SUGARCANE APHID CONTROL – SMALL PLOT INSECTICIDE TEST

T. E. Reagan, F. R. Posey, and G. E. Coburn
Department of Entomology and Pest Management Enterprises, Inc.

Nine insecticide treatments were evaluated for control of two aphid pest species in sugarcane, the sugarcane aphid (WSA), *Melanaphis sacchari*, and the yellow sugarcane aphid (YSA), *Sipha flava*. An RCB design with five replications of three-row plots (0.01 acre each) in a field of plant sugarcane (variety LCP 85-384) was set up at the Henry Corley farm near Cheneyville, La. Insecticide treatments were applied in water using a "solo" 3-gal. hand pump pressurized backpack sprayer with an 8004 T-Jet flat fan tip nozzle with 32 psi spraying both sides of the sugarcane row on July 7 or 8. Relatively uniform pre-treatment infestations averaged 75-80 WSA and 8-10 YSA sampled on the 3rd or 4th leaf below the whorl. Post treatment counts were made on the 3rd or 4th leaf below the whorl with random samples of 10 plants per plot. Results on the sugarcane aphid (Table 1) indicated that the higher trending treatments, Aphistar (.25 lb) and Furadan (.75 lb), were not significantly different from the other rates of Furadan (.5 and .25 lb), Karate (.03 or .05 lb), or Orthene 75S (0.5 lb). Except for Danitol (181.6 g) with YSA, all treatments for both species were significantly different from the untreated check.

Table 1. Sugarcane aphid response to small plot insecticide test at Cheneyville, La, 2000.

Treatment (ai/acre)	Number of Aphids Per Leaf	
	Sugarcane Aphid (WSA) *Melanaphis sacchari*	Yellow Sugarcane Aphid (YSA) *Sipha flava*
Aphistar (0.25lbs)	0.4d	0c
Orthene 75S (0.5lbs)	1.4cd	0c
Furadan 4F (0.25lbs)	2.0cd	0c
Furadan 4F (0.5lbs)	0.6cd	0c
Furadan 4F (0.75lbs)	0.4d	0c
Karate Z (0.015lbs)	6.2cd	2bc
Karate Z (0.03lbs)	5.6cd	2bc
Knack (50g)	35.2b	3abc
Danitol (181.6g)	21.8bc	5.8ab
Check-Untreated	65.6a	6a

Ten plants randomly sampled leaves per plot (50 per treatment) ($P \leq 0.05$, LSD).

ASSESSMENT OF INSECT PEST MANAGEMENT IN LOUISIANA SUGARCANE

T. E. Reagan, F. R. Posey, M. E. Salassi, and W. H. White

Department of Entomology, Department of Agricultural Economics
& Agribusiness, and USDA-ARS Sugar Research Unit, Houma, La.

To determine an experimental assessment of insect pest management in Louisiana sugarcane, eight production regions were selected for comparison of sugarcane borer (SCB) *Diatraea saccharalis* spring deadhearts, SCB and other insect pest insecticidal control, end-of-season bored internodes (and adult emergence), and yield. In each area, two management units were selected to compare two-plantcane and two stubble fields in SCB susceptible varieties versus moderate or resistant varieties. A total of 117 fields were sampled across the primary Louisiana sugarcane production areas. The varieties sampled were LCP85-384 or HoCP91-555 (SCB susceptible) and HoCP85-845, CP70-321, LCP86-454, or LHo83-153 (SCB resistant). With cooperation from the respective growers and/or licensed consultants and county agents, spring deadheart sampling, stand counts, insecticide use, and end of season SCB bored internode frequency and adult emergence holes were compared to the yields of the sampled fields. During the deadheart survey, borer larvae were collected and reared out for parasite (parasitoid) determination.

Out of the 5,350 stalks (65,081 total internodes) evaluated for the eight areas, 1,331 of the internodes were bored, given a total average of 2.05%, and SCB spring deadhearts averaged 277 per acre for the 2000 growing season (Table 1 provides an analyzed mean of the summary for each area). Results indicated a year of very light insect pressure with most fields receiving only one or less application of insecticide because of the severity of the drought that farmers faced during this growing season. An exception to the drought occurred in the Central Louisiana area where early rains were received (Table 2 compares above normal rainfall versus drought conditions), and some fields required three applications for SCB control with infestations reaching as high as 20% live larvae in the leaf sheaths at times, and one field required four applications of insecticide. Some of these same farmers were also faced with an outbreak of the newly discovered white sugarcane aphid *Melanaphis sacchari* (Zehtner) and the yellow sugarcane aphid *Sipha flava* (Forbes) requiring additional insecticide treatments.

