Texas Rice

Texas A&M University System
Agricultural Research and Extension Center
Beaumont, Texas

June 2006 Volume VI Number 4

32nd Annual Eagle Lake Rice Field Day

The 32nd Annual Rice Field Day at the Eagle Lake Research Station will be held Tuesday June 27th starting at 4:00 pm. With all the new developments in production and crop protection, farmers and other industry representatives are encouraged to come and learn the latest information in rice research from Texas A&M and USDA scientists.

Field Day activities will begin with a tour of the research plots, with water and sodas provided. Speakers will include entomologist Dr. Mo Way, who will speak about insect management in both the main and ratoon crops. Way will also discuss his latest research in seed treatment options for rice water weevils to replace ICON 6.2FS, which is no longer available to rice farmers because of its negative effect on crustaceans. According to Way, he is working with several companies on a wide array of chemistries. "We have seen some very promising preliminary results," said Way, "it appears some will be as good, or better, than ICON on the rice water weevil, and have a broader spectrum of control." Way said they are already seeing damage from chinchbugs and leafhoppers that would have been prevented if the farmers had been able to use ICON as a seed treatment for RWW. Of course, there are other chemicals that are approved to treat for RWW, which are applied either just before or after permanent flood.

How does a farmer decide if a treatment is necessary? "Consider the field history," said Way, "and how susceptible is the variety you're growing. Also look at plant stand - thinner stands tend to encourage RWW populations. We have also found that early flood leads to higher RWW pressure, as does planting at the optimum time, however, early and late plantings are not as vulnerable. And finally, remember that isolated fields surrounded by wooded areas seem to have higher populations of RWW. A farmer should take all these things into consideration when deciding on whether to treat at permanent flood."

Dr. Garry McCauley, one of the speakers on the field tour, will be discussing hybrid rice research.

Other speakers on the field tour will be Drs. Anna McClung and Rodante Tabien, discussing the varietal improvement program and new releases; Dr. Garry McCauley providing an update on hybrid research; Dr. Joe Krausz sharing his research on seedling diseases in hybrid vs. conventional varieties; and Melissa Barton, with the Texas Department of Agriculture, discussing the latest developments in state laws and regulations applicable to producers.

The evening meal and program will follow the field tours and will begin around 6:30 pm. The dinner is courtesy of BU Growers, a limited partnership business specializing in seed rice production, drying & storage, and rice brokering. Based in Bay City, BU Growers has sponsored the Eagle Lake and Beaumont field days since the company's inception in 1989.

The evening program will feature El Campo rice farmer L.G. Raun, who will discuss the new farm bill, which is scheduled to begin with the 2008 growing sea-

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From the Editor...

Welcome to the June issue of *Texas Rice*. In last month's issue, I mentioned the need for a national policy aimed at maintaining agricultural production as an important, integral, and secured part of our nation's economy. An effective national agricultural policy must have two essential components. The first component would include enforceable provisions to insure that U.S. agriculture is on a level playing field with our trading partners. Agricultural tariffs and duties currently average 62% worldwide, compared with 12% for the U.S. In other words, on average, the U.S. spends five times the amount that other countries spend bringing food through the ports of foreign trading partners. Disproportionately high foreign agricultural tariffs and duties provide many trading countries an economic advantage that threatens the financial well-being of U.S. internal and export ag commodity markets.

Normalizing tariffs and duties would benefit most countries of the world. Burfisher, et al. in a February, 2001 USDA Economic Research Service Report, stated that global relaxing or elimination of tariffs directed at agricultural commodities, would increase world trade and US agricultural exports. Citing from this same report, "Distortions from agricultural tariffs, domestic support, and export subsidies cause world agricultural prices to be 12 percent below the level they would otherwise be." In other words, eliminating agriculture tariffs and duties would result in a 12% increase in producer's gross revenue.

