New products by Nichino
Product Composition

- **Active ingredient:** Tolfenpyrad
- **New Chemistry**
- **Label Brands**
  - Torac 15EC
    - Use rates 14-21 fl oz
  - Bexar 15SC.
    - Use rates 21-27 fl oz
- **EPA Registered**
- **California Registration Pending**
  - Expected September 2014
Current Registered Crops

**Current Registered Crops**

**Bexar 15SC**
- Grape
- Citrus
- Tree Nuts
- Stone Fruit
- Persimmon
- Pomegranates

**Torac 15EC**
- Leafy Vegetables:
  - Lettuce, Celery, Spinach
  - Potatoes
  - Cotton

**Second Tier Crops:**
- Fruiting Vegetables
- Cucurbits
- Brassicas
- Strawberries
- Blueberries
- Onions
Chemistry: General Properties

- **Broad Spectrum Contact Insecticide**
  - Non systemic or translaminar
  - Adjuvant/spreader recommended

- **Residual efficacy:** Varies by pest (5-7 days)

- **Speed of activity:** Fast acting
  - Faster when warmer

- **Crop Safety**
  - No phytotoxicity on all labeled crops.

- **Non-selective Chemistry**
  - Toxic to most beneficial insects 7-14 days
  - Toxic to Bees by direct contact.
    - Follow Bee language on label
- **Torac is an Insecticide and Fungicide**
- **IRAC Group 21A and FRAC Group 31**
- **Mitochondrial Electron Transport Inhibitor**
- **Disrupts Cell Respiration**
- **IRM**
  - New mode of action for target insect pests
  - No cross resistance outside Group 21 A.
## Key Target Pests

<table>
<thead>
<tr>
<th>Leafy Vegetables</th>
<th>Citrus</th>
<th>Tree Nuts</th>
<th>Potatoes</th>
<th>Grape</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thrips</td>
<td>Citrus thrips</td>
<td>Aphids</td>
<td>Colorado Potato beetle</td>
<td>Mealybug</td>
</tr>
<tr>
<td>Aphids</td>
<td>Citricola Scale</td>
<td>Leaf footed plant bug</td>
<td>Potato Psyllid</td>
<td>Leafhoppers</td>
</tr>
<tr>
<td>Flea beetles</td>
<td>ACP</td>
<td>Leaf rollers</td>
<td>Aphids</td>
<td>Leafrollers</td>
</tr>
<tr>
<td>Leps (Suppression)</td>
<td>Aphids</td>
<td>Lygus</td>
<td>Thrips</td>
<td></td>
</tr>
<tr>
<td>Whitefly (Suppression)</td>
<td>Mites</td>
<td>Mealybug</td>
<td>Leafhoppers</td>
<td></td>
</tr>
<tr>
<td>Powder Mildew</td>
<td>Katydid</td>
<td>Leaf hoppers</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- Thrips
- Citrus thrips
- Aphids
- Colorado Potato beetle
- Mealybug
- Leaf footed plant bug
- Potato Psyllid
- Leafhoppers
- Flea beetles
- ACP
- Leaf rollers
- Aphids
- Leafrollers
- Leps (Suppression)
- Aphids
- Lygus
- Thrips
- Whitefly (Suppression)
- Mites
- Mealybug
- Leafhoppers
- Powder Mildew
- Katydid
- Leaf hoppers
Torac Efficacy Trials

- **Trial Locations**
  - Yuma, AZ
  - Holtville, CA
  - Lompoc, CA
  - Salinas, CA

- **Small Plot Replicated Trials**
  - 2-4 beds X 30-50 ft long
  - 4 Replicates
  - CO2 Backpack/Tractor Applied
  - Spray volume: 20-50 GPA
  - Spreader
Comparative Efficacy – Lettuce

*Western flower thrips*
Yuma Ag Center, Spring 2010-2011

- 3 Trials
- 8 applications

% Control

- Lannate + Warrior II
- Lannate + Torac
- Lannate
- Warrior II
- Torac

NICHINO AMERICA
Comparative Efficacy – Lettuce

Western flower thrips
Yuma Ag Center, Spring 2010-2011

• 3 Trials
• 8 applications
Comparative Efficacy – Tank Mixtures in Lettuce

*Western flower thrips*

Yuma Ag Center, Spring 2013

- 2 spray applications
- 14 d spray interval
- 3, 7 & 11 & 14 DAA
# Efficacy Comparison Between Available Chemistry

