# SMALL PLOT EVALUATION OF INSECTICIDAL CONTROL OF THE SUGARCANE BORER IN LOUISIANA SUGARCANE, 2011

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Seven insecticide treatments in addition to an untreated control were evaluated for season long control of the sugarcane borer, *Diatraea saccharalis,* in a randomized block design with five replications in a sugarcane field of 2nd ratoon HoCP 96-540 in Burns Point, LA. Treatment plots consisted of three 24-ft rows (0.01 acre) separated by 5-ft gaps. Insecticide applications were made the mornings of 5 Aug and 30 Aug when infestations exceeded the treatment threshold of 5% of stalks with borer larvae present in leaf sheaths. Insecticides were mixed in 2 gal of water and applied using a Solo back pack sprayer delivering 40 gallons/acre at 20 psi. Borer injury to sugarcane was assessed at the time of harvest (5 Oct) by counting the total number of internodes (15 stalks/plot), number of bored internodes and moth emergence holes in each stalk. Proportion of bored internodes was analyzed using a generalized linear mixed model (Proc Glimmix, SAS Institute) with a binomial distribution, and means were separated with Tukey's HSD ($\alpha = 0.05$). Emergence data was analyzed using a generalized linear mixed model (Proc Glimmix, SAS Institute) with a normal distribution.

Insecticide treatments provided substantial control and significantly reduced the proportion of bored internodes when compared to untreated checks ($F = 70.8$, $P < 0.0001$, df = 7, 587). Percentage of bored internodes in the treated plots ranged between 0.09-1.3% compared to the 20.3% observed in the untreated check. Besiege applied at 9.0 oz/acre showed greatest reduction in internode injury; however, differences were not detected among the insecticide treatments. Adult emergence ranged between 0.0-0.72 emergence holes per stalk, and followed the same trend as percentage bored internodes ($F = 26.7$, $P < 0.0001$, df = 7, 586).

**Table 1: Sugarcane borer injury as affected by insecticide treatments, St. Mary Parish, 2011**

| Treatment[a] | Active Ingredient | Rate (fl oz/acre) | % Bored Internodes | Emergence/Stalk |
|---|---|---|---|---|
| **Control** | NA | NA | 20.3 B | 0.72 B |
| **Prevathon (low)** | Chlorantraniliprole | 12 | 1.30 A | 0.03 A |
| **Prevathon (high)** | Chlorantraniliprole | 20 | 1.20 A | 0.04 A |
| **Belt** | Flubendiamide | 3.0 | 0.92 A | 0.01 A |
| **Coragen** | Chlorantraniliprole | 3.0 | 0.80 A | 0.01 A |
| **Confirm** | Tebufenozide | 8.0 | 0.62 A | 0.03 A |
| **Diamond** | Novaluron | 12.0 | 0.34 A | 0.00 A |
| **Besiege** | Chlorantraniliprole + λ-cyhalothrin | 9.0 | 0.09 A | 0.00 A |

[a]Insecticide treatments were applied with Induce surfactant at 0.5% v/v.
Means within column followed by the same letter are not significantly different (P = 0.05, Tukey's HSD).

# EVALUATION OF SOIL APPLIED INSECTICIDES FOR CONTROL OF WIREWORMS IN SUGARCANE, IBERIA PARISH, 2011

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Evaluation of 3 insecticides applied during sugarcane planting for control of wireworms was conducted at Segura Farms, Iberia Parish in 2011. Treatments included granular formulations of Arena® (clothianidin) at 80 lbs/acre, Thimet® (phorate) at 19.5 lbs/acre, a liquid formulation of Prevathon® (chlorantraniliprole) at 26.9 fl oz/acre, and an untreated check. Treatments were applied over seed pieces in open furrows during planting on September 16, 2011. The test was conducted with a randomized block design with 5 replications. Plots size was 0.01 acres (three 24-foot-rows). Stand counts (no. stalks/24ft row) and deadhearts were recorded on December 5, 2011. On April 5, 2011 stand counts, deadhearts, and number of gaps >3ft was recorded for each row. Additionally, stalk height to the whorl was recorded for 10 stalks/row. All data were analyzed with generalized linear mixed models ($\alpha$=0.10).

