

## VARIETAL RESISTANCE TO THE SUGARCANE BORER 2023

Blake E. Wilson and Tyler Musgrove  
Department of Entomology

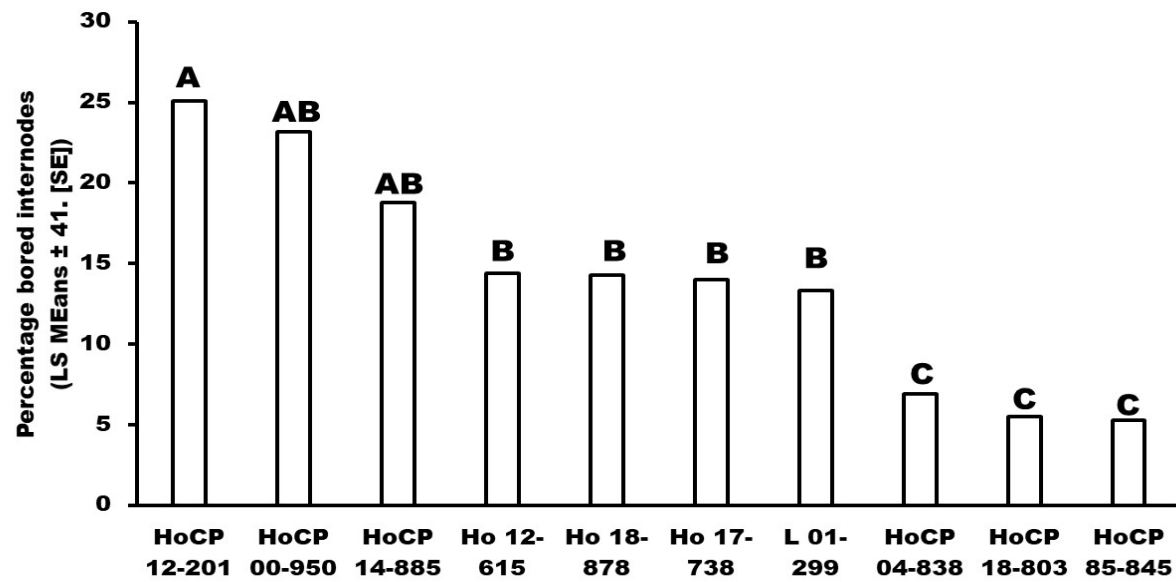
The sugarcane borer (SCB), *Diatraea saccharalis*, is the most destructive insect attacking the Louisiana sugarcane crop. Varietal resistance to the SCB is a key pest management strategy, and resistant varieties have reduced insecticide usage by approximately 50%. Continued assessment of SCB resistance among commercial and experimental sugarcane varieties is critical to maintaining the success of this strategy in IPM programs. Resistance is assessed annually in small-plot field trials conducted at the Sugar Research Station in St. Gabriel, LA.

In the 2022-planted trial (2023 plant cane), three advanced experimental sugarcane varieties of the 2017 and 2018 series of the variety development program were included, in addition to commercial varieties. Commercial varieties known to be resistant included HoCP 85-845, L 01-299, and HoCP 04-838. Susceptible commercial varieties included HoCP 00-950 and L 12-201. Additional commercial varieties evaluated included those with intermediate or unknown levels of SCB susceptibility (Ho 12-615 and HoCP 14-885).

Varieties were planted in one-row 7-m plots using randomized block design with five replications. To increase the SCB population in the experimental plots, rows of corn were planted in between two-row plots and inoculated with laboratory-reared SCB larvae early in the season. A 12-stalk sample was cut from each plot at harvest, and the numbers of bored internodes and total internodes were recorded. Data was analyzed with generalized linear mixed models (SAS, Proc Glimmix). The Kenward–Roger method was used to estimate denominator degrees of freedom, and Tukey's HSD ( $\alpha=0.05$ ) was used for mean separations. Models included variety as a fixed effect and replication as a random effect.

Differences in the percentage of bored internodes were detected among varieties ( $F = 24.0$ ,  $df = 9, 24$ ;  $P < 0.001$ ). Injury ranged from 5.3% (HoCP 85-845) to 25.1% (L 12-201) bored internodes (Figure 1). Experimental variety HoCP 18-803 was among the most resistant varieties evaluated. This results suggest a range of SCB resistance remains present in the variety development program.

