Volume 12 Issue 4 November 1, 2015

RICE RESEARCH STATION NEWS

Southwest Region

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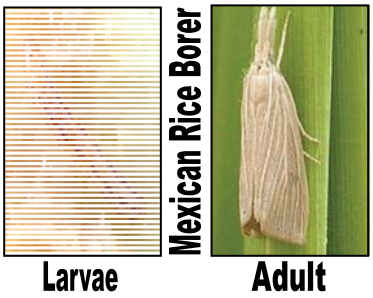
Mexican Rice Borer Update

The Mexican rice borer – a potentially damaging pest of grass crops like rice, sugarcane and corn – continues its establishment in Louisiana. Rice and sugarcane growers in southwest Louisiana will need to alter their production and management practices to account for this unwelcome addition to the complex of pests that attack their crops. This insect was first found in Louisiana in Calcasieu Parish in 2008. Since then, its range has expanded eastward at an average rate of about 10-15 miles per year. This insect is capable of spreading much more rapidly, however, if weather and other factors are optimal. The Mexican rice borer has now been found in eight Louisiana parishes, including most of the major rice-producing parishes in southwest Louisiana: Calcasieu, Beauregard, Allen, Cameron, Jefferson Davis, Acadia, Vermilion and Evangeline. Monitoring of this pest over the past seven years has shown that population levels gradually increase after initial establishment in an area, so infestations tend to be higher in parishes in which the insect has been established for several years, like Calcasieu, Jefferson Davis and Cameron (Figure 1). Although this insect is not yet considered a major pest of rice in Louisiana, numerous fields in Calcasieu Parish have experienced damaging infestations over the past three years. Mexican rice borers were also found in sugarcane fields in Louisiana for the first time in 2013.

The life history of the Mexican rice borer in rice is similar to that of the sugarcane borer, a long-established pest of rice in Louisiana. Female Mexican rice borer moths lay their eggs on leaves, with a preference for dead, dried leaves. Newly hatched larvae feed on leaf blades or in between the leaf sheath

Cont. pg. 2



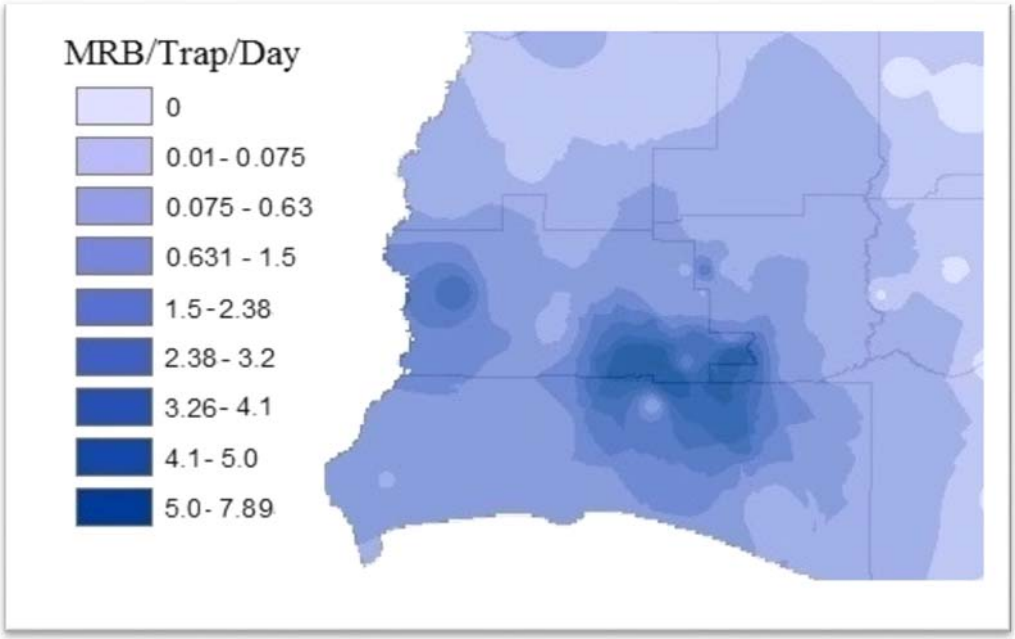


Figure 1: Average catches of Mexican rice borer in Pheromone traps in southwest Louisiana, 2014

