

## Outcrossing in Avocado: Is There a Relationship to Fruit Yield

Continuing Project, Year 4 of 4

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### **Benefit to the Industry**

With the trend toward Hass monoculture in southern California, there has been an observed decline in fruit yield. The question arose whether the absence of cross-pollination was the cause of the lower Hass fruit numbers. The project addressed the question whether a correlation between outcrossing and Hass fruit yield existed when another variety (Bacon, Fuerte and Zutano) served as a pollen source.

### **Objectives**

The objectives of the project were 1) determining the amount of outcrossing occurring in a Hass grove when a tree of another variety served as a pollen source? 2) analyzing the correlation between the degree of outcrossing and fruit numbers on the Hass tree? 3) examining the effect of distance on outcrossing? Were Hass trees located close to the pollen source showing different degree of outcrossing and fruit numbers as compared to trees located further away? 4) examining the effect of climate by comparison of outcrossing in different regions in southern California?

### **Summary**

Based on three years of data, the conclusions were:

1) Within the inland region of Temecula, a clear correlation existed between outcrossing and Hass fruit yield when an alternate pollen source (Bacon, Fuerte or Zutano) was present. A higher degree of outcrossing was seen on Hass trees located close to the pollen source. When examining Hass trees further from the pollen source, the degree of outcrossing was comparatively lower as was the fruit yield.

2) With the coastal regions of Santa Barbara and Ventura, the correlation between outcrossing and fruit yield was not as clear. Factors such as the presence of other pollen sources in the grove and possible effect of temperature during time of bloom will be further investigated.

Figure 1. General experimental plot design.

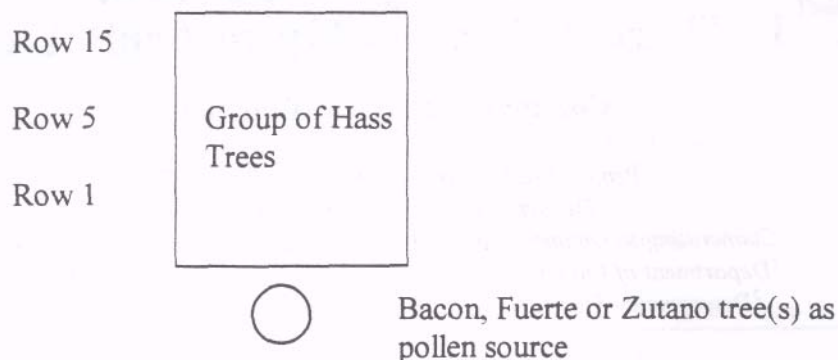


Figure 2. Design strategy for the outcrossing project. Note that Santa Barbara has only two sites, one for Bacon and one for Fuerte.