Figure 1. *Diatraea saccharalis* injury among commercial and experimental sugarcane varieties in plant cane, St. Gabriel, LA, 2022.



## INSECTICIDAL CONTROL OF THE SUGARCANE BORER 2023

Blake E. Wilson, Tyler Musgrove, Carlos Rivera  
Department of Entomology

The sugarcane borer (SCB), *Diatraea saccharalis*, is the most destructive insect attacking the Louisiana sugarcane crop. Chemical control remains a critical component of SCB integrated pest management. Currently, only 3 insecticides are registered for SCB control in Louisiana and new products are needed to mitigate the risk of insecticide resistance development.

An on-farm insecticide screening was conducted in Vacherie, LA (St. James Parish) which evaluated three rates of experimental chemistry plinazolin (1.03, 1.54, and 2.05 fl oz/acre) along with the industry standard, Vantacor (chlorantraniliprole) at 1.2 fl oz/acre. Insecticides were applied to 2-row, 24-foot plots of Ho 12-615 on July 21, 2023 using a CO<sub>2</sub>-pressurized backpack sprayer calibrated to deliver 15 gallons per acre. The experiment was conducted in a randomized block design with four replications.

SCB injury was assessed on Oct 6, 2023 from 12 stalks per plot and the numbers of bored internodes, total internodes, and adult emergence holes were recorded. Data were pooled for each twelve stalk sample and analyzed with generalized linear mixed models (SAS Proc Glimmix) with treatment as a fixed effect and replication as a random effect. Kenward Rogers for degrees of freedom, Tukey's HSD ( $\alpha = 0.05$ ) for mean separation.

Treatment affected percentage bored internodes with all treated plots differing from non-treated controls (Table 1). The high rate of Plinazolin provided the best control with approximately 80% reduction in SCB injury. Some injury was already present prior to the insecticide application, so the level of control realized may be higher than reflected in the data. Treatment affected adult emergence per stalk with Vantacor and the high rate of Plinazolin reducing emergence relative to non-treated controls.

Results suggest plinazolin may offer an effective alternative to chlorantraniliprole in the future. Plinazolin is not registered for use in Louisiana sugarcane as of 2024.

Table 1. Influence of insecticide treatments on sugarcane borer, *Diatraea saccharalis*, injury, St. James Parish, LA, 2023

Treatment	Rate (fl oz/acre)	Percent bored internodes	Emergence/stalk
Plinazolin	1.03	2.33 b	0.063 ab
Plinazolin	1.54	3.20 b	0.043 ab
Plinazolin	2.05	1.75 b	0.040 b
Vantacor	1.20	2.16 b	0.020 b
Non-treated	NA	10.00 a	0.208 a
$F_{4, 15} =$		8.83	3.97
$P =$		0.002	0.022

