Evaluation of Voliam Flexi, Beleaf, and Cyclaniliprole to Control Asian Citrus Psyllid and Citrus Leafminer on Oranges, Summer 2014*

Philip A. Stansly,¹ Jawwad A. Qureshi, and Barry C. Kostyk

University of Florida/IFAS, Southwest Florida Res. and Ed. Center, 2685 State Rd. 29 North, Immokalee, FL 34142-9515, Phone: (239) 658-3427, Fax: (239) 658-3469 (pstansly@ufl.edu; jawwadq@ufl.edu; bkostyk@ufl.edu) and ¹Corresponding author, email: pstansly@ufl.edu

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Orange | Citrus sinensis
Asian citrus psyllid | Diaphorina citri

Thiamethoxam; Chlorantraniliprole; 4H-1,3,5-Oxadiazin-4-imine, 3-[(2-chloro-5-thiazolyl)methyl]tetrahydro-5-methyl-N-nitro-; 3-bromo-N-[2-chloro-4-methyl-6-[(methylamino)carbonyl]phenyl]-1-(3-chloro-2-pyridinyl)-1H-pyrazole-5-carboxamide; Cyclaniliprole; 3-bromo-N-[2-bromo-4-chloro-6-[(1-cyclopropylethyl)amino]carbonyl]phenyl]-1-(3-chloro-2-pyridinyl)-1H-pyrazole-5-carboxamide; Flonicamid; N-(cyanomethyl)-4-(trifluoromethyl)-3-pyridinecarboxamide; Petroleum Oil; Refined petroleum distillate

ACP is the key pest of Florida citrus due to its role as vector of greening disease or “huanglongbing.” Feeding damage from CLM larvae facilitates spread of citrus canker caused by Xanthomonas axonopodis pv. citri. Both pests cause considerable damage to young flush in their own rights. Therefore, effective insecticides to control both pests are needed. The experimental block at Southwest Florida Research and Education Center Immokalee, Florida consisted of 6-yr-old sweet orange “Valencia” and “Hamlin” orange trees planted at a density of 132 trees per acre. Seven treatments and an untreated check were randomly distributed in an RCBD with four replicates in five-tree plots over four rows with several untreated buffer rows between treated rows. Treatments were applied on 2 June to both sides of the trees. Applications were made using Durand Wayland AF100-32 air blast speed sprayer operating at 1.9 mph and 350 psi equipped with four John Bean ceramic nozzles no. 4, 4, 4, and 2.5 with three, two, one, and one whirl plates, respectively, delivering 100 gpa. Ten randomly selected shoots per plot were collected and examined under a stereo-microscope in the laboratory to count ACP nymphs and three fully expanded leaves on each shoot were examined to count CLM larvae. Density of ACP adults was assessed using a stem tap sampling method whereby a randomly chosen branch was struck three times with a short length of PVC pipe and individuals falling on a white clipboard placed underneath were counted. Four tap samples, one on each side of the canopy, were conducted per tree on three central trees per plot. Data were subjected to analysis of variance and means separated using LSD (P = 0.05).

Significant number of dead ACP nymphs compared with untreated check were observed in treatments of Voliam Flexi 7 oz, Beleaf 2.28 oz, Cyclaniliprole 13.7 fl oz + Beleaf 1.91 oz and Cyclaniliprole 22 fl oz at 3 DAT and Voliam Flexi, or Beleaf 2.85 oz at 7 DAT (Table 1). Live nymphs were reduced significantly with all treatments through 14 DAT except Beleaf 2.85 oz at 7 DAT. Only Voliam Flexi provided significant reduction in nymphs at 21 DAT. Adult ACP reduction compared to the untreated check was significant for all treatments at 3, 14, and 28 DAT except Beleaf 50 SG (2.85 oz/ac), Cyclaniliprole 13.7 fl oz + Beleaf 1.91 oz, and Cyclaniliprole 22 fl oz/ac at 3 DAT and the two latter treatments at 28 DAT (Table 2). No treatments were significant at 14 DAT and 35 DAT, and only Voliam Flexi and Beleaf 2.85 oz + 435 oil were effective at 21 DAT. All treatments provided significant reduction in CLM larvae through 21 DAT except Beleaf alone after 3 DAT and with 435 oil after 7 DAT (Table 1). No phytotoxicity was observed.

