CATKIN REMOVAL FROM ‘SERR’ WALNUT TREES BY FALL APPLICATIONS OF ETHEPHON (ETHREL)

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ABSTRACT

Removal of excess catkins prior to pollen-shedding may prove important in the prevention of pistillate flower abscission (PFA) which in ‘Serr’ walnuts has been related to excess pollen accumulation on the stigmatic surface of pistillate flowers. Application of two rates of ethephon (600 and 1800 ppm) on November 20, 1995 resulted in 45 and 88 percent reductions in catkins present in March, 1996 when compared to an untreated check. Catkin drop occurred mostly in January and February. Leafing was delayed about 4 days at the 600 ppm rate and 10 days at the 1800 ppm rate. There was no apparent effect on harvest date and no significant differences in nut weight, kernel weight or crackout percentage from either treatment.

OBJECTIVE

Excessive pollen loads on the stigmatic surface of the pistillate flowers of walnuts is believed to be responsible for a significant portion of the pistillate flower abscission (PFA) problem. The ‘Serr’ variety is adversely impacted by PFA more than most other walnut varieties resulting in this otherwise promising variety having reduced mature tree yields and few new acres being planted (Polito, V. et al. 1995. “Pollen, Pistillate Flower Abortion/Abscission” Walnut Research Reports - 1995, pp 77-86).

Several methods have been proposed for reducing pollen load including shaking trees in the spring to remove catkins, removing pollenizer varieties such as ‘Tehama’ and spraying with ethephon just prior to pollen shedding. While the first two methods have achieved some success, they have not provided a complete answer to the problem. Spraying ethephon just prior to bloom has previously been shown to be ineffective (Coates, William W. 1991. “The Performance of Ethephon as a Staminate Bloom Removal Agent on English Walnuts” Walnut Research Reports - 1991, pp 63-64).

The objective of this project is to document the value of post-harvest applications of ethephon for the removal of catkins which has been observed by at least one grower as well as by Rhone-Poulenc Ag Company (see California label for Ethrel). Fall applications of ethephon, if effective, would provide another tool for reducing pollen load particularly where tree shaking in the spring is impossible due to excessively wet, fine-textured soils or other considerations.
PROCEDURES

The following treatments were applied to a mature ‘Serr’ walnut orchard northeast of Hollister by dilute handgun sprays on November 20, 1995. Each treatment was replicated four times utilizing single tree replicates.

1. Check - no spray

2. Ethephon 600 ppm (9 pints Ethrel/450 gal water/acre @ 6 gal spray/tree)

3. Ethephon 1800 ppm (27 pints Ethrel/450 gal water/acre @ 6 gal spray/tree)

Visual observations for leaf fall were made in early December and for catkin drop in January and February. In March, just prior to pollen-shedding, the average number of catkins per limb were counted for representative 2 to 3 inch limbs in each quadrant of each test tree. Observations were also recorded concerning leafing date and harvest date. Twenty nut samples from each treatment were weighed and cracked and the nut weight, kernel weight and percent kernel recorded.

RESULTS

The following observations were recorded during the year from treatment on November 20, 1995 until harvest on October 1, 1996.

1. Leaf fall was accelerated in ethephon-treated trees but no other phytotoxicity was noted during the trial.

2. Catkin drop appeared to be primarily in January and February but no observations of catkin drop were made in December or March.

3. The low rate of ethephon (600 ppm) delayed leafing about 4 days compared to the check while the high rate (1800 ppm) delayed leafing about 10 days.

4. The mean number of catkins per limb (2 to 3 inch limbs in each quadrant) were as follows (rated in March):

   (a) Check 104.0 catkins/limb
   (b) 600 ppm ethephon 57.3 catkins/limb
   (c) 1800 ppm ethephon 12.5 catkins/limb

5. There was no apparent effect of any treatment on harvest date (10/1/96).

6. Nut weights, kernel weights and crackout percentages were similar for all treatments (see table 1).
Table 1: Nut Crackout Results - Post-harvest Ethephon Versus Check

<table>
<thead>
<tr>
<th></th>
<th>Mean Nut Weight (g)</th>
<th>Mean Kernel Weight (g)</th>
<th>Percent Kernel</th>
</tr>
</thead>
<tbody>
<tr>
<td>Check - no spray</td>
<td>11.3</td>
<td>6.7</td>
<td>59.6</td>
</tr>
<tr>
<td>Ethephon - 600 ppm</td>
<td>11.4</td>
<td>6.9</td>
<td>60.1</td>
</tr>
<tr>
<td>Ethephon - 1800 ppm</td>
<td>11.5</td>
<td>6.9</td>
<td>60.0</td>
</tr>
</tbody>
</table>

CONCLUSIONS

Ethephon appears to be an effective for the removal of catkins prior to pollen shedding when applied post-harvest in mid-November. A 600 ppm solution of ethephon applied at 6 gallons per tree resulted in a 45 percent reduction in catkin retention in March while an 1800 ppm solution of ethephon resulted in an 88 percent reduction in catkins. There appear to be no significant impacts on harvest date, nut weight or percent kernel. Leaf fall is accelerated following treatment and leafing is delayed in the spring.

These 1996 results should be viewed as very preliminary since this research is based on one year’s data in one location with rates of Ethrel that exceed current label allowances. At an approximate price of $44 per gallon, these Ethrel treatments cost about $49.50 per acre for the 600 ppm rate and $148.50 per acre for the 1800 ppm rate. Costs could possibly be reduced by a reduction in total gallonage applied per acre at the lowest effective concentration combined with the best timing. Ethrel is currently registered at the rate of 3 to 5 pints per acre in 100 to 500 gallons of water. The 600 ppm rate in 250 gallons of water per acre equals the maximum legal rate (5 pints/acre).