2010 Texas Rice Education Contest

Agriculture is the basis of civilization, which began approximately 10,000 years ago in the Fertile Crescent (now Iraq). The main rivers, Euphrates and Tigris, flowing through this region provided rich alluvial soils and water to produce crops that could be harvested and stored for later consumption. Our distant ancestors switched from being hunter-gatherers to farmers-herdsmen. Instead of grubbing for food all day, agriculture allowed our ancestors time and energy to build cities, roads, dams and edifices; time and energy to think about political and religious concepts; time and energy to invent written communication, libraries and universities; and time and energy to develop science, math, and medical concepts and practices. Today, most humans in developed countries, such as the US, live in cities and suburbs far removed from agriculture.

Our food comes from all over the US and the world, such as coffee from Brazil, tropical fruits from Central America, poultry from Arkansas, beef from the panhandle of Texas, spices from Indonesia, vegetables and nuts (a little pun) from California, citrus from Florida, wheat from Canada, corn from the Midwest, dairy products from Wisconsin and rice from Texas!, etc., etc. This cornucopia of food ends up in large supermarkets where we shop in air-conditioned comfort selecting from a vast array of high quality, delicious fresh, canned and frozen items. So, urban/suburban shoppers are far removed from the realities of where and how their food is produced. Furthermore, although SE Texas is an agricultural region, few of our neighbors appreciate or understand

Continued on page 9

Students taking the Texas Rice Education Contest at the Texas A&M AgriLife Research and Extension Center at Beaumont on September 27, 2010.
From the Editor ...

Meeting the Goal of the Land Grant University System

Welcome to the September issue of Texas Rice. This issue presents two articles. The first is by Dr. Way who describes the Texas Rice Education Contest that he has held for the past 14 years. The goal of the Rice Contest is to interest high school students in science by exposing them to the wealth of biological information that is found in a rice production system. Through Dr. Way’s efforts and love of kids and science, one or more of the students who participate in the Rice Contest may someday become rice research leaders.

In the second article, Dr. Shane Zhou and colleagues provide an overview of panicle blight that occurred across much of the U.S. Rice Belt in 2010. This year, Shane initiated 22 field trials in an attempt to improve the management of rice diseases. This is a massive effort and particularly impressive given that Shane has been a member of our Center for only a bit over a year.

There is considerable debate as to why diseases were more prevalent in 2010 and whether the diseases were directly responsible for reducing rice yields, or did unfavorable climatic conditions weaken the rice plants and thereby reduce the yields, with the disease showing up secondarily. The year 1995 was also a bad year for panicle blight, and there were strong arguments presented at that year’s Rice Technical Working Group meeting supporting both ideas about the causes for the yield decreases. Dr. Garry McCauley and I have discussed an approach that we hope will help to unravel the basis for both years having lower yields and high disease pressures. We hope to present a follow-up article on this topic in a later issue of Texas Rice.

An important expectation of each and every new Assistant Professor at the Beaumont Center is that they will excel and become internationally recognized for their research, while simultaneously developing improved crop management and production systems so Texas growers can continue to compete with the very best from across the U.S. and the world. Balancing science with developing deliverables is not something that everyone does well. It takes a conscientious effort to maintain a balance between these two aspects. The fun of unraveling complex biological puzzles draws some researchers closer and closer to scientific discovery. At some point, focusing on the intricacies of science, can take away from developing management solutions. For some, the desire to work with growers can be an equally powerful pull. For some, focusing on communicating results, at the expense of maintaining a strong research program, can result in a scientist losing the ability to contribute to improving science and limit his contribution to moving agricultural management to the next level.

Too often, I have heard some imply that applied science is a less valuable form of science. I tend to either ignore these types of comments or vigorously convey my disagreement. Excellent science is excellent not because it is basic or applied. It is excellent when a researcher formulates ideas in a clear and logical manner, tests ideas in a rigorous manner, analyzes data methodically and without bias, and presents results in a manner that clearly and unambiguously moves our understanding and management of biological processes forward and not sideways or backwards.