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### Table 1

<table>
<thead>
<tr>
<th>Treatment/formulation</th>
<th>Rate form/acre</th>
<th>Dead ACP nymphs No. per shoot</th>
<th>Live ACP nymphs No. per shoot</th>
<th>CLM larvae No. per shoot</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>3 DAT</td>
<td>7 DAT</td>
<td>14 DAT</td>
</tr>
<tr>
<td>Untreated check</td>
<td></td>
<td>1.05c</td>
<td>0.05c</td>
<td>5.00a</td>
</tr>
<tr>
<td>Voliam Flexi 7 oz</td>
<td>4.63ab 1.40a</td>
<td>0.03c</td>
<td>0.15d</td>
<td>0.03c</td>
</tr>
<tr>
<td>Beleaf 50 SG 2.28 oz</td>
<td>5.65a 0.68b</td>
<td>1.33bc</td>
<td>2.75cd</td>
<td>6.48h</td>
</tr>
<tr>
<td>Beleaf 50 SG 2.85 oz</td>
<td>3.60abc 0.35bc</td>
<td>2.43b</td>
<td>7.10ab</td>
<td>3.68bc</td>
</tr>
<tr>
<td>Beleaf 50 SG + 435 oil</td>
<td>1.23c 0.08c</td>
<td>0.30c</td>
<td>1.83bc</td>
<td>2.68bc</td>
</tr>
<tr>
<td>Cyclaniliprole 50 SL 13.7 oz</td>
<td>5.52a 0.48bc</td>
<td>1.05bc</td>
<td>1.23d</td>
<td>1.73c</td>
</tr>
<tr>
<td>Beleaf 50 SG 1.91 oz</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cyclaniliprole 50 SL 16.4 oz</td>
<td>2.53c 0.00c</td>
<td>0.45bc</td>
<td>0.55d</td>
<td>3.23bc</td>
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<tr>
<td>Cyclaniliprole 50 SL 22 oz</td>
<td>4.33abc 0.10c</td>
<td>1.20bc</td>
<td>4.90bc</td>
<td>2.25c</td>
</tr>
</tbody>
</table>

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

### Table 2

<table>
<thead>
<tr>
<th>Treatment/formulation</th>
<th>Rate form/acre</th>
<th>ACP adults No. per tap sample</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>3 DAT</td>
</tr>
<tr>
<td>Untreated check</td>
<td></td>
<td>0.45a</td>
</tr>
<tr>
<td>Voliam Flexi 7 oz</td>
<td>0.10b</td>
<td>0.00b</td>
</tr>
<tr>
<td>Beleaf 50 SG 2.28 oz</td>
<td>0.08b</td>
<td>0.04b</td>
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<tr>
<td>Beleaf 50 SG 2.85 oz</td>
<td>0.28ab 0.39ab</td>
<td>0.17b</td>
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<tr>
<td>Beleaf 50 SG + 435 oil</td>
<td>0.06b</td>
<td>0.06b</td>
</tr>
<tr>
<td>Cyclaniliprole 50 SL + Beleaf 50 SG 13.7 oz + 1.91 oz</td>
<td>0.28ab</td>
<td>0.14ab</td>
</tr>
<tr>
<td>Cyclaniliprole 50 SL 16.4 oz</td>
<td>0.10b</td>
<td>0.06b</td>
</tr>
<tr>
<td>Cyclaniliprole 50 SL 22 oz</td>
<td>0.25ab 0.67a</td>
<td>0.13b</td>
</tr>
</tbody>
</table>

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