SMALL PLOT EVALUATION OF INSECTICIDES AGAINST THE SUGARCANE BORER, 2014

J.M. Beuzelin, T.E. Reagan, B.E. Wilson, M.T. VanWeelden, D. M. May
LSU AgCenter, Department of Entomology

The efficacy of insecticides labeled for sugarcane borer (SCB), *Diatraea saccharalis*, management in sugarcane was assessed in a field of variety HoCP 96-540 (1st ratoon) on a commercial farm near Jeanerette, LA. Eight insecticide treatments and a nontreated check were evaluated in a RCBD with 4 blocks and 1 replicate per block. Plots were 24 ft wide (four 6-ft rows) and 24 ft long separated by 6-ft alleys. Inspection of 300 randomly selected stalks on 28 July revealed SCB infestations were extremely low (0% with live larvae on plant surfaces). However, inspection of 100 stalks on 15 August showed that infestations attained 3% of stalks with at least one treatable larva, nearing the action threshold of 5%. Insecticides were applied on 15 Aug with a CO_2-pressurized backpack sprayer calibrated to deliver 10 gpa at 40 psi ≈2 ft above the canopy. A 2-row boom equipped with 8 TeeJet TP11001VS nozzles spaced 18 inches was used. SCB injury was assessed by recording the number of bored internodes and the total number of internodes from 25 randomly selected stalks from the center two rows of each plot at the time of harvest on 17 Oct. SCB moth production recorded as the no. adult emergence holes for each stalk was also assessed. Bored internode data were compared using a generalized linear mixed model (PROC GLIMMIX, SAS Institute) with a binomial distribution, while emergence per stalk data were analyzed with linear mixed models (PROC MIXED, SAS Institute). Kenward-Roger method was used to calculate error degrees of freedom and means were separated using Tukey's HSD ($\alpha = 0.05$).

Differences ($P<0.05$) among treatments were detected for % bored internodes, which ranged from 0.5% (Prevathon at 14 fl oz/acre) to 7.4% (nontreated check) (Table 1). Diamond, Belt, Prevathon, and Confirm provided successful season-long control of SCB infestations reducing injury to <2% bored internodes. Similarly, all insecticide treatments reduced adult emergence per stalk over nontreated controls.

Table 1. SCB injury and adult emergence, small plot insecticide trial, Jeanerette, La, 2014.

Treatment/Formulation[a]	Rate amt (fl oz/acre)	% bored internodes[b]	No. adult emergence holes per stalk[b]
Confirm	6	1.8b	0.01b
Confirm	8	1.7b	0.01b
Diamond	9	1.1b	0.04b
Diamond	12	0.8b	0.00b
Belt	3	0.8b	0.02b
Belt	4	0.9b	0.00b
Prevathon	14	0.5c	0.00b
Prevathon	20	1.0bc	0.02b
Nontreated check	--	17.1a	0.29a
F value		30.9	5.07
p value		<0.001	<0.001

[a]All insecticides were applied using the nonionic surfactant Induce at 0.25% v/v.
[b]Means followed by the same letter are not different (Tukey's test, $\alpha = 0.05$)

MEXICAN RICE BORER RANGE EXPANSION IN LOUISIANA

T.E. Reagan[1], B.E. Wilson[1], M.T. VanWeelden[1], J.M. Beuzelin[1], J. Meaux[2], and R. Miller[3]

[1]LSU AgCenter, Department of Entomology
[2]LSU AgCenter, Calcasieu Parish Extension Office
[3]Louisiana Department of Agriculture and Forestry

Cooperative studies on the Mexican rice borer (MRB), *Eoreuma loftini*, between the LSU AgCenter, Texas A&M University AgriLIFE, the Texas Department of Agriculture, and the Louisiana Department of Agriculture and Forestry (LDAF) have been on-going since 2001 to monitor the movement of this devastating pest of sugarcane into Louisiana. As previously anticipated, MRB spread into Louisiana by the end of 2008, and was collected in two traps near rice fields northwest of Vinton, LA on December 15. Since then, extensive trapping of MRB has been conducted in southwest Louisiana by LDAF and LSU AgCenter personnel. Currently, more than 100 traps are being monitored in ten parishes in Louisiana.