As simple as it may sound, normalizing tariffs and duties is not an easy matter. Countries that have experienced periods of extreme famine justifiably are very protective of their agriculture and will continue to maintain policies aimed at insuring their agricultural production remains intact. As an extreme case, the Japanese government subsidized each rice farmer ca. $2,500 per each ton of rice produced. In contrast, the U.S. government subsidizes each rice farmer somewhere around $30 per ton of rice produced, assuming various limitations do not reduce this amount. A solution to the inevitable conflict between countries over this issue will require non-trade distorting policies that are applied fairly across countries. In this regard, many Americans feel the WTO agreements on agriculture subsidies are trade distorting and must be changed.

The second essential component of a U.S. national agricultural policy would include enforceable provisions to provide for a planned preservation of agricultural lands to insure our country's ability to meet the food, feed, and fiber needs of future generations. Such provisions should address a future need for land to provide the housing and business infrastructure necessary to accommodate population growth, while maintaining sufficient agricultural lands to feed future populations. Failing to maintain agricultural lands as a strategic necessity would inevitably result in our country becoming reliant on other countries for our food. Such provisions would also have to be structured to ensure a viable livelihood for our agriculturalists. It does little good to protect agricultural lands if our farmers cannot afford to produce crops. This later point again brings up the difficulty of developing multinational trade agreements that do not favor one country over another.

In the last issue of *Texas Rice*, I also discussed the need for a massive increase in federal and state funding for biofuels crop production. On June 7, 2006, the Worldwatch Institute presented a 38-page report titled, "*Biofuels for Transportation*". The report identifies the opportunities and limitations associated with biofuels production in the U.S. and elsewhere. Based on data presented in the report, ethanol production worldwide has increased at an annual rate of ca. 14.5%, with current world production of ethanol at ca. 10 billion gallons/yr. The largest producers of ethanol worldwide are Brazil (44.6%) and the U.S. (43.9%). In comparison, the global biodiesel production has reached ca. 0.8 billion gallons/yr., with the U.S. ranking 3rd in production behind Germany and France. While

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Special Section:
Highlighting Research in 2006

Farming Rice

a monthly guide for Texas growers

Providing useful and timely information to Texas rice growers, so they may increase productivity and profitability on their farms.

Fungicide Timing for Multiple Rice Diseases

Rice diseases pose a major threat to rice production. The two major diseases, sheath blight and blast, cause significant yield and quality reductions that cost farmers millions of dollars each year. Grain smuts have also become significant problems in rice production, causing significant quality reductions. Planting rice varieties with disease resistance is the best control method, however, resistant rice often is either not available, or the resistance breaks down over time after a variety is released.

Most long-grain varieties are susceptible to sheath blight, and several major varieties are also susceptible to blast. How a crop is managed in the field can reduce disease development, but reducing inputs can limit yield, too. As a result, rice farmers often rely on fungicides to control diseases. Fungicide timing is critical for maximum economic return.

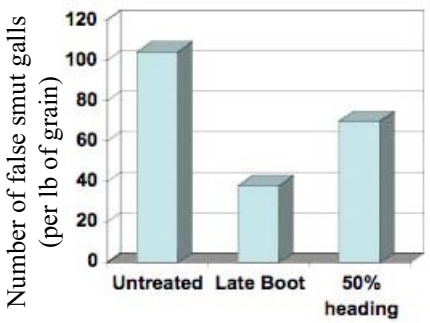
Deciding to use a fungicide and when to apply it are the two most critical decisions a producer must make. The correct decision will make money, and the wrong one will lose money. Each disease has its own cycle, and control practices are effective only at certain stages, when the pathogen is susceptible to the chemical control, and before irrevocable damage occurs in the crop. Typical sheath blight fungicide timing is at the boot growth stage; however, several fungicides also control blast when applied at heading. Consequently, a general trend has been to apply rice fungicides later in the season to control both blast and sheath blight with a single application. Several fungicides that are most effective against smuts cannot be applied after heading, making them ineffective against blast.

