Texas Rice

Texas A&M University System
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60th Diamond Anniversery Texas A&M Field Day - Harvesting Energy

Grains may be diamonds in the rough for this 60th anniversary Texas A&M Research and Extension Center field day. It takes a lump of coal to ultimately become a diamond, and it may soon mean that a stack of hay can yield a gallon of fuel, saving our precious oil reserves for other, more critical uses, and help the U.S. achieve the ultimate goal of energy self-sufficiency.

Join us on Thursday, July 12th to learn about the latest research being conducted in rice - and other bio-energy crops, such as energy cane, sweet sorghum and soybeans. The field day is not just for farmers, but also for anyone who is interested in rice and other bio-fuel crops that will impact our local communities. The field tours begin at 8am, with trailers covered to give some relief from the sun.

To start the tour, Dr. Anna McClung will be speaking about varietal improvement progress and potential releases. The ARS and Texas A&M breeding programs conduct yield trials at Beaumont, Eagle Lake, and Ganado to assess how experimental lines perform across a diversity of Texas environments. This year over 100 selections from the breeding programs are being evaluated. Although the majority of these are being developed for the conventional long grain white milled rice market, there are number of selections that are being tested for specialty markets. These include aromatics, pigmented rice, waxy rice for the ingredients industry, and superior parboiling and processing rice cultivars. In addition, several cultivars that have very high yield potential (similar to that observed for hybrids), but low milling quality, are being evaluated for use in the rice flour market.

Dr. Rodante Tabien, a former rice breeder of the Philippines, moved to Texas in December. 2002 to become the Texas state rice breeder. He has been working on rice research and breeding for 22 years. He will discuss updates on the two state breeding activities going-on for the past four years at the Beaumont Center. These are the development of high yielding rice varieties for Texas being funded by Texas Rice Research Foundation and the development of ultra high yielding main crop cultivars financially supported by the Lower Colorado River Authority. Dr. Tabien will also discuss some of his research on herbicide tolerance and generated mutants.

Dr. Lee Tarpley will discuss increasing the yield of hybrid rice through the combined use of increased nitrogen fertility at mid-season and the use of Palisade, a growth retardant. This combination has been evaluated to increase main and ratoon crop yields of semi-dwarf hybrid rice, while maintaining milling quality and not increasing lodging susceptibility. Dr. Tarpley will also discuss tank-mixing rice stink bug insecticides and gibberellic acid to be applied at main crop soft dough to enhance early growth of the ratoon tillers and thus increase rice ratoon yield, while controlling the rice stink bug. Finally, Dr. Tarpley will share research findings on how high nighttime temperatures and high UV-B radiation can decrease rice yields.

Mike Jund will discuss on-going research to evaluate new and current varieties and hybrids under Texas growing conditions with emphasis on management practices to improve ratoon yield. In Texas, the ratoon crop contributes significantly to the rice producers net income.

Dr. M.O. Way will provide an update on insect problems encountered in 2006 and evaluation of novel chemistries for rice water weevil, rice stink bug and stem borer control. He will also give a demonstration of new sampling methods for rice stink bugs and will

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From the Editor...

Welcome to the July issue of *Texas Rice*. Although our Eagle Lake Field Day was rained out, the evening program was well attended with hardly an empty seat. My guess is that we had somewhere around 225-250 people in attendance. Special thanks again to Joe Mike Crane with BU Growers for providing the evening meal, and to all of the contributors who make our research at the David R. Wintermann Rice Station in Eagle Lake possible.

A highlight of the evening program was a ceremony honoring the David R. and Eula Wintermann Foundation, which provided a generous gift of $270,000 that will allow the Texas Agriculture Experiment Station to purchase 77 acres of land at the David R. Wintermann Rice Station in Eagle Lake, insuring our scientists the ability to continue to conduct cutting-edge research for rice producers who farm west of Houston. The Wintermann Foundation continues a tradition of giving started by David and Eula Wintermann. The Texas Agricultural Experiment Station owes the Wintermann Foundation a tremendous debt of gratitude.

July marks the 60th Beaumont Center Field Day.

David R. and Eula Wintermann Foundation Board members Steve Balas, Donald N. Bendy and Jack M. Johnson, (Judi Johnson - not present), receiving plaques from Ted Wilson, Beaumont Center Director, and Bill Dugas, TAES Deputy Director, honoring their generous contribution to the Texas Agricultural Experiment Station, allowing the purchase of the research property at Eagle Lake.

