

THE EFFECTS OF AMBIENT OXIDANTS ON
THOMPSON SEEDLESS GRAPES

(Executive Summary)

Final Report on ARB Contract A1-132-33
"The Effects of Present and Potential Air Pollution
on Important San Joaquin Valley Crops: Grapes"

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Executive Summary

THE EFFECTS OF AMBIENT OXIDANTS IN THE CENTRAL SAN JOAQUIN VALLEY ON THOMPSON SEEDLESS GRAPES

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Oxidant injury on vinifera grapes, commonly referred to as "oxidant stipple" has been recognized since the mid 1950's as an air pollution problem in the Los Angeles basin, Lambrusca type grapes growing in New York east of Lake Erie have also been found to be suffering from oxidant stipple, sometimes combined with sulfur dioxide injury.

Results of a four year study with Thompson Seedless grapes grown in carbon filtered and ambient air at Parlier, 15 miles southeast of Fresno, indicate that this very important crop, worth in excess of two hundred million dollars annually is being significantly damaged by air pollutants, present in central San Joaquin Valley air.

Ten year old Thompson Seedless grape vines growing in carbon filtered air for four years produced approximately thirteen percent more cane prunings and fruit than did similar vines growing in non-filtered, ambient air. Sugar content of fruit from the filtered treatment averaged seven tenths (0.7) of a percentage point higher than fruit from the ambient treatment, but berry size and acid contents were not affected. The primary factors influencing the yield differences were a ten percent increase in bunch count (number of bunches per vine) and a four percent increase in bunch size. When the first year's yields, which are principally determined by factors occurring the previous growing season, are discounted, the data indicates that continued exposure to ambient pollution in the Parlier area results in fruit yield reductions ranging from seventeen percent in high yield years to twenty-seven percent in low yield years.

Since bunch count per vine is the chief factor associated with general yield levels, and is also the chief factor influenced by air pollution, one can speculate that higher than usual air pollution during the period of cane and fruiting bud development one season may be a significant factor in reducing potential yields the following season.

The observed combination of less bunches per vine and smaller average size bunches together with reduced cane production is a definite indication of reduced vine vigor and photosynthetic activity resulting from exposure to ambient air pollutants.

Regulatory measures which would significantly improve air quality in the San Joaquin Valley air basin would obviously contribute to increased grape yields.