Table 1. Deadheart Assessment and SCB Injury in Louisiana Sugarcane Industry for 2000.

Selected Areas	SCB Deadhearts/ Acre	% SCB Bored Internodes
Central	675a	4.10a
Southwest	167b	2.91ab
Upper River	150b	2.77ab
Upper Lafourche	406ab	2.51abc
Lower Lafourche	113b	2.04bc
Vermilion	248b	1.33bc
Teche	219b	1.26bc
Lower River	238b	0.68c

Each value represents a mean of 16 fields ($P \leq 0.05$, LSD).

Table 2. Integrated Pest Management Comparison of Three Areas of the Louisiana Sugarcane Industry for 2000.

Area	Rainfall (Inches)			# of Insecticide Applications	% SCB Bored Internodes	# of Dead-hearts/ Acre
	Apr & May	Jun & Jul	Aug & Sep			
Central	11.70	6.26	0.84	2.5	4.10a	675a
(+/-) from normal	2.45	0.47	- 4.50			
Lower River	1.80	7.30	12.40	0.1	0.68c	238b
(+/-) from normal	- 3.93	- 2.80	- 2.17			
Vermilion	1.03	7.13	5.89	0.0	1.33b	248b
(+/-) from normal	- 7.57	- 3.79	- 6.50			

Weather data was gathered from Climatological Data Louisiana 2000 ($P \leq 0.05$, LSD).

Central = Rapides and Avoyelles parishes, Lower River = St. John and St. Charles parishes, and Vermilion = Abbeville and Youngsville areas including all of Vermilion parish.

SMALL PLOT ASSESSMENT OF INSECTICIDES AGAINST THE MEXICAN RICE BORER IN TEXAS SUGARCANE

T. E. Reagan, F. R. Posey, C. Blanco, R. Miller, and J. W. McGee
Department of Entomology and Rohm and Haas Co.

Three insecticides and an untreated check were evaluated in an experiment for Mexican rice borer, *Eoreuma loftini* (Dyar) control at Duda farms near Donna, Texas, in the Lower Rio Grande Valley. An RCB design with six replications was used in a field of first ratoon sugarcane (variety CP 72-1210). Insecticide treatments were applied to three-row plots (0.01 acre each) using a 3-liter CO_2 pressurized backpack sprayer with two hollow cone nozzles delivering 25 gpa at 30 psi. To obtain the maximum possible coverage, both sides of each row were sprayed with the two-nozzle wand held approximately 45 degrees to the horizontal. Seven applications were made to each side of the cane row at approximate three-week intervals. The initial treatment was made on 27 Apr when the MRB larval infestation was approximately 5% live larvae on the plant surface and in the leaf sheaths, and MRB adult pheromone trap catches adjacent to the test averaged greater than two moths per day. MRB damage was assessed by counting bored internodes and the total number of internodes per stalk from 120 randomly selected stalks of sugarcane (20 stalks/ plot) on the center row in each treatment (2 Nov). All insecticides were applied with Latron CS-7 at 0.125% v/v. Following ANOVA, separation of means was by LSD.

Based on percentage of MRB bored internodes, all three insecticide treatments significantly suppressed plant injury with the reduction in boring varying from 65-87%. Plant injury from the sugarcane borer, *Diatraea saccharalis,* which is distinctively different, was never more than a 5-8% proportion of that attributed to MRB.

Table 1. Effect of insecticides against the Mexican rice borer in sugarcane, Donna, Texas, 2000.

Treatment/ formulation	Rate per acre	Percent bored internodes
Fury 1.5 EC	3.83 oz	2.12b
Confirm 2F	16.00 oz	3.63b
Intrepid 2F	8.00 oz	5.93b
Untreated	–	16.53a

Means in a column followed by the same letter are not significantly different at 5% level (LSD).
Seven applications with a CO_2 backpack sprayer at approximate three-week intervals initiated 4-27-00.