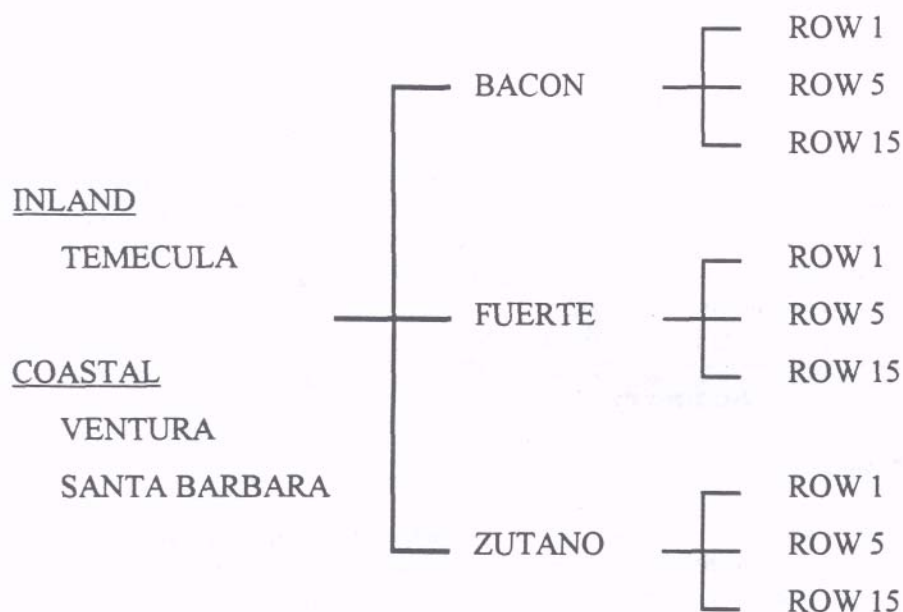
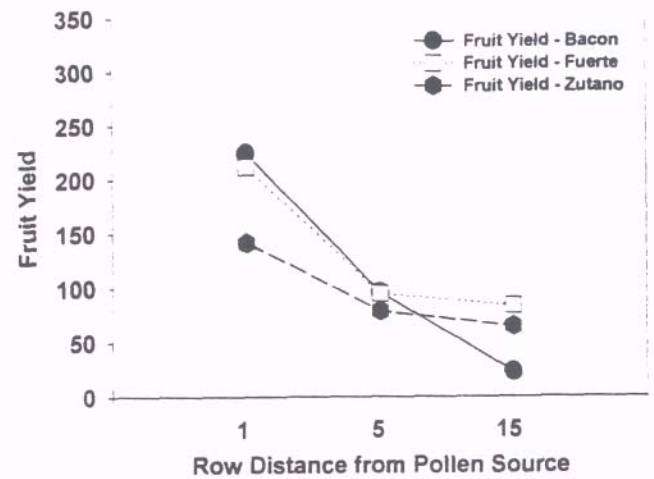
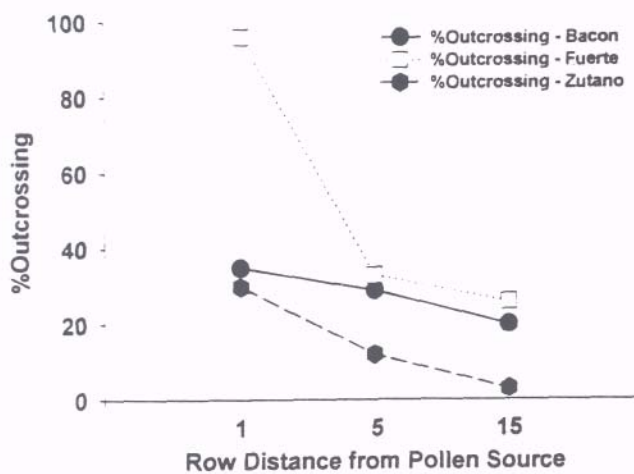


Table 1. Location of groves where avocado collections were done.

<u>Location</u>	<u>Pollen Source</u>	<u>Grove</u>
Temecula	Bacon	Kanning Ranch
	Fuerte	On El Prado Road
	Zutano	On El Prado Road
Ventura County	Bacon	Saticoy
	Fuerte	Santa Paula
	Zutano	Santa Clara
Santa Barbara County	Bacon	Goleta
	Fuerte	Goleta

