Is Scouting for Rice Diseases Effective?

Good technique for disease scouting.

In times when rice prices are low, producers must keep production costs low. One area to save money is on fungicide applications. Applying a fungicide when needed can greatly improve the return you receive from a crop. But applying a fungicide when it is not needed will not increase yield, milling or the second crop. Prediction of fungicide use is based on the susceptibility of the variety and, more importantly, scouting for presence and level of disease in each field. Remember, the only reason to apply a fungicide is to make more profit.

Here's an excellent example of how scouting can improve the return from fungicide applications: Sheath blight fungicide trials were conducted in 2008 and 2009 at three locations – the LSU AgCenter Rice Research Station at Crowley, Lake Arthur and Fenton. Four varieties – CL151 (susceptible), Cheniere (susceptible), Catahoula (moderately susceptible) and Neptune (moderately resistant) – were treated with four fungicide treatments at mid-boot. The four treatments were an unsprayed check, Quadris at 9 oz/A, Quilt at 28 oz/A and Stratego at 19 oz/A. Plots were scouted for sheath blight infestations at panicle differentiation based on the percent positive stops method. Sheath blight severity, infestations and rice yield were determined.

Over all the trials and treatment combinations, fungicides significantly increased yields 50 percent of the time with an average yield increase of 592 lb/A (Table 1). Neptune did not require spraying five of six times because of its moderate resistance to sheath blight. When Neptune was eliminated from the calculations, fungicides significantly increased yield 63 percent of the time with an average yield increase of 729 lb/A. The Lake Arthur location did not exceed the treatment threshold, and when it was eliminated from the calculations, fungicides significantly increased yields 67 percent of the time with an average yield increase of 782 lb/A. When Neptune and Lake Arthur were both not included in the calculations, fungicides significantly increased yields 86 percent of the time with an average yield increase of almost 1,000 lb/A – plus we only used about two-thirds of the fungicide as blanket applications to all fields, reducing costs. Knowing the disease reaction of a variety and scouting for sheath blight allowed for a more accurate prediction of fungicide needed and greatly increased fungicide yield response compared to blanket applications on every variety, every location and every year. Fungicide applications were counterproductive (yield losses) in some cases if severe sheath blight was not present. The story is the same for blast if the variety is not susceptible and no leaf blast is present; a fungicide application is seldom profitable. You may see some disease in the field at the end of the season, but it takes a lot of disease to cause a significant loss. **That is why you should scout for sheath blight and other diseases. Less costs, more profits.**

Table 1. Percentage significant yield increases and average yield increases (lb/A) for Quadris, Quilt and Stratego fungicide applications compared to unsprayed check on the varieties CL151, Cheniere, Catahoula and Neptune at the Lake Arthur, Fenton and Rice Research Station locations in 2008 and 2009.

Fungicide	Over all trials	Variety Based (No Neptune)	Scouting Positive (No Lake Arthur)	Scouting + Variety
Quadris	46% (529)	56% (644)	63% (773)	75% (951)
Quilt	54% (667)	72% (832)	69% (848)	92% (1070)
Stratego	50% (579)	61% (712)	69% (754)	92% (954)
Overall	50% (592)	63% (729)	67% (782)	86% (992)

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Special Dates of Interest:

- **Southwest LA Rice Tour**
  Thursday, May 28, 2015 - Fenton area
- **Vermilion Parish Rice Tour**
  Thursday, May 28, 2015 - Klondike area
- **Rice Marketing and Technology Convention**
  June 2-4, 2015, Cancun, Mexico
- **Acadia Parish Rice and Soybean Field Day**
  Tuesday, June 16, 2015 , RRS South Farm
- **Rice Research Station Field Day**
  Wednesday, July 1, 2015 , Crowley, LA

Inside this Issue

Pest of the Quarter - Rice Flatsedge

Rice flatsedge (*Cyperus iria*) is an annual plant known by several common names. Depending on your location it has been referred to as grasshopper's cyperus, ricefield flatsedge and umbrella sedge. Rice flatsedge should not be confused with another sedge with the common name smallflower umbrella sedge (*Cyperus difformis*). Rice flatsedge is native to east Africa, India, China, Japan, Malaysia and Australia.

Rice flatsedge prefers disturbed areas in soils conducive to holding moisture, and it is often found in poor soils along ditches and riverbanks. This weed can also be found in upland crops such as cotton, soybean, corn and turfgrass. Rice flatsedge is considered to be more of a weed in rice than other crops. Rice production is an ideal habitat for rice flatsedge growth, and this is probably the reason the common name starts with rice. Rice flatsedge was first identified in the United States in the 1840s and can now be found across the country in California, Texas, the southeastern states, and as far north as Illinois and Pennsylvania.