My how things have changed since the end of WWII, from 1700 lbs/ac rice grain yields in 1945 to 7300 lb/ac in 2006, from labor intensive planting and harvesting, to marvelously efficient tractors, planters, and harvesters. Without these modern innovations, the U.S. rice acreage under cultivation would have to be about 4.5 times greater to meet current demands. I cannot think of a better way to conserve land than through efficient agricultural production and management.

What will the next 60 years bring? One of the biggest changes will be in the crops that are grown. If oil prices stay above $50/barrel, ethanol production will truly explode in the U.S., with the Texas Gulf Coast likely being a big winner in the race to produce the crops necessary to build and sustain a cellulosic-based ethanol production industry. This area is well situated in terms of ample rainfall and warm temperatures, which are ideal growing conditions for high biomass crops. Combine this with the area's strong transportation infrastructure of rails, roads, and rivers, proximity to the state's largest petrochemical infrastructure, and large amount of land that is available for agricultural production, makes our area unsurpassed in its suitability for high biomass-bioenergy crop production. While other regions of the U.S. can claim a few of these advantages, the Texas and U.S. Gulf Coast has the greatest potential for year-round production of bioenergy crops.

Biomass-based crop production is not without its challenges. Methodology is still being developed or modified to allow the largely grain-based ethanol industry to transition to a biomass based industry. Several competing methods are out there. From aerobic and anaerobic microbial fermentation to pyrolysis, it is possible that each of these methods will play a role in

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60th Annual Beaumont Field Day

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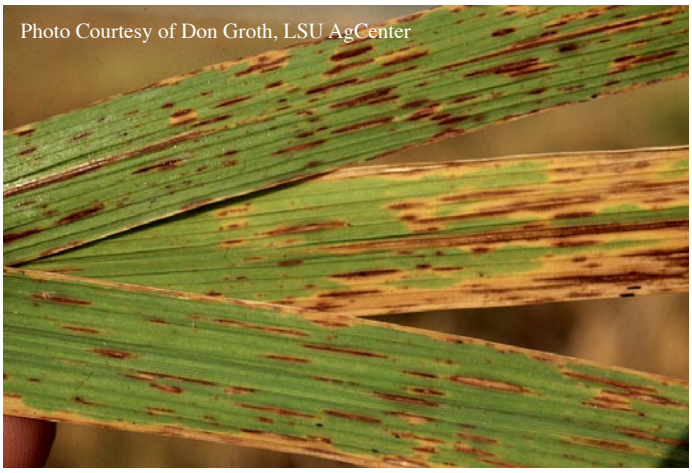
Farming Rice
a monthly guide for Texas growers

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

Control of Narrow Brown Leaf Spot on Rice

Last year the fungus *Cercospora janseana,* which causes narrow brown leaf spot, inflicted significant damage to the rice crop in south Louisiana. Its severity varies from year to year but last year was the worst on record. The disease is more severe as rice approaches maturity. Spots are linear and reddish-brown. On susceptible cultivars, the lesions are wider, more numerous, and are lighter brown with gray necrotic centers. They tend to be narrower, shorter, and darker on resistant cultivars. Spots usually appear near heading and are slow to develop, taking up to 30 days from infection. Both young and old leaves are susceptible. Seed heads can become infected, causing premature ripening and unfilled grain. Symptoms can be confused with rotten neck and panicle blast lesions. Narrow brown disease lesion symptoms usually are darker brown and develop in the internodal area of the neck. Sheaths and glumes can be infected, causing significant discoloration and necrosis. On sheaths, the disease is referred to as "net blotch" because of the brown sheath cell walls and the tan to yellow intracellular areas that form a net-like pattern. Grain infection appears as a defuse brown discoloration. The disease can also be severe on the second crop.



Symptoms of Narrow Brown Leaf Spot on rice.

Rice breeders have found resistance to narrow brown leaf spot, but new races of the pathogen develop rapidly. Low nitrogen appears to favor disease development. Fungicides used to reduce other diseases may reduce narrow brown leaf spot. Propiconazole (Tilt, PropiMax, Bumper, Stratego, and Quilt) has the best activity of the labeled fungicides. A limited number of tests have been conducted to determine the best activity against all stages of this disease but disease control and yield increases appear best when fungicides are applied at boot growth stage (a four inch panicle in the boot). The rate of propiconazole needed to control the disease is approximately equivalent to 6 ounces of Tilt, PropiMax, Bumper, 19 ounces of Stratego, or 21 ounces of Quilt. This rate for Tilt, PropiMax, and Bumper is very weak against sheath blight and the 21 ounces of Quilt only has 6 ounces of Quadris in it, which would also be weak against sheath blight. These fungicides will need added sheath blight fungicides to control sheath blight. The 19 ounces of Stratego has 6 ounces of propiconazole and a full rate of Gem and should work well against sheath blight.

