REMOVAL OF STAMINATE WALNUT FLOWERS (CATKINS) WITH ETHEPHON

William W. Coates

ABSTRACT

Removal of excess catkins on walnut cultivars subject to pistillate flower abortion may be desirable due to initial research which has shown excess pollen may interfere with pollination. Ethephon has previously been shown by the author to be effective in pistillate flower removal. In this project, ethephon (Ethrel) was applied at three rates (one, two and five pints/100 gal water) and two timings. Results this year indicate that ethephon appears to be ineffective for catkin removal at the rates and timings utilized. Further research should be pursued at other rates and timings.

OBJECTIVES

The removal of staminate walnut flowers (catkins) may prove useful in reducing the pollen load on pistillate walnut flowers of walnut trees suffering from pistillate flower abortion (PFA). Some initial research has tied excessive pollination to reduced walnut fruit set, particularly with cultivars subject to PFA such as 'Serr'.

It was previously shown by the author and Dr. George Martin that ethephon (Ethrel) sprays could effectively reduce or eliminate the pistillate bloom of walnuts when applied at full bloom or shortly thereafter. Rates utilized were 2 to 4 pints of Ethrel/100 gal water for complete removal and 1/2 to 1 pint of Ethrel/100 gal water for partial removal.

The purpose of this project was to test catkin removal efficacy utilizing ethephon sprays applied before pollen shedding occurred.

PROCEDURES

Two rates of ethephon (Ethrel) were chosen (1 and 2 pints/100 gal water) to be applied at two different spray timings. If these were phytotoxic, then the second spray date would include a lower rate; and if catkin removal was poor, the second spray date would include a higher rate. The latter situation was the actual case and 5 pints/100 gal was used instead of 1 pint/100 gal at the second timing. Ten trees of each rate, plus a check, were sprayed one time in a randomized block design, and an adjacent block was sprayed at a second timing.

Approximately 6 gallons of spray material were applied per tree (450 gal/acre) at 225-250 psi by handgun sprayer. The trees chosen were 'Serr' cultivar grafted onto Northern California black walnut seedlings in 1981 and 1982. This is a very vigorous orchard (Nello Zanella - grower) north of Hollister on class I Sorrento series soil not previously utilized for tree crops. Yield of 'Serr' has been relatively low considering the size of the trees compared to neighboring cultivars in this cultivar evaluation block.
RESULTS:

Sprayed 3/23/90

A = Check
B = 1 pt Ethrel/100 gal
C = 2 pt Ethrel/100 gal

Catkins expanding - mean length 20.24mm (50 catkins).
None releasing pollen.
Terminal buds breaking - some up to one inch long.

Sprayed 3/29/90

D = Check
E = 2 pt Ethrel/100 gal
F = 5 pt Ethrel/100 gal

Catkins expanding - mean length 50.96mm (50 catkins).
None releasing pollen.
Terminal buds up to 2-3 inches long, some leafed out.

Utilizing a scale of 1 = no catkin removal and 10 = complete catkin removal, the blocks were rated on 4/4/90 (50% of catkins shedding pollen, 1-2% pistillate bloom) and on 4/11/90 (most catkins near end of pollen shedding, 50% pistillate bloom).

<table>
<thead>
<tr>
<th></th>
<th>4/4/90</th>
<th>4/11/90</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>1.2</td>
<td>8.4</td>
</tr>
<tr>
<td>B</td>
<td>1.4</td>
<td>8.4</td>
</tr>
<tr>
<td>C</td>
<td>1.7</td>
<td>8.5</td>
</tr>
<tr>
<td>D</td>
<td>1.2</td>
<td>7.4</td>
</tr>
<tr>
<td>E</td>
<td>1.3</td>
<td>7.0</td>
</tr>
<tr>
<td>F</td>
<td>1.9</td>
<td>7.4</td>
</tr>
</tbody>
</table>

As can be observed above, little catkin removal in excess of the check was noted when either the rate or spray timing was varied. The catkins at the 4/4/90 evaluation seemed to be more loosely attached at the 5 pint rate but no difference was noted on 4/11/90. Leafing and fruit set did not vary significantly between treatments.

CONCLUSIONS

Initial testing of ethephon (Ethrel) sprays as a staminate flower (catkin) removal agent on walnuts indicated little efficacy when these sprays were applied before pollen shedding. Rates of 1, 2 or 5 pints of Ethrel per 100 gallons of water applied at 6 gallons of spray material per tree were ineffective at two timings during catkin elongation.

Questions remaining to be answered would be the effect of even higher rates (which may prove to be phytotoxic) or of later timings (which may lead to the undesirable removal of pistillate flowers). The Ethrel utilized was from an unopened container that had been in storage for 3 years. (The effect of the new material should also be investigated.) A combination of spraying combined with either shaking or blowing (from a handgun or speed sprayer) should also be investigated.