Rice flatsedge is an annual plant reproducing from seed. It has a fibrous root system absent of tubers or rhizomes structures, which are generally the structures that cause other sedges to be perennials. The plant can grow rapidly up to a height of 24 inches. This plant has multiple stems often referred to as tillers. The leaves are shiny and can be pale to dark green with rough margins near the leaf tip. Leaves emerge in threes, or as taxonomists would say three-ranked. This means the plant would have a leaf count of three, six, nine, etc. as it matures. The seedheads of rice flatsedge can reach 8 inches long and are composed of several dense spikes, which are made up of multiple spikelets often yellow to golden brown in color.

Field shots of Rice flatsedge

Rice flatsedge has the ability to maximize growth and seed production when grown in competition with rice. This makes the weed difficult to control with cultural practices such as tillage, crop density and planting date. Because this weed can survive in flooded or upland conditions, water management will not help control it. Unfortunately, the best control of rice flatsedge in rice is the use of herbicides. There are several herbicides with activity on this weed, but the most effective herbicide on rice flatsedge is halosulfuron, sold under the trade names Permit® or Halomax®. However, rice flatsedge populations have been identified in Louisiana that are resistant to this herbicide. Basagran is an option for producers who have a resistance issue or would like to change modes of action to implement a resistant management strategy. In 2015, BASF will have a new formulation of Basagran available, Basagran 5L.

Rice Flatsedge can be found in nearly every rice field in Louisiana. It is important for producers to be proactive and initiate control measures when this weed is small and actively growing. This will prevent yield losses due to competition or reduced harvest efficiency. Other herbicide options for rice flatsedge control can be found in the Louisiana Suggested Chemical Weed Management Guide at http://www.lsuagcenter.com/en/communications/publications/Publications+Catalog/Crops+and+Livestock/Weed+Control/Louisiana+Suggested+Chemical+Weed+Management+Guide.htm.

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Economic Benefits of Clearfield Rice

The Clearfield rice technology has been extremely valuable to the Louisiana rice industry over the past several years. For the 2014 crop year, five of the top 10 rice varieties grown in the state were a Clearfield or Clearfield hybrid variety. The major benefit of Clearfield rice is the protection against red rice afforded by the planting of herbicide-resistant Clearfield rice lines. The ability of rice producers to select from a variety of high-yielding Clearfield rice lines to plant on their farms has, and will continue to be, a major factor supporting the significant economic benefit this rice production technology provides the state's rice industry. Clearfield varieties recommended for planting in 2015 by the LSU AgCenter Rice Research Station have all shown very high grain yield potential, including CL151 and CL152 in long grain and CL261 and CL271 in medium grain. In addition, the ability to drill-plant Clearfield rice affords producers the capability to control and significantly reduce the adverse effects of red rice in a particular field in a much less management intensive means compared with water-seeding conventional rice varieties.

A sometimes overlooked, but just as significant, economic benefit of Clearfield rice production is its very good milling yield and its impact on the rough rice market price received by producers. The improved milling yields observed for Clearfield varieties add value to the rice crop separate and apart from grain yield. For example, CL151 has an expected milling yield of 59/69, based on 2012-2014 data. With a base level rough rice market price of $12.35/cwt. (55/70 basis), this milling yield for CL151 would equate to a market price of $12.56/cwt. or $20.35 per barrel. A lower milling yield, which might be the result of the presence of red rice, would lower the market price received for the rough rice sold. For example, a lower milling yield of 55/69 would result in an estimated reduction in rough rice market price of $0.33/cwt. ($0.53/bbl.). A 55/65 milling yield would result in an estimated $0.78/cwt. ($1.26/bbl.) reduction in market price. Based on this data, the higher milling yields of Clearfield are providing approximately $23 to $54 per acre of increased revenue solely from higher market prices based on milling yield.

Clearfield rice technology provides tremendous benefit to the economic viability of the Louisiana rice industry. It can continue to provide that benefit into the future, even as alternative rice production technologies are developed and commercialized. However, for Clearfield to continue to be available to control red rice and provide added economic benefit to the state's rice production sector, it is vital that producers follow the stewardship practices recommended regarding both in-season production of Clearfield rice as well as the crop rotation recommendations following production of Clearfield rice in specific fields.