SMALL PLOT ASSESSMENT OF INSECTICIDES AGAINST THE SUGARCANE BORER

T. E. Reagan, F. R. Posey, and W. H. White
Department of Entomology and USDA-ARS Sugarcane Res. Unit, Houma, LA

Eleven insecticide treatments were evaluated for control of sugarcane borer (SCB), *Diatraea saccharalis* (F.) in an RCB design with five replications in a field of plant sugarcane (variety) LCP 85-384, at St. Gabriel, La. Insecticide treatments were applied to three-row plots (0.01 acre each) using a CO_2 sprayer mounted on an all-terrain vehicle on 13 Jul and 4 Aug. Three 8005 flat fan spray tips per 6 feet width of row delivered 20 gpa at 35 psi. Initial treatment was made when the SCB infestation exceeded Louisiana's economic threshold level (5% of the stalks containing live larvae in the leaf sheaths); the succeeding application was made when re-infestation began to appear in the Confirm 2F treatment. Prior to test initiation, one application of Lorsban 15G was broadcast (15.0 lb/acre) to suppress red imported fire ant predation on SCB larvae (10 Jul). SCB damage was assessed by counting the bored internodes, moth emergence holes, and total number of internodes per stalk from 100 randomly selected stalks of sugarcane (20 stalks/plot) in each treatment (27 Oct). All of the Confirm 2F and Intrepid 2F treatments were applied with the surfactant Latron CS-7 at 0.25% vol/vol. Following ANOVA, means were separated with LSD.

Except for Intrepid 2F at the 4 oz per acre rate, all insecticide treatments resulted in less than 10% bored internodes (economic injury level) [Table 1]. All treatments were significantly different from the untreated check of 18.42% bored internodes. Because of unseasonable drought conditions, borer infestations were abnormally low during the summer of 2000. Experience shows that the most reliable untreated check approaches 25% bored internodes.

Table 1. Effect of small plot insecticidal test on (SCB) *Diatraea saccharalis* (F.), St. Gabriel Research Station, 2000.

Treatment/formulation	Rate (amt/acre)	% Bored internodes	No. of exit holes/acre[a]
Fury 1.5 EC	3.2 oz	2.50d	5,674c
Karate Z	1.92 oz	3.73cd	5,158c
Danitol 2.4 EC	21.3 oz	4.91cd	7,221c
Confirm 2F[b]	8.0 oz	5.31cd	8,252bc
Knack	16.0 oz	5.71bcd	8,768bc
Asana XL	5.8 oz	5.94bcd	10,315bc
Intrepid 2F[b]	6.0 oz	6.37bcd	14,957bc
Intrepid 2F[b]	2.0 oz	8.05bcd	17,536bc
Tracer	3.0 oz	8.70bc	18,567bc
Tracer	2.0 oz	8.70bc	19,083bc
Intrepid 2F[b]	4.0 oz	11.81b	25,272ab
Untreated Check	---	18.42a	40,229a

Means followed by same letter in a column are not significantly different ($P \leq 0.05$, LSD).

Insecticide plots were treated on 13 Jul and 4 Aug.

[a]Number of exit holes reflect moth emergence. [b]+ Latron CS-7 at 0.25% vol/vol.

ASSESSMENT OF VARIETAL RESISTANCE TO THE SUGARCANE BORER

T. E. Reagan, F. R. Posey, and W. H. White
Department of Entomology and USDA-ARS Sugar Research Unit, Houma, La.

Sugarcane resistance to the sugarcane borer, *Diatraea saccharalis*, (SCB) is categorized as a combination of physical characteristics that hinder boring (i.e., rind hardness, leaf-sheath appression), cultivar specific tolerance to boring, and antibiosis mechanisms that contribute to differences in survival of bored in larvae. The extent of this resistance is also influenced by the severity of infestations. Heavy borer pressure results in more bored internodes even in cultivars considered highly resistant. Several factors contribute to seasonal areawide SCB infestation levels such as weather conditions, predator and parasite numbers, and indigenous borer populations. Expansive acreage of cultivars with elevated moth production increases endemic SCB populations and imposes additional pressure on the remaining resistant varieties. For this reason, we also report moth production for each cultivar in these tests.

Test plots for assessing SCB varietal resistance in the 1997 HoCP and 1998 L series cultivars and three commercial varieties were planted September 22, 1999, at Glendale Plantation, Killona, La. A randomized block design replicated four times was used with each block containing two plots of the commercial cultivars CP70-321, HoCP85-845, and LCP85-384 and one plot for each block of the HoCP-97 and L-98 cultivars. No chemical controls for SCB were applied in the test and natural control from fire ants was suppressed by applying granular Lorsban in late June. A 15-stalk sample was cut from each plot on October 12, 2000 (four replications = 60 stalks per each of HoCP-97 and L-97 cultivar and 120 stalks per commercial cultivar). Sample stalks were examined to determine the number of bored internodes, moth emergence holes, and the total number of internodes.