To date, pheromone traps have detected MRB moths in Calcasieu, Cameron, Jefferson Davis, Beauregard, Allen, Vermillion, Acadia, and Evangeline Parishes (Fig. 1). LSU AgCenter Entomology personnel monitored 56 MRB pheromone traps in Calcasieu, Jefferson Davis, Cameron, Allen, Acadia, Beauregard, Vermilion, and Evangeline Parishes from Feb-Dec, 2014. LDAF trapping efforts are focused near the eastern edge of the MRB range with traps deployed in Pointe Coupe and West Baton Rouge Parishes, as well as trapping near sugarcane mills in St. Mary and Iberia Parishes during harvest. The first MRB infestation in Vermilion Parish sugarcane was detected in October of 2014. MRB infestations were also observed in Calcasieu and Jefferson Davis Parishes. Levels of infestation, however, remained relative low, and were below 10% of stalks with MRB injury in all fields monitored in 2014. Current known MRB distribution covers all of Calcasieu, Cameron, Jeff. Davis, and Beauregard, and Allen Parishes. It stretches from the Gulf north to Deridder, LA and Mamou, LA and east to Rayne, LA. Based on its current rate of spread of roughly 15 mi/yr, MRB will likely become established throughout Vermillion (31,000 acres of sugarcane) and Acadia (1,800 acres) and may be detected in Lafayette (12,600 acres), Rapides (11,400 acres), and St. Landry (6,500 acres) Parishes during the 2015 growing season.

Table 1. MRB infestations and pheromone trap captures in Louisiana sugarcane, 2014.

Parish	Number of trap sites	Mean MRB/Trap/Day								
		March	April	May	June	July	Aug	Sept	Oct	Nov
Calcasieu	11	0.25	0.76	0.84	0.88	0.97	0.82	0.54	1.12	1.08
Jeff. Davis	16	0.34	2.78	1.33	1.13	2.02	1.16	3.73	1.02	2.12
Cameron	5	0.08	0.90	1.36	1.44	1.42	1.11	0.72	1.06	0.70
Beauregard	5	0.00	0.00	0.01	0.03	0.05	0.03	0.01	0.01	0.01
Allen	4	0.00	0.06	0.08	0.15	0.23	0.38	0.16	0.10	0.05
Acadia	10	NA	NA	0.03	0.01	0.03	0.06	0.01	0.04	0.04
Vermilion	4	NA	NA	0.02	0.02	0.03	0.04	0.00	0.00	0.00
Evangeline	1	NA	NA	0.03	0.00	0.00	0.03	0.00	0.00	0.00