John Palumbo, UA 20014

## Thrips Management in Desert Leafy Vegetables - 2014

### Relative Efficacy Index For Western Flower Thrips

<table>
<thead>
<tr>
<th>Product</th>
<th>IRAC MOA</th>
<th>Adult</th>
<th>Larvae</th>
<th>Comments*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lannate</td>
<td>1A</td>
<td>•••</td>
<td>•••</td>
<td>Tank mix with pyrethroid for best thrips control; PHI: 10 d on lettuce; 7 d spinach</td>
</tr>
<tr>
<td>Acephate</td>
<td>1B</td>
<td>•••</td>
<td>•••</td>
<td>Tank mix with pyrethroid for best thrips control PHI: 14-21 d on head lettuce, has aphid activity</td>
</tr>
<tr>
<td>Dimethoate</td>
<td>1B</td>
<td>•</td>
<td>•</td>
<td>Tank mix with another product for enhanced thrips and aphid activity; PHI: 14 d on leaf lettuce</td>
</tr>
<tr>
<td>Pyrethroids</td>
<td>3</td>
<td>•</td>
<td>•</td>
<td>Tank mix with Lannate or Orthene for best performance; use high labeled rates; PHI: varies with products</td>
</tr>
<tr>
<td>Assail</td>
<td>4A</td>
<td>•</td>
<td>•</td>
<td>May provide thrips suppression when sprays are targeted for aphids. Use at high rates (4 oz for Assail 30SG); PHI: 7 d on leafy vegetables.</td>
</tr>
<tr>
<td>Radiant/Success</td>
<td>5</td>
<td>•••</td>
<td>•••</td>
<td>Stand alone worm, leafminer, and thrips control; Use of pyrethroid can improve adult thrips activity, PHI: 1 day on leafy vegetables</td>
</tr>
<tr>
<td>Agri-Mek</td>
<td>6</td>
<td>•</td>
<td>•</td>
<td>Use a penetrating adjuvant; use 12 oz or higher for thrips activity; performs better when tank-mixed with a pyrethroid; PHI: 7 days on leafy vegetables.</td>
</tr>
<tr>
<td>Beleaf</td>
<td>9</td>
<td>•</td>
<td>•</td>
<td>May provide thrips larvae suppression when sprays are targeted for aphids. Use at higher rates; PHI: 0 d on leafy vegetables</td>
</tr>
<tr>
<td>Torac</td>
<td>21A</td>
<td>•••</td>
<td>•••</td>
<td>Not as efficacious as Radiant or Lannate, but significantly better than other alterantives. For best results, tank mix with Lannate or Radiant; PHI: 3 d on lettuce</td>
</tr>
<tr>
<td>Movento</td>
<td>23</td>
<td>•</td>
<td>•</td>
<td>May provide thrips larvae suppression when sprays are targeted at aphids; use a penetrating adjuvant at 0.25%/v or ; PHI: 3 d for leafy vegetables</td>
</tr>
</tbody>
</table>

### Efficacy Index
- ••• Good residual control
- •• Marginal residual control
- • Poor control

*Always consult the label before applying any of these products on leafy vegetables or cole crops.*
## Post Treatment Average Trips per Plant

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Rate</th>
<th>Adult</th>
<th>Larvae</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lannate</td>
<td>0.75 lb</td>
<td>50.2 a</td>
<td>67.3 c</td>
<td>117.5 cd</td>
</tr>
<tr>
<td>Warrior</td>
<td>1.9 oz</td>
<td>49.2 a</td>
<td>131.3 b</td>
<td>180.5 b</td>
</tr>
<tr>
<td>Lannate + Warrior</td>
<td>0.75 lb + 1.9</td>
<td>45.6 a</td>
<td>48.7 cd</td>
<td>94.3 de</td>
</tr>
<tr>
<td>Torac 15EC</td>
<td>21 oz</td>
<td>56.3 a</td>
<td>70.2 c</td>
<td>126.5 c</td>
</tr>
<tr>
<td>Lannate + Torac 15EC</td>
<td>0.75 lb + 21 oz</td>
<td>41.1 a</td>
<td>35.0 d</td>
<td>76.10 e</td>
</tr>
<tr>
<td>UTC</td>
<td></td>
<td>59.6 a</td>
<td>249.9 a</td>
<td>309.5 a</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Adult</th>
<th>Larvae</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>F value</strong></td>
<td>2.21</td>
<td>63.2</td>
<td>66.8</td>
</tr>
<tr>
<td><strong>Pr &gt; F</strong></td>
<td>0.11</td>
<td>&lt;.0001</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td><strong>LSD</strong></td>
<td>13.8</td>
<td>30.5</td>
<td>31.6</td>
</tr>
</tbody>
</table>

Two applications 8 days apart  
Spray volume: 21 GPA  
NIS 0.25% v/v
Post Treatment Mean Thrips per Plant and Percent Scarring at Harvest

4 applications at 10 day interval
Plots 6X30 ft X 4 reps
Backpack sprayer
30 GPA
LSD P=0.05
Torac Efficacy on Western Flower Thrips In Lettuce

John Palumbo, Yuma, AZ 013
Post Treatment Average Thrips/Plant

- Radiant
- Lannate Sp 0.75 oz + Warrior II 1.9 oz
- Torac 21 fl oz
- Untreated

Two applications 10 day interval
Spray volume: 20 GPA
NIS 0.25% v/v
Pre-application Counts 7.3 thrips/plant
Torac Tank-Mix Efficacy on Western Flower Thrips In Lettuce
Yuma, AZ 2013

