Developing Economic Thresholds for Stem Borers Attacking Rice on the Upper Gulf Coast of Texas

2005

Agronomic and Cultural Information

Fields: The following fields were selected by Brent Batchelor (CEA, Matagorda Co.) and Chris Schneider (CEA, Jackson Co.) based on a history of stem borer infestations:

North Clemville: 100 acres in Matagorda County @ N 29°02.294’ and W 96°07.452’
South Clemville: 70 acres in Matagorda County @ N 28°54.96’ and W 96°04.819’
Markham: 156 acres in Matagorda County (coordinates not available)
S & W: 112 acres in Jackson County @ N 29°05.215’ and W 96°33.392’
Shoemate: 130 acres in Jackson County @ N 29°10.533’ and W 96°36.148’

Planting: North Clemville: Drill-seeded Cocodrie on Apr 21
South Clemville: Drill-seeded Cocodrie on Apr 22
Markham: Broadcast-seeded Cocodrie on Apr 29
S & W: Drill-seeded Cheniere on Apr 8
Shoemate: Broadcast-seeded Cocodrie on Apr 22

Treatments: Half the plots (6.33’ x 50”) treated for stem borers with Karate Z @ 0.03 lb (AI)/acre using a backpack sprayer (two applications generally at panicle differentiation and 7-10 days later unless indicated otherwise below):

North Clemville: Jun 16 and Jun 29
South Clemville: Jun 17 and Jun 29
Markham: Jun 20, Jun 29 and Jul 13
S & W: Jul 1
Shoemate: Jul 1 and Jul 5

Sampling: Whitehead (WH) counts, panicle counts and WH collections were conducted at harvest.

Drill-seeded fields: WHs counted in 1-30 ft row and panicles counted in 3-1 ft row transects
Broadcast-seeded fields: WHs counted in 2-15 ft² areas and panicles counted in 2-1 ft² areas

In all fields (except Shoemate) 10 panicles were randomly selected from each plot and filled and unfilled grains were separated, counted and weighed. Twenty WHs were removed from all fields and dissected to identify stem borer species. No specimens were found. Any borers present had already pupated and emerged.

Harvest: Drill-seeded fields: harvested 1 row, 10 in. row spacing, 30 ft long
Broadcast-seeded fields: harvested 2-3 ft x 5 ft areas

North Clemville: Aug 19
South Clemville: Aug 19
Markham: Aug 30
S & W: Aug 23
Shoemate: Sep 7

Yield converted to lb/acre adjusted to 12% moisture
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Discussion

Stem borer damage in selected fields was very low, so data are not very instructive (Table 1). These fields were chosen based on the fact that nearby fields in previous years suffered considerable stem borer damage, but, in general, 2005 was a light year for stem borers in Jackson and Matagorda Counties. The research, however, did provide good practice in collecting whitehead and panicle data and involving the County Extension Agents in treating required plot areas.

We plan to modify the study in 2006. The experiment will be conducted at Ganado, TX where stem borers typically are problematic. Plots will be planted late to mid-May with Cocodrie. The late planting combined with the stem borer-susceptible cultivar will improve the likelihood of a good natural stem borer infestation. All plots will be treated with Karate Z at 0.03 lb (AI)/acre immediately before permanent flood. This application will control rice water weevil but not stem borers. At panicle differentiation plants will be inspected for early signs of stem borer – small sheath lesions on culms. These damaged culms will be marked. Undamaged culms on the same plant will be sprayed with Karate Z using a small diameter PVC pipe to isolate the unaffected culms. At maturity, panicles from undamaged and damaged culms will be hand cut, counted and threshed. Number of filled and unfilled grains will be counted and weighed. Thus, differences in number and weights of grains from damaged and undamaged culms will quantify stem borer injury. Comparative density of damaged and undamaged culms also will be recorded. At least 100 paired observations (100 plants with at least one damaged culm) will be made. Data will be subjected to paired t-test and regression analysis.

Table 1. Stem borer damage and yield from small plots in commercial rice fields. 2005

<table>
<thead>
<tr>
<th>Field</th>
<th>County</th>
<th>Trt.</th>
<th>No. WH b</th>
<th>No. panicles/ft c</th>
<th>Wt. (g) filled grains / panicle d</th>
<th>No. grains per panicle</th>
<th>% unfilled grains / panicle d</th>
<th>Yield (lb/acre)</th>
</tr>
</thead>
<tbody>
<tr>
<td>N.Clemville</td>
<td>Matagorda</td>
<td>T</td>
<td>2 a</td>
<td>33 a</td>
<td>1.9</td>
<td>92</td>
<td>15</td>
<td>18</td>
</tr>
<tr>
<td>U</td>
<td>0 b</td>
<td>29 b</td>
<td></td>
<td></td>
<td>2.3</td>
<td>107</td>
<td>17</td>
<td>14</td>
</tr>
<tr>
<td>S.Clemville</td>
<td>Matagorda</td>
<td>T</td>
<td>1</td>
<td>31</td>
<td>2.4</td>
<td>115</td>
<td>36</td>
<td>24</td>
</tr>
<tr>
<td>U</td>
<td>1</td>
<td>31</td>
<td></td>
<td></td>
<td>2.4</td>
<td>116</td>
<td>36</td>
<td>23</td>
</tr>
<tr>
<td>Markham</td>
<td>Matagorda</td>
<td>T</td>
<td>0</td>
<td>40</td>
<td>3.0</td>
<td>137</td>
<td>14</td>
<td>9</td>
</tr>
<tr>
<td>U</td>
<td>1</td>
<td>38</td>
<td></td>
<td></td>
<td>3.0</td>
<td>136</td>
<td>13</td>
<td>9</td>
</tr>
<tr>
<td>S &amp; W</td>
<td>Jackson</td>
<td>T</td>
<td>0</td>
<td>37</td>
<td>3.3</td>
<td>158 a</td>
<td>32</td>
<td>17</td>
</tr>
<tr>
<td>U</td>
<td>0</td>
<td>34</td>
<td></td>
<td></td>
<td>2.6</td>
<td>132 b</td>
<td>28</td>
<td>18</td>
</tr>
<tr>
<td>Shoemate</td>
<td>Jackson</td>
<td>T</td>
<td>1</td>
<td>48</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>U</td>
<td>3</td>
<td>45</td>
<td></td>
<td></td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
</tr>
</tbody>
</table>

a T = treated for stem borers with Karate Z @ 0.03 lb (AI)/acre, U = untreated
b Number of whiteheads in 1-30 ft row in drill-seeded fields and in 30 ft² in broadcast-seeded fields
c Number of panicles in 1 ft of row in drill-seeded fields and 1 ft² in broadcast-seeded fields
d Derived from the mean of 10 main crop panicles per plot
Means followed by the same or no letter are not statistically different at the 5% level (ANOVA and LSD).