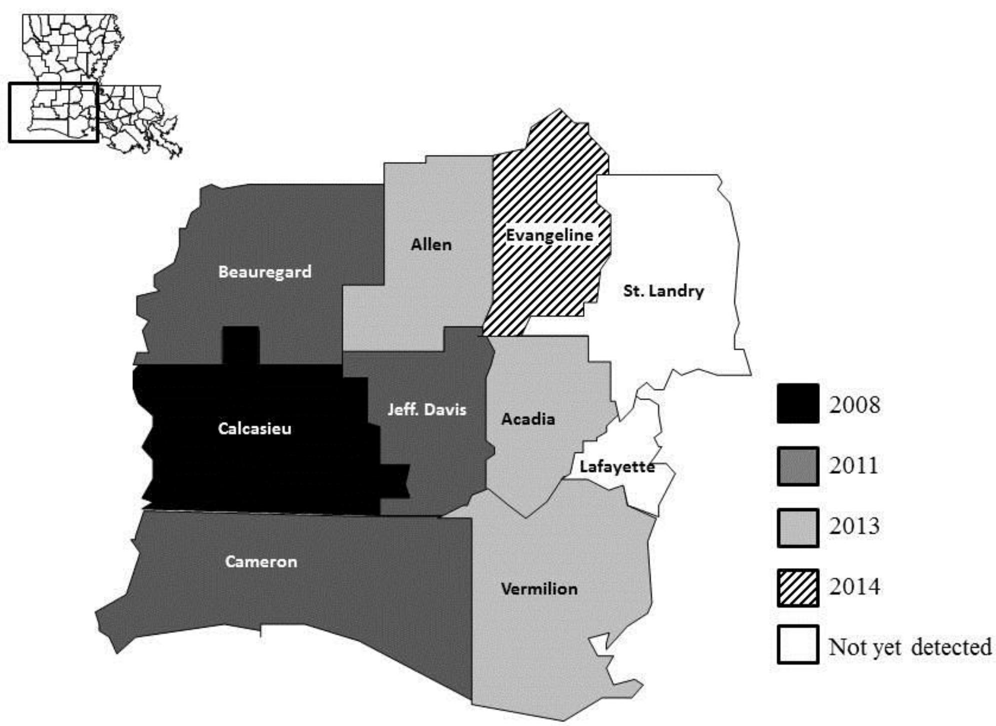

Figure 1. Mexican rice borer range expansion in SW Louisiana as of December 2014. Traps present in Rapides, St. Martin, St. Landry, Iberia and St. Mary Parishes have not yet detected MRB.

This work is part of the PhD dissertation research of Blake Wilson.

ASSESSING THE IMPACT OF NITROGEN FERTILIZATION ON MEXICAN RICE BORER INJURY IN BIOENERGY SORGHUM

T. E. Reagan[1] M. T. VanWeelden[1], B. E. Wilson[1], J. M. Beuzelin[1], M. O. Way[2]
[1]Department of Entomology, Louisiana State University Agricultural Center, Baton Rouge, LA
[2]Texas A&M AgriLIFE Research and Extension Center, Beaumont, TX

Field experiments were conducted in 2013 and 2014 at the Texas A&M AgriLife Research and Extension Center at Beaumont, TX to assess the impact of nitrogen (N) fertilization rate on Mexican rice borer, *Eoreuma loftini* (Dyar), injury and yield in cultivars of sorghum with potential as dedicated bioenergy feedstocks. Two high-biomass sorghum cultivars (ES 5200 and ES 5140) and one sweet sorghum cultivar (M81E) were selected for the study. Experiments were arranged using a randomized, split-plot design with four blocks (one replication per block). Each block was 22.7 m long and 25.4 m wide (24 rows). Rates of N fertilization were randomized to plots, and high-biomass sorghum and sweet sorghum cultivars were randomized to subplots. Plots were 22.7 m long and 6.4 m wide (six rows), and subplots were 22.7 m long and 2.1 m wide (two rows). High-biomass sorghum and sweet sorghum cultivars were planted on 10 May in 2013 and 9 May in 2014 at a rate of 210,039 seeds per hectare. Following planting, urea granules were applied by hand to plots at one of four fertilization rates: 0, 45, 90, 135 kg N/ha. Sorghum cultivars and N fertilization rates were re-randomized in 2014. At harvest, 12 stalks per subplot were cut, stripped of leaf material, and total internodes, bored internodes, and emergence holes were recorded. Stalks were then weighed and crushed to separate the juice and bagasse. Brix readings were acquired from juice samples, and ethanol productivity was estimated using yield parameters. Injury and yield parameters were analyzed using two-way ANOVA with N rate and cultivar as fixed effects, and block, N rate × block, and cultivar × N rate × block as random effects. Kenward-Rogers method was used to estimate error degrees of freedom and Tukey’s HSD was used to separate the means ($\alpha = 0.05$).