Fungicide timing and rate trials have been conducted at the LSU AgCenter's Rice Research Station, the University of Arkansas Rice Research Station, and in grower fields in both states for a number of years. Typically, fungicides are applied to small plots using CO_2 pressurized sprayers, although several aerial trials have been conducted. Fungicides were applied at either 7 days after panicle differentiation (panicle 0.125 inch in length), boot (2 inch panicle in the sheath), 50 percent heading (at least half of heads emerging from the sheath), or 5, 10 or 15 days after heading. Varieties selected were susceptible either to sheath blight, blast, or smut, and were managed to encourage disease (i.e. inoculated, fertilized with high nitrogen rates, planted late, and/or located where disease pressure is high).

Timing is an important consideration in fungicide control in sheath blight, blast and smut. The booting stage appears to be the best time for smut control (Figure 1). Earlier applications may require high rates to be effective, and applications after heading can be ineffective, as well as illegal, because restrictions on the label of some fungicides prevent applications after the heads emerge. Sheath blight control has been best at the boot growth stage (Figure 2). Applications

False smut galls on rice grains.

Figure 1. Effect of Tilt (4 oz/A) applications timing at different growth stages on rice false smut control as compared to an unsprayed check.



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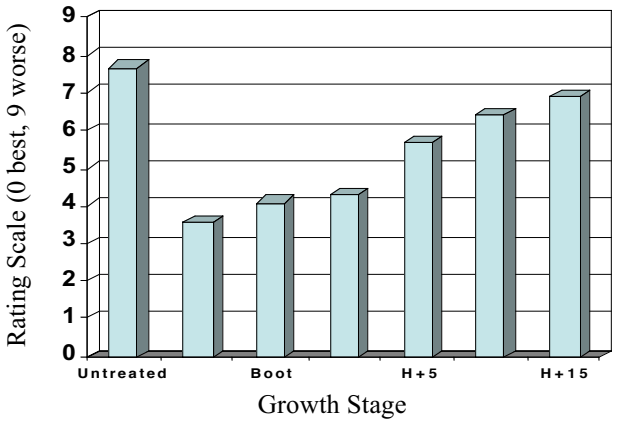
Fungicides continued...

Figure 2. Effect of Quadris (9 oz/A) application timing at different growth stages on sheath blight control as compared to an unsprayed check.



at 7 days after panicle differentiation can be effective, but higher fungicide rates are often necessary for season-long control. Applications at heading have been effective; however, sheath blight can spread up the plant more readily and cause more damage by this growth stage. Blast control has been best when fungicides were applied at heading (Figure 3). Applications after heading lost effectiveness on both sheath blight and blast (Figures 2 and 3).

Fungicide timing must be based on the most damaging disease present in a field. This is determined by knowing the varietal susceptibility, field disease history, what is occurring in the area and, most importantly, by scouting for disease in the field multiple times during the growing season.

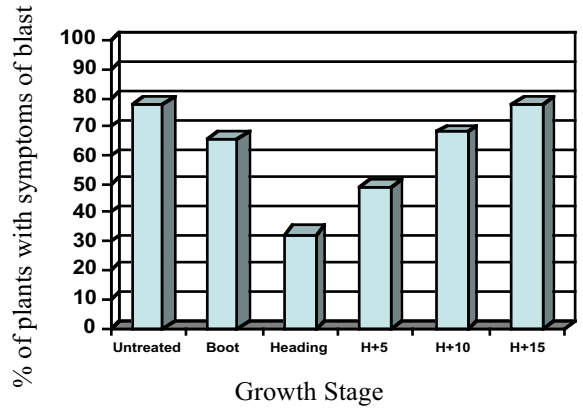
— If sheath blight and smuts are both significant in a field, a boot application would be best. Earlier applications, with higher rates, would be advisable only if sheath blight had started early in the season and was causing significant damage before the boot growth stage.

