Recent Advances in Insect Control Research in Rice

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Insect problems - 2006

- Early-season pests
  -- Rice water weevil
  -- Fall armyworm
  -- South American rice rice miner

- Late-season pests
  -- Rice stink bug
  -- Stem borers (no Mexican rice borers reported in LA in 2006)
Rice water weevil
Root pruning by weevil larvae
10% yield loss \times 6000 \text{ lbs/acre} \times $10/\text{cwt} = - $60/\text{acre}
Use of insecticides against the rice water weevil - 2007

- Karate Z
- Mustang Max (EW for fertilizer)
- Prolex
- Trebon (Section 18; tentative)
- Dimilin
Pyrethroids act by killing adults, thereby preventing egg-laying.
Timing of insecticide applications for weevil management

- Many adult weevils are present before flooding and additional weevils fly in after flooding
- Females lay eggs in standing water
- Females prefer young rice plants for egg-laying

Therefore, most egg-laying occurs shortly after flooding!!!
Apply pyrethroids when adults / feeding scars are present and fields are flooded.

A second application may be needed.
Influence of cultural practices for weevil management

- “Delayed” flooding: Continuous or pinpoint flooding leads to infestation of young, vulnerable rice plants. Delaying flood until rice is at the 5-leaf stage or beyond reduces damage from weevils
- “Early” planting
- Draining of fields with larvae
- Seeding rate
- Fertilization
Cultural practices for weevil management

- “Delayed” flooding
- “Early” planting: planting rice in early March may allow fields to escape weevil infestation
- Draining of fields with larvae
Cultural practices for weevil management

Planting date and use of insecticides: single applications of pyrethroids appear to be sufficient in early-planted, but not late-planted rice
Relative efficacies of a single application of Karate (0.03 lbs ai/acre) in an early-planted and a late-planted experiment.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>% control of rice water weevil larvae</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>16-19 daf</td>
</tr>
<tr>
<td>Experiment 1: Early season test,</td>
<td>98.5%</td>
</tr>
<tr>
<td>1 daf</td>
<td></td>
</tr>
<tr>
<td>Experiment 2: Late-season test,</td>
<td>65.6%</td>
</tr>
<tr>
<td>2 daf</td>
<td></td>
</tr>
</tbody>
</table>
Influence of cultural practices for weevil management

- “Delayed” flooding
- “Early” planting
- Draining of fields with larvae
- **Seeding rate**
- Fertilization
Cultural practices for weevil management

Seeding rate may affect severity of weevil infestation (thin stands have more weevils) and may affect extent of yield loss (low seeding rates suffer greater relative yield losses?)
Influence of cultural practices for weevil management

- “Delayed” flooding
- “Early” planting
- Draining of fields with larvae
- Seeding rate
- Fertilization
Cultural practices for weevil management

Additional fertilizer applied after weevil injury does not appear to help rice compensate for weevil injury.
Integrating weevil management with crawfish production

- Rice and crawfish cultivated in close proximity
- Crawfish harvested in March/April/May
- Weevil insecticides very toxic to crawfish
Integrating weevil management with crawfish production

• Granular formulations of insecticides will reduce drift into neighboring fields and ponds
  -- Mustang impregnated on fertilizer
  -- Trebon (Section 18 anticipated): a pyrethroid-like granular insecticide, used like Karate etc.

• Draining, other cultural practices
Tools for weevil management: 2008 and beyond

Several granular insecticides and insecticidal seed treatments have shown promise in small-plot tests and may be available in the future.
# Future weevil management tools

<table>
<thead>
<tr>
<th>Product</th>
<th>Use Pattern</th>
<th>Control</th>
</tr>
</thead>
<tbody>
<tr>
<td>V10170 (Valent)</td>
<td>Seed treatment</td>
<td>Excellent</td>
</tr>
<tr>
<td>DPX-E2Y45 (DuPont)</td>
<td>Seed trtmt</td>
<td>Excellent</td>
</tr>
<tr>
<td>Dinotefuran (Mitsui)</td>
<td>Pre/post granular</td>
<td>Excellent</td>
</tr>
<tr>
<td>Dinotefuran (Mitsui)</td>
<td>Late post granular</td>
<td>Very good</td>
</tr>
<tr>
<td>Avicta + Cruiser (Syngenta)</td>
<td>Seed trtmt</td>
<td>Very good</td>
</tr>
</tbody>
</table>
Fall armyworms and other armyworms in rice can be controlled by a combination of flooding and insecticide applications.
Confirm for armyworm control?

- Confirm would be safe for crawfish
- Section 18: need information on pest incidence and impact
- Yield impact of armyworms unclear
- Section 3 may be a better route
Rice stink bug: no changes in management recommendations or available insecticides in 2007 (no Orthene)
Rice Stink Bug: use of insecticides

- Bugs suck sap from developing grains
- Scout when rice is headed—50% to 75% panicle emergence
- Take 10 sweeps at 10 different areas
- Thresholds:
  - First two weeks of heading: 3-5 bugs per 10 sweeps
  - After first two weeks of heading: 10 bugs per 10 sweeps
South American Rice Miner = “whorl maggot”

- New pest in Louisiana and Texas
- Found in numerous fields in 2005 & 2006
- A pest of late-planted rice
- Primarily a pest of seedlings
- Economic impact is unknown
South American Rice Miner: damage

- Larvae feed internally on leaves before they unfurl in the whorl or stem.
- Feeding causes large, elongated lesions along the leaf edge. Affected leaves become dry and tend to curl and wither.
- Injured seedling look ragged and heavy infestations may kill plants, leading to reduced stands.
South American Rice Miner: management

• Foliar insecticides are unlikely to do much good (adults are mobile; larvae are inside plant)
• Systemic insecticides may help?
• Avoid planting rice late
• We need to know more about the biology and economic impact of the insect!!
• Contact county agent if you suspect infestation
Sugarcane borer
Distribution of egg massses – no choice field experiment

![Graph showing egg mass distribution at different growth stages (Tillering, Panicle Initiation, Boot, Heading). The graph has bars for Vertical Distribution: Lower, Middle, and Upper. The y-axis represents Egg Masses ranging from 0 to 180.](image-url)
Effect of Age and Variety on Oviposition Preference

*Bars accompanied with different letters are significantly different (P < 0.05; Tukey’s)*
Summary

• Females primarily laid eggs on the upper third of plants

• Under no-choice conditions, females will oviposit on younger, vegetative state plants

• Females tended to lay eggs on the inner surfaces of leaves

• Given a choice, females prefer to oviposit on the larger, reproductive stages (boot and heading)

• Observations in greenhouse: feeding lesions observed within two days of egg eclosion; larvae in stems in 5-9 days
Management of stem borers

- Problems may be worse if alternate hosts nearby (sugarcane, corn, sorghum)
- Early planting
- Insecticide applications if adults or eggs observed
  - Begin scouting at PD/early boot
  - Look for adults, eggs, lesions
  - Applications of pyrethroids must be made before larvae enter stem