Differences in the percentage of bored internodes were detected among N rates, ranging from 2.9% at 0 kg N/ha to 8.4% at 135 kg N/ha in 2013, and 1.2% at 0 kg N/ha to 3.9% at 135 kg N/ha in 2014. In 2013, the no. adult emergence holes per stalk increased substantially with higher rates of N, with emergence increasing 7.4-fold from 45 to 135 kg N/ha and 3.1-fold from 95 to 135 kg N/ha. Yields from both years indicated that N rate was positively associated with increases in stalk weight and ethanol productivity, but not sugar concentration. Rate of N had a positive impact on fresh stalk weight across all cultivars (Table 1, 2), increasing 1.5 and 1.4-fold in 2013 and 2014, respectively, between 0 and 135 kg N/ha. N rate impacted ethanol productivity in both years, ranging from 12222.0 L/ha at 0 kg N/ha to 18865.0 L/ha at 135 kg N/ha in 2013 and 5112.4 L/ha at 0 kg N/ha to 7587.6 L/ha at 135 kg N/ha in 2014. Because associations between yield parameters and *E. loftini* injury were not strong, it is suggested that N rate impacts yield more than *E. loftini* injury. Fertilization rates should be maintained between 45 and 90 kg N/ha to maximize yields and minimize risks of negative area-wide effects from increased production of *E. loftini* adults.

Fig. 1. *Eoreuma loftini* injury in high-biomass and sweet sorghum cultivars measured at four N fertilization rates. Percentage of bored internodes in (A) 2013 and (B) 2014. Number of adult emergence holes per stalk in (C) 2013 and (D) 2014. Beaumont, TX.