— If blast and sheath blight are both present, applying a fungicide with both sheath blight and blast activity at heading would be best, because blast can be more damaging than sheath blight, and applications at heading were effective on sheath blight.

— If blast and kernel smut are both significant in fields, a fungicide application at heading would be advisable, because blast is more destructive, and applications at heading are somewhat effective for kernel smut. If kernel smut has been a major problem in a field, applying the smut fungicide at boot stage, and the blast fungicide at heading, may be advisable, but much more costly because two fungicide applications costing $15 to $30 each would have to be used.

Split applications for sheath blight and blast at boot and heading are also more effective, but economic constraints of rice production limit this practice. Most important, fungicides must be applied at or before 50 percent to 70 percent heading to maximize disease control and yields. ✻

Figure 3. Effect of Quadris (9 oz/A) application timing at different growth stages on blast control as compared to an unsprayed check.



Article by D. Groth and R. Cartwright,
Louisiana Agriculture, Winter 2006, Vol. 49:1

Field Day continued...

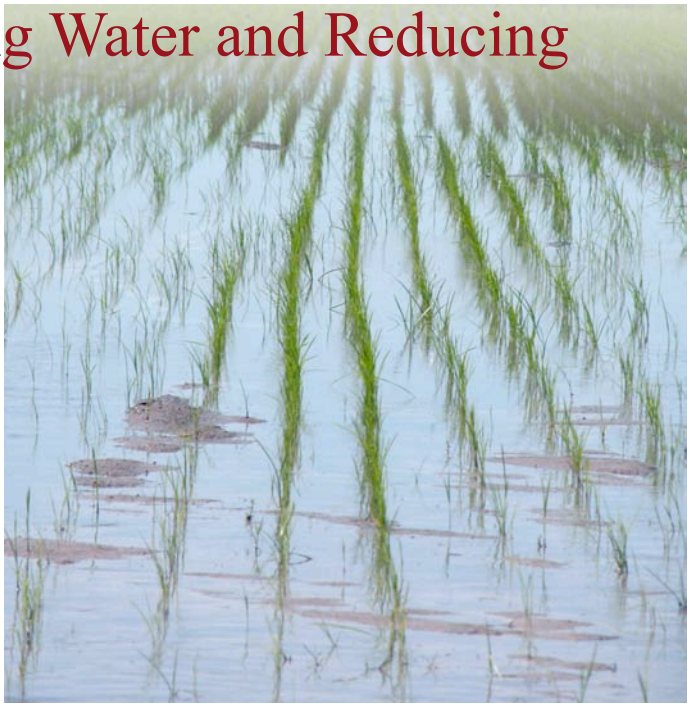
son. Raun will also discuss the 2007 federal budget, with a recap of decisions on the Emergency Supplemental Disaster Payment, and WTO negotiations.

Kyle Jensen, river operations manager with the Lower Colorado River Authority, will provide information about a conservation program where LCRA is teaming up with the Natural Resource Conservation Service to save farmers up to 80% on the cost of implementing water conservation practices.

And of course, there will be opportunities throughout the afternoon for producers to ask questions of scientists conducting research at the Beaumont Center and Eagle Lake Station.

CEU hours will be given to those on the field tour. Anyone interested in rice research and production is encouraged to attend. For more information contact Coleen Meitzen at (979)234-3578 or Brandy Morace at (409)752-2741 ext 2227.✻

Innovative Irrigation: Saving Water and Reducing Methane Emissions



In this shallow flooded field, areas of soil are visible through the water.