Cultivars HoCP97-609 and L98-209 had the most bored internodes (10.47% and 12.65%, respectively). LCP85-384 had the highest moth production with 23,426 moths per acre produced, and is seven to eight times higher than HoCP85-845 and L98-207 ($P \leq 0.05$, LSD). Commercial cultivar LCP85-384 also had a higher level of bored internodes at 9.69%. HoCP85-845 had the lowest bored internodes (3.59%), followed by CP70-321, and L98-207 at 4.18%, and 6.01%, respectively.

Host plant resistance to target pest insects remains an important component of the sugarcane IPM system, providing growers with a proven methodology for minimizing the economic impact of the sugarcane borer. Resistant varieties reduce pest damage at little or no cost to the grower. Our research now provides additional assessment criteria for selecting resistant cultivars. Incorporating the cultivar's pest survival rating better allows us to flag varieties that will enhance SCB populations in an area. Quantifying the impact of adult SCB emergence involves little additional data collection and enhances the efficiency and value of the entomological component in sugarcane breeding and varietal development at the LSU Agricultural Center.

Table 1. Sugarcane borer damage and moth production on 1997 HoCP series, 1998 L series cultivars, and three commercial varieties during 2000, Glendale Plantation, Killona, La. Test was planted September 22, 1999, and samples cut October 12, 2000.

Variety	% Bored Internodes	Stalks/Acre*	Moths/Acre Production
HoCP85-845	3.59d	30,799	3,337b
CP70-321	4.18d	33,493	5,582ab
L98-207	6.01cd	57,934	3,862b
HoCP97-606	6.52bcd	42,754	11,401ab
LCP85-384	9.69abcd	46,851	23,426a
HoCP97-609	10.47abc	40,561	19,605ab
L98-209	12.65ab	49,163	10,652ab

Means followed by the same letter are not significantly different ($P \leq 0.05$, LSD).
* Based on stand counts provided by Dr. Kenneth Gravois, Sugar Research Station.

Acknowledgment: The sugarcane entomology program would like to express appreciation for help from other members of the sugarcane variety development and breeding program for their assistance in cutting the seed-cane, planting, and harvesting the plots.

EFFECTS ON NON-TARGET ARTHROPODS FOLLOWING INSECTICIDAL WIREWORM CONTROL IN SUGARCANE

T. E. Reagan, F. R. Posey, M. Ramaswamy, and E. A. Ostheimer
Department of Entomology

Granular insecticides were spread with a tractor-mounted Gandy applicator in open sugarcane (*Saccharum* spp. (Interspecific hybrid) 'LCP 85-384') furrow at planting of a 32-acre field of Vanderlick Farms near Lecompte, La., November 16, 1999, to evaluate effect of wireworm insecticides on non-target arthropods. Treatments assigned to 1.6 acre plots in an RCB design with five replications were Aztec 2.1G, Mocap 20G, Thimet 20G, and an untreated check. Particular attention was given to constructing drains and water furrows so that pesticide-treated soil would not drain into adjacent plots. Three pitfall traps (pint jars filled with 150 ml of 70% ethylene glycol in water) were embedded 10 m apart on the center of the middle three rows of each plot and covered by a 22 cm diam metal disc supported on a tripod 3 cm above the jar and soil surface. Non-target arthropods [Araneida (Spiders), Gryllidae (Crickets), Formicidae (Ants, *Solenopsis invicta* Buren)] were collected in pitfall traps during sampling periods for early (Mar 3-15), middle (Jun 23-Jul 5, and Jul 5-25) and late (Aug 8-30) season.

The ant collection early season showed a 25% suppression in Aztec plots ($P \leq 0.05$, LSD). Mid-season spiders were suppressed approximately 30%, and crickets 50-60% in all insecticide treatments ($P \leq 0.05$, LSD). *S. invicta* was significantly reduced 30-50% in Mocap and Aztec treatments, with a trend for a 30% reduction in Thimet plots mid-season [Table 1]. In this experiment differences were not detected with late season sampling of arthropods, among any other arthropods throughout this study, or in yield of sugarcane.