The debate over the value of basic and applied research often revolves around whether a particular

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Severe Outbreaks of Bacterial Panicle Blight of Rice in Texas

Bacterial panicle blight, primarily caused by *Burkholderia glumae*, is potentially a serious rice disease that may cause significant yield and quality losses in epidemic years. The causal agent of this disease was first described in Japan in 1967 (Hashioka, 1969). The disease has since been reported in several major rice-producing countries, including China, Korea, Latin America, the Philippines, Vietnam, and the United States. In the United States, the cause of the disease was not identified until 1996 to 1997 after a severe epidemic of panicle blight in 1995 in the rice production region along the Gulf of Mexico (Shahjahan et al., 2000). Historically, the terms “panicle blight” or “panicle blighting” has been used to describe the losses of rice yield caused by abiotic factors, including high temperatures and water stress, and unknown biotic factors for more than half century in the southern United States (Nandakumar et al., 2009). In 2010, outbreaks of bacterial panicle blight and panicle blight occurred in Texas and Arkansas (Cartwright and Wilson, 2010). This increases the concern of the impacts of bacterial panicle blight on rice production in Texas and other southern rice-producing states.

Table 1. Observed date, location, cropping system, variety or line, and estimated severity for the outbreaks of bacterial panicle blight in rice in Texas in 2010.

<table>
<thead>
<tr>
<th>Date</th>
<th>Location (County)</th>
<th>Cropping System</th>
<th>Variety or Line</th>
<th>Estimated Severity (% Panicles Affected)</th>
</tr>
</thead>
<tbody>
<tr>
<td>7/9</td>
<td>Jefferson</td>
<td>Commercial fields</td>
<td>CL111</td>
<td>Severe</td>
</tr>
<tr>
<td>7/14</td>
<td>Jefferson</td>
<td>Research plots</td>
<td>Lemont/Jasmine 85</td>
<td>Moderate to very severe</td>
</tr>
<tr>
<td>7/15</td>
<td>Colorado</td>
<td>Commercial fields</td>
<td>CL111</td>
<td>Severe</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Research plots</td>
<td>Cocodrie</td>
<td>Moderate</td>
</tr>
<tr>
<td>7/15</td>
<td>Jackson</td>
<td>Research plots</td>
<td>Cocodrie</td>
<td>Moderate</td>
</tr>
<tr>
<td>7/23</td>
<td>Jefferson</td>
<td>Research plots</td>
<td>Francis</td>
<td>50%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Bengal</td>
<td>47%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>CL111</td>
<td>33%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>CL151</td>
<td>15%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Presidio</td>
<td>1%</td>
</tr>
<tr>
<td>7/28</td>
<td>Jefferson</td>
<td>Organic research plots</td>
<td>RU0903150</td>
<td>20%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Micro2 -1572</td>
<td>13%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Bengal</td>
<td>10%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Cocodrie</td>
<td>1%</td>
</tr>
<tr>
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<td>Chambers</td>
<td>Commercial fields</td>
<td>CL151</td>
<td>Moderate</td>
</tr>
<tr>
<td>8/6</td>
<td>Wharton</td>
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</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>CL151</td>
<td>Moderate</td>
</tr>
<tr>
<td>8/8</td>
<td>Jefferson</td>
<td>No-till organic plots</td>
<td>Micro2 -1572</td>
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<td></td>
<td>RU0903150</td>
<td>8%</td>
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<td></td>
<td>RU0703144</td>
<td>8%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>RU0703190</td>
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Bacterial Panicle Blight ...

There is an interest in developing effective strategies for managing bacterial panicle blight. The objectives of this article are to summarize recent outbreaks of bacterial panicle blight in Texas, describe their potential relationship to different weather factors, and describe the symptoms and epidemiology of bacterial panicle blight, and suggest management strategies for the disease.

