

Pheromone Trap Assisted Scouting - Mexican Rice Borer in Sugarcane

Gene Reagan

Department of Entomology
LSU Agricultural Center, Baton Rouge, LA



The Mexican Rice Borer *Eoreuma loftini* (Dyar) (Lepidoptera: Crambidae)

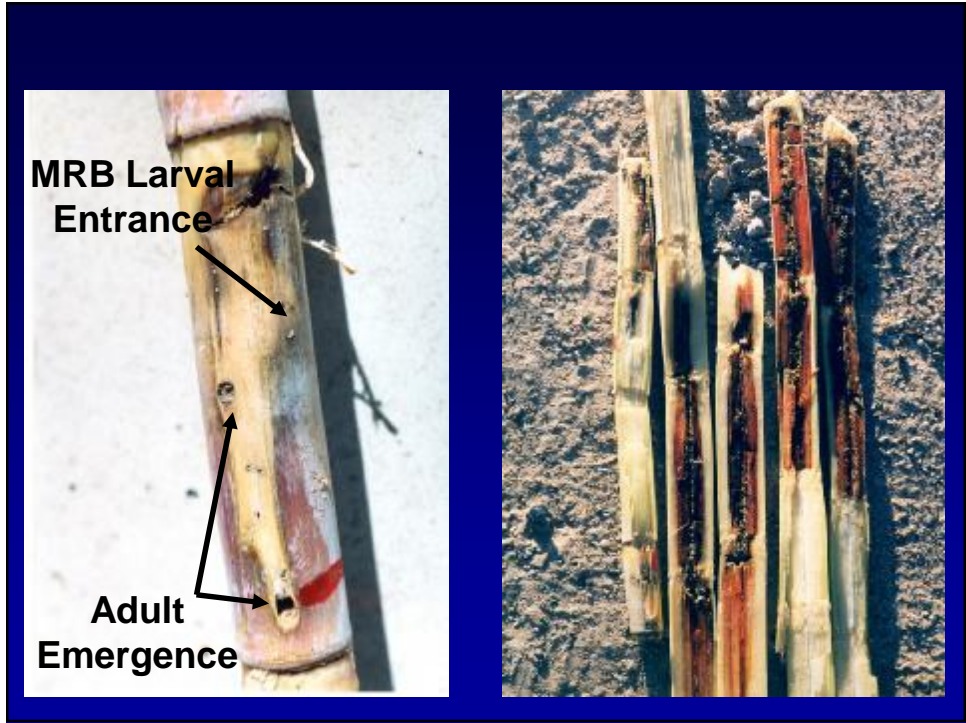




MRB Larval Injury



MRB Larval Injury



A loss of \$10-20 million annually over the entire Texas sugarcane region



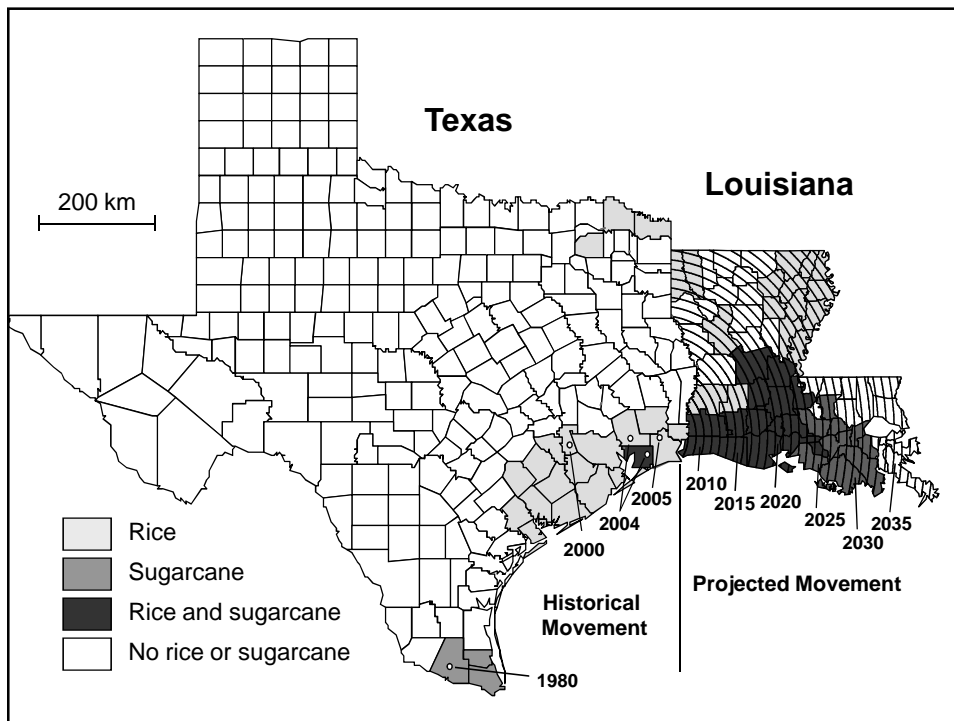
Legaspi et al. 1997 Subtrop. Plant Sci. 49: 53-64.



