WALNUT FLOWER AND FRUIT REMOVAL WITH ETHEPHON

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ABSTRACT

The high potential early yield of precocious, lateral-bearing walnut cultivars such as 'Howard' and 'Pedro' can cause two potential problems. One is reduced tree growth resulting in tree training difficulties and stunting particularly on poor soils. The other potential problem is early exposure to blackline pollen while infection sites (the pistillate flowers) are very near the graft union. Elimination of the pistillate flowers during the first few years of tree establishment should reduce both problems.

In 1985, three growth regulators (NAA, gibberellin and ethephon) were tested for pistillate flower removal potential and phytotoxic effects. Only ethephon looked promising and further testing was conducted in 1986. Young 'Howard' and 'Pedro' trees were sprayed at 3 1/2 weeks after full pistillate bloom with either 2 or 4 pints of Ethrel per 100 gallons of water. The higher rate caused excessive foliar phytotoxicity while the lower rate resulted in only slight to moderate phytotoxicity. Both treatments resulted in complete nut removal. Growth was reduced with both treatments when compared to the check and also trees where the nuts were removed by hand.

In 1987, lower concentrations of ethephon will be tested to determine if an acceptable level of nut removal can be obtained while still maintaining adequate growth.

OBJECTIVES

The objectives of this trial were to evaluate the effects of growth regulators in the removal of pistillate flowers as an aid in improving the vigor of young, precocious, lateral-bearing cultivars and in reducing their exposure to blackline pollen early in the life of the tree. Only ethephon was tested in 1986 as NAA and gibberellin were shown to be ineffective in 1985.

PROCEDURES

Four treatments were applied to young 'Howard' trees and two treatments to young 'Pedro' trees in a commercial walnut orchard north of Hollister. Each treatment was replicated five times. All treatments were applied by compressed air sprayer to the point of runoff (approximately 1/4 gallon per tree depending upon size.) The treatments were as follows:

'Howard'

Treatment 1 - Ethrel 2 pts/100 gal water
Treatment 2 - Ethrel 4 pts/100 gal water
Treatment 3 - No spray, nuts removed by hand
Treatment 4 - No spray, nuts not removed (check)
'Pedro'

Treatment 1 - Ethrel 4 pts/100 gal water  
Treatment 2 - No spray, nuts removed by hand

Treatments were applied on May 8, 1986 at about 3 1/2 weeks after full bloom (pistillate flowers) for both 'Howard' and 'Pedro'. Evaluations were made for fruit removal, foliar phytotoxicity and shoot growth initially and at the end of the season.

RESULTS

The trees were rated on May 8, 1986 for initial tree size and vigor with a rating of 5 being very vigorous and 0 being no growth. The trees were again rated on June 10, 1986 for phytotoxicity (5 = complete defoliation, 0 = no foliar phytotoxicity), nut removal (5 = complete nut removal, 0 = normal set) and for growth (5 = excellent growth, 0 = no growth). Growth was also evaluated on December 10, 1986. The following results are the mean of 5 replications for each treatment.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Vigor (June)</th>
<th>Phytotoxicity</th>
<th>Nut Removal (June)</th>
<th>Growth (December)</th>
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<tbody>
<tr>
<td>'Howard'</td>
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<tr>
<td>Tr. 1</td>
<td>2.6</td>
<td>2.4</td>
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<tr>
<td>Tr. 2</td>
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<td>3.8</td>
<td>5.0</td>
<td>1.6</td>
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<tr>
<td>Tr. 3</td>
<td>2.2</td>
<td>0.6</td>
<td>4.8</td>
<td>3.4</td>
</tr>
<tr>
<td>Tr. 4</td>
<td>2.2</td>
<td>0.6</td>
<td>0.6</td>
<td>3.6</td>
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<tr>
<td>'Pedro'</td>
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<tr>
<td>Tr. 1</td>
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<tr>
<td>Tr. 2</td>
<td>2.0</td>
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<td>4.6</td>
<td>4.6</td>
</tr>
</tbody>
</table>

A phytotoxicity rating is shown for treatment 3 and 4 due to physiological leaf burn or mesophyll collapse. The mean number of nuts removed by hand from 'Howard' trees was 54.4 nuts per tree. For 'Pedro' the mean was only 10.4 nuts per tree. The age of most of the treated trees was two years after grafting in the orchard.

CONCLUSIONS

Ethephon shows promise as a fruit and flower removal agent applied between full bloom and 3 1/2 weeks following full bloom of the pistillate flowers. Nut removal was complete at both 2 pts/100 gal and 4 pts/100 gal. Growth was inhibited by both treatments but growth retardation and foliar phytotoxicity were greater with higher concentration.

In 1987, lower concentrations will be tested in order to determine the point at which nut removal begins to decline and whether growth retardation is still a problem at that concentration. Timing of the spray applications does not appear to be critical as far as nut removal is concerned but may have an effect upon shoot growth.