2016 Southern Consultants Meeting
DuPont™ Dermacor® X-100 Seed Treatment

Stephen H. (Steve) Crawford

February 25, 2016
Scope of Discussion

• Arkansas Rice Insecticide Seed Treatment (IST) Research

• LSU Rice IST Research

• Potential for Combination IST in Hybrid Rice
A Brief Review of Rice Insecticide Seed Treatment Research in AR

• Primary Research Leader: Dr Gus Lorenz, University of AR

• Trial Summaries from 2007 – 2011, 2008 – 2015, and 2015, only

• Research on conventional and Clearfield varieties, at seeding rates of 65 lb/A and above
Rice Insect Seed Treatment’s vs. UTC (2008-2015)
201 Observations

Average Stand Increase of 14.5%

% Stand Increase Above UTC

Dr. Gus Lorenz, University of Arkansas
Rice insecticide Seed Treatment vs. UTC
2008-2015

Chance of Yield Increase: 80%
Mean Yield Increase: 8.33 bu/acre

Dr. Gus Lorenz, University of Arkansas
(2007-2011) Summary of Yield Increase Above or Below UTC When Using Dermacor® X-100

Avg = 6 bu/ac. Above UTC 70% of the time

Dermacor® provides superior weevil control

Gus Lorenz, Univ. of Arkansas
(2007-2011) Summary of Yield Increase Above or Below UTC When Using Cruiser Insecticide Seed Treatment

Avg = 5 bu above UTC
Above UTC 71% of the

Weevil control is inferior but yield benefits are similar

Dr. Gus Lorenz, Univ. of Arkansas
(2007-2011) Summary of Yield Increase Above or Below UTC When Using NipsIt Insecticide Seed Treatment

Avg = 4 bu/ac above UTC
Above UTC 67% of the time.

Dr. Gus Lorenz, Univ. of Arkansas
Seed Treatment x Planting Date, 2015

<table>
<thead>
<tr>
<th>Date</th>
<th>Fungicide</th>
<th>CruiserMaxx Rice</th>
<th>NipsIt INSIDE</th>
<th>Dermacor X-100</th>
</tr>
</thead>
<tbody>
<tr>
<td>3-Apr</td>
<td>b</td>
<td>b</td>
<td>b</td>
<td>a</td>
</tr>
<tr>
<td>21-Apr</td>
<td>b</td>
<td>ab</td>
<td>b</td>
<td>a</td>
</tr>
<tr>
<td>5-May</td>
<td>a</td>
<td>a</td>
<td>a</td>
<td>a</td>
</tr>
</tbody>
</table>

Dr. Gus Lorenz, University of Arkansas
Seed Treatment x Planting Date, 2015

Rice Water Weevils /3 cores

3-Apr 21-Apr 5-May 19-May 3-Jun 16-Jun

- Fungicide
- CruiserMaxx Rice
- NipsIt INSIDE
- Dermacor X-100

Dr. Gus Lorenz, University of Arkansas
Seed Treatment x Planting Date, 2015

Yield bu/acre

- 3-Apr
- 21-Apr
- 5-May
- 19-May
- 3-Jun
- 16-Jun

Fungicide 
CruiserMaxx Rice
NipsIt INSIDE
Dermacor X-100

Dr. Gus Lorenz, University of Arkansas
Let’s Shift Focus to Hybrid Rice

- Seeding rates of 21 – 23 lb/A vs. 65 – 100 for Clearfield and conventional varieties
- Seed treatments that do not vary treatment rate with seeding rate deliver lower ai/A rates of application (neonicotinoids)
- Seed treatments that do vary seed treatment rate with seeding rate provide a more uniform ai/A rate (Dermacor® X-100)
Why Focus on Hybrid Rice?

• A growing segment of rice production
• High yield potential
• Potential for improved efficacy on target pests with combination treatments, compared to current programs
• Low seeding rate -- with constant neonicotinoid loading rate -- provides economically feasible option for combination treatment
Why Dermacor® X-100 plus Neonicotinoid IST In Hybrid Rice?