Special Dates of Interest:

- **Rice Technical Working Group March 1-4, 2016, Galveston, TX**
- **Rice Station Annual Field Day Wednesday, June 29, 2016**

Inside this Issue

Mexican Rice Borer Update Cont.

and the stem, leaving characteristic orange-tan feeding lesions (Figure 2). Older larvae bore into stems, where feeding injures vascular tissues and can sever the growing portion of the plant. When feeding occurs during the vegetative stage of plant development, the tiller often dies and fails to produce a panicle (deadheart). When feeding occurs after panicle initiation, injury results in drying of the panicle. Affected panicles may not emerge or, if they do, do not produce grains, remain straight and appear whitish (whitehead) (Figure 3). However, feeding inside the stem does not always produce visible symptoms. There is much that remains unknown about the biology of this pest in rice, including its impact on rice yields.

Figure 2: Feeding lesion caused by Mexican rice borer feeding on leaf sheath.
(Photo by Johnny Saichuk)

Figure 3: Whitehead caused by Mexican rice borer feeding inside stem
(Photo by Johnny Saichuk)

Because the Mexican rice borer feeds on weedy grasses and multiple crop hosts, there is little chance of eradicating the pest or preventing further range expansion. Increased awareness of this pest and cooperative efforts among the LSU AgCenter, rice and sugarcane growers, and other stakeholders will be needed to reduce the impact of this new pest. One tactic that can be used is Dermacor X-100 seed treatment, which has proven effective at reducing whitehead densities, as well as rice water weevil densities. Another important step that could be taken is to increase monitoring efforts using pheromone traps. Pheromones are chemicals that insects produce to communicate with one another, and they can be used as lures in traps. Pheromone-baited traps attract only males, which do not lay eggs, and therefore trapping does not pose a risk of attracting populations to new areas. These traps are the tool that has been used to monitor spread of this insect in Louisiana. Use of pheromone traps could alert growers to the presence of borers in their fields early in the season and might help farmers decide whether to use foliar insecticides. If you are interested in obtaining pheromone traps to monitor fields, contact Mike Stout, professor of entomology at the LSU AgCenter mstout@agcenter.lsu.edu. Counting of whiteheads can also be used to measure severity of infestation, but damage to plants has already occurred by the time whiteheads are visible. Early planting and destruction of stubble after harvesting will also help reduce infestations.

Researchers from the LSU AgCenter Rice Research Station and Texas A&M were recently awarded a grant from the U.S. Department of Agriculture to study additional tactics for minimizing the impact of Mexican rice borers in Louisiana rice and to educate stakeholders in the state about this new threat. Experiments are being conducted to determine optimal rates of Dermacor X-100 for control of both rice water weevils and stem borers, and commercial varieties are being evaluated for possible resistance to Mexican rice borers and other pests such as the rice water weevil, sheath blight, and sugarcane borers. Silicon and nitrogen fertilization will be studied to assess their impact on borer infestations, and yield reductions from borer infestations will be quantified. The overall goal of this USDA-funded grant is to develop and implement a multitactic management program for the Mexican rice borer that is compatible with the management programs for the other members of the pest complex in Louisiana rice.

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How the Louisiana Master Farmer Program Benefits Louisiana Rice Producers

The voluntary Louisiana Master Farmer Program (LMFP) was initiated just over 14 years ago. Its purpose is to educate, promote and demonstrate that implementing best management practices (BMPs) result in protection of natural resources and agricultural sustainability. The LSU AgCenter working with the other four partners developed the program for all commodities. The partners are the Louisiana Department of Agriculture and Forestry (LDAF), the Natural Resource Conservation Service (NRCS), the Louisiana Cattleman's Association and the Louisiana Farm Bureau Federation.

