Final Report - Project No. 83-X1

TITLE:

Effect of Air Pollution on Nonpareil Almond Trees

PROJECT LEADER:

Robert F. Brewer

OBJECTIVES:

To determine the effects of ambient air pollution on nonbearing Nonpareil almond trees.

EXPERIMENTAL PROCEDURES:

Young Nonpareil almond trees planted in the field in the spring of 1982 were enclosed in large blower-ventilated plastic covered greenhouses in March of 1983. Four units, each enclosing three trees were supplied with carbon-filtered smog-free air throughout the spring and summer months. A similar number of units received nonfiltered or ambient air. Periodic observations were made in search of visible foliar symptoms which could be attributed to air pollution. At the end of the summer, the trees were dissected into leaves, branches 3/4 inch or smaller, and main scaffold cut 8 inches above the bud union. The trunk diameters were also measured 8 inches above the bud union and compared with measurements made in the spring before the treatments were started.

EXPERIMENTAL RESULTS:

No foliar symptoms which could be attributed to air pollution were observed on the trees receiving the ambient air treatment. All of the flecking and other foliar injury symptoms observed were probably due to mite or other insect feeding earlier in the season. Trunk diameters measured 8 inches above the bud union averaged approximately 4% larger with the filtered air treatment, but this apparent difference was not statistically significant. Similarly trees receiving filtered air produced 11.4% more foliage, but because of considerable variation within each of the treatments, this difference was not statistically significant. Wood weights, however, were statistically different with 23.8% more wood weight in the chambers receiving filtered air. Combining leaves and wood also produced a significant difference between filtered and ambient of 18.4%.

The following table contains a summary of the data collected during the course of this experiment.

Table 1.
Effects of ambient and filtered air on two-year old Nonpareil almond trees.

Observation or Measurement	Air Treatment	
	Filtered	Ambient
Leaf Symptoms	None	None
Trunk Diameter Increase	3.98 cm	3.85 cm
Weight of Leaves	3.58 kg	3.22 kg
Weight of Wood	4.51 kg*	3.61 kg
Total Weight of Top	8.09 kg*	6.83 kg

* Significantly different at .05 level of probability.

CONCLUSIONS AND DISCUSSION

Although there were no clearly discernible foliar symptoms of air pollution injury, it would appear that Nonpareil almond trees are limited in vitality by existing air pollution. A long and more elaborate experiment using larger chambers would be necessary to further assess the long term impact of air pollution on almond growth and fruit production.

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83-X1

December 19, 1983

Mr. Robert K. Curtis
Almond Board of California
P. O. Box 15920
Sacramento, California 95852

Dear Bob:

Enclosed are two copies of a report on our air pollution work with almonds. If you want or need more of the raw data, let me know. Thank you very much for your help with this project.

Sincerely,

R. F. Brewer

Robert F. Brewer
Associate Horticulturist

RFB/dln
Enclosure