For questions on application of this practice to your specific location, please call me at the office.

---



Kevin R. Day
Farm Advisor
(559) 685-3309, Ext. 211

*University of California Cooperative Extension*
*and the*
*Kearney Agricultural Center*

*present*

# VARIETY DISPLAY AND RESEARCH UPDATE SEMINAR

**May 31, 2002**

**at the**

**Kearney Agricultural Center**
**9240 South Riverbend Avenue**
**Parlier, California**

**Multi-Purpose Room**

| | |
|---|---|
| 8:00 - 9:00 a.m. | Variety Display by Stone Fruit Nurseries, Breeders and the USDA |
| 9:00 - 10:00 a.m. | Research Update - Irrigation Management |

***For more information call:*** Scott Johnson (559/646-6547), Kevin Day (559/685-3309, Ext. 211), Harry Andris (559/456-7557), Brent Holtz (559/657-7879, Ext. 209), or Bob Beede (559/582-3211, Ext. 2737).