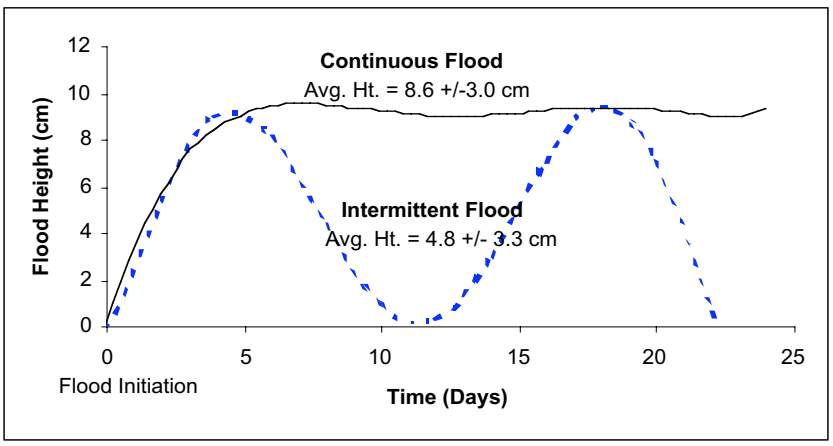
Water conservation continues to be a hot topic in rice farming, as groundwater stores are being depleted and expanding urban areas compete with farmers for what remains. In Arkansas, the situation is nearing the critical stage, with the depletion of the *Alluvial* aquifer in the Grand Prairie region. Across the state line in Mississippi, researchers are taking a proactive approach to sidestep the problem of groundwater depletion.

Dr. Joe Massey, with Mississippi State University, is leading a research team whose goal is to reduce water use, and at the same time, reduce methane emissions in rice production. The practices they are investigating are intermittent irrigation, coupled with multiple inlet irrigation.

Intermittent irrigation is a water *management* system where, once the initial flood is achieved, pumping is halted and the flood is allowed to naturally subside for about 7 to 10 days, after which time the flood is fully reestablished. Intermittent irrigation cycles reduce water inputs by reducing (a) over-pumping and (b) increasing rainfall capture by keeping the rice paddies less-than-full. In the Mississippi Delta, where Massey is conducting the research, about 10 inches of rain occurs during a typical growing season, representing a valuable, yet largely untapped, resource for rice growers.

Multiple-inlet irrigation is a water distribution system, whereby irrigation water is distributed through 10-mm thick by 15-in diameter plastic tubing having floodgates along its length. Multiple-inlet irrigation allows (a) greater flood control and (b) more rapid re-establishment of flood, reducing potential crop stress and improving nitrogen use efficiency. When coupled with intermittent irrigation, significant reductions in water (and energy) use occur.

At three Mississippi and two Arkansas field sites, side-by-side comparisons were made in 2004 and 2005, between continuously-flooded vs. intermittently-flooded rice using multiple inlets. On average, water use was reduced by up to 50%. In addition, intermittent irrigation lead to a reduction in run-off, which reduced Non-Point Source pollution of agricultural chemicals, by nearly 60%.



From *Water-Saving Irrigation for Mississippi Rice Production*. 2005 Research Report of the Mississippi Rice Promotion Board.

Regarding weed control, Massey found that if the producer's weed control program was good using conventional flooding, it worked well with intermittent flooding too. This result likely would not have been possible in the past, but with the herbicide programs available to producers today (ex. Command PRE, followed by several of the newer POST herbicides), weed control under intermittent flooding has held up in all three years of trials.

Massey also found that yield was equal, or slightly better in intermittent-flood than

