

PEST of the QUARTER

Stem Borers Become More Troublesome



Southwest
Region

The sugarcane borer is becoming more of a problem for Louisiana rice. This insect overwinters as last-instar larvae in the stalks (stubble) of rice and other hosts. Larvae pupate in the spring and adult moths emerge in May. Adult sugarcane borers are straw-colored moths, approximately ¾ inch long, with a series of black dots arranged in an inverted V-shaped pattern on the front wings. Eggs are flat, oval, cream-colored, and positioned like fish scales in clusters of 2-100 eggs. Eggs are typically laid on the upper third of plants. Larvae emerging from eggs feed on the surface of leaves and quickly move to the base of the leaf. Larvae feed on leaf tissue inside of the leaf sheath for a few days before boring into the stem. After this point in the life cycle, control of sugarcane borers using insecticides is not possible. Larvae feed inside the stem for three to

four weeks. Pupation occurs inside the stem. Early infestations of the sugarcane borer result in death of the youngest partially unfurled leaf of the rice plant, a symptom known as a dead-heart. Feeding inside the stem during panicle development causes partial or complete sterility of panicles and manifests as whiteheads in mature rice.

The Mexican rice borer still hasn't crossed the border from Texas into Louisiana but is slowly heading our way. The life histories of the sugarcane borer and the Mexican rice borer on rice are similar. Egg-laying behavior of the two species is comparable, although the Mexican rice borer prefers to lay its eggs on dry leaves. Like sugarcane borer larvae, Mexican rice borer larvae feed on leaves and leaf sheaths for a short time and later bore into rice stalks. Tunneling behavior of the two species differs somewhat. For example, sugarcane borers keep their tunnels free of frass, whereas Mexican rice borers do not. Last-generation larvae of the Mexican rice borer overwinter in stems and emerge in the early spring.

The Mexican rice borer was first detected in Texas in 1980 and is now the major insect pest of sugarcane in the Lower Rio Grande Valley. Concerns about the movement of Mexican rice borers into new areas of Texas and possibly into Louisiana

(including rice-growing areas in both states) prompted the initiation in 2000 of a major monitoring effort for this pest. This program is the result of a collaboration between the Texas and Louisiana Departments of Agriculture, the LSU AgCenter and Texas A&M.

Pheromone traps are used to monitor this insect in various counties in Texas and Louisiana. The range of the Mexican rice borer is slowly expanding. In 2004, adults of this insect were detected in two counties, Chambers and Liberty, in which they previously had not been found. In 2005, a few moths were found for the first time in Jefferson County, just east of the Louisiana-Texas border. Trap catches in the year after initial infestation have been consistently higher than in the year of initial infestation, a pattern which is consistent with the establishment of the pest in the new counties. Results from monitoring in 2006 have not yet been tabulated, but, as of 16 October 2006, no Mexican rice borers have yet been captured in Louisiana.

In response to the impending threat of the Mexican rice borer and to increasing problems with the sugarcane borer in Louisiana rice, the Rice Entomology program has expanded its focus to include research on stem borers. All research to this point has been conducted with the sugarcane borer, because the Mexi- Cont. pg 2



Mexican Rice Borer

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Special Dates of Interest:

Louisiana Seed Rice Growers Meeting
November 2, 2006
Rice Research Station, Crowley, LA
Rice Outlook Conference
December 2-5, 2006
South Las Vegas, Nevada

Pest of the Quarter

Stem Borers Become More Troublesome

Cont.

can rice borer cannot be imported into the state for experimentation.

Research on the management of sugarcane borers with insecticides was initiated following severe infestations of several fields in central Louisiana in 2002. Two pyrethroid insecticides are currently registered against this pest. Small-plot comparisons of insecticide efficacies showed that applications of pyrethroid insecticides made at the pre-boot, panicle initiation, and panicle differentiation stages of rice development reduced symptoms of stem borer infestation and increased rice yields.

In addition, several experiments investigating egg-laying behavior of stem borers have been conducted. In a field experiment, rice was found to be susceptible to infestation by sugarcane borers from the mid-tillering stage to

the heading stage, and, in a greenhouse experiment, egg-laying by sugarcane borers was found to be greater at the boot and heading stages than at the panicle initiation and mid-tillering stages of rice. Experiments are being performed to compare egg-laying on several commercial varieties of rice. The ultimate goal of these experiments is to develop a strategy for the proper timing of insecticide applications for stem borer control.

In addition, the results of a cooperative research program on management of the Mexican rice borer involving Dr. M.O. Way (Texas A&M, Rice Research and Extension Center) and Dr. T.E. Reagan (LSU AgCenter, Department of Entomology) are being closely monitored. This collaborative program is being

carried out in Texas and involves research on basic strategies for using insecticides against the Mexican rice borer as well as research on cultural practices and host-plant resistance for managing the Mexican rice borer.



Stem Borer Damage

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Medium-Grain Variety Development and Variety Blend Update

Medium-grain rice was planted on a little less than 5 percent of the total rice acreage in Louisiana in 2006. Jupiter, at 52 percent of the total medium-grain acreage, surpassed Bengal as the most widely planted medium-grain variety.

