Overtree Sprinkling - Tree Response and Water Economy K. Uriu, Pomology and D. W. Henderson, Water Sci. and Engr.

Objectives:

To evaluate effect of overtree sprinkling versus a newly established drip irrigation treatment in the overtree irrigation plot at the Wilmarth Orchard in Colusa. Evaluate K deficiency correction from the application of K in the drip irrigation water.

Results; Conclusions; Work Planned:

In 1975 the overhead sprinkling used for summer cooling caused severe fruit drop and defoliation because of the high sodium level found in the irrigation water. Therefore, in 1976 the cooling treatment was changed to a drip irrigation treatment. The 3 treatments then were: 1) overhead sprinkling for irrigation, 2) overhead sprinkling for irrigation as well as applying KNO₃ several times during the season and 3) drip irrigation. During the last several years, non-cultivation combined with sprinkle irrigation had produced a heavy sod cover which encouraged prune roots to develop into the surface soil which, in this orchard, happens to be high in potassium. Thus, all trees were green and healthy. In 1976, the sprinkle irrigated trees maintained the good appearance. However, in the drip plot, trees began showing severe K deficiency symptoms. The absence of winter rains in 1975-76 had made nonfunctional the roots that were feeding on the high K surface soil. The active root area was presumably restricted to the sub-surface area immediately under the drippers where soil K was low.

Treatment	sol. sol.	Drying Ratio	Dried Fruit Size (#/lb.)	Yield (lbs./tree)	% Side Cracks
Overtree sprinkling-irrigation plus KNO3 applied overtree	18.9	3.59	67	38.7	8.5
Overtree sprinkling-irrigation	18.8	3.54	63	32.7	8.6
Drip irrigation	21.4	3.24	73	33.9	1.7
	*	*	N.S.	N.S.	*

*Drip irrigation significantly different at the 1% level.

The drip irrigation treatment had significantly less side-cracks, was higher in soluble solids and had a more favorable drying ratio but did not have a higher yield nor larger fruit size presumably because of the severe K deficiency that developed.

In an adjoining drip irrigation experiment, K_2SO_4 had been applied in the drip irrigation water in 1974 and 1975. In 1976 no K was applied-only drip water. These trees showed excellent K deficiency correction and remained green through 1976 while trees not receiving K_2SO_4 showed considerable leaf scorch and dieback.

In a similar experiment established in Gridley in 1975, K_2S_4 in the drip irrigation water also gave excellent K deficiency correction.