List of Grants

1. **USDA (CSREES) IPM Crops at Risk Program** – Building an Area-wide IPM Perspective for Stalk Borers Threatening Sugarcane and Rice (2008-2010): **\$215,390**
2. **USDA (CSREES) IPM Enhancement Grants Program** – IPM of Invasive Stem Borers Impacting Sugarcane and Rice in the Gulf Coast Region (2005-2006): **\$62,071**
3. **U.S. EPA (Strategic Agricultural Initiative)** – Chemical Management of Stem Boring Insects in Environmentally-Sensitive Agroecosystems (2004-2007): **\$86,000**
4. **USDA (CSREES) IPM Crops at Risk Program** – Development and Implementation of an IPM Program for Exotic and Native Stalk Borers Threatening Sugarcane and Rice in Louisiana and Texas (2003-2006): **\$184,771**
5. **USDA (CSREES) Integrated Pest Management Program** – IPM of the Mexican Rice Borer in Sugarcane and Rice (2002-2005): **\$199,070**
6. **USDA (CSREES) Critical Issues** – Mexican Rice Borer, Identification of Range and Variety Assessment (2000-2001): **\$40,000**

MRB Pheromone Trap



LDAF MRB trapping in Louisiana, 2009

District	Parish	# Traps	Site Descr.
Crowley	Calcasieu	39	Plant Hosts
Crowley	Cameron	5	Plant Hosts
Crowley	Jeff Davis	12	Plant Hosts
Crowley	Beauregard	3	Plant Hosts
Opelousas	Iberia	8	Mill / COOP
Opelousas	St. Mary	3	Mill / COOP

Ganado Site Visit



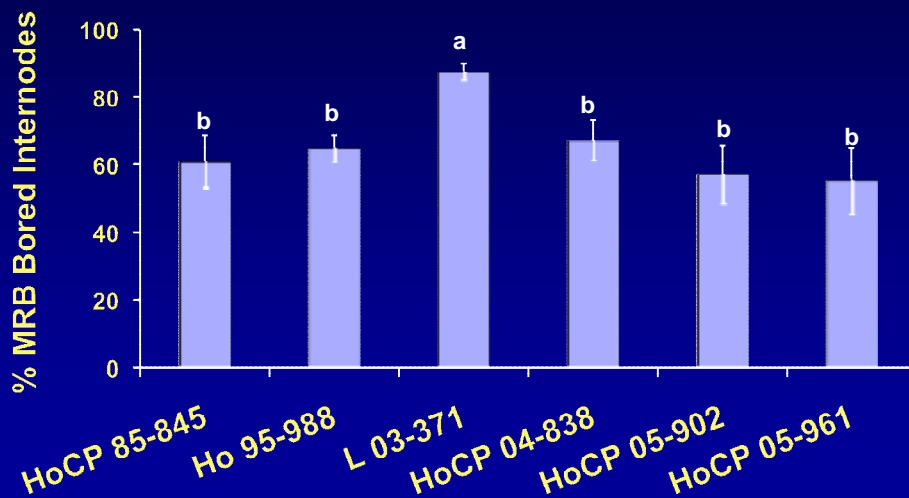
Sugarcane Susceptibility to MRB Weslaco, TX, 2001

Cultivar	% Bored Internodes	Moth Emergence/hectare
HoCP 91-555	13.8a	15,071ab
LCP 85-384	12.1ab	17,052a
NCo 310	9.0ab	4,926ab
CP 70-321	7.6ab	3,805ab
HoCP 85-845	5.3b	3,038b
<i>F</i>	3.37	4.34
<i>P < F</i>	0.035	0.0015

Randomized block design, 5 replications, Tukey's HSD.

