LETTUCE (HEAD): *Lactuca sativa* L. var. *capitata* L., ‘Synergene 352’

WESTERN FLOWER THRIPS CONTROL WITH TORAC ON HEAD LETTUCE, 2011

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Western flower thrips (WFT): *Frankliniella occidentalis* (Pergande)

The objective of the trial was to evaluate the efficacy of the new insecticide Torac (tolifenpyrad) when applied alone and in a mixture with an industry standard for control of western flower thrips on spring head lettuce under desert growing conditions. Head lettuce was direct seeded on 7 Jan, 2011 at the Yuma Valley Agricultural Center, Yuma, AZ into double row beds on 42 inch centers. Stand establishment was achieved using overhead sprinkler irrigation, and irrigated with furrow irrigation thereafter. Plots were two beds wide by 35 ft long and bordered by two untreated beds. Four replications of each treatment were arranged in a RCB design. Formulations and rates for each compound are provided in the tables. Foliar sprays were applied on 6 and 20 Mar with a CO₂ operated boom sprayer that delivered a broadcast application at 40 psi and 21.5 gpa through 2 TXVS-18 ConeJet nozzles per bed. An adjuvant, Dyne-Amic (Helena Chemical Co.), was applied at 0.25% vol/vol to all treatments. Numbers of WFT from 5 plants per replicate were recorded at various sample dates following each application (DAT). Relative WFT numbers were measured by removing plants and beating them vigorously against a screened pan (12 inch x 7 inch x 2 inch) for a predetermined time (10 s). A 6 inch by 6 inch sticky card was placed inside of the pan to catch the dislodged WFT. Sticky cards were then taken to the laboratory where adult and larvae were counted. Data were subjected to ANOVA and means were separated using $F$-protected LSD ($P \leq 0.05$).

WFT population levels were moderate during this trial. Following the first application, adult WFT numbers did not differ between the Torac+Lannate and Torac alone treatments (Table 1). However, by 3 DAT2 the Torac+Lannate treatment provided significantly better control than the Torac alone. None of the spray treatments in this trial provided residual control of WFT adults beyond 5 - 6 days following application. When averaged across all sample dates, WFT adult numbers in the Torac-only treatment did not differ from Lannate, Warrior or the Torac+Lannate treatments, but were significantly higher than the Radiant and Lannate+Warrior standards. The Torac+Lannate treatment provided more consistent control of WFT larvae relative to the Torac treatment applied alone (Table 2). When averaged across all sprays and sample dates, the Torac-alone treatment had significantly higher WFT larvae numbers than all other treatments except the Warrior II treatment. As a stand-alone treatment Torac provides significant activity against adult WFT comparable to the pyrethroid. However, when used in combination with Lannate, Torac provided enhanced control of WFT larvae comparable to the standard Lannate+Warrior II mixture presently used by desert lettuce growers. No phytotoxicity symptoms were observed following any of the insecticide treatments. This research was supported by industry gift(s) of pesticide and/or research funding.