Currently, national watershed initiatives to improve water quality have resulted in new regulations. These have had a direct influence on how water runoff from agriculture production is managed at the farm level. Examples of new regulations in three selected states are listed below.

New state water quality requirements

Iowa – Des Moines Water Works filed a lawsuit against trustees of three surrounding county drainage districts for damages incurred as a result of nitrate pollution in Des Moines drinking water (concern with farm water runoff from tile drains).

Minnesota – Required 50-foot grass buffer (10 acres along each side of stream) for nearly all waters, including streams, rivers and ditches. An estimated 110,000 acres of buffers are to be seeded (2015).

Ohio – Requires certification of fertilizer applicators and nutrient management plans for farms when fertilizer is applied to 50 acres or more.

These new regulations will require conservation planning to implement BMPs to ensure a reduction in nutrient and sediment loss in the waters leaving a producer's farm. Producers in these states are now faced with implementing mandatory conservation practices or programs for regulatory compliance. These states lack a voluntary state program to provide documentation of the needed BMPs and conservation planning.

Producers in Louisiana have the Master Farmer Program as the vehicle to meet the regulatory requirements. The three phases of the program are environmental education, field days, and development and implementation of a resource management level conservation plan. These phases provide the documentation of conservation plan implementation and state certification from LDAF. Louisiana rice producers have recognized the value in the program and have more certified Louisiana Master Farmers than any other commodity group. Rice producers have taken the lead in addressing the environmental issues of production agriculture.

In Phase I, rice producers benefit from environmental educational presentations by the state Department of Environmental Quality and the state Department of Natural Resources. Topics covered include point-source pollution in rivers and streams; the Gulf of Mexico hypoxic zone; the role of Soil and Water Conservation Districts and NRCS in conservation planning and programs; SPCC requirements; Clean Water Act (WOTUS) requirements; sewer system regulations; residue management; prescribed burn management; and current state soil and water regulations. The major benefits of Phase I are to learn about the issues, programs and practices that are available; to become aware of the conservation planning procedure to address environmental issues resulting from agriculture production; to become familiar with the regulatory issues facing rice producers; and to have documentation that an extensive environmental education course was attended.

In Phase II, field days that showcase implemented BMPs and conservation programs are viewed on the producer's farm. Costs, implementation issues and alternative practices are discussed. The benefit to the rice producer is the viewing of new BMPs, question-and-answer opportunities, and learning the benefits and costs of implemented practices. Also, cost-share of NRCS federal programs and practices are presented. Rice producers participating in the Master Farmer Program benefit from extra NRCS EQIP points. This increases their application score for the practice to be funded at 50 percent or up to 75 percent cost share. This is especially beneficial for young or beginning farmers, those participating in a CCPI conservation programs and for certified producers that have acquired additional property or have identified new resource concerns.

In Phase III, rice producers voluntarily request assistance from NRCS to develop a whole farm resource management system (RMS) level conservation plan. This RMS level plan is farm-specific and community-specific and addresses identified conservation issues and documents BMPs utilized for five years. Once the plan is developed, it is presented to the rice farmer for discussion, modification and acceptance. The plan is a living document. It can be modified with an agreed upon timeline. Another benefit for rice producers is that RMS plan development with NRCS is free. Considerable additional cost could be incurred, depending on the size of the farming operation, if the RMS plan is not developed by NRCS conservation planners.

A producer completing the three phases with a fully implemented RMS level plan is granted a Louisiana Master Farmer Certification by the State Commissioner of Agriculture and Forestry. The major benefit of the program comes with the final certification. The Master Farmer Program has been recognized across the U.S. by environmental groups, state Departments of Environmental Quality, land-grant universities, and even the U.S. EPA as a model program for voluntary education and compliance with natural resource and environmental conservation. With certification, the national standards needed to meet regulatory requirements at the state level (with state soil and water regulations) is assumed by state statute. The Kellogg Company has paid a premium for purchased rice from Louisiana Certified Master Farmers who have participated in their Master Kellogg Grower Program.