No differences in stand counts were detected between treatments on December 5 (Table 1). Thimet and Prevathon treatments reduced the number of deadhearts compared to untreated controls ($F$ = 2.58, $P$ = 0.0974). The Arena treated plots had the highest mean stand (shoots/row) while the Prevathon treatment showed the greatest reduction in number of dead hearts (Table 1). April 5 counts revealed stand was greater in Prevathon treated plots than arena treated plots ($F$ = 2.45, $P$ = 0.021), however, none of the insecticide treatments were different than untreated controls (Table 1). No differences were detected in the number of deadhearts or the number of gaps were detected between treatments in April. Plant height was greater in Prevathon treated plots than in arena treated plots or untreated controls (Table 1). Results indicate that only Prevathon had a significant effect on sugarcane stand likely associated with wireworm injury. Additionally, Prevathon is a reduced-risk chemistry which would be expected to have little effect on non-target organisms and beneficial insects. Mean height was lowest in untreated plots, indicating treatments may have reduced insect injury to roots.

**Table 1: Early season plant cane injury as affected by soil applied insecticide treatments, Iberia Parish, 2011**

| | | December 5, 2011 | | April 5, 2012 | | | |
|---|---|---|---|---|---|---|---|
| **Treatment** | **Rate** | **Stand** | **Deadhearts*** | **Stand*** | **Deadhearts** | **Gaps >3ft** | **Stalk Height (in)*** |
| Arena | 80 lbs/acre | 51.2 | 0.47 AB | 62.7 B | 3.2 | 0.74 | 7.3 B |
| Thimet | 19.5 lbs/acre | 44.0 | 0.27 B | 83.9 AB | 4.1 | 0.49 | 7.7 AB |
| Untreated Control | NA | 44.3 | 1.20 A | 78.5 AB | 3.5 | 0.43 | 7.2 B |
| Prevathon | 26.9 fl oz/acre | 46.3 | 0.07 B | 95.7 A | 3.8 | 0.55 | 8.0 A |

*Means which share the same letter are not significantly different (LSD, P>0.10)

**RED IMPORTED FIRE ANT PREDATION ON MEXICAN RICE BORER IN SUGARCANE AT BEAUMONT, TEXAS, 2011**

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A study was initiated in the summer of 2011 at the Texas A&M AgriLife Center at Beaumont, TX to assess the effect of predation by the red imported fire ant (*Solenopsis invicta*) on Mexican rice borer (MRB) injury to sugarcane. The experiment was conducted in plots of two adjacent sugarcane variety tests by establishing ant-suppressed and unsuppressed areas. Ant populations were suppressed using a granule bait formulation of hydramethylnon and S-methoprene applied to the rows and bases of plants.

In each area of the variety tests, MRB injury was assessed in four sugarcane cultivars of interest; two conventional cultivars and two energy cultivars (Table 1). Bored internodes and emergence holes were counted on 10 randomly selected stalks from each plot using destructive sampling and a stalk-splitter machine. The percentage of bored internodes and number of emergence holes were analyzed using generalized linear mixed models (Proc Glimmix, SAS Institute) with binomial and Poisson distributions, respectively.

A 50% increase in the percentage of bored internodes was observed across all ant-suppressed areas. However, statistical analysis did not detect differences ($F=1.48$, $P=0.284$) supporting the numerical trend (Table 1). A difference in emergence holes per stalk was associated with ant suppression ($F=2.43$, $P=0.023$). The mean number of emergence holes per stalk across all unsuppressed areas was 0.16, and increased to 0.36 in areas where ants were suppressed. This data suggests that predation of the MRB by the red imported fire ant decreases both injury and build-ups of pest populations in sugarcane. Additional data collected from pitfall traps implemented throughout the summer to detect relative abundance of the red imported fire ant may help to better quantify the role of ant predation.