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Puerto Rico Critical to Rice Breeding Efforts

The Rice Research Station's breeding nursery in Puerto Rico is critical to our efforts to continually provide new, improved varieties to the Louisiana rice industry. It allows us to expand our research efforts from the limited growing season in southwest Louisiana to a year-round program. Because Puerto Rico is a tropical environment, warm-season crops such as rice can be grown all 12 months of the year. The area is located at the latitude of 18 degrees and is far enough south to encounter little seasonal temperature influence. In fact, the average daily temperature varies only about 4 degrees F between summer and winter.

There are numerous areas in the Caribbean, Central and even South America that have the proper environment for a winter nursery. But because Puerto Rico is a Commonwealth of the United States, the rice seed we produce there can easily be returned to Crowley and planted directly into our research fields. Rice seed produced in a foreign country must be grown under strict greenhouse quarantine procedures prior to being planted in the field. This is according to USDA Animal and Plant Health Inspection Service policies to prevent importation of noxious insects, weeds and diseases. This quarantine requirement would negate the utility of a winter nursery anywhere other than in Puerto Rico.

Our research is conducted at the Lajas Experiment Station, which is part of the University of Puerto Rico-Mayaguez. The university has a number of research stations on the island similar to the LSU AgCenter's system of research stations in Louisiana (including the Rice Research Station). The island of Puerto Rico is somewhat rectangular and approximately 100 miles east to west and 40-50 miles north to south. As a point of reference, San Juan, the largest city and capital, is near the northeast corner of the island, and our research site is in the Lajas Valley near the southwest corner.

The rice research site is a cooperative effort between the public breeding programs in Louisiana, Arkansas, Mississippi, Missouri, Texas and the USDA Dale Bumpers Center in Arkansas. The joint program is conducted by a research agreement among the various programs and the University of Puerto Rico-Mayaguez. The main research site is approximately 30 acres shared by the programs. Several years ago as the AgCenter's breeding program continued to expand, we signed a separate agreement with the university and began to use a new site exclusively. This more than doubled the amount of breeding material that can be evaluated, advanced and purified in our breeding efforts.

Using this past season as an example will illustrate how the program typically works. We made a large number of crosses (artificial hybridizations) during the summer of 2013, as we do each year. In February of 2014, seed from these crosses were planted in the greenhouse at the Rice Station. In mid-March these F1 plants were transplanted from the greenhouse into a research field. Because these plants had been started very early in the greenhouse, when they were transplanted, they were advanced well ahead of plants from seed planted directly into the field. These plants reached maturity by late July and were hand-harvested and dried. This F2 generation seed was then loaded for planting into seed cells by Karen Bearb in the breeding lab. We use a Hege row planting system in Puerto Rico similar to that used at the Rice Station. The seed was inspected by Louisiana Department of Agriculture and Forestry personnel and then air-freighted to Puerto Rico, where it was planted by Anthony Rivera, director of the Puerto Rico program, on August 14.

The rice is grown in Puerto Rico just as it would be on the Crowley station using similar fertilizers, herbicides and insecticides. Several breeding project personnel travelled down to harvest on December 1. Over a two-day period, we selected and harvested a large number of panicles from the numerous F2 populations. Some of this seed was shipped back to Crowley and planted. However, selected lines were threshed, reloaded and then planted in Puerto Rico a few days later. That planting took about four and a half months to mature and was harvested. The material in Puerto Rico was all F3 generation and will produce F4 generation breeding rows in Crowley this summer. In addition, we also bulked a number of rows that will go into a preliminary yield test on the Rice Station this year. A promising line from this yield test could produce a new rice variety as early as 2018. If we did not have the Puerto Rico nursery, we would be limited to growing only one generation each year at the Crowley research station. Under this scenario, it would have been 2017 at the earliest before any of these lines were even in a preliminary yield test.

We also commonly use the Puerto Rico location to increase seed of a potential new variety shortly prior to its release. This year we had seed increases of LA2134 (a potential new Clearfield long grain) and LA2008 (a potential new Clearfield medium grain).Thus, it is easy to understand how the Puerto Rico station can decrease the timeline on the development of a new variety by three years, if not more. It is also important to point out that the Puerto Rico winter nursery is only possible because of funding provided by rice producer/landowner checkoff funds under the direction of the Louisiana Rice Research Board. Simply put – no checkoff funds, no Puerto Rico nursery.