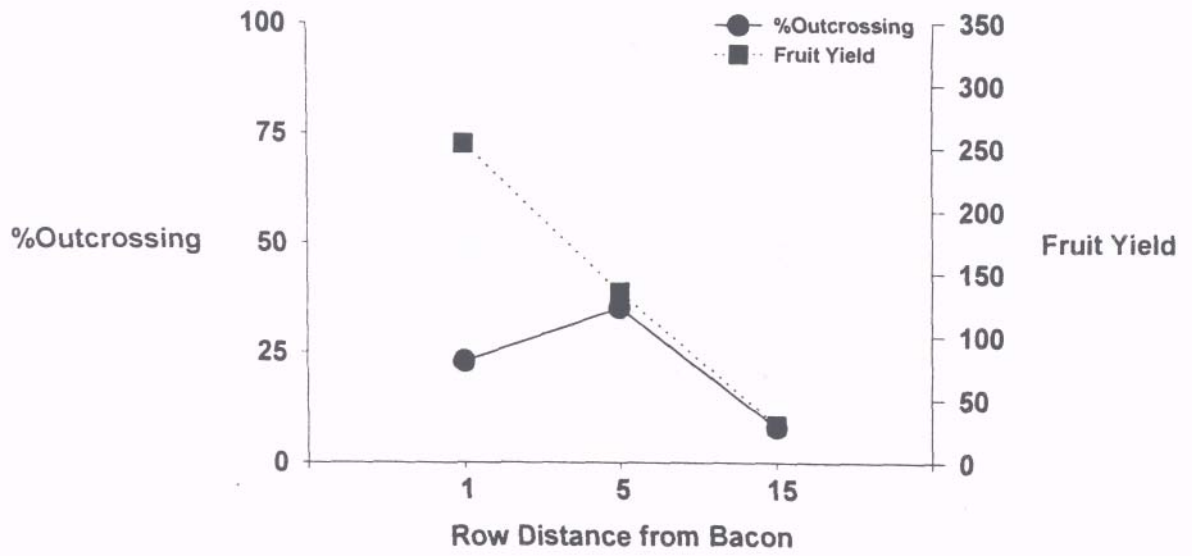
### Inland region - Temecula

Graph 1 (left) and 2 (right). Data graphed for the inland region, Temecula. Graph 1 shows the data points for outcrossing. Graph 2 shows the data point for fruit yield. Each data point is an average for the two Hass trees in each of row 1, 5 or 15, for the three years of collection, 1993, 1994 and 1995.