- For enhanced control of rice water weevil at typically low hybrid seeding rates, compared to neonicotinoids only
- For control of armyworms and stem borers, which are not controlled by neonicotinoids
- For control of grape colaspsis, chinch bugs, thrips, aphids, and black bug (Nipsit Inside only) controlled by neonicotinoids
Benefits of Insecticide Seed Treatments

Michael Stout, LAES & LCES (interim)
Marty Frey, RA, Rice Research Station

Lina Bernaola
Emily Kraus
Srinivas Lanka
Nathan Mercer
Proportion of untreated rice with weevil infestations that exceeded threshold, 2008-2011

Threshold = 3 larvae per core
Average weevil density = ~11
Each weevil larva causes ~0.7% yield loss
Each larva “costs” ~$5.00 per acre!
Rice Insecticide Seed Treatments and Rates of Application

- **Cruiser** 7.0 oz/cwt (neonicotinoid)
  - 1 loading rate for all seeding rates

- **Nipsit Inside** 1.92 oz/cwt (neonicotinoid)
  - 1 loading rate for all seeding rates

- **Dermacor® X-100** 1.5 - 5.0 oz/cwt (anthranilic diamide)
  - Loading rate increases as seeding rate decreases
  - Maintains Dermacor® X-100 rate and cost/A relatively flat
Spectra of activity with Cruiser/Nipsit and Dermacor® X-100

Dr. Mike Stout, LSU
<table>
<thead>
<tr>
<th></th>
<th>CruiserMaxx</th>
<th>Dermacor® X-100</th>
<th>Nipsit INSIDE</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Active Ingredient</strong></td>
<td>Thiamethoxam</td>
<td>Chlorantraniliprole</td>
<td>Clothianidin</td>
</tr>
<tr>
<td><strong>Class</strong></td>
<td>Neonicotinoid</td>
<td>Anthranilic diamide</td>
<td>Neonicotinoid</td>
</tr>
<tr>
<td><strong>Rate</strong></td>
<td>7.0 fl oz/cwt</td>
<td>1.5 – 5.0 oz/cwt</td>
<td>1.92 fl oz/cwt</td>
</tr>
<tr>
<td><strong>Insects on Label</strong></td>
<td>Rice Water Weevil, Grape Colaspis, Chinch Bugs, Thrips, Aphids</td>
<td>Rice Water Weevil, Mexican Rice Borer, Rice Stalk Borer, Sugarcane Borer, Grape Colaspis 2(ee), Fall, Yellow-striped 2(ee) and True armyworms 2(ee)</td>
<td>Rice Water Weevil, Grape Colaspis, Chinch Bugs, Thrips, Aphids, Black Bug</td>
</tr>
<tr>
<td><strong>Planting Method</strong></td>
<td>Not for use in water-seeded rice production, Do not plant or sow by aerial application</td>
<td>Treated seed may be drilled or broadcast and incorporated into the soil, or broadcast into flooded rice fields 24(c)</td>
<td>Only in dry seeded rice production, cover planted seed thoroughly by soil</td>
</tr>
</tbody>
</table>
Seeding rate effect on seed treatment efficacies

<table>
<thead>
<tr>
<th></th>
<th>% reduction in rice water weevil larvae at seeding rate:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>30 lbs/A</td>
</tr>
<tr>
<td>Cruiser</td>
<td>27.2 %</td>
</tr>
<tr>
<td>Dermacor®</td>
<td>61.7 %</td>
</tr>
</tbody>
</table>

Data and presentation from Dr. Mike Stout, LSU
What about combinations of Dermacor® x-100 + neonicotinoid seed treatments?

- No evidence so far that these will help with weevil management (if Dermacor® is used, weevil control is almost always satisfactory)

- Will increase spectrum of pests controlled
Dermacor® X-100 plus Neonicotinoid Seed Treatment Applications In Hybrid Rice

• Insecticide Seed Treatment (IST) may be applied by certified treaters as on-site mixtures, or

• One IST may be applied by certified treaters as an “over-treatment” to seed previously treated with the other
  – Cruiser or Nipsit Inside –fb– Dermacor® X-100
  – Dermacor® X-100 –fb—Cruiser or Nipsit Inside
DuPont™ Dermacor® X-100 seed treatment
USA-12-874 Dermacor® Mixtures  2012 - 2013

- Dermacor® X-100
- Nipsit Inside
- Dermacor® X-100 + Nipsit
- Cruiser Maxx Rice
- Dermacor® X-100 + Cruiser Maxx
- UNTREATED CHECK