Reay-Jones et al. 2003. J. Econ. Entomol. 96: 1929-1934

Sugarcane Variety Test Ganado, TX, 2009



Sugarcane Variety Test Beaumont, TX, 2010

- **25 sugarcane varieties**

HoCP 85-845, HoCP 96-540, HoCP 05-902
HoCP 05-961, HoCP 00-950, HoCP 04-838
Ho 06-563, Ho 06-9610, Ho 07-613, Ho 07-604
Ho 07-617, Ho 07-612, Ho 06-537, L 01-299
L 03-371, L 07-57, L 07-68, N-17, N-21, N-24, N-27
US 93-15, US 01-40, US 08-9001, US 08-9003

- **Percent bored internodes and emergence data will be collected in fall of 2010**

Irrigated vs. Non-Irrigated Sugarcane

- **Non-stressed**



- **Stressed**



Irrigated vs. Non-Irrigated Sugarcane



Aerial Application Insecticide Test LRGV, TX, 2009

- Baythroid and Diamond insecticides
- 5 fields (replications) ranging from 36-85 acres of variety CP 72-1210
- Insecticide treatments were assigned randomly to field plots (10 acres/treatment /plot)
- Trap catches of >20 moths/trap/week were used as an action threshold to initiate monitoring for treatable infestations

Wilson et al. 2010. Arthropod Manage. Tests (in press)

Aerial Application Insecticide Test, LRGV, TX, 2009



Aerial Application Insecticide Test LRGV, TX, 2009

Rep	No. of male MRB moths per trap												% larval infestation
	15-Jul	22-Jul	29-Jul	5-Aug	12-Aug	19-Aug	26-Aug	2-Sep	9-Sep	16-Sep	23-Sep	14-Oct	
1	7	5	5	12	<u>35</u>	18	<u>27</u>	15	6	13	8	2	5
2	4	11	22	<u>37</u>	<u>31</u>	20	<u>40</u>	21	7	2	8	2	10.5
3	5	9	5	17	16	12	<u>29</u>	19	10	7	2	2	12.5
4	16	9	15	15	<u>22</u>	<u>24</u>	<u>23</u>	<u>29</u>	<u>24</u>	12	<u>20</u>	3	8.8
5	7	14	13	12	<u>37</u>	20	21	<u>38</u>	16	8	21	4	32.1

Insecticides were applied on 21 Aug, 2009

Sugarcane Stalk Splitter



Aerial Application Insecticide Test LRGV, TX, 2009

Treatment	Rate (oz/a)	% Bored Internodes	Moth Emergence per Stalk
Control	NA	20.42a	0.8258a
Baythroid	2.8	12.63a	0.464a
Diamond	12	6.80b	0.306a

Means within column followed by the same letter are not different
($P \geq .05$, Tukey's HSD)

MRB Insecticide Test Ganado, TX, 2009

Treatment ^a	Rate (oz/acre)	% Bored Internodes	Exit Holes/stalk
Control	-	64.7a	0.98 a
Confirm	12	41.5ab	0.83 a
Diamond	12	25.2b	0.60 a
Baythroid	2.8	22.0bc	0.46 a
Belt	4	8.1c	0.00 a
<i>F</i> value		16.75	2.41
<i>p</i> value		<.0001	0.0987

^a3 insecticides applications (19 Jun, 22 Jul, and 20 Aug, 2009)

Means within column followed by the same letter are not different (P ≥ .05, Tukey's HSD)

SCB Insecticide Test Burns Point, LA, 2009

Treatment ^a	Rate (oz/acre)	% Bored Internodes	Exit Holes/stalk
Control	-	28.07a	1.49b
Confirm	8	4.97b	0.05a
Belt	3	3.09b	0.13a
Baythroid	2.1	3.07b	0.14a
Belt	4	2.46b	0.14a
Diamond	9	1.82b	0.10a
Coragen	5	1.38b	0.10a
<i>F</i> value		10.39	22.46
<i>p</i> value		<.0001	<.0001