At present, there is no recommended scouting method for *Cercospora* except to look at the lower leaves for the narrow brown leaf spot lesions. If the disease is present, there is no treatment threshold, so fungicides will have to be applied preventative. There is also no guarantee that the disease will develop to the same levels as last year, which was unusually wet and the pathogen had extensively over-wintered on rice in crawfish fields giving it a head start. Pressure could also be lower because the two most susceptible varieties, Cheniere and CL131, are not being grown this year, which will contribute less inoculum to the epidemic. However, some early season *Cercospora* has been detected this year and will be monitored for development. ✻

Article by Don Groth, LSU AgCenter, Rice Research Station.
Louisiana Farm and Ranch, June 2007, Vol. 3, No. 6 pg. 12.

Field Day continued...

discuss current and potential future regulatory actions.

Dr. Don Groth will discuss the fungus, *Cercospora janseana*, which causes narrow brown leaf spot. Its severity varies from year to year and is more severe as rice approaches maturity. Dr. Groth will describe the symptoms of the disease, and possible control methods.

Dr. Shannon Pinson will report on progress that is being made to molecularly tag genes that impact sheath blight resistance and milling quality. This project, known as RiceCAP, is a $5 million, 9-state, multidisciplinary effort to extend molecular gene tags from the realm of 'simple' major genes, to traits controlled by many genes.

Pennycress (*Thalspi arvense*). Photo courtesy of University of Missouri Extension.

Dr. Ming Chen will discuss health-beneficial compounds in rice. The bran layer of the whole grain rice contains several health-beneficial compounds including vitamin E, oryzanol fractions, and phenolic compounds. These are antioxidants that are believed to provide protection against diseases such as cancer and cardiovascular disease. In addition, the antioxidants of rice bran and its oil have the potential for use as additives to improve the storage stability of foods.

After the tours the morning program will begin with Dr. Ted Wilson, the Beaumont Center Director, who will give an overview of research programs at the Beaumont Center, including future research directions. His presentation will be followed by Dr. Terry Isbell, a USDA-ARS researcher working on potential new crops that can provide feedstock for the biofuel industry. Dr. Isbell was trained as an organic chemist at the University of Missouri-Columbia and has over 16 years research experience and is currently Research Leader of the New Crops and Processing Technology Research Unit. He will discuss new crops with potential for Eastern Texas including penny cress (*Thalspi arvense*), lesquerella (*Lesquerella fendleri*) and cuphea (*Lythraceae*). Lesquerella and pennycress are plants in the mustard family and will most likely grow as winter annuals in this part of the country. Lesquerella is an oilseed crop with fatty acids rich in hydroxy fatty acids. This oil is intended to replace imported castor oil. Castor contains ricin (second most toxic substance known to man) and other allergens making cultivation of this crop unattractive. Lesquerella does not contain these toxic components and has been shown to have good agronomic potential with yields now approaching 2,000 lbs/acre. The oil from its seed will be useful in a wide range of industrial applications, foremost are lubricants such as greases. Pennycress is a winter annual that show promise as a winter crop that can produce bio-diesel. Harvests of wild stands of pennycress have shown that yields should exceed 2,000 lbs seed/acre with seed oil content of 36%. The crop matures early in the central Midwest and has great potential to provide a double crop for acreage intended to produce soybeans. Initial testing of pennycress methyl esters are confirming its potential as a bio-diesel. Cuphea is a summer annual that will be valued for its medium chain saturated fatty acids. These fats are currently imported from the Pacific Rim and used almost exclusively as detergents. In Eastern Texas, this indeterminate plant may have several harvests per year, which could make the economics of this crop viable.

Next, Dr. Jeff Dahlberg, a researcher with the National Sorghum Producers, will discuss sweet sorghum and the potential it has to be a major cellulosic feedstock. (This is when they use the entire plant to produce the ethanol, not just the grain.) Dr. Dahlberg is a graduate of Occidental College, University of Arizona and Texas A&M. He worked as an extension agent for the US Peace Corps in Niger, West Africa and has a Masters and Ph.D. in Plant Breeding and Genetics. He served as the Sorghum Curator and Research Geneticists for the USDA-ARS in Mayaguez, Puerto Rico for 7 years and is currently the Research Director for the National Sorghum Producers. He has published over 90 research articles and abstracts in various refereed and non-refereed journals dealing with sorghum. He works on both legislative and research issues that

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The Rice Man of Africa

This is the first in a 2 - part article by Savitri Mohapatra, with the Africa Rice Center (WARDA), which is one of 15 international agricultural research centers supported by the Consultative Group on International Agriculture Research (CGIAR). Drs. Ted Wilson (TAES) and Anna McClung (USDA-ARS) toured the Center in 2001 to support collaborative efforts.