<table>
<thead>
<tr>
<th>Treatment/ formulation</th>
<th>Rate/ acre</th>
<th>2-DAT1</th>
<th>5-DAT1</th>
<th>9-DAT1</th>
<th>3-DAT2</th>
<th>6-DAT2</th>
<th>10-DAT2</th>
<th>Avg</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lannate SP</td>
<td>0.75 lb + 1.9 oz</td>
<td>1.5b</td>
<td>3.4c</td>
<td>15.6a</td>
<td>9.1c</td>
<td>18.1cd</td>
<td>27.1a</td>
<td>12.5cd</td>
</tr>
<tr>
<td>+ Warrior II</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lannate SP</td>
<td>0.75 lb + 21 oz</td>
<td>1.0b</td>
<td>2.7c</td>
<td>16.1a</td>
<td>11.8c</td>
<td>23.3bc</td>
<td>42.2a</td>
<td>16.2b</td>
</tr>
<tr>
<td>+ Torac 15EC</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lannate SP</td>
<td>0.75 oz</td>
<td>1.5b</td>
<td>5.1bc</td>
<td>21.0a</td>
<td>9.7c</td>
<td>20.7bcd</td>
<td>30.7a</td>
<td>14.7bc</td>
</tr>
<tr>
<td>Warrior II</td>
<td>1.9 oz</td>
<td>2.3b</td>
<td>7.0ab</td>
<td>16.9a</td>
<td>12.9c</td>
<td>24.0b</td>
<td>26.9a</td>
<td>15.0b</td>
</tr>
<tr>
<td>Torac 15EC</td>
<td>21 oz</td>
<td>2.6b</td>
<td>4.2bc</td>
<td>18.0a</td>
<td>18.4b</td>
<td>24.5b</td>
<td>32.3a</td>
<td>16.6b</td>
</tr>
<tr>
<td>Radiant SC</td>
<td>7 oz</td>
<td>1.0b</td>
<td>3.9c</td>
<td>14.9a</td>
<td>11.9c</td>
<td>15.6d</td>
<td>22.9a</td>
<td>11.7d</td>
</tr>
<tr>
<td>Untreated</td>
<td>-</td>
<td>6.6b</td>
<td>9.7a</td>
<td>15.5a</td>
<td>26.9a</td>
<td>32.4a</td>
<td>31.3a</td>
<td>20.4a</td>
</tr>
</tbody>
</table>

Means in a column followed by the same letter are not significantly different ($P > 0.05$, $F$-protected LSD).
Table 2.

<table>
<thead>
<tr>
<th>Treatment formulation</th>
<th>Rate/acre</th>
<th>2-DAT1</th>
<th>5-DAT1</th>
<th>9-DAT1</th>
<th>3-DAT2</th>
<th>6-DAT2</th>
<th>10-DAT2</th>
<th>Avg</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lannate SP + Warrior II</td>
<td>0.75 lb + 1.9 oz</td>
<td>9.5d</td>
<td>22.9c</td>
<td>26.5bc</td>
<td>5.9c</td>
<td>9.1d</td>
<td>34.4cd</td>
<td>18.0d</td>
</tr>
<tr>
<td>Lannate SP + Torac 15EC</td>
<td>0.75 lb + 21 oz</td>
<td>11.6cd</td>
<td>20.5c</td>
<td>19.8cd</td>
<td>4.5c</td>
<td>7.5d</td>
<td>23.8de</td>
<td>14.6d</td>
</tr>
<tr>
<td>Lannate SP</td>
<td>0.75 oz</td>
<td>14.5bcd</td>
<td>21.4c</td>
<td>18.4cd</td>
<td>7.1c</td>
<td>13.2d</td>
<td>41.4bcd</td>
<td>19.3d</td>
</tr>
<tr>
<td>Warrior II</td>
<td>1.9 oz</td>
<td>20.5b</td>
<td>36.9b</td>
<td>38.0b</td>
<td>32.3b</td>
<td>53.5b</td>
<td>58.8ab</td>
<td>39.9b</td>
</tr>
<tr>
<td>Torac 15EC</td>
<td>21 oz</td>
<td>17.6bc</td>
<td>28.3bc</td>
<td>22.0c</td>
<td>17.6c</td>
<td>27.3c</td>
<td>43.9bc</td>
<td>26.1c</td>
</tr>
<tr>
<td>Radiant SC</td>
<td>7 oz</td>
<td>10.5d</td>
<td>9.1d</td>
<td>8.2d</td>
<td>4.3c</td>
<td>4.4d</td>
<td>6.5e</td>
<td>7.2e</td>
</tr>
<tr>
<td>Untreated</td>
<td>-</td>
<td>34.9a</td>
<td>46.9a</td>
<td>51.1a</td>
<td>79.4a</td>
<td>73.0a</td>
<td>73.1a</td>
<td>59.7a</td>
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</tbody>
</table>

F value  | 17.12  | 17.05  | 10.43  | 37.28  | 79.71  | 12.24  | 68.34  |
Pr>F      | <.0001 | <.0001 | <.0001 | <.0001 | <.0001 | <.0001 | <.0001 |

Means in a column followed by the same letter are not significantly different (P > 0.05, F-protected LSD).