RWW - # per Core

3.5  6.9  4.6  7.1  3.3  12

MTE-12-420  Mike Stout - LSU
SWK-12-208  Mo Way - Texas A&M
MTE-13-420  Mike Stout - LSU
MTE-12-601  Jeff Gore - MSU
MTE-13-240  Mo Way - Texas A&M
DuPont™ Dermacor® X-100 seed treatment
USA-12-874 Dermacor® Mixtures 2012 - 2013

Untreated Check - 7871 lbs/A
DuPont™ Dermacor® X-100 seed treatment
Fall Armyworm Control
2013 LSU - Dr Mike Stout Lab Bioassay

Percentage mortality of fall armyworms in feeding assays by using neonates on foliage of plants treated as seeds with different insecticides. 2-week old plants (2-3 leaf stage) 6 days later - Larvae weighed

Trial No.: MTE-13-421  Dermacor X-100  25 micro gms/sd  Nipsit  17 micro gms/sd  Cruiser  33 micro gms/sd

18% Natural Mortality in Check
DuPont™ Dermacor® X-100 seed treatment
2014 LSU - Rice Tec Strip Trial

Yellow Striped Armyworm Control
McNeese State University

Trial No.: MTE-14-102
<table>
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</tr>
<tr>
<td></td>
<td>Grape Colaspis</td>
<td>Mexican Rice Borer</td>
<td>Grape Colaspis</td>
</tr>
<tr>
<td></td>
<td>Chinch Bugs</td>
<td>Rice Stalk Borer</td>
<td>(ee)</td>
</tr>
<tr>
<td></td>
<td>Thrips</td>
<td>Sugarcane Borer</td>
<td>Fall, Yellowstripe 2(ee)</td>
</tr>
<tr>
<td></td>
<td>Aphids</td>
<td>Grape Colaspis (ee)</td>
<td>and True Armyworms 2(ee)</td>
</tr>
<tr>
<td><strong>Planting Method</strong></td>
<td>Not for use in</td>
<td>Drilled or broadcast</td>
<td>Only in dry seeded</td>
</tr>
<tr>
<td></td>
<td>water-seeded rice</td>
<td>and incorporated into</td>
<td>rice production, cover</td>
</tr>
<tr>
<td></td>
<td>production</td>
<td>the soil, or</td>
<td>planted seed thoroughly</td>
</tr>
<tr>
<td></td>
<td>Do not plant or sow</td>
<td>broadcast treated seed</td>
<td>by soil</td>
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<td>into flooded rice</td>
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<td></td>
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<td>fields 24(c)</td>
<td></td>
</tr>
<tr>
<td>Active Ingredient</td>
<td>Thiamethoxam</td>
<td>Chlorantraniliprole + thiamethoxam or clothianadin</td>
<td>Clothianidin</td>
</tr>
<tr>
<td>-----------------------------------</td>
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<td>-----------------------------------------------</td>
<td>--------------</td>
</tr>
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<td>Neonicotinoid</td>
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<td>Neonicotinoid</td>
</tr>
<tr>
<td>Rate</td>
<td>7.0 fl oz/cwt</td>
<td>5.0 oz/cwt + Labeled Rate</td>
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<td>Grape Colaspis</td>
<td>Mexican, Rice Stalk &amp; Sugarcane Borer</td>
<td>Grape Colaspis</td>
</tr>
<tr>
<td></td>
<td>Chinch Bugs</td>
<td>Grape Colaspis</td>
<td>Chinch Bugs</td>
</tr>
<tr>
<td></td>
<td>Thrips</td>
<td>Armyworms, Chinch Bugs, Aphids, Thrips,</td>
<td>Armyworms, Chinch Bugs,</td>
</tr>
<tr>
<td></td>
<td>Aphids</td>
<td>Black Bug*</td>
<td>Aphids, Thrips,</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Black Bug*</td>
</tr>
<tr>
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<td>Not for use in water-seeded rice production</td>
<td>Drilled or broadcast and incorporated into the soil.</td>
<td>Only in dry seeded rice production, cover planted seed</td>
</tr>
</tbody>
</table>
Dermacor® X-100 Path Forward
North LA, AR & MS

• Focus on hybrid rice—low seeding rates
• Conduct demos with Dermacor® X-100 + neonicotinoid treatments vs. neonicotinoid only treatments
• University & selected consultants
• Compare stand establishment, seedling vigor, pest levels, control measures & yield
Always read and follow all label directions and precautions for use.

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Cruiser® & Cruiser Maxx™ (Syngenta), Nipsit INSIDE® (Valent), Clearfield (BASF)