In the medium-grain breeding program, experimental lines are continuously evaluated for high yield potential, disease resistance, good milling quality and other agronomic traits. Medium-grain lines and other breeding material were grown in several states and Puerto Rico in 2006. The winter nursery in Lajas, Puerto Rico, allows breeders to go through three years' worth of breeding and selection in only one year. A major benefit of growing experimental material in multiple locations is that adaptation can be evaluated. Also, valuable yield and milling data are available as each experimental line is exposed to different environmental factors such as early and late planting, sheath blight and blast pressure, light and heavy soils, different harvest moistures, etc.

The Uniform Regional Rice Nursery (URN) is a multi-state yield trial that provides valuable data for participating breeders. Through this test, breeders compare the yield, milling quality, and performance of their elite experimental lines to proven commercial varieties. One medium-grain line stood out in the 2006 URN test in Crowley – RU0602168. This variety has Bengal, Mercury, and Rico 1 in its pedigree and is about the same height and maturity as Jupiter. Preliminary tests indicate high yield potential and good milling quality. This experimental line will be tested in a statewide variety trial and the URN in 2007.

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**Milled sample of the
medium grain variety Jupiter**

Anther Culture Application in Rice Breeding

The anther culture program at the Rice Research Station is an integral part of rice variety development efforts. The goal of the anther culture project is the production of regenerated double haploid plants for use by the rice breeders. These double haploid plants are uniform and non-segregating and thus can be entered directly into yield testing. The use of anther culture allows lines to be entered into yield testing in a much shorter period of time than needed in conventional breeding efforts. In the summer of 2006, 144 different lines were sampled (primarily from F2 populations). These populations represented all of the various breeding objectives on the station. More than 314,000 anthers were plated, resulting in the regeneration of approximately 14,500 plants. These plants are being maintained in the greenhouses. After field evaluation and selection, these plants will be introduced into the breeding program's preliminary yield and agronomic tests.

The anther culture program is not limited to summer field sampling. There is also a winter cycle in which plants are grown in the greenhouses or brought in from the field for sampling. The anthers of these lines will be plated and plants regenerated through the winter using the same methods as the summer cycle.

The timeframe for the development of new varieties can be cut by several years using the double haploid plants produced through anther culture. The anther culture program at the Rice Research Station is the largest and most productive of its kind in the United States.



Rice anthers being placed onto media.

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Medium-Grain Variety Development and Variety Blend Update

Cont.

In addition to the breeding project, a study was conducted to evaluate the potential for using variety blends (seed from two varieties mixed before planting) to increase grain yield and/or yield stability. Two pure-line varieties (Cocodrie and a sheath-blight resistant experimental line RU0402152) and two hybrids (CLXL730 and XP723) were blended in all combinations and planted in six locations to determine if blends were more stable than the pure varieties or hybrids. Grain yield and milling quality were also evaluated. Another side study was conducted in which XP723 and Cocodrie were blended in various proportions to determine the optimum blend ratio. The thought behind a blend is that each variety has unique strengths and weaknesses and one variety may do relatively better (within a parish, farm, or field) than the other. If that is the case, then it might be beneficial to maximize the chance that the favored variety is in the location at which it is favored. More research will be conducted in 2007 to determine if this is a cost-effective strategy to increase grain yield, milling quality or yield stability.

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Rice Referendums Set for

January 30, 2007

Voting on the Rice Research and the Rice Promotion referendums will be conducted on Tuesday, January 30, 2007. All Louisiana rice producers are eligible to vote on these important referendums which, if passed, will enable these important check-off funds to continue for five additional years. The rice research check-off earmarks \$.05 per cwt for production research activities, while the promotion check-off devotes \$.03 per cwt for promotional activities on rice. Voting will be held in the Louisiana Cooperative Extension Service offices in most rice parishes. In some parishes (those with fewer than 30 rice producers) voting will be conducted using a mail out ballot.

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Breeding for Sheath Blight Resistance

Sheath blight (SB) is the most serious rice disease in Louisiana and throughout the southern rice-producing areas because of its endemic, and occasionally epidemic, development each year and also because of the significant yield loss it causes. The use of SB resistant varieties, if available, would be the best way to control this disease. So far, no completely resistant cultivars have been identified for this disease worldwide. The LSU AgCenter's program for breeding for sheath blight resistance, however, has created and identified several hundred breeding lines with a useful level of partial resistance. Many of these lines have desirable agronomic characteristics coupled with high yield potential and the grain quality characteristics required by the rice industry.

In the past seven years of our project for developing sheath blight resistance in rice, which is based on combining partial resistance from sources developed in our program or identified worldwide, 101,480 progeny rows, including generations from F2 through F9 were planted, inoculated with *Rhizoctonia solani* and evaluated for sheath blight development. Superior lines were advanced to yield trials.



Inoculating plots at the Rice Research Station

Progeny rows were developed from selections among progeny generated in 1,026 crosses among sheath blight resistance sources, commercial varieties, and breeding lines with different sources of genes for partial resistance and superior agronomic characteristics. Yield tests included 2,225 combine-harvested plots with test lines having comparisons of sheath blight inoculated and non-inoculated plots for yield, sheath blight development, lodging, agronomic characteristics, and grain quality characteristics.