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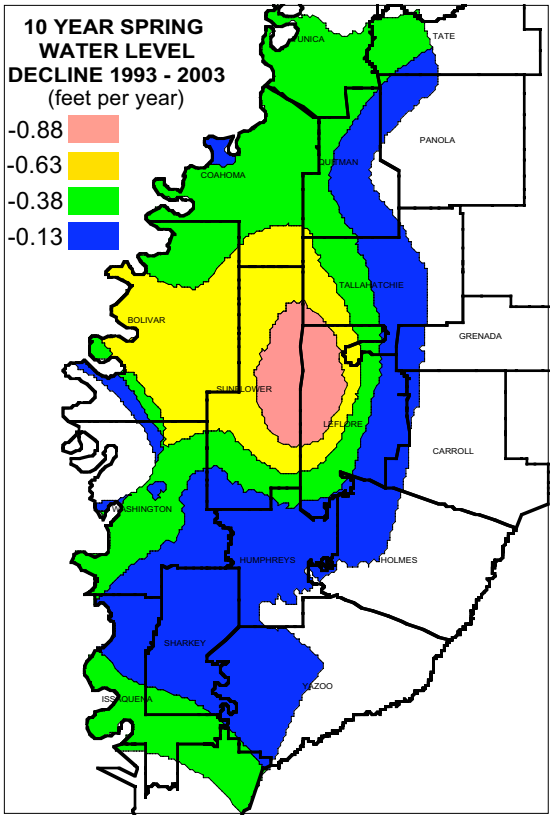
Innovative Irrigation continued...

in continuous flood. He speculated that even though rice can tolerate flooded conditions, there are other detrimental impacts of flooding, such as straighthead, that may explain why yields from intermittent flooding may be slightly higher than continuously flooded.

In addition to these benefits, methane emissions were reduced by an average of 50% using intermittent flood. Intermittent irrigation reduces methane emissions by allowing more oxygen to diffuse into the soil. This is due to the fact that methane is produced in flooded soils by anaerobic bacteria. Removing floodwater decreases methane emission to the atmosphere, because soil aeration inhibits methane production by methogens, while depleting existing soil methane through aerobic oxidation of methane by methanotrophs. Studies have shown that loss of floodwater quickly and dramatically reduces methane emission. And even after the fields are re-flooded, methane emission does not fully recover for at least two weeks.



From *Water-Saving Irrigation for Mississippi Rice Production*. 2005 Research Report of the Mississippi Rice Promotion Board

With intermittent flooding, the sediment becomes less anaerobic with less methane produced. By intermittently flooding the field, the higher portion of the upper paddies becomes exposed to air, making them less anaerobic. Massey speculates that it might be possible that sediment still covered by, say, 0.25 inches of water are less anaerobic than sediment covered with 4 inches of water. Significant reductions in methane production using intermittent irrigation have been documented in research conducted in China, India, and at the Texas A&M Research Center in Beaumont.

In 1992, Dr. Fred Turner published a paper based on research he did in conjunction with Dr. Ronald Sass at Rice University in Houston, Texas. In their study, four water treatments were evaluated for their effect on methane emissions from rice fields. They were normal permanent flood (46 days post planting), normal flood with midseason drainage aeration, normal flood with multiple drainage aeration, and late flood (76 days post planting). Although the multiple aeration water treatment emitted 88% less methane than the normal irrigation treatment, and did not reduce yield, it did require 2.7 times more water than the normal floodwater treatment. This is because the water was intentionally drained from the field, and was then replaced 6 days later. In Massey's work with intermittent flood, however, the same benefits are realized, and water is actually saved rather than wasted.

Although shown in production-scale studies that significant reductions in water use and associated energy costs may occur, grower adoption of intermittent plus multiple inlet rice irrigation remains low, due to time constraints that prevent growers from closely monitoring of water levels in their rice paddies. Sensors or other devices that could indicate the depth of flood in the rice paddies (especially after canopy closure) and, ultimately, automatically control flood management, could improve the adoption of these and other water-saving irrigation practices in rice production.*

Article by Jay Cockrell and Joe Massey

References:
Massey, J.H. and M.C. Smith. 2005. Water-Saving Irrigation for Mississippi Rice Production. 2005 Research Report of the Mississippi Rice Promotion Board. (pgs. 15-17)

Sass, R.L, Fisher, F.M., Wang, Y.B., Turner, F.T., Jund, M.F. 1992. Methane Emission from Rice Fields: The Effect of Floodwater Management. Global Biogeochemical Cycles, Vol. 6, No 3, pages 249-262

current ethanol and biodiesel production are but a small part of total world gasoline and diesel production, there is tremendous potential for increased sales. The Worldwatch report goes on to state that when "petroleum prices are above (U.S. $50) per barrel … ethanol from sugar cane is significantly less expensive than gasoline, and biodiesel is also increasingly competitive with diesel." The report concludes that advances in biofuels technology "could allow biofuels to substitute for 37% of U.S. gasoline use within the next 25 years."