^a2 insecticides applications (7 Jul and 6 Aug, 2009)

Means within column followed by the same letter are not different (P ≥ .05, Tukey's HSD)

Wireworm Insecticide Test Burns Point, LA, 2009

- **Admire Pro** (liquid), **Rynaxypyr** (liquid and granular), **NUQ05055** (granular), and **Mocap** (granular)
- **RCB (5 reps), 3-row plots (30 ft)**
- **Insecticides applied at planting**

Wireworm Insecticide Test Burns Point, LA, 2009

Treatment	Rate ^a	Shoots/acre		Yield (ton/acre)	Sugar(lb s/ton)
		Dec 08	Apr 09		
Admire Pro^b	14	14,037 a	41,820 ab	40.5 a	229 a
Mocap	20	16,457 a	43,078 ab	40.3 a	236 a
NUQ05055	13.4	15,005 a	44,676 ab	39.8 a	234 a
Rynaxypyr^b	7	14,279 a	45,015 a	38.1 a	234 a
Rynaxypyr	21	13,117 a	38,722 b	32.6 a	237 a
Control	-	13,746 a	39,884 ab	31.7 a	238 a
F value		0.73	3.25	0.91	0.04
p value		0.6052	0.0230	0.4912	0.9992

^a oz/acre for liquid formulation, lbs/acre for granular formulation

^b liquid formulation

Means within column followed by the same letter are not different
(P ≥ .05, Tukey's HSD)

List of Publications

1. Hummel et al. 2010. Monitoring and **first discovery** of the MRB in LA. Florida Entomologist 93: 123-124.
2. Reay-Jones et al. 2008. **Predicting Economic Losses** from the Continued Spread of the MRB. J. Econ. Entomol. 101: 237-250.
3. Reay-Jones et al. 2007. Role of **oviposition preference** in an invasive Crambid impacting two graminaceous crops. Environ. Entomol. 36: 938-951.
4. Reay-Jones et al. 2007. Economic assessment of controlling stem borers with **insecticides** in TX rice. Crop Protection 26: 963-970.
5. Reay-Jones et al. 2007. **Movement** of the MRB through the TX rice belt. J. Econ. Entomol. 100(1): 54-60.
6. Way et al. 2006. **Plant resistance** to stem borers among TX rice cultivars. J. Econ. Entomol. 99(5): 1867-1876.
7. Reay-Jones et al. 2005. **Integrated tactics** for managing the MRB in sugarcane Environ. Entomol. 34: 1558-1565.
8. Reay-Jones et al. 2005. Concepts of **area-wide management** of the MRB. Sugarcane International 23: 20-24.
9. Reay-Jones et al. 2003. **Plant resistance** to the MRB among LA and TX sugarcane cultivars. J. Econ. Entomol. 96: 1929-134.

Research Areas

- **Monitoring and predicting MRB movement**
- **Host plant resistance and role of plant biochemistry**
- **Insecticides and timing of applications**
- **Cultural practices (irrigation)**
- **Role of non-crop hosts**
- **Pheromone trap assisted scouting**

Best Management Practices for the Mexican Rice Borer

- **Plant Resistant Varieties**
- **Pheromone Trap Assisted Scouting**
- **Narrow-Range Minimum-Risk Insecticides**
- **Minimize Plant Stress**
 - Drought tolerant varieties
 - Irrigation and fertilization
- **Process Cane at the Closest Mill**

Acknowledgment of Support

Cooperators:

- W. Akbar
- J. Amador
- J. Beuzelin
- M. Gould
- K. Gravois
- J. Hoy
- B. Legendre
- J. Ottea
- D. Pollet
- F. Reay-Jones
- A. Showler
- M. Stout
- M. Way
- E. Webster
- B. Wilson
- W. White

Funding Agencies:

- **USDA (CSREES) Critical Issues Program**
- **USDA (CSREES) Southern Region IPM Program (Research and Extension)**
- **USDA (CSREES) Crops at Risk Program**
- **EPA Strategic Agricultural Initiative**
- **American Sugar Cane League**
- **Texas Rice Research Foundation**