## MEXICAN RICE BORER EXPANSION IN LOUISIANA

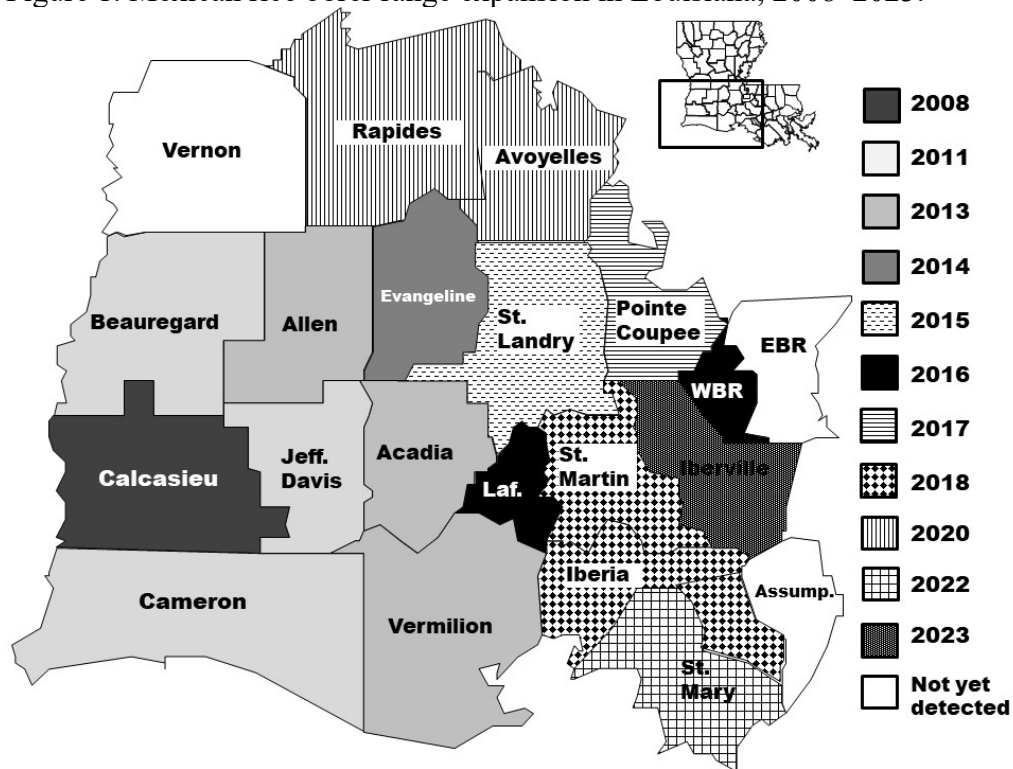
Blake Wilson  
Department of Entomology

The Mexican rice borer (MRB) (*Eoreuma loftini*) is an invasive insect which is a damaging pest of sugarcane and other grass crops. The MRB has been the dominant pest of sugarcane in Texas since the 1980s, and was first detected in Louisiana in 2008. MRB populations can be monitored with pheromone traps. These bucket traps are baited with a female sex pheromone which can detect adult male moths even at low population densities. Eastward spread through Texas and into Louisiana has been monitored with pheromone traps since 2000.

As of December of 2023, the MRB has been detected in 18 Louisiana Parishes: Acadia, Allen, Avoyelles, Beauregard, Calcasieu, Cameron, Evangeline, Iberia, Iberville, Jefferson Davis, Lafayette, Pointe Coupee, Rapides, St. Landry, St. Martin, St. Mary, Vermilion, and West Baton Rouge (Figure 1). Expansion into Iberville Parish was detected by observation of larval infestations in sugarcane in the norther part of the Parish in 2023. No detections have been made in East Iberville or other regions east of the Mississippi River. High populations are present in rice producing areas of southwestern Louisiana. MRB infestations in sugarcane in Avoyelles, Pointe Coupee, Vermillion, and West Baton Rouge often require insecticidal treatment. The current range now includes approximately >75% of the state's sugarcane acreage.

Continued eastward expansion into sugarcane production regions along the Mississippi River and Bayou Lafourche in future years is anticipated. This spread is unlikely to be mitigated through management, but care should be taken to avoid increasing the rate of spread. Movement of sugarcane, particularly seed cane, to uninfested areas should be avoided. Transportation of sugarcane to the mill is thought to have minimal impact on MRB spread due to the rapidity of processing cane upon arrival. Still, cane should be taken to the closest mill wherever possible. Movement of alternative hosts including rice, hay, and other grasses should also be avoided. Detection of MRB in new areas should be reported to LSU AgCenter extension agents.

Figure 1. Mexican rice borer range expansion in Louisiana, 2008–2023.



## EFFICACY OF SOIL-APPLIED INSECTICIDES FOR CONTROL OF SUGARCANE WIREWORMS, 2023-2024

Blake E. Wilson<sup>1</sup>, Carlos Wiggins<sup>1</sup>, Carlos Rivera<sup>1</sup>, Tyler Musgrove<sup>1</sup>, Hannah Penn<sup>2</sup>, and Randy Richard<sup>2</sup>

<sup>1</sup>Department of Entomology and <sup>2</sup>USDA-ARS Sugar Research Unit (SRU)

Wireworms (Coleoptera: Elateridae) are sporadic pests of sugarcane which feed on seed cane at planting and have potential to reduce plant populations. One of two currently labeled organophosphate insecticides is applied at planting to approximately 25% of plant cane acres. This product is hazardous to the applicator and detrimental to beneficial insects, thus alternative insecticides are needed. Further, a new neonicotinoid insecticide, thiamethoxam (Platinum<sup>®</sup>, Syngenta) is anticipated to receive EPA registration for use in sugarcane in coming years, but the product has scarcely been tested for efficacy against wireworms. Additional interest in broflanilide and other experimental insecticides for wireworm control has led to a need for product efficacy evaluation. Assessing insecticidal control of wireworms in sugarcane has historically been challenging due to the unpredictable nature of infestations. This study investigated the influence of insecticides on plant cane emergence in a field trial conducted at the USDA farm in Schriever, LA. Plots