The Federal Clean Water Act requires swimmable and fishable streams and rivers. Previous agricultural production practices are considered the main source resulting in agriculture not meeting the water quality regulatory requirements. Louisiana rice producers are in a unique position to address state and federal soil and water regulatory issues. They have the ability to manage water on their farms 24 hours a day, 365 days a year. Many can utilize surface rather than ground water to irrigate their crops.

Participation in the Master Farmer Program provides support to develop and implement practices that reduce nutrient loss (nitrogen and phosphorus) and sediment loss from farms. Nutrient and sediment loss are considered to be the main sources of poor water quality creating the hypoxic zone in the Gulf of Mexico. Certified LMFP Rice Farmers are setting the standard to protect water quality.

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Evaluating Ammonia Loss with a Laboratory Volatilization Chamber

Ammonia volatilization is a major contributor to nitrogen use efficiency. Ammonia volatilization under favorable environmental conditions may lose 30 percent to 50 percent of applied nitrogen by broadcasting urea fertilizer. The nitrogen loss is very dependent on the environmental conditions (temperature, soil water content or soil pH), including the type and rate of fertilizer application. Soil water contents, airflow, and soil surface temperature are the main factors that influence the dissolution before being released as ammonia in the atmosphere.

Urease inhibitors can prevent the conversion of urea to ammonium. Various urease inhibitors have been tested for effectiveness to reduce N loss. Several chemical compounds, such as nitrapyrin, polymer-coated, and N-(n-butyl) phosphoric triamide (NBPT), had been added to urea fertilizers to inhibit N transformations leading to a reduction in N loss and an increase in N use efficiency.

The ammonia volatilization process is rapid and can be influenced by many environmental factors, it is not easy to study it from field experiments. Laboratory experiments are useful because it allows the effects of each factor (air flow, temperature, and soil moisture) to be individually manipulated for testing. Dynamic chambers are typically used for estimating ammonia volatilization under laboratory conditions. They are usually made of three parts: (1) a control system to control air conditions (temperature and humidity) at the chamber inlet, (2) a volatilization chamber where N fertilizer is applied to soil, (3) an acid trap for collecting emitted ammonia.

The air flow rate was monitored and in each volatilization chamber using one air flow meter per chamber. The inlet of the volatilization chamber was connected to the source of input humidified-air, and the outlet was connected to the acid trap. The acid trap was replaced as scheduled (i.e. every day from 1-7 and every other day from 8-14). Ammonia in the acid trap will be analyzed to estimate the potential loss of nitrogen at any specific time.

The volatilization chamber can be used for evaluating nitrogen loss as ammonia gas from applying nitrogen fertilizer to soil. The tests can be performed any time during the year, on any type of soil, and with any N fertilizer products.

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Figure 1: This box contains six chambers of soil and fertilizer and six water tubes. It is connected to an air flow meter on the top shelf, a temperature controller on the left and an acid trap on the right side of the box.

Figure 2: Inside the box, there are six white capped chambers (jars) on the right that contain soil and fertilizer along with six white water tubes to control temperature and humidity.

Pest of the Quarter

PICKERELWEED

Pickerelweed (*Pontederia cordata*) is a perennial plant often found in shallow freshwater ponds, marshes, lakes, edges of streams and roadside ditches. The plant prefers land that remains undisturbed over extended periods of time. Pickerelweed has become a problem in rice production in Louisiana due in large part to crawfish production. This weed is seldom found in rice culture when the grower practices a rice-soybean or rice-fallow rotation, and this is especially true where the producer performs some type tillage operation on a regular basis. Pickerelweed is often found growing in flooded rice or crawfish ponds with nutsedge species, common burhead, grassy arrowleaf, alligatorweed, as well as other aquatic plant species. Pickerelweed is native to North and Central America, and it is found as far north as Quebec and as far south as Brazil.