Table 1: Mean percentage of bored internodes and emergence per stalk by sugarcane cultivar with ants suppressed and unsuppressed in Beaumont, TX, 2011

| Variety | Ants Suppressed | | Ants Not Suppressed | |
|---|---|---|---|---|
| | % Bored internodes | Emergence/stalk | % Bored internodes | Emergence/stalk |
| HoCP 85-845 (plant and ratoon) | 6.28 | 0.1 | 3.36 | 0.07 |
| HoCP 04-838 (plant and ratoon) | 11.67 | 0.4 | 9.61 | 0.15 |
| Ho 02-113 (plant) | 6.51 | 0.14 | 7.79 | 0.06 |
| L 79-1002 (plant) | 6.62 | 0.23 | 9.76 | 0.22 |
| Ho 08-9001 (ratoon) | 17.48 | 0.4 | 9.19 | 0.15 |
| Ho 08-9003 (ratoon) | 33.88 | 0.99 | 13.04 | 0.3 |

# EVALUATION OF COMMERCIAL AND EXPERIMENTAL SUGARCANE CULTIVARS FOR RESISTANCE TO THE MEXICAN RICE BORER, BEAUMONT, TEXAS, 2011

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Because of the limitations of chemical and biological control against the Mexican rice borer (MRB), *Eoreuma loftini,* host plant resistance is an important part of management. As control tactic, host plant resistance can not only aid in reducing stalkborer injury, but can also reduce area-wide populations and potentially slow the spread of the MRB. The effect of cultivars on reducing area-wide populations is examined by comparing the number of adult emergence holes. In addition, recent research suggests resistant cultivars which impede stalk entry and prolong larval exposure on plant surfaces may enhance the efficacy insecticide applications. Continued evaluation of stalkborer resistance is necessary as host plant resistance remains a valuable tool in stalkborer IPM.

A field study was conducted at the Texas A&M AgriLIFE Research and Extension Center at Beaumont, TX, to assess cultivar resistance to the MRB among commercial and experimental sugarcane cultivars. The test had 1-row, 12-foot plots arranged in a randomized block design with 5 replications. The test included a wide variety of cultivars developed from breeding programs in St. Gabriel, LA; Houma, LA; and Canal Point, FL.
The test evaluated resistance in 19 cultivars. Cultivars from previous varietal resistance tests which were reevaluated include: HoCP 85-845, HoCP 00-950, Ho 07-613, L 07-57, HoCP 05-961, and HoCP 04-838. HoCP 85-845 has been a resistant standard for many years. HoCP 04-838, which appears to have little resistance to the MRB, has recently been released to commercial growers. Experimental cultivars in the early stages of varietal development which were evaluated include: HoCP 08-726, Ho 08-706, L 08-090, L 08-088, Ho 08-711, Ho 08-717, HoL 08-723, L 08-075, L 08-092, Ho 08-709. Two energy cane varieties, L 79-1002 and Ho 02-113, were also evaluated.

The percentage of bored internodes and number of emergence holes were analyzed using generalized linear mixed models (Proc Glimmix, SAS Institute) with binomial and Poisson distributions, respectively. Results showed significant differences ($F=2.71$, $P= 0.0017$) in injury which ranged from 1.9-17.2% bored internodes (Table 1). The most resistant cultivars examined were HoCP 85-845 and L 08-075. Experimental cultivar, L 08-075, is potentially highly resistant as it demonstrated >8-fold reductions in MRB injury compared to susceptible cultivars. The most susceptible cultivars were HoCP 08-726, L 08-090, and HoCP 04-838. Differences in adult emergence ($F= 1.99$, $P =0.0187$) followed the same trend as injury data ranging from 0.02-.46 emergence holes per stalk (Table 1). Results from the cultivars which were reevaluated were consistent with previous findings. Energy cane varieties showed intermediate levels of resistance.

**Table 1: Borer Injury and Moth Production, Beaumont Variety Test, 2011**

| Variety | % Bored | Emergence/stalk |
|---|---|---|
| HoCP 08-726 | 17.2 | 0.45 |
| L 08-090 | 13.7 | 0.35 |
| HoCP 04-838 | 13.4 | 0.28 |
| HoL 08-723 | 13.1 | 0.10 |
| Ho 08-711 | 13.1 | 0.46 |
| Ho 08-717 | 12.4 | 0.20 |
| Ho 08-706 | 9.5 | 0.18 |
| Ho 07-613 | 9.0 | 0.27 |
| L 79-1002 | 8.5 | 0.21 |
| L 07-57 | 8.5 | 0.21 |
| Ho 08-709 | 8.0 | 0.07 |
| L 08-088 | 8.0 | 0.23 |
| HoCP 00-950 | 7.9 | 0.08 |
| Ho 02-113 | 7.7 | 0.08 |
| L 08-092 | 7.7 | 0.08 |
| Ho 05-961 | 7.6 | 0.24 |
| HoCP 91-552 | 7.6 | 0.23 |
| HoCP 85-845 | 3.9 | 0.10 |
| L 08-075 | 1.9 | 0.02 |

*Means which share a line are not significantly different (LSD).