Brazilian biofuel production has focused on sugarcane as a feedstock, while U.S. biofuel production has focused on using grain as a feedstock. Recent advances in cellulose (straw, wood pulp, etc.) extraction methods increasingly offer viable alternatives to both systems, and although cellulose extraction is more costly at present, it is projected to become as cost-effective as conventional gasoline and diesel production and a major source for biofuels production by 2010 (Worldwatch June 2006).

Federal, state, and local governments around the world can play an important role in promoting the development of biofuel-based industries. Governments can provide funding to establish biofuel factories strategically placed in different areas of the U.S. and around the world. A dispersed production infrastructure has the advantage of making our fuel industry less centralized and therefore less vulnerable to single strike terrorist actions, while providing for rural economic development through a much broader business base.

The development of a vibrant biofuel based industry in a country will require a significant investment in research. A major need exists for funding to support the development of high biomass producing varieties and improved methods of ethanol and biodiesel extraction. For the most part, agricultural crops have been developed to promote increased crop yields and not increased total biomass. As a result, while many modern varieties produce higher grain, nut, or fruit yields, such yield increases have typically resulted in reduced total above-ground biomass. Research focusing on improved extraction methods and higher biomass production could go hand-in-hand in promoting expanded agricultural production and renewed economic viability for rural areas across much of the U.S. and the world. The key to optimizing cellulose extraction is basically a two-stage process, the first being to develop highly efficient ways to unlock the chemical bonds that resulted in the conversion of sugar molecules to cellulose, the second to efficiently convert the sugar molecules to ethanol.

Before ending this editorial, I would be remiss were I not to invite you to our upcoming field days at Eagle Lake and Beaumont. The Eagle Lake field day is scheduled to begin at 4:00 PM on June 27. As part of the field tour, our scientists will provide up-to-date coverage of cutting edge rice research. Speakers will include Drs. Rodante Tabien and Anna McClung, who will discuss varietal research, Dr. Garry McCauley, who will provide an update on the management of hybrid rice, Dr. Mo Way, who will provide an overview of entomological research, Dr. Joe Krausz, who will discuss disease management in hybrid and inbred rice varieties, and Melissa Burton, who will provide an overview of state laws and regulations that are applicable to rice producers. This will be followed by an evening program where LG Raun will discuss the 2007 federal budget, the negotiations on disaster relief, and current World Trade Organization negotiations, and Kyle Jensen will discuss a proposal by LCRA that would reduce the cost to growers of adopting on-farm water conservation measures.

The Beaumont Center field day is scheduled for July 13, with the field tours beginning at 8:00 AM. The theme this year is 'Biofuels for Agriculture', and our guest speakers will include Dr. Mark Holtzapple, professor of agricultural engineering with Texas A&M University; Russ Heissner with Celanol Corporation, in charge of the new ethanol plant in Jennings, LA, that will utilize cellulose-to-ethanol technology; and David Schermock, an industrial engineer with AgriBioFuels, who just announced the opening of a new facility in Dayton, TX to produce biodiesel. It will be a timely and informative program, we hope you can join us.

Please keep on sending us your comments and suggestions.

Sincerely,

L. T. Wilson

L.T. Wilson
Professor and Center Director
Jack B. Wendt Endowed Chair
in Rice Research

Hlavinka Stands TALL

The Texas Agricultural Lifetime Leadership program recently announced the 24 members of its newest two-year class. The premier leadership development program of Texas Cooperative Extension, Texas Agricultural Lifetime Leadership is aimed at helping participants reach their full leadership potential.

