WALNUT FLOWER AND FRUIT REMOVAL WITH ETHEPHON

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ABSTRACT

The ability to remove the pistillate bloom and young nuts from precocious lateral-bearing cultivars during the first several years in the orchard may be useful both in reducing competition with shoot growth and eliminating potential blackline infection sites. Ethephon applied as Ethrel at 2 or 4 pts/100 gal water will eliminate all flowers and nuts when applied shortly after full bloom (1986 data). Significant but incomplete nut removal resulted from applications of 1/2 pt Ethrel/100 gal at full bloom plus 2 weeks or 1 pt Ethrel/100 gal at full bloom plus 5 weeks. Some phytotoxicity and reduced seasonal growth occurred with all treatments.

OBJECTIVES

The high early yield of precocious, lateral-bearing walnut cultivars such as 'Howard' 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 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 with 2 or 4 pints of Ethrel per 100 gallons of water applied to young 'Howard' and 'Pedro' trees at 3 1/2 weeks after full bloom. The higher rate caused excessive 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 compared to the check and trees where the nuts were removed by hand.

The objective of the tests in 1987 was to determine if lower rates of Ethrel would result in adequate flower and nut removal without phytotoxicity.

PROCEDURES

Three Ethrel treatments were applied to young 'Howard' 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 1/3 gallon per tree depending upon size). The treatments were as follows:

Treatment 1 - Ethrel 1/4 pt/100 gal water at full bloom plus 2 weeks
Treatment 2 - Ethrel 1/2 pt/100 gal water at full bloom plus 2 weeks
Treatment 3 - Ethrel 1 pt/100 gal water at full bloom plus 5 weeks
Treatment 4 - No spray, nuts removed by hand at full bloom plus 2 weeks

Treatment 5 - No spray, nuts not removed (check).

Full bloom for pistillate flowers was estimated to be April 24, 1987. The full bloom plus 2 weeks spray was applied May 8 while the 5 weeks spray was applied May 28. Evaluations were made for fruit removal, foliar toxicity and growth.

**RESULTS**

<table>
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<th>Rate</th>
<th>Phytotoxicity</th>
<th>% Nut Removal</th>
<th>Seasonal Vigor</th>
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<tr>
<td>Treatment 1</td>
<td>1/4 pt</td>
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<td>3.0</td>
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<tr>
<td>Treatment 2</td>
<td>1/2 pt</td>
<td>moderate</td>
<td>52.2</td>
<td>1.6</td>
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<tr>
<td>Treatment 3</td>
<td>1 pt</td>
<td>moderate</td>
<td>22.7</td>
<td>1.3</td>
</tr>
<tr>
<td>Treatment 4</td>
<td>hand removed</td>
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<td>100</td>
<td>4.6</td>
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<tr>
<td>Treatment 5</td>
<td>check</td>
<td>none</td>
<td>0</td>
<td>2.6</td>
</tr>
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</table>

Treatments 1, 2, 4 and 5 were rated on May 28, 1987 for nut removal and phytotoxicity. Treatment 3 was rated on June 8, 1987 for nut removal and phytotoxicity. Growth was rated on December 10, 1987 (5 = excellent growth, 0 = no growth). The mean number of nuts removed by hand from treatment 4 was 60.2 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 when applied shortly after full bloom of the pistillate flowers. Nut removal is complete at 2 or 4 pts of Ethrel/100 gal water. Only partial removal is achieved at 1/2 or 1 pt Ethrel/100 gal water. Growth is inhibited by all Ethrel treatments and this may severely limit Ethrel's usefulness since this negates any beneficial growth stimulation of nut removal. Ethephon sprays may have some more immediate applications for nut removal on walnut trees in landscaping situations.

Nut removal by hand appears to be very useful at stimulating shoot growth due to the removal of competition from the developing nuts.

In 1988, ethephon will be applied at or before full bloom to determine whether earlier spraying will reduce or eliminate foliar toxicity and adverse effects on shoot growth.