Table 1. Pitfall trap collection of non-target arthropods following insecticidal wireworm control in sugarcane, Lecompte, La., 2000.

	Non-Target Arthropods								
Treatment/	*Solenopsis invicta*			Spiders			Crickets		
Formulation	Early	Mid	Late	Early	Mid	Late	Early	Mid	Late
Thimet 20G	35.2a	67.1ab	94.2	10.4	20.0b	18.8	3.6ab	18.3b	65.6
Mocap 20G	24.8ab	62.1b	110.6	10.6	17.7b	15.6	2.0b	18.0b	75.0
Aztec 2.1G	22.8b	48.3b	94.6	11.2	17.3b	12.8	4.4a	13.8b	84.6
Untreated	30.2ab	92.7a	98.6	12.2	25.0a	15.4	3.2ab	34.8a	70.2

Mean number per three traps per two-week sampling period (comparatively adjusted for sampling interval).
Each insecticide applied at 9.0 lb formulated material per acre.
Means followed by same letter in a column are not significantly different ($P \leq 0.05$, LSD).

ASSESSING THE THREAT OF THE MEXICAN RICE BORER TO SUGARCANE AND RICE IN THE UPPER TEXAS RICE BELT AND WESTERN LOUISIANA

T. E. Reagan, M. O. Way[1], and F. R. Posey
Department of Entomology and
[1]Texas Agricultural Research and Extension Center
1509 Aggie Drive, Beaumont, TX 77713

As a followup to pheromone trap sampling for the Mexican Rice Borer (MRB), *Eoreuma loftini* (Dyar) (Lepidoptera: Crambidae), adjacent to sugarcane fields in Southeast Texas and Southwest Louisiana in 1999, cooperative studies between Texas A&M and the LSU AgCenter were undertaken in the summer and fall of 2000 to define the insect's present range. Using twice weekly monitoring of pheromone traps in 12 Texas counties and seven Louisiana parishes, newly discovered MRB locations were in Brazoria, Colorado, Fort Bend, Waller, and Wharton counties in Texas. (See Figure 1 for relative locations). The insect still is not known to occur in Louisiana, but now appears in relatively high populations within 50 - 60 miles of the new sugarcane production area near Beaumont, TX (See Table 1). In addition to pheromone trap assessment, larval infestations in rice and other grasses have been discovered in many of the newly invaded areas.

Management studies involving varietal resistance and insecticide control were also assessed with cooperators in the USDA, LSU AgCenter, and Texas A&M Systems, as well as with chemical industry colleagues, and the Rio Grande Valley Sugar Growers Association. The most promising MRB pesticidal controls in sugarcane, though inadequate compared to the sugarcane borer standards, were cyfluthrin (Baythroid(R)) and the ecdysone agonist tebufenozide (Confirm(R)). Replicated variety assessment to determine relative MRB resistance of rice and sugarcane has shown at least 4.5-fold differences in susceptibility among selected commercially available varieties. MRB has proved to be a very severe pest of sugarcane in South Texas and Mexico, and would be an especially serious problem to Louisiana growers under drought conditions similar to those experienced in recent years. Agricultural Extension agents together with the Texas and Louisiana departments of agriculture personnel have additionally assisted in these monitoring studies.

Table 1. Pheromone Trap Collections of Mexican Rice Borer (*Eoreuma loftini*) Moths in Southeast Texas, 2000[1]

Texas Counties	May	June	July	August	September	October	November
NEW DISCOVERY							
Brazoria	6	39	23	31	6	--	6
Colorado	75	192	203	305	432	712	113
Fort Bend	56	210	85	135	43	--	--
Waller	0	4	10	16	18	23	9
Wharton	109	228	232	325	393	638	132
PREVIOUSLY KNOWN COUNTIES							
Calhoun	--	--	110	307	385	560	107
Jackson	263	350	275	276	98	102	34
Matagorda	846	832	462	1175	1096	435	--
NO MRB COLLECTED							
Chambers	0	0	0	0	0	0	0
Jefferson	0	0	0	0	0	0	0
Liberty	0	0	0	0	0	0	0
Orange	0	0	0	0	0	0	0

[1]Number of moths per two traps per month. Moths were removed from traps twice weekly; pheromone lures and insecticide strips replaced monthly.

Figure 1. Map of Mexican Rice Borer Pheromone Trapping in the Main Texas Rice Area (Southeast Texas), 2000.