Louisiana

IPM of Invasive Stem Borers Impacting Sugarcane and Rice in the Gulf Coast Region

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Hovering just over the Louisiana border in southern Texas, two invasive and destructive pests have proven an economic disaster for Texas rice and sugarcane growers. In 1980, the Mexican rice borer (MRB) appeared in the Lower Rio Grande Valley, where it quickly ate its way through the sugarcane crop, leaving farmers with barren stems. Texas growers increased the number of pesticide treatments per year, spending hundreds of thousands of dollars with little result. As MRB inched up through Texas toward Louisiana, concern grew significantly among Louisiana growers, extension personnel and researchers.

In response, a group of Texas A & M University and Louisiana State University Agricultural Center researchers, including Drs. Thomas E. Reagan, M.O. Way, F.P.F. Reay-Jones, and Ben Legendre, began to monitor the insects more closely. Part of their study included discovering how the insect could survive even the heaviest pesticide treatment in the harsh, dry conditions of the Texas heat. Their observations proved that this stem borer was not only immune to environmental stress; they actually preferred it.

"The insect evolved in the southern part of the Sonoran desert in Mexico," Dr. Reagan said. "It's able to survive under extremely stressful conditions. It even lays its eggs on brown foliage, so it's far more attracted to stressed plants."

Natural predators, typically an effective pest control strategy for many pests, had little effect on the stem borers, primarily because the insect burrows into the plant and is not exposed—one of the reasons that pesticides don't work, either. The weather is the other reason.

The MRB causes a loss of $10-$20 million annually over the entire Texas sugarcane region.

"The sea breeze in the Lower Rio Grande Valley is so severe that it interferes with insecticides," said Dr. Reagan. "The insect goes into the plant so quickly that we need something that leaves a residue when they hatch from the eggs."

After Texas spent millions of dollars on biocontrol research with few results, Reagan's team began to refocus on other pest management methods, including new crop varieties, weed and irrigation management, and insecticide applications. From 2000 to 2006, they tested each technique individually and in conjunction with others. At last they discovered how the stem borers could be controlled—by combining all of the methods together.

Their monitoring efforts concluded that the more resistant varieties, especially CP 70-321 and HoCP 85-845, did not succumb as easily to MRB and the sugarcane borer (SCB) as did the traditional varieties. According to a report summarizing their findings, even some of the newly released varieties were as susceptible to the pests as the older ones. Irrigation reduced plant injury from the borers to about half of what was found during natural weather conditions.

As the team studied the movements of both stem borers, they discovered one of the secrets behind the insects' quick infestation: stem borers inhabit and lay their eggs in some of the weeds that grow in and around the rows of crops, providing a comfortable habitat for the stem borers and their offspring and sucking nutrients from the crops, leaving them weak and susceptible to the stem borers' attack. According to Dr. Reagan and his graduate student Julien Beuzelin, the insects' most popular weeds included Johnson grass, broadleaf signal grass, and spangletop.

Dr. Reagan's team also tested environmentally-friendly insecticides to reduce the impact of chemical treatments on predators. While novaluron, a biologically-based insecticide, worked in controlling SCB in sugarcane, none of the natural pesticides worked in rice. Synthetic pyrethroids proved most effective, but they also killed many of the arthropod predators that

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eat stem borers, including ants and spiders. However, when used in conjunction with the other control methods, the insecticides were even more effective.

Although his team has made strides in finding ways to control the stem borers, Dr. Reagan says the concern does not stop with the farms. The stem borers have affected not only sugarcane harvests; they have also raised questions about processing the cane. Some of the sugarcane produced in Texas used to be processed in Louisiana mills. With concerns about infested cane crossing the border, Louisiana sugarcane processors will be designating a new mill in Lacassine (Western Louisiana), to process TX cane, but only after MRB infests that area.

At present there is a quarantine on Texas cane coming into Louisiana.

"Almost all processing of east Texas sugarcane was done in St. Mary parish, which is centralized in the major production area," said Dr. Reagan. "With the new mill in Lacassine, insect-infested cane will go there."

More detailed information is presented in the technical report on the project, Reay-Jones, F.P.F., L.T. Wilson, M.O. Way, T.E. Reagan, C.E. Carlton. 2007. Movement of the Mexican rice borer (Lepidoptera: Crambidae) through the Texas rice belt. Journal of Economic Entomology 100(1): 54-60.

Yield differences in this experiment ranged from 50 lbs/acre for untreated to 5000 lbs/acre for treated for stem borer control.