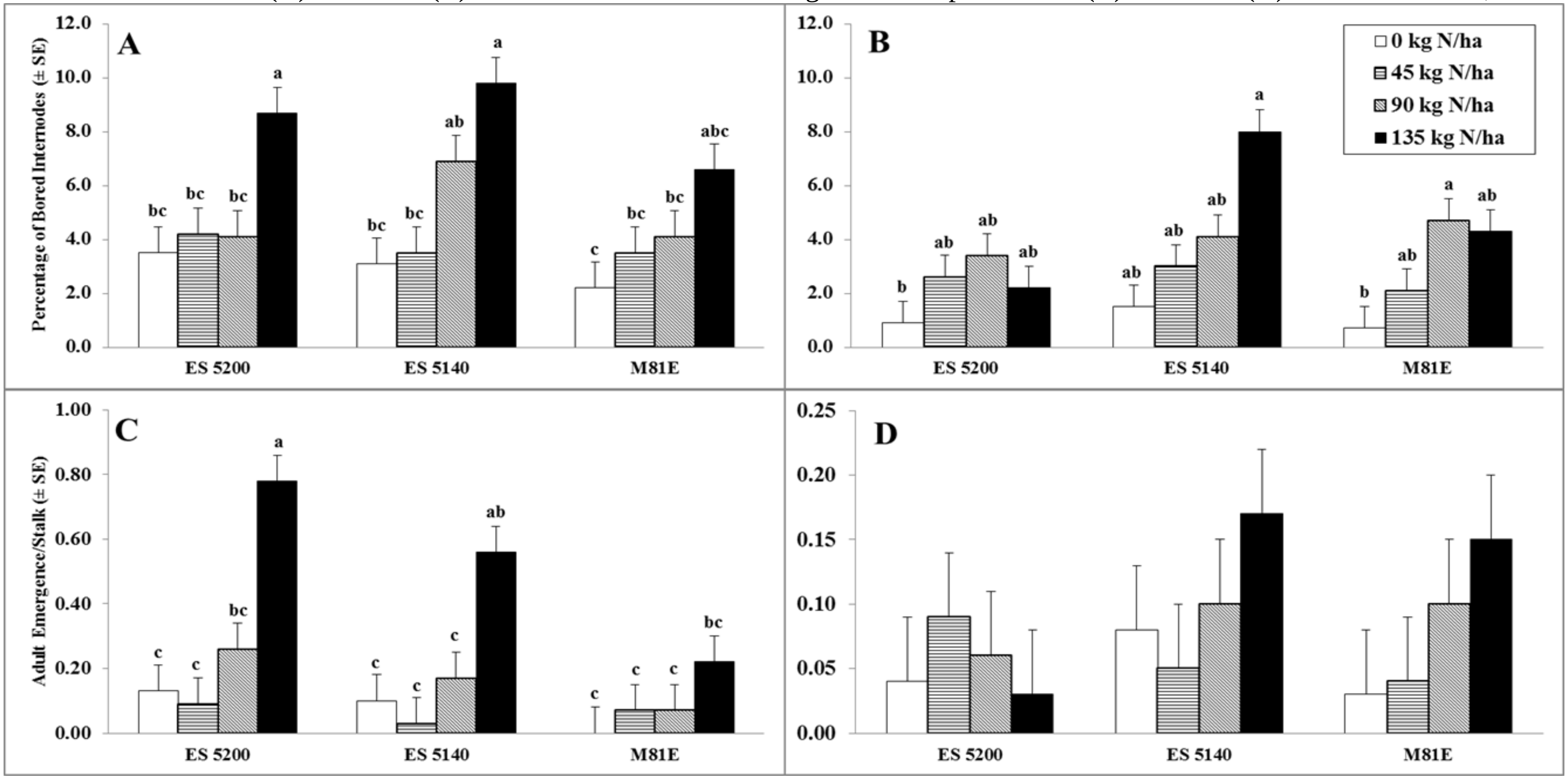

Table 1. Yield estimates (LS means) in high-biomass and sweet sorghum at varying N fertilization rates. Beaumont, TX, 2013–2014.

Cultivar	N Rate (kg/ha)	2013 Fresh Weight (kg) per Stalk (± 0.05 [SE])	2013 Sugar Concentration (± 0.4 [SE])	2013 Ethanol Productivity (L/ha) (± SE)	2014 Fresh Weight (kg) per Stalk (± 0.03 [SE])	2014 Sugar Concentration (± 0.3 [SE])	2014 Ethanol Productivity (L/ha) (± 1499.7 [SE])
High-biomass Sorghum ES 5200	0	0.42 bc	5.4 ab	23238.0 ± 3021.5 abcd	0.11	5.1 ab	4903.7
	45	0.49 abc	5.7 ab	23578.0 ± 3021.5 abc	0.15	4.9 ab	6773.2
	90	0.54 ab	5.7 ab	26986.0 ± 3114.8 ab	0.16	5.2 ab	7602.9
	135	0.63 a	6.1 ab	35627.0 ± 3021.5 a	0.16	5.2 ab	8010.8
High-biomass Sorghum ES 5140	0	0.18 d	4.7 b	10235.0 ± 3021.5 cde	0.16	3.6 b	5849.6
	45	0.16 d	4.8 b	8440.0 ± 3021.5 cde	0.13	3.7 b	5049.5
	90	0.17 d	4.7 b	8300.1 ± 3021.45 de	0.18	4.2 ab	7208.5
	135	0.28 cd	5.5 b	14585.0 ± 3114.8 bcde	0.19	4.4 ab	7889.2
Sweet Sorghum M81E	0	0.06 d	7.0 a	3192.4 ± 3021.5 e	0.11	5.6 a	4583.9
	45	0.10 d	6.7 a	5547.1 ± 3021.5 e	0.19	4.6 ab	8049.2
	90	0.12 d	6.8 a	6998.9 ± 3021.5 e	0.15	4.7 ab	5940.4
	135	0.17 d	6.1 ab	6382.4 ± 3114.9 e	0.20	3.9 b	6862.9

[1]Means followed by the same letter are not significantly different ($P < 0.05$, Tukey's HSD).
[a]Means within columns for fresh weight per stalk (2013, 2014), sugar concentration (2013, 2014), and ethanol productivity (2014) have the same SE.

This work is part of the PhD dissertation research of Matthew T. VanWeelden.