With his gentle smile and calm demeanor, Monty Jones doesn't look like the proverbial wild-haired scientist. But there is no doubt that the New Rice for Africa (NERICA) breakthrough achieved through years of his painstaking breeding, with national and international scientists, has changed forever the way the world looks at African rice and African science.

Going boldly exactly where other respected scientists had given up on, Dr. Jones succeeded for the first time in producing fertile offspring - NERICA - by crossing the prolific Asian rice (Oryza sativa) with the hardy African species (Oryza glaberrima), a feat that had been almost written off as a breeding impossibility.

"Dr. Monty Jones has demonstrated by his remarkable contribution that it is possible to reshape the agricultural map of our continent through the African creative genius," says Dr Papa Abdoulaye Seck, Director General of the Africa Rice Centre, where Dr. Jones made the NERICA breakthrough.

Because the African and Asian rice species do not naturally interbreed, Dr Jones and his team used a technique called embryo-rescue to ensure that crosses between the two varieties survive and grow to maturity. The fruit of this effort was NERICA, which presents several advantages over traditional African rice varieties. NERICA represents more than 3000 varieties of improved rice for various African agro-ecological zones, opening up a new world of rice biodiversity.

Dr. Jones remembers vividly the excitement he felt when he first saw seven of 48 crosses produce a few fertile plants. "Some even had 98 to 100% fertility!" From that moment onward, he was to have several such "eureka" moments, as he noticed one by one the desirable characteristics of the two parents that had been transferred to the offspring.

Several internationally acclaimed rice scientists had doubted that some NERICA varieties had more than 300 grains per panicle, compared with the Asian rice varieties that have on average 100 grains. But this did not deter Dr. Jones and his team who continued to break new ground, learning to use anther culture, a technique that allows breeders to obtain pure breeding lines in around 2 years, one-third the time required for conventional selection.

"There was often an element of luck in our research," he says, modestly referring to their success in producing callus, a mass of undifferentiated cells that can be used to grow genetically identical copies of plants with desirable characteristics.

Since its large-scale release in the late 1990s, NERICA, its developers and partners continue to receive a stream of global accolades that has forced a rethink on Africa's will and capacity to solve its problems. This year, Dr. Monty Jones has been named one of the most influential people in the world by Times magazine.

"When Africa breaks free from the grip of poverty and famine - as it now looks poised to do - Monty Jones, 56, will have played a pivotal role. Jones' efforts in creating NERICA are legendary. (His) work has also helped inspire other groups to support an African Green Revolution. The payoff will be a healthy, well-nourished continent on a path of economic growth," wrote Jeffrey Sachs for Times magazine.

Dr Jones was among the first to appreciate the value of Africa's indigenous rice species as a reservoir of genes for resistance to several local stresses and to develop and apply new tools to increase the efficiency of the rice breeding program in Africa. In developing NERICA, he started off by ensuring collection and classification of some 1,500 varieties of native African rice that were in danger of extinction.

Currently Executive Secretary of the Forum for Agricultural Research in Africa (FARA), Dr Jones' developed NERICA during his tenure (1991-2002) as a senior scientist at the Africa Rice Center. The New Rices for Africa (NERICA) are regarded an "exceptional breakthrough achievement" for their ability to thrive in the continent's poor soils, defy drought and weeds and the same time increase yields by up to 250 percent depending on the management regime. ✻

Why Sorghum is the "Ideal" Biofuels Crop of the Future

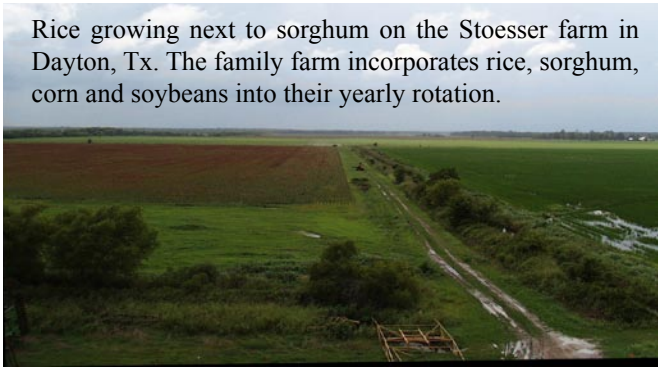
Debate on renewable fuels has come to the forefront recently with the advent of $3.00 gasoline and the debate over the availability of fossil fuels in the future. With these debates have come several proposals by which the Nation might be able to achieve goals of production and consumption of more biofuels. Worldwide, Brazil and India have been producing ethