

Increasing Growth and Yield of 'Thompson

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Fig. 1. Trellis treatment 1W consisting of a single cane-supporting wire 4½ feet above the vineyard floor.

The five-year summary of results of a trellising trial with 'Thompson Seedless' vines grown in the San Joaquin Valley showed that a wide, four-wire double crossarm trellis increased vine growth by 38 percent, crop yields by 20 percent, and soluble solids by nearly 3 percent, when compared with a one-wire trellis. When a two-wire single crossarm trellis was compared with a one-wire trellis the gain in vine growth was 14 percent, yield was enhanced by 13 percent, and soluble solids were the same.

Three trellis types were installed in March, 1968 in a 'Thompson Seedless' block growing at the University of California Kearney Horticultural Field Station, Parlier. The vines were planted on their own roots in 1966 at a spacing of 8 feet between vines and 12 feet between rows. The trial was designed as a randomized complete-block. Each plot consisted of five adjacent vines, but only the center three were used for performance studies. Treatments were replicated ten times. The cultivation and irrigation practices were those employed on the station and standard throughout the experiment.

The vines were cane-pruned in January of each year to a standard length of 15 nodes. The severity of pruning for each vine was governed by the amount of growth during the previous season. Thus, the number of canes retained per vine was based on the weight of one-year wood removed as prunings, plus the estimated

weight of the canes kept. Seven nodes were left per pound of one-year wood removed. For example, a vine with a one-year wood weight of 8.8 pounds (7.6 pounds of prunings plus 1.2 pounds of retained canes) would be pruned to leave four 15-node canes for a total of 60 nodes.

The three trellis treatments were 1W (control), a single cane-supporting wire 4 1/2 feet above the vineyard floor (fig. 1); 2W, two cane-supporting wires spread on a 30-inch horizontal crossarm 4 1/2 feet above the vineyard floor (fig. 2); and 4W, two cane-supporting wires on a 30-inch horizontal crossarm 4 1/2 feet high, and two foliage-supporting wires on a 4-foot crossarm 16 inches above the lower crossarm (fig. 3).

The vines were harvested each year in early to mid-September when a maturity of 20 to 22° Brix was reached. The day before harvest, 100 berries were sampled at random from the clusters on the three test vines in each plot. The samples were counted, weighed, and then crushed so that the soluble solids in the juice could be measured as °Brix by hand refractometer.

Using the one-year dormant wood

weight to characterize annual vine growth, the 4W trellis treatment vines were consistently larger in each year of the trial. In fact, a growth response was observed as early as 1968, the initial growing season following installation of the trellis treatments. When all five years' data were combined, a 38 percent increase in growth over that of the control (1W) was indicated (table 1, fig. 4). And with the 2W trellis vines, only in 1969 was vine growth significantly better than the control (1W).

Crop yields during the five-year life of the trial were markedly reduced in all plots in two of the years by damaging radiation frosts in April in 1970 and 1972 when shoots were 4 to 6 inches long. There were no differences in severity of injury resulting from trellis type, since the shoots in all treatments were at the same height above the vineyard floor.

The 4W treatment had significantly greater yields than control in 1969, 1971, and 1972, whereas the 2W trellis significantly outyielded the control in 1969 and 1972. Analysis of the combined data for 5 years revealed that the 4W treatment produced a significantly greater crop than control (1W), with an overall increase of



Fig. 2. Trellis treatment 2W consisting of two cane-supporting wires on a 30-inch crossarm 4½ feet above the vineyard floor.

Seedless' Vines by Trellising

20 percent (table 1). The increases in crop yield resulting from trellis treatments 2W and 4W were due to a significant increase in the number of clusters per vine (table 1).

Mean cluster weights did not differ significantly as a result of the treatments (table 1), and only in 1969 were the mean berry weights significantly higher with the 4W trellis than with the control (1W). Fruit maturity ($^{\circ}$ Brix) was higher for the 4W trellis than for either the 1W or 2W treatments when the five-year data were combined (table 1), and in all years except 1970 and 1972 when frost damage occurred.

The relationship between yield and $^{\circ}$ Brix was expressed as a product and is shown in fig. 4 as pounds of fruit soluble solids per vine. Treatment 4W gave significant increases over the control in the combined analysis. The taller, wider trellis (4W) exposed more leaf surface, enabling the vines to photosynthesize at higher levels.

Conclusions

The improvement in crop yield with the largest trellis (4W) resulted from a marked improvement in vine growth, since with the balanced pruning method the number of nodes retained per vine at pruning time was proportional to vine growth. Bud fruitfulness (data not shown) and cluster and berry weights were not affected by the crossarm trellis systems. Percentage soluble solids ($^{\circ}$ Brix) and total soluble solids in fruits per vine



Fig. 3. Trellis treatment 4W consisting of two cane-supporting wires on a 30-inch horizontal crossarm 4½ feet above the vineyard floor, and two foliage-supporting wires on a 4-foot horizontal crossarm 16 inches above the lower crossarm.

were also increased by the 4W trellis system, which not only provided support for the summer shoot growth, but also gave the greatest horizontal vine spread. The growth and soluble solids responses indicate that greater leaf display to the sunlight was mainly responsible.

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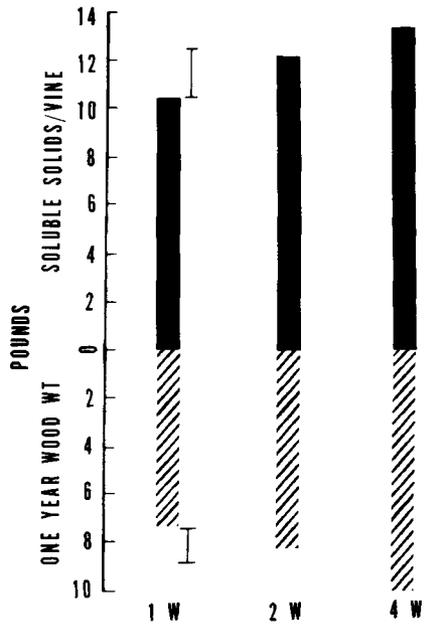


Fig. 4. Yield of fruit soluble solids per vine and weight of one-year wood per vine for three trellis treatments. Data combined for 5 years, 1969-1973. Least significant differences at $p \leq 0.01$ are shown.

Trellis type*	One year wood, lb./vine	Crop yield, lb./vine	No. clusters/vine	Cluster wt. (lb.)	Wt. 100 berries (g)	$^{\circ}$ Brix
1W	7.2	52.3	53	1.01	173	20.9
2W	8.2	59.4	58†	1.03	172	20.9
4W	10.0‡	62.8‡	64‡	0.97	171	21.5‡
LSD .05	—	—	4	NS	NS	—
LSD .01	1.5	10.0	5	NS	NS	0.6

*For descriptions, see figs. 1, 2, 3.
 †Denotes significance $p \leq 0.05$.
 ‡Denotes significance $p \leq 0.01$.