

## **Water use of plum trees (*Prunus salicina*) trained to four canopy arrangements**

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Water supply is a limiting factor in the production of south Western Australia. Fruit growers are adopting intensive orchard systems and are using a variety of canopy training Methods. We wanted to establish whether the training system was likely to have a strong influence on water use.

### **Methods**

We studied the soil water balance of 6 year old plum trees (cvs Laroda and Santa Rosa) trained to vase, palmette, Lincoln and Tatura trellis systems. The trees were growing on a loamy sand and had a rooting depth of 90 cm. Water use was measured in three experiments in 1987 and 1988 by the water balance Method. Irrigation was from drippers and was applied at the rate of 110%, 40% and nil of class A pan evaporation in the three experiments.

### **Results and discussion**

When trickle irrigated at 110% class A pan evaporation rate the Tatura trellis used more water than the other systems, but the differences were small, being 9-12% between training systems. There were no significant ( $P=0.05$ ) differences between the two cultivars in their water use. When irrigated after harvest at 40% of A pan the vase system used more water than the others, but differences were less than 18% although statistically significant ( $P = 0.05$ ). When water was withheld for a week in a period of high evaporative demand ( $7.3 \text{ mm day}^{-1}$ ) the Tatura and Palmette systems used more water (14%) than the others. This was associated with their ability to extract water from deeper layers in the soil.

Well watered trees used 75-99% of the measured intercepted net radiation for evaporation of water. Since differences in canopy water use were not large, but yield differences were considerable ( $38 \text{ t ha}^{-1}$  for the vase and  $62 \text{ t ha}^{-1}$  for the Tatura trellis) the efficiency of water use will be greatest on those canopies giving the greatest yield. Because water use was measured over discreet intervals and not throughout the whole season we are unable to calculate precise values of water use efficiency.