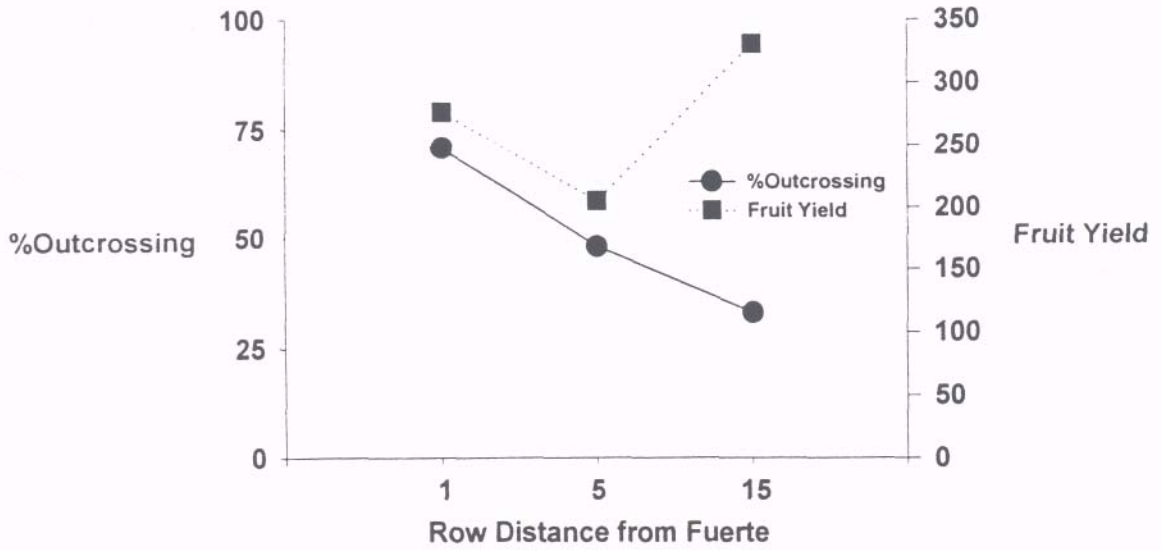


### Coastal regions - Ventura and Santa Barbara

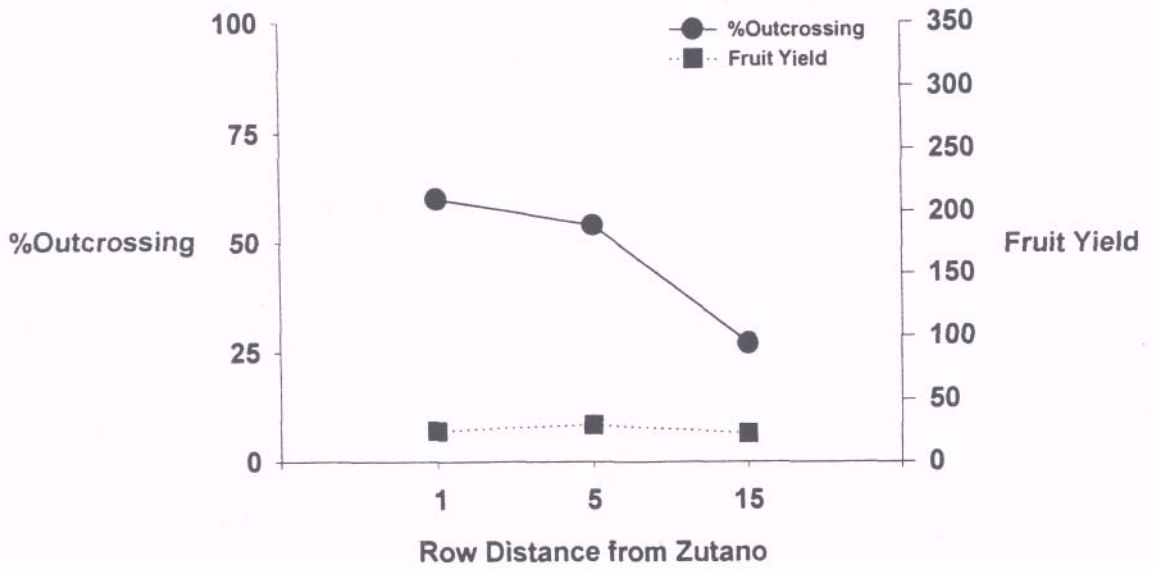
Graph 3 through 7 - The data for the coastal regions of Ventura and Santa Barbara is shown in the following five graphs. The graph is the combination of the two graphs, one for outcrossing and the second for fruit yield. The left vertical line represents one of the graphs with the scale for percent outcrossing and the circles showing the outcrossing data points. The right vertical line is the second graph, showing the scale for fruit yield with the squares representing the fruit yield data points. The horizontal line is shared by both graphs and shows the row distance of the Hass trees from the pollen source. Each data point is an average of the two Hass trees for the three years of collection. Graph 3 - Ventura - Bacon as pollen source



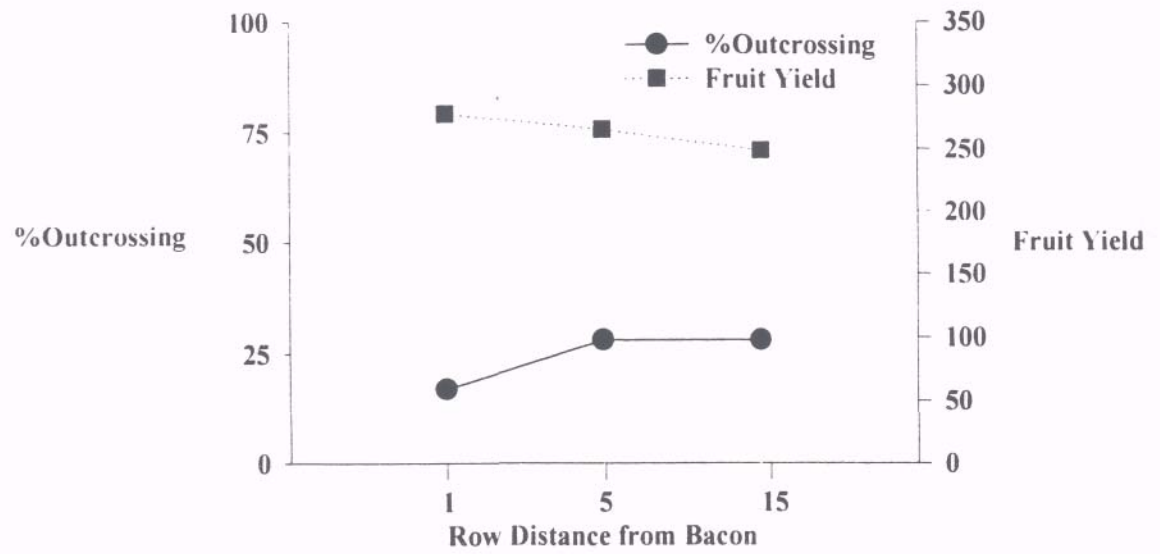
Graph 4 - Ventura - Fuerte as pollen source



Graph 5 - Ventura - Zutano as pollen source



Graph 6 - Santa Barbara - Bacon as pollen source



Graph 7 - Santa Barbara - Fuerte as pollen source