Lines with yield potential equivalent to or greater than commercial variety controls, sheath blight ratings from moderate to highly resistant, heights and times to heading in the range of commercial varieties, typical long or medium grain quality, and high milling yields were advanced to the LSU AgCenter Rice Breeding program at the Rice Research Station in Crowley.

The breeding program has placed three or more lines from our project in the U.S. rice breeders Uniform Rice Nursery (URN) in recent years. In 2006, three lines were included in the URN, two lines in breeding program yield tests, and 28 lines were planted in the breeders crossing block as germplasm. Twenty-one crosses were made by the Breeding Program for our studies.

Many lines in the 2006 sheath blight yield test had high yields whether inoculated or not inoculated. Some examples are given in the table below. These lines had desirable agronomic characteristics, but some had poor milling. These lines will be used in crosses with lines with good sheath blight resistance and good milling in 2006/2007.

This program has been supported by the Louisiana Rice Research Board since its initiation.

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Performance of Selected Lines in Yield Tests Inoculated with *Rhizoctonia solani* in 2006
 (LSU AgCenter Rice Research Station, Crowley, LA.)

Line	Mean Yield* (lb/A at 12% moisture)		Sheath Blight Rating** (0-9 scale)
	Non-inoculated	Inoculated (diseased)	
05SBYT - 67	10,643	9977	3
05SBYT - 14	10,866	9372	6
05SYBT - 26	10,245	9583	4
05SBYT - 12	10,091	9260	2
05SBYT - 60	9542	10,527	7

* Mean yield is of two inoculated plots or two non-inoculated plots.

** Rating scale where "0" = no disease and "9" = plots dead from sheath blight at maturity

Girouard Joins AgCenter

Dr. Ernest Girouard joins the LSU AgCenter as an area agent for conservation planning and development. He will work with the Master Farmer program, helping producers write conservation plans in order to become certified as Master Farmers.

"My primary responsibility is in the Southwest Region," Girouard said.

Girouard received his doctorate degree in animal nutrition from LSU in 1967. He also holds a bachelor's degree in agriculture and a master's degree in animal nutrition, both from LSU.

Dr. Steve Linscombe, director of the Southwest Region and the Rice Research Station, said the AgCenter is fortunate to have Dr. Girouard as a staff member.

"His experience as a rice farmer, and his academic background will be an asset for advising producers on conservation practices," Linscombe said.

Girouard has been on the Soil and Water Conservation District in Vermilion Parish for 22 years, and he has served as chairman for the past eight years.

Girouard lives near Kaplan. He has four children and four grandchildren.



Dr. Dustin Harrell Named Agronomist at Rice Research Station



Dr. Dustin Harrell, the newest faculty member at the LSU AgCenter Rice Research Station, arrived on the job at the close of the main rice-growing season.

Harrell, a native of Gladewater, Texas, started Aug. 9, and he already has several agronomy projects he has either started or planned.

He graduated from Texas A&M University in 1997 in agriculture science and taught agriculture for 2 years at Troup High School in Texas. In 2001, he earned a master's degree in soil fertility at Stephen F. Austin University at Nacogdoches, Texas, followed by a doctorate at LSU in agronomy last year.

He worked as a soil scientist in South Texas with the Natural Resources Conservation Service for 10 months before taking the job at the Rice Station.

"I always wanted to get back over here, and I really wanted to do research," he said. "I was waiting for something like this position to open."

His projects for rice involve research on ratoon crop, stubble management, nitrogen rates and timing, different nitrogen sources, phosphorous fertilization, seeding methods, tillage systems and seeding rates. He also conducts variety trials for crops grown in rotation with rice.

He is working on calibrating a new soil test extraction for phosphorous that will result in improved fertility recommendations.

Dustin and his wife, Kristy, live in Rayne.



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Focus on Research Associates



Research Associate Ron Regan started his career at the Rice Research Station nearly 25 years ago helping with the soybean project with Dr. Jim Griffin and Robert Habetz.

He has stayed all these years because he enjoys the people at the Rice Station "They're a great group to work with," he said.

He later worked with Dr. Tim Croughan in the Tissue Culture Project, then in the Agronomy Project with Dr. Pat Bollich, Dr. Jason Bond, and now the newest faculty member, Dr. Dustin Harrell.

Regan assists in planting, maintaining, and harvesting rice, soybeans, wheat, and grain sorghum in the project. He likes to operate the tractor and combine.

"We'll be planting wheat in 2 or 3 weeks," he said.

Regan grew up on a farm between Egan and Iota. He tried farming on his own for 2 years, but found he wasn't cut out for it.

"I don't handle worries as well as you need to when you are a farmer," Regan said.

But with his job in research, "It's kind of like farming but with a steady income," he said.

Before taking the job at the station, he also worked in the oilfield.

Regan graduated from LSU in 1980 with a bachelor's degree in agricultural business. When he isn't working, Regan could be watching his favorite sport, motorcycle road racing.

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The LSU Agricultural Center is a statewide campus of the LSU System and provides equal opportunities in programs and employment.