John Palumbo, UA
Post Treatment Average Thrips/Plant

Three applications 13 day interval
Spray volume: 20 GPA
NIS 0.25% v/v
Pre-application Counts 6.5 thrips/plant
Torac Efficacy on Western Flower Thrips in Lettuce Post Treatment Average Thrips/Plant Salinas, CA 2012

Three applications at 7 day interval
Spray volume: 45 GPA
NIS 0.25% v/v
Pre-application Counts: 1-1.5 thrips/plant
Surendra Dara UCCE, 2012
Post Treatment Average Thrips/Plant

Three applications 8-12 day interval
Spray volume: 50 GPA
NIS 0.25% v/v
Pre-application counts: 6 thrips total/plant
Torac Rotation Program Efficacy on Western Flower Thrips in Lettuce

Eric Natwick UCCE Holtville, CA 2013
Post Treatment Average Thrips/Plant

4 applications at 10 day interval
Spray volume: 53 GPA
NIS 0.25% v/v
Pre-application counts: 281 thrips/plant
Torac Rotation Program Efficacy on Western Flower Thrips in Head Lettuce

Eric Natwick UCCE Holtville, CA 2013
Post Treatment Average Thrips/Plant

Three applications at 11 day interval
Spray volume: 53 GPA
NIS 0.25% v/v
Pre application counts 106 thrips/plant
Torac 15EC Efficacy on Green Peach Aphid in Head Lettuce
San Luis Obispo, CA 2010

Post treatment Average Aphids per Plant

Applications: Total of 4 spaced at 8-11 day interval
Spray volume: 50 GPA
Timing: November-December
LSD P= 0.05
Torac Aphid Control in Head Lettuce
Yuma, AZ
John Palumbo 2012

Post Treatment Average Aphids per Plant

- **Untreated**
- **Closer 2.85 oz**
- **Closer 2.14 oz**
- **Closer 1.43 oz**
- **Assail 4 oz**
- **Movento 5 oz**
- **Torac 15 EC 21 fl oz**

Two applications 18 days apart
Spray volume 20 GPA
**Torac Efficacy on Downy Mildew: *Bremia lactucae* in Lettuce**  
Yuma, AZ  
Michael Matheron UA 2011

<table>
<thead>
<tr>
<th>Insecticide</th>
<th>Average number plants with Downy mildew lesions per plot</th>
</tr>
</thead>
<tbody>
<tr>
<td>Forum 6 fl oz</td>
<td>1.2</td>
</tr>
<tr>
<td>Presidio 4 fl oz</td>
<td>1.4</td>
</tr>
<tr>
<td>Quadris 2.08 SC 15.5 fl oz</td>
<td>2.8</td>
</tr>
<tr>
<td>Manzate Pro Stick 2.1 lb</td>
<td>3.4</td>
</tr>
<tr>
<td>Torac 21 fl oz</td>
<td>4.4 b</td>
</tr>
<tr>
<td>UTC</td>
<td>8 a</td>
</tr>
</tbody>
</table>

*LSD (Least Significant Difference, *P*=0.05)*

4 applications 10-14 day interval  
GPA 50  
Plot: 2 beds 25 ft X 4 reps  
Tractor mounted sprayer
**Torac Efficacy on Powdery Mildew: *Erysiphe cichoracearum* in Head Lettuce**

Yuma, AZ  
Michael Matheron UA 2011

<table>
<thead>
<tr>
<th>Product</th>
<th>Mean Value Disease Rating Per Plot</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quintec 5 fl oz</td>
<td>0.8 b</td>
</tr>
<tr>
<td>Rally 5 oz</td>
<td>1.0 b</td>
</tr>
<tr>
<td>Torac 21 fl oz</td>
<td>1.2 b</td>
</tr>
<tr>
<td>UTC</td>
<td>3.2 a</td>
</tr>
</tbody>
</table>

LSD (Least Significant Difference, \(P=0.05\))

**Disease Rating Scale**

<table>
<thead>
<tr>
<th>Rating</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>No powdery mildew colonies present on plant.</td>
</tr>
<tr>
<td>1</td>
<td>Powdery mildew present on bottom leaves.</td>
</tr>
<tr>
<td>2</td>
<td>Powdery mildew present on bottom leaves and lower wrapper leaves.</td>
</tr>
<tr>
<td>3</td>
<td>Powdery mildew present on bottom leaves and all wrapper leaves.</td>
</tr>
<tr>
<td>4</td>
<td>Powdery mildew present on bottom leaves, wrapper leaves, and cap leaf.</td>
</tr>
<tr>
<td>5</td>
<td>Powdery mildew present on entire head.</td>
</tr>
</tbody>
</table>

4 applications 10-14 day interval  
GPA 50  
Plot: 2 beds 25 ft X 4 reps  
Tractor mounted sprayer
Summary

- Torac and Bexar are new Nichino products
- EPA Registered in February 2014
  - California registration pending
- Broad spectrum contact insecticides
- Show good- Excellent efficacy on target pests
- Offer new mode of action for most target pests
- Excellent rotational products
THANK YOU