Prior to planting, wireworm larvae were hand collected from commercial sugarcane fields on multiple dates during the summer 2023. In each experiment, one larvae per row-foot was placed in each plot and lightly covered with earth. Seed cane (L 01-299) was planted on 28 September 2023 in each plot at a rate of 3.5 mature internodes per row-foot. Treatments were applied over the top of the seed cane with a back-pack sprayer calculated to deliver 15 gallons per acre. Treatments included an infested control, an uninfested control, three rates of plinazolin, three rates of broflanilide, infested and uninfested plots treated with Platinum (thiamethoxam), and the industry standard, Thimet (phorate). The seed cane was covered with soil immediately following the application. Sugarcane emerged naturally, and stand counts were taken at on 8 Dec 2023, 13 Jan 2024, and 25 March 2024. Tiller counts were converted to tiller per acre prior to analysis. Data were analyzed for each date separately with generalized linear mixed models (SAS, Proc Glimmix) with treatment as a fixed effect and replication (n=5) as a random effect. Severe drought in the fall of 2023 greatly reduced plant cane emergence in all plots and may have affected wireworm feeding. Differences among treatments were not detected at any of the sampling dates (Table 1).

Table 1. Sugarcane stand as affected by insecticide treatments (LS Means), Schriever, LA, 2023–2024.

Treatment	Rate (fl oz/acre)	Tillers per acre		
		8 Dec 2023 Mean $\pm$ 1,496 [SE]	13 Jan 2024 Mean $\pm$ 1,303 [SE]	25 Mar 2024 Mean $\pm$ 2,609 [SE]
Uninfested control	NA	8,864	11,136	20,909
Infested control	NA	7,954	9,545	18,409
Plinazolin	2.74	7,500	10,682	18,409
Plinazolin	4.56	8,182	9,545	15,227
Plinazolin	6.84	6,364	9,090	14,901
Thiamethoxam	5.67	6,364	8,636	15,000
Thiam. uninfested	5.67	5,454	8,182	14,091
Broflanilide	2.28	8,182	10,000	16,364
Broflanilide	1.14	8,182	11,364	15,227
Broflanilide	0.57	6,818	9,318	16,364
Brof. uninfested	NA	6,364	8,636	15,682
Thimet	3 lbs/a	7,945	11,364	19,909
$F_{11, 33} =$		0.62	0.98	0.88
$P =$		0.801	0.484	0.570

## EVALUATION ON IN-GROUND BAITS FOR COLLECTION OF SUGARCANE WIREWORMS 2023

Blake E. Wilson, Carlos Wiggins, Carlos Rivera  
Department of Entomology

Wireworms (Coleoptera: Elateridae) are sporadic pests of sugarcane which feed on seed cane at planting and have potential to reduce plant populations. Wireworms have been a threat to sugarcane production in Louisiana for more than 100 years, but much remains unknown about their biology and pest status. Research is lacking due to the sporadic nature of infestations and difficulty in observing and quantifying wireworm larvae. Insecticide evaluations require collections of large numbers of larvae to inoculate experimental field plots. Anecdotal evidence suggests corn soaked in beer buried in the ground is an attractive bait useful in the collection of wireworms or sampling for pest management decisions.

An on-farm trial was conducted to evaluate the attractiveness of beer-soaked corn along with alternative baits including potatoes, and balls of sweetened bread dough (wheat flour, honey, and beer). The experiment was conducted in July 2023 in St. James Parish in a field of first ratoon sugarcane known to harbor relatively high infestations of wireworms. The experiment was conducted in a randomized block design with each of the three baits buried at approximately six inches beneath the soil surface in a sugarcane row (replication). After one week, baits were unearthed and wireworms found on bait or in surrounding soil were recorded and collected. Data were analyzed with generalized linear mixed models (SAS, Proc Glimmix) with bait as a fixed effect and replication (n=20) as a random effect.

Differences were detected among baits in the numbers of wireworms recovered ( $F = 5.34$ ,  $df = 2, 58$ ;  $P = 0.008$ ). The greatest numbers of wireworms were collected on potato (1.13 wireworms/bait  $\pm$  0.24 [SE]), with approximately half of that number on corn (0.5) and dough (0.5). Results suggest potatoes is a more effective bait than beer soaked corn, and could be used to improve efficiency of larval collections from sugarcane.