## THE EFFECT OF INTERTRAP DISTANCE ON THE PERFORMANCE OF MEXICAN RICE BORER PHEROMONE TRAPS

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The Mexican rice borer (MRB), *Eoreuma loftini*, is an invasive stalk borer from Mexico which is expected to cause major economic losses to the sugarcane and rice crops in Louisiana. Traps baited with MRB female sex pheromone are effective tools to monitor range expansion and assist scouting for the pest in sugarcane. Traps are currently placed >6 parishes in Western Louisiana to monitor MRB populations. However, the attractive distance, or active space, remains unknown. The active space is the area downwind of a pheromone source over which males are able to detect and respond to the pheromone. A study was conducted in Oct–Nov 2011 to assess the active space of pheromone traps by examining the effect of intertrap distance on the number of male MRB captured.

The effect of intertrap distance as assessed with hexagonal arrays of pheromone traps with a single trap in the center (Figure 1). Arrays with intertrap distances of 5, 25, 50, 100 and 250 m were deployed in rice fields on two farms in Jefferson and Chambers Counties, TX, and the number of moths caught was recorded for all traps for 5 sampling periods for a total of 10 replications. The number of moths caught per trap/day and the proportion of moths caught by the center trap versus perimeter trap were analyzed using generalized linear mixed models (Proc Glimmix SAS 2008). Differences were detected between treatments ($F$ = 16.9, $P$ < 0.0001), with the greatest numbers of MRB caught in traps with an intertrap distance of 250 m (Table 1). The proportion of the total moths caught by center trap was lower than the average proportion caught in perimeter traps at 5, 25, and 50 m ($F$ = 2.79, $P$ = 0.027). No differences were detected between center and perimeter traps in 100 and 250 m arrays (Table 2). Results indicate there is substantial interference between traps placed less than 100m apart. Reduced trap capture in the center trap relative to perimeter trap likely results from overlapping active spaces at low distances. Additionally, data suggest the active distance of *E. loftini* pheromone traps may be greater than 100 m. Based on these results, pheromone traps should be placed at least 250 m apart from in order to maximize trap performance.

Figure 1: Hexagonal arrays of MRB pheromone traps.

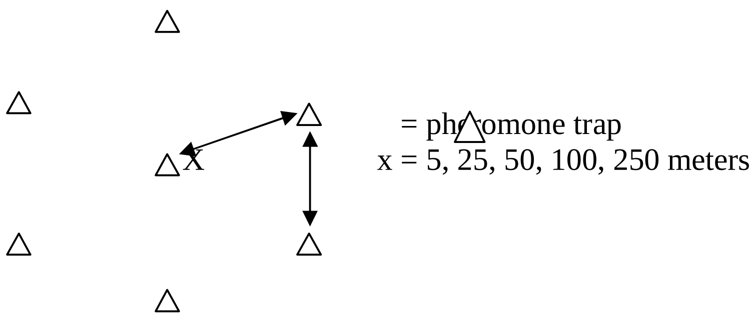

Table 1: Average daily trap capture of MRB pheromone traps as affected by intertrap distance.

| Intertrap Distance (m) | MRB caught/trap/day |
|---|---|
| 5 | 0.51 A |
| 25 | 0.90 A |
| 50 | 1.38 A |
| 100 | 2.90 B |
| 250 | 4.22 C |

LS Means (± 1.1 [SE]). $F$= 16.9, df = 4,36, $P<0.0001$. Means which share a letter are not significantly different (LSD, $\alpha=0.05$).

Table 2: The proportion of total MRB catch caught by center traps versus perimeter traps as affected by intertrap distance.

| Intertrap Distance (m) | Proportion of Total Array Catch | |
|---|---|---|
| | Central Trap | Perimeter Traps |
| 5 | 0.056* | 0.157 |
| 25 | 0.044* | 0.159 |
| 50 | 0.081* | 0.156 |
| 100 | 0.102 | 0.150 |
| 250 | 0.163 | 0.142 |

LS Means. $F$= 2.79, df= 4, 293, $P<0.0267$.
*Central trap is significantly less than mean for perimeter traps (LSD, $\alpha=0.05$).