During the 2010 cropping season, a number of commercial fields in Jefferson, Colorado, Chamber, and Wharton County, where rice acreage accounts for ca. 60% of the total acreage in Texas, were observed infested with bacterial panicle blight. Among the commercial fields surveyed, rice variety CL111 was the most severely affected, followed by CL151 (Table 1). In contrast, far less bacterial panicle blight was observed on the variety Presidio or on hybrids. Diseased areas in the field appeared to be a result of the spread of the pathogen from a central infected area (Fig. 1), although affected fields were also observed to have disease patterns that spread for dozens of yards in an amoeba type fashion. Bacterial panicle blight was also commonly observed in research plots located at three research facilities across the Texas Rice Belt (Table 1). In several field studies at the Texas A&M AgriLife Research and Extension Center at Beaumont, bacterial panicle blight was present on numerous varieties and breeding lines to varying degrees (Fig. 2). Francis, Bengal, CL111, MCR 02-1572, and some Lemont/Jasmine 85 derived lines were among those most severely damaged (Table 1 and Fig. 2). The disease also was present in some plots with CL151, and Presidio. However, the severity on both varieties was much lower compared to CL111, Bengal, and Francis (Fig. 3). In addition, bacterial panicle blight was occurred on Bengal, Cocodrie, RU0903150, MCR 02-1572, and other varieties or elite lines of rice grown under organic management (Table 1).

The outbreaks of bacterial panicle blight appear to be related to particular weather conditions. Weather conditions favorable for the development of the disease are warm night-time temperatures and high humidity or rainfalls during heading and flowering.

Fig. 1. Outbreak of bacterial panicle blight of rice in a CL111 field at East Bernard in Wharton County, Texas in 2010. Note the dashed circular area showing the focal pattern of the disease.

Fig. 2. Severity (% panicles affected) of bacterial panicle blight on 20 varieties and elite lines of rice in naturally infested field at the Beaumont Center, Texas in 2010.
For 2010, abnormally high minimum (night time) temperatures occurred on June 21 through July 10 (Fig. 4) when ca. 60% of the Texas rice acreage was near or at heading and flowering. During that period of time, rainfall was frequent and relative humidity was 95% or above most of the time (Fig. 4). The combination of favorable weather conditions, high night-time temperatures and high humidity, occurring at the most susceptible stages of rice plants promoted the infection and development of bacterial panicle blight. Similar weather patterns were observed in 1995 when a severe epidemic of panicle blight took place in Texas, with some of the symptoms suspected to be caused by bacterial panicle blight. There were many days with high maximum temperatures 95°F or above, day temperatures above 89°F from 10 am to 12 pm (the flowering time) and precipitation from the last week of June through the first week of August (Table 2). Heading and flowering occurred on a large percentage of the Texas rice crop during that period. These conditions were associated with severe outbreaks of panicle blight and significant yield losses in 1995. Figure 5 shows the examples of the severity of this disease in 1995 and its association with yield loss for different rice varieties, with disease severity estimated to range from 1 to 22% of panicles affected.

Bacterial panicle blight has symptoms that can be distinguished from other diseases with some practice. Bacterial panicle blight occurs sporadically on individual plants or in circular or oval patterns in the field (Fig. 6). In contrast, common panicle blanking, caused by abiotic stress such as from excessive heat, develops in the field more uniformly and does not form apparent foci (circular or oval patterns).
Bacterial Panicle Blight ... patterns). There are three important characteristics of bacterial panicle blight that separate it from other panicle disorders: 1) Bacterial panicle blight often does not appear to prevent successful pollination although it can affect individual glumes or whole panicles (Fig. 7). Thus seed may be present on the panicle unlike panicle sterility that is caused by heat stress; 2) Infected florets initially have discoloration ranging from light green to light brown on the basal portion of the glumes with a reddish-brown margin separating this area from the rest that becomes straw-colored later (Fig. 7 and 8); and 3) The rachis or branches of the panicle remain green for awhile at the base of each floret, even after the glumes desiccate and turn tan (Fig. 7 and 8). Florets at the latest stages of infection usually appear to be gray or black due to the abundant growth of saprophytic fungi on the surface (Fig. 8). The disease can cause linear lesions on sheaths with a distinct reddish-brown border and a gray and necrotic center, resulting in sheath rot (Fig. 9A) and stem rot (Fig. 9B). On the leaves, lesions are circular to oval in shape with a smooth reddish-brown border and a gray or straw-colored center (Fig. 9C). If the infected plants are young, this disease can cause seedling blight (Fig. 9D). However, these symptoms on leaves, sheaths, stems or seedlings are rarely observed under field conditions in the southern United States.

