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University of California researchers have studied the effects of irrigation on almonds for about 20 years. It has generally been thought that about 42-inches per acre per season is a reasonable estimate of water use by mature, productive almonds.

Seasonal water use follows a bell-shaped curve. Under this 42-inch model, water use starts out low after leafout at about 1.0 inch every 15 days, peaks at about 4.5-inches every 15 days in the first half of July, and declines back to about 1.0 inch every 15 days as the season ends. While there is some question whether 42 inches is too low to maximize long-term almond yields, the general shape of that curve still seems accurate.

In some situations, growers may have much less than 42-inches of water available from stored soil moisture and irrigation water. The challenge becomes managing crop stress over the course of the season.

One relatively effective approach that doesn't rely heavily on field monitoring is to attempt to sustain crop stress uniformly across all stages of tree growth and crop development by using estimates of crop water use. The limited water allocation is applied as a consistent percentage of the seasonal water use pattern. If 24 inches of irrigation water are available, representing about 60 percent of the potential water use, then the irrigation water would be allocated at about 60 percent of real-time or historic rates of crop water use over the course of the season.

Kearney Agricultural Center water management specialist David Goldhamer published results of a four-year study illustrating the effectiveness of the above approach. Almonds were produced with 55, 70, 85 and 100 percent of a 42-inch water allocation.

Water was either cut back as a consistent percentage of estimated crop water use to try to sustain less pronounced crop stress across all stages of crop growth, or cutbacks targeted only pre-harvest, or post-harvest crop stages for higher crop stress.

The effect of limited water supply was minimized with uniform allocation of water across all crop stages. However, productivity was reduced particularly with 55 and 70 percent allocations. The uniform crop stress strategy gave both the highest four-year yields, and the largest average nut size within each water allocation. Sharp cut backs before harvest resulted in the second highest yields, but reduced nut size. Sharply withholding water after harvest affected bud development and reduced yield the next season.

University of California Davis Professor Ken Shackel was able to get by with a water allocation of about 85 percent of full supply with no short-term yield loss or effect on nut size by using a pressure chamber to actually track midday crop stress and keeping it within the -12 to -20 bar range in July during hull split.

Water management specialist Terry Prichard showed that irrigating at a threshold value of -20 to -22 bars beginning in June resulted in 34 percent less tree water use and no significant influence on yield over a four-year period. Vegetative growth declined, however, suggesting continuation of the strategy may have eventually reduced yields.

For more information on strategies to manage almonds with limited water allocations refer to http://UCManageDrought.ucdavis.edu.

(University of California researchers and farm advisors who want to publish their recommendations in this space can contact Bob Johnson at BJohn11135@aol.com)