One of the new class members is Terry Hlavinka from East Bernard, Hlavinka Equipment CASE-IH vice president and general manager, and also a rice, cotton, corn, grain sorghum, soybean, wheat and beef cattle producer.

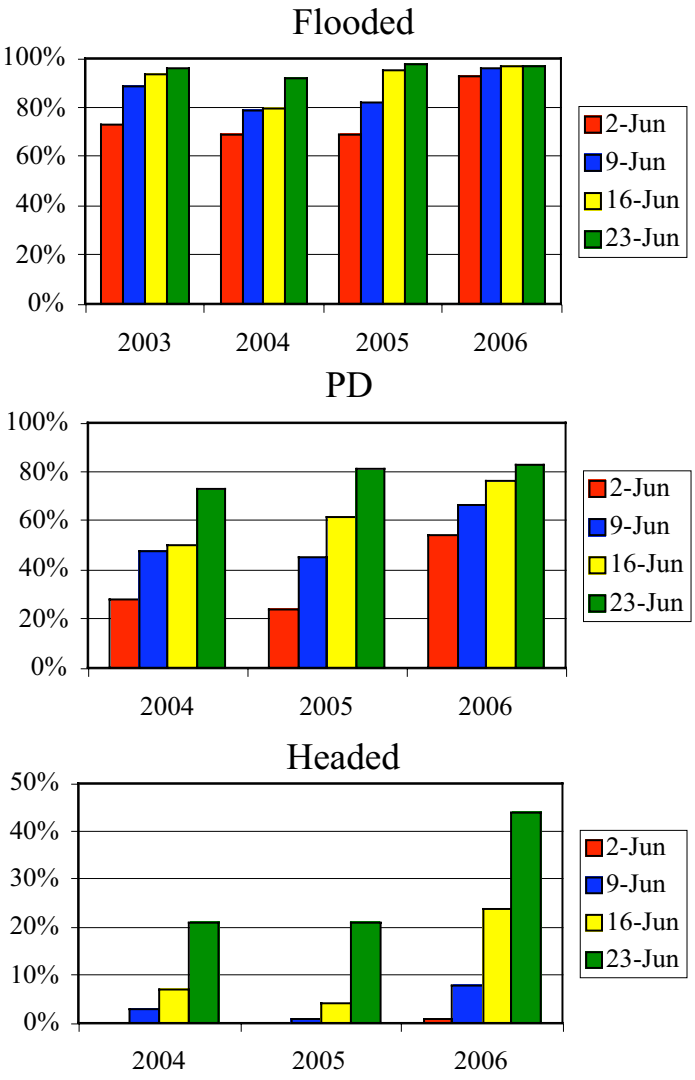
"Given the critical issues facing agriculture today, there is a need to provide intensive leadership development experiences for a promising new generation of leaders," said Dr. Jim Mazurkiewicz, director. Participants in the previous nine classes of the leadership program total 233 men and women. They have included farmers, ranchers, horticulturists, foresters, government officials, commodity representatives, agribusiness executives, media representatives, financial lenders, attorneys and others from many aspects of agriculture.

"The TALL program increases knowledge and understanding of agriculture and related industries in the context of today's complex economic, political and social systems," Mazurkiewicz explained. "Participants also learn the processes of organizational decision making and the role of political institutions, and they acquire a greater appreciation of how agriculture must interact with society as a whole."*

For more information contact Dr. Jim Mazurkiewicz, 979-845-1554, j-mazurkiewicz@tamu.edu

Rice Crop Update

As of June 23, 97% of the Texas rice crop was in permanent flood, just a bit behind 2005, and 5 percentage points ahead of 2004. 83% of the acreage had reached PD, and 44% was already headed, well ahead of the previous two years.



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