Pickerelweed is a perennial plant reproducing from seed and by an extensive rhizome system. The mature seed can remain dormant for several weeks until conditions are right for germination and survival. The extensive rhizome system is used primarily for maintaining populations in an infested area, and not normally associated with spread to noninfested areas; however, pickerelweed can be spread by rhizomes by movement on contaminated tillage equipment.

Pickerelweed can reach heights of 1 to 4 feet with leaves oval to lance shaped. The leaves can reach a size of 8 inches long by 4 inches wide. As the plant matures, the waxy layer on the leaf surface thickens. This waxy leaf surface is fairly resistant to herbicide application and is the reason many herbicides do not have activity on this weed as it matures. The flowers are blue to violet in color and produce seed that are slightly longer than wide, 0.15 inches long by 0.1 inches wide. The flowers are pollinated by bees and other insects. The seed are 80 percent to 90 percent viable when allowed to germinate under flooded conditions; however, germination decreases under alternating moisture conditions. The plant primarily spreads to new areas by seed that can float for up to 15 days after release from the plant.

Pickerelweed can be used as a food source for many different organisms. Ducks will feed on the seed, and deer, nutria, and muskrats can feed on the leaves and rhizomes. Another benefit of the plant is to provide protection for birds, fish, frogs and insects. Because the plant prefers flooded conditions, it can also host many different microbes that can serve as a food source for crawfish and fish.

Pickerelweed can be found in nearly every rice field in Louisiana that is in a rice-crawfish rotation. It is important for producers to be proactive and initiate herbicide control measures when this weed is small and actively growing. Herbicide applications should be made before the heavy wax layer is formed on the leaf surface or prior to the formation of rhizomes to maximize control. The best method of control is to allow the area to dry and perform numerous tillage operations during dry periods. An upland crop or fallow rotation out of a rice-crawfish production system for a couple of years will drastically reduce pickerelweed infestations.

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The 2016 Rice Technical Working Group (RTWG) meeting will be March 1-4 at the Moody Gardens Hotel and Convention Center, 7 Hope Blvd, Galveston, Texas. The RTWG functions according to an informal memorandum of agreement among the State Agricultural Experiment Stations and the Agricultural Extension Services of Arkansas, California, Florida, Louisiana, Mississippi, Missouri and Texas, and various agencies of the U.S. Department of Agriculture. Membership includes personnel in these and other cooperating public agencies and participating industry groups actively engaged in rice research and extension.

Since 1960, research scientists from the U.S. rice industry and from international agencies have participated in the biennial meetings. The RTWG is an organization that provides a platform for rice scientists to meet periodically and exchange information. While most participants are from the United States, the meeting is also attended by rice scientists from numerous foreign countries. The meeting will have concurrent speaker sessions, as well as a number of poster presentations. The concurrent sessions are typically broken down into the following subject areas: breeding, genetics and cytogenetics; rice culture; economics and marketing; plant protection (insects and diseases); post harvest quality, utilization and nutrition and weed control and growth regulation. While the participants at this meeting are primarily scientists, a growing number of innovative rice farmers and consultants have attended the meetings in recent years to obtain information on the latest technology, as well as have an opportunity to interact with rice scientists from around the world. Additional information on the 2016 RTWG can be found at www.rtwg.net.

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Rice Verification Program Update

The Louisiana Rice Research Verification Program (LRRVP) in Louisiana was established in 1997 by Dr. Johnny Saichuk through checkoff funds from Louisiana rice producers administered by the Louisiana Rice Research Board. The LRRVP has been very successful in fulfilling its mission objectives ever since its inception. In fact, the objectives of the program over the years have remained the same. First and foremost, the program aims to "verify" that agronomic recommendations derived from research are appropriate at the commercial rice production level. The second objective is to increase the confidence of rice growers, consultants and rice industry personnel in the LSU AgCenter's official research-based agronomic recommendations. The final, and probably the most important, objective of the program is to educate rice growers, extension personnel, consultants and rice industry representatives about all aspects of rice production.