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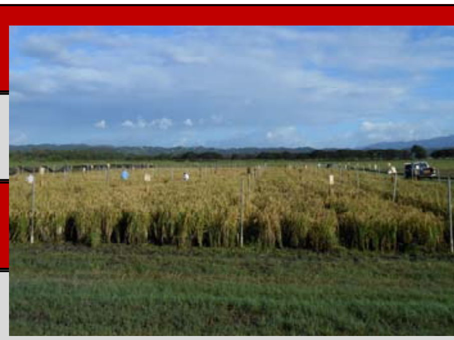
Puerto Rico Nursery


Mid-season Nitrogen Fertilizer Applications in Rice Varieties

In dry-seeded (drill or broadcast), delayed flood rice production systems in Louisiana, it is recommended that nitrogen (N) fertilizer should be applied in two applications. The first application should be applied just before the permanent flood is established. This application should be approximately two-thirds of the rice crop's seasonal need. The actual rate will vary according to soil type, variety grown and personal experience at a particular location. This N fertilizer should be applied on dry ground, and the flood should be established as soon as possible after the application.

The second N fertilizer application should occur at mid-season and can be applied into the standing flood. One of the most common questions I receive every year is, "Why can N fertilizer be applied into a flood at mid-season but cannot be applied into a standing flood early in the season?" The answer to this question is really quite simple. The initial flood in rice is established when the rice is at the 4- to 5-leaf stage of development. At this time the rice root system is not fully developed, and it can only take up the applied N very slowly. In fact, research has shown that fertilizer N applied at this time will take approximately three weeks for 75 percent or more of it to be taken up by the rice plant. This means that N loss mechanisms like ammonia volatilization and nitrification-denitrification have plenty of time to occur before the rice can take up the fertilizer N. Of course, if the flood can be established quickly after N fertilizer is applied and the soil becomes anaerobic (oxygen is removed), the flood water can actually stabilize the N in the ammonium (NH_4^+) form. If this occurs, the rice can then take it up as it needs it over the next few weeks, and the N losses from ammonia volatilization and nitrification-denitrification will be minimized. The rice root system at mid-season will be fully developed and can take up the same amount of fertilizer N in approximately three days. In this situation, the rice plant actually outcompetes N loss mechanisms. This is why we can apply fertilizer N in the flood at mid-season and not early in the season

We determine when to apply mid-season fertilizer N based on the physiological development stage of the rice plant. Mid-season N should be applied during the period between rice panicle initiation (PI) and panicle differentiation (PD). Panicle initiation (PI) occurs at approximately the same time as beginning internode elongation (BIE), or jointing, and signifies the change from vegetative to reproductive growth. The rice panicle at PI cannot be seen by the naked eye and can only be seen with a microscope. However, we can look for what we often call "green ring." Before an internode can elongate (jointing), chlorophyll accumulates above the node and forms a distinct green ring (Figure 1). We can visually see this green ring only for a couple of days. Therefore, we have to be diligent in splitting stems to look for the "green ring." This is how we know when to call the flying service to apply our mid-season fertilizer N. The optimal mid-season N application window closes when the rice reaches PD. At PD, the panicle is approximately 2 mm in length, can be seen with the naked eye, and generally occurs when the internode (or joint) is approximately ½ inch long (Figure 2). Research has shown that mid-season N application is equally efficient when applied anytime during the recommended application window between PI and PD.

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Figure 1. Rice plant showing the accumulation of chlorophyll often referred to as "green ring." Green ring can be used to estimate the panicle initiation (PI) growth stage and beginning internode elongation (BIE).

Figure 2. Rice plant at the panicle differentiation (PD) growth stage of rice development. PD generally occurs when the first internode elongates approximately ½ inch.

Photos by Dr. Johnny Saichuk.

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Focus

Nathan Breaux

This is Nathan Breaux's favorite time of year to be working at the Rice Research Station.

"Because that's when we're getting the ground ready for planting," said Breaux, a 2010 graduate of Crowley High School.

Getting the ground ready this year was a scramble, and the station's farm crew often had to work evenings and weekends to prepare the soil for planting.

Before he started working at the station as a farm assistant in December 2011, he had worked at LaGrange Food Mart and Academy Sporting Goods and attended the University of Louisiana at Lafayette.

But, he said, sitting in a college classroom wasn't for him. "I really enjoy being outside. Working outdoors is what I love, and what we do is fun to me."

Breaux said he enjoys the hands-on work, from repairing farm equipment in the winter to working the ground for growing season.

He worked with his uncles, Linus Reagan and John Breaux, on their rice farms.

When he's not working, Breaux enjoys playing pool and guitar, along with hunting and fishing.

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