The disease cycle and epidemiology of bacterial panicle blight of rice is not completely understood. The cause of the disease has been identified as the bacterial pathogens *B. glumae* and *B. gladioli*, with the former being the primary pathogen (Hashioka, 1969; Ura et al., 2006; Nandakumar et al., 2009). The bacteria of both species were found to be widely

<table>
<thead>
<tr>
<th>Crop Phenology (% heading)</th>
<th>Month</th>
<th>Week</th>
<th>No. of Days ≥ 95°F</th>
<th>Mean ≥ 75°F</th>
<th>10 am to Noon ≥ 89°F</th>
<th>Precipitation</th>
<th>Total Precipitation (inch)</th>
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</thead>
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<td>June</td>
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<td>0</td>
<td>0</td>
<td>-</td>
<td>0</td>
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<td>3</td>
<td>1</td>
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<td>-</td>
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<td>4</td>
<td>1</td>
<td>-</td>
<td>4</td>
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</tbody>
</table>

Table 2. Summary of rice crops and weather data at Beaumont and Eagle Lake, Texas in 1995.

Fig. 5. Yield and panicle blight severity (% panicles affected) of eight commercial varieties of rice in naturally infested field at the Beaumont Center, Texas in 1995 (Source: Anna McClung, unpublished).
Bacterial Panicle Blight...

present in rice seed lots in studies conducted in Japan, the Philippines and the United States (Cottyn et al., 2001; Nandakumar et al., 2009). Infected rice seeds are believed to be the primary source of inoculum. Jeong et al. (2003) reported in Korea that *B. glumae* could infect tomato, sesame, perilla (an herb), eggplant and hot pepper. The bacterium is capable of inhabiting the surface of plants and soils under a wide range of environments (Compant et al., 2008), which can serve as the sources of inoculum.

The bacterium invades germinated seeds, inhabits the roots and lower sheaths, and moves up the growing plant as an epiphyte (an organism growing on a plant surface, but not as a parasite). Infection by the bacterium occurs at flowering by invading rice spikelets through stomata or wound in the epidermis of glumes. The bacterium colonizes and multiplies in spikelets quickly after invasion by utilizing intermediate sugars in developing grains (Hikichi et al., 1994). The bacterium is spread primarily by splashing and windblown rain and panicle contact, resulting in the formation of disease foci. High temperatures in combinations with high humidity and frequent rain are essential for the development of bacterial panicle blight epidemics.

Options for management of bacterial panicle blight are currently limited. Partially resistant varieties are available, although most commonly-planted rice varieties in the South are susceptible or very susceptible. Some varieties, such as Presidio, CL151 and XL723, are less susceptible to the disease than others. Proper cultural practices, including early planting or use of early maturing varieties to avoid the hottest times of the growing season and avoiding excessive seeding and nitrogen rates, are helpful in reducing the damage caused by the disease. Oxolinic acid is the only chemical (an antibiotic) that has been shown to be effective to control this disease. Unfortunately, oxolinic acid is not labeled for use on rice in the United States. Use of pathogen-free seeds is an effective practice to reduce the incidence of bacterial panicle blight but this practice has not been implemented in the United States.

Studies on the epidemiology and management of bacterial panicle blight have been initiated at the Beaumont Center. Two bacterial panicle blight

![Fig. 6](image6.png) A focal pattern of bacterial panicle blight in rice.

![Fig. 7](image7.png) Symptoms of bacterial panicle blight on rice.

![Fig. 8](image8.png) Comparison of the developmental symptoms of bacterial panicle blight on infected kernels of rice (lower row) relative to healthy kernels (upper row).
nurseries were established in the Texas Rice Belt to identify, evaluate and develop disease resistance in rice germplasm. A biocontrol research program has been initiated with the aim of utilizing antagonistic bacteria for protection of planted-seeds and panicles of rice from the infection by the bacterial panicle blight pathogen. Multiple field trials were conducted to increase our understanding of the spatial spread of the disease and the disease-yield relationships. The goal of these studies is to develop environmentally friendly, sustainable management programs for bacterial panicle blight in rice. These research activities were funded, in part, by the Texas Rice Research Foundation.