Acadia Parish Rice Research Verification Program visit April 28, 2015. Pictured from left: Rice producer Brent Pousson, Jessie Kalina (DOW Agrisciences), Jeremy Hebert (Acadia Parish agent), Rustin Gilder (Crowley Grain) and Barrett Courville (Acadia Parish agent).

The program begins each year by selecting a number of rice producers who would benefit the most from the program. These producers are generally in the early stages of their rice farming career. Normally, only one producer is selected from a given parish each year. Once selected, the participants will stay in the program for a minimum of two cropping seasons. A few months prior to planting each year, the producer, extension specialist, extension agent and the producer's crop consultant meet to select a field, take soil samples, discuss targeted planting practices, select a rice variety or hybrid, select seed treatments, and to choose a seeding rate. A fertilizer program plan of action is generated according to AgCenter recommendations when the soil sample results are received back from the soil testing laboratory.

Once the rice crop is planted, the producer, extension agent, extension personnel, crop consultant and sometimes additional farm employees or family members, all walk and scout the rice field on a weekly basis. Everyone gathers at the field edge after walking/scouting the field to discuss what each person saw. Weekly recommendations are generated based on what is observed during scouting and the current growth stage of the rice. Not only are the recommendations generated, but why they were chosen are explained and discussed. This is where the true educational magic of the program takes place for everyone involved, not just the producer. Time and time again over the years, unique situations come up where official recommendations cannot be followed to the letter. This year was no exception. For example, frequent rainfall events during March and April caused soils to stay saturated, and application of pre-flood fertilizer on completely dry ground was not possible in all situations. In cases like these, alternative recommendations are made based on current scientific knowledge and past experiences, resulting in a recommendation of the best alternative practice.

Five producers from five different rice-producing parishes participated in the 2015 LRRVP. In Acadia Parish, the rice hybrid XL753 was planted and yielded 55 dry barrels. In Vermilion, CL111 was dry broadcast and yielded 40 dry barrels. The Cameron Parish field also planted CL111 and yielded 44 dry barrels. In Concordia and West Carrol parishes, CLXL745 was drill-seeded and yielded 52 and 56 dry barrels, respectively. The statewide rice yield average in 2015 is forecast to be down 6 percent to 10 percent this year as compared to the last couple of years, probably in the 42 to 43 barrels per acre range. With that being said, the yields in the LRRVP fared pretty well in 2015. If you think that you or someone you know would benefit from the LRRVP, be sure to contact your local parish extension agent.

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Focus

Lauren Ingalls

Lauren Ingalls doesn't have to think why she likes working as a research specialist at the Rice Research Station.

"Because I like working outside, and I like working with plants."

Ingalls grew up on Grand Isle, and she graduated from the University of Louisiana at Lafayette in 2010 with a bachelor's degree in animal science. After school, she worked on a produce farm in Lafayette and a cattle ranch in Vermilion Parish. "I got tired of being kicked by cows." Eventually, she went to work at the station in January 2013.

Her job at the station includes a wide variety of tasks for Dr. Herry Utomo, LSU AgCenter molecular geneticist, including preparation of seed for planting, planting and growing rice in greenhouses and in the field.

"I like planting things, and I like riding on the back of a planter."

She is a lieutenant in the Louisiana National Guard and commands approximately 80 people in a forward support company. "We deliver fuel, ammo, food, water and maintenance equipment."

When Hurricane Isaac hit in 2012, she was activated for three months to distribute food, water and tarps to affected residents in the New Orleans area.

When Lauren isn't at work or doing guard duty, she enjoys reading and spending time with her two dogs.

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Research partially funded by the Louisiana Rice Research Board

Research partially funded by USDA-NIFA