For more information, please read the following references:


*Article by Drs. Xin-Gen (Shane) Zhou, Anna McClung, Mo Way, Rodante E. Tabien, and L. T. (Ted) Wilson. Drs. Zhou, Way, Tabien, and Wilson work at the Texas A&M AgriLife Research and Extension Center at Beaumont, TX, while Dr. McClung works at the USDA ARS, Dale Bumpers National Rice Research Center, at Stuttgart, AR. For more information, please contact Shane Zhou at xzhou@aesrg.tamu.edu.
the complexities of agriculture, specifically rice production. Unfortunately, particularly our youth have a poor understanding of the significance of agriculture to our society. Fast and packaged food from drive-ins and convenience stores have become the norm. Our children are bombarded with TV and other media commercials encouraging consumption of all sorts of foods and snacks. But, little information is given regarding the source and significance of our nutrition. Because agriculture is so vital to our survival and well-being, the Texas A&M AgriLife Research and Extension Center at Beaumont has for many years educated SE Texas youth about the specifics of rice production. The objectives of this outreach effort are to: 1) teach youth the value of rice production in our region, 2) use agriculture as a model to improve math and science skills, and 3) encourage our youth to attend college and major in an agriculturally-related discipline. We desperately need hard-working, energetic, intelligent youth to continue the great tradition of providing food for an expanding global population.

To this end, the Beaumont Center has for many years developed, organized, and administered the Texas Rice Education Contest. I assumed the leadership role of this event upon the relocation to College Station of Dr. Arlen Klosterboerer who was our rice extension agronomist until 1996. Recently, Daun Humphrey at the Beaumont Center has become Co-chair of the Contest. She contacts the teachers, performs various logistical functions, scores the tests, provides home-made snacks for the students, and presents the awards. Since Arlen’s relocation, the Contest has evolved considerably. Now, the Contest is given at the Beaumont Center during the week of the Texas Rice Festival, which is held in Winnie in early October. A preparatory training session is also given one week prior to the Contest. This training is valuable because students are given time to view specimens on the identification portion of the test, and student questions are answered and discussed.

The Contest is open to students in High School FFA Chapters in SE Texas. The Vocational-Agriculture teachers play an important role in the Contest because they organize transportation to and from the Center and help coach their students. In 2010, the Contest was held on September 27, and consisted of 117 questions involving identification of weeds, insects, and diseases. Preserved or live specimens are presented to the students, much like a lab practical exam in college. Thus, the Contest provides the students an atmosphere of learning and testing similar to college. High school teachers are more than ever required to develop hands-on curricula and this Contest can serve as a model for this type of learning environment. In addition, details testing the students’ knowledge of rice development, insect biology, pest management, and agronomic practices are formulated as true/false, multiple choice, and fill-in-the-blank questions. Essay and math questions relating to calibrating pesticide spray equipment, calculating economic injury levels, and determining fertilizer amounts are also on the test.

This year, 67 students from 6 high schools competed. Below is a list of the winners and awards:

**Top 4 High Schools. Each school was awarded a plaque.**
1) Hardin-Jefferson
2) Hamshire-Fannett
3) Silsbee
4) Little Cypress-Mauriceville

**Top 5 Students, and their respective awards**
1) Dalton Horn - Hardin-Jefferson; awarded belt buckle, ribbon and gift certificate
2) Kayti Browning - Hardin-Jefferson; awarded belt badge, ribbon and gift certificate
3) Tommy Wendling - Hamshire-Fannett; awarded belt badge, ribbon and gift certificate
4) Jacob Dunwoody - Hardin-Jefferson; awarded belt badge, ribbon and gift certificate
5) Guadalupe Carrillo - Hardin-Jefferson; awarded belt badge, ribbon and gift certificate

**Top 6 through 16 Students. Each awarded a ribbon and a gift certificate.**
6) Laura Floyd - Hardin-Jefferson
7) Kolbi Payne - Hardin-Jefferson
8) Jesse Olalde - Hamshire-Fannett
9) Donald Fowler - Hardin-Jefferson
10) Theresa Rodriguez - Hardin-Jefferson
Rice Education Contest...

11) Megan Guidry - Hamshire-Fannett
12) Tyler White - Hardin-Jefferson
13) Luis Romero - Hamshire-Fannett
14) Kimberly Wendling - Hamshire Fannett
15) Marshall Browning - Hardin-Jefferson
16) Katherine Leggett - Little Cypress-Mauriceville

Awards were paid for or supplied by the Texas Rice Festival, Dow AgroSciences, DuPont, FMC Corporation, Syngenta Crop Protection, Valent USA Corporation, Landis International, Mitsui Chemical and Texas AgriLife Research. I thank these sponsors for their continued support of the Contest.

In addition, interested students will be offered an opportunity to tour Texas A&M University at College Station. They will visit the Department of Entomology and other departments of their choosing. As mentioned before, we need young folks to consider pursuing a piece of science is structured with an application in mind. Science for science sake is a luxury that few of us have. The same argument can be applied to research. Research without a clear focus is rarely designed with a clear direction in mind.

I often use an analogy with new students and young post-docs when discussing experimental design and analysis and the difference between measuring treatment effects and understanding treatment effects. A goal of applied agricultural research is not to conduct experiments that show that one treatment yields more than another treatment, but instead to understand why each treatment yielded at a particular level so that we better understand the underlying processes, so we can understand how to increase the yields even further.

Not all science is of equal value to society. A scientist can be so tightly focused on a research question to make it difficult to identify an outcome that can easily be applied to the management of a problem. During the earlier stages of my scientific career, I frequently verbalized my belief that each scientist within a Land Grant University System should focus at least a small part of their research effort on agriculture as an occupation - promising high school students can become inspired to do so by visiting with college professors and undergraduate/graduate students. Several past students who participated in the Contest have gone on to college specializing in agriculturally-related disciplines.

Daun Humphrey has access to the study guide, test and key of the 2010 test. If you would like this information, please contact Daun at dhumphrey@aesrg.tamu.edu. Finally, if you have suggestions for improving the Contest, contact Daun or me moway@aesrg.tamu.edu. Educating our youth is essential to the betterment of our society. The Texas Rice Education Contest is a tool to introduce youth to a fascinating, rewarding and life-sustaining field of study - AGRICULTURE! *

* Article by Dr. Mo Way, Texas A&M AgriLife Research and Extension Center at Beaumont.

From the Editor ...

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I often use an analogy with new students and young post-docs when discussing experimental design and analysis and the difference between measuring treatment effects and understanding treatment effects. A goal of applied agricultural research is not to conduct experiments that show that one treatment yields more than another treatment, but instead to understand why each treatment yielded at a particular level so that we better understand the underlying processes, so we can understand how to increase the yields even further.

Not all science is of equal value to society. A scientist can be so tightly focused on a research question to make it difficult to identify an outcome that can easily be applied to the management of a problem. During the earlier stages of my scientific career, I frequently verbalized my belief that each scientist within a Land Grant University System should focus at least a small part of their research effort on developing management solutions. As such, I felt that no one single scientist should abrogate a responsibility for conducting research that helps growers. I felt that by maintaining ones foot in both doors this increased the change of developing science that helps agriculture. While I still feel there is merit to this way of thinking, I also realize that one could become like Don Quixote and constantly tilt at windmills. While entertaining to observers, tilting at windmills does not lead to appreciable accomplishments. Now, as a researcher, I try to focus on maintaining a strong research program that crosses the basic and applied research spectrum, and in the process contributing to science while also developing management solutions. As an administrator, I encourage scientists who I either supervise or mentor to consciously work to maintain a balance between scientific discovery and the development of deliverables. From the latter perspective, I have an unwritten goal of encouraging Beaumont Center scientists to structure their research programs so they produce at least one new research

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Rice Crop Update

As of September 15, 2010, the main crop rice acreage in Texas that had been harvested was 98.7%. In comparison, 97.0, 93.6, 95.4, and 90.0% had been harvested by September 15 in 2006, 2007, 2008, and 2009, respectively.

As for the 2010 ratoon crop, this has not yet reached maturity and there have been no harvests of this crop as of September 15. Similarly, no ratoon crop had been harvested as of September 15 in 2007 and 2008. However, about 1 and 4% of the ratoon crop had been harvested by September 15 in 2006 and 2009, respectively.

The figure on the right shows the comparison in percentage of main crop rice acreage that had been harvested by September 15 in 2006 to 2010.

Weekly updates on the acreage and percentage of rice grown in Texas that are in the various growth stages are available at our website at http://beaumont.tamu.edu/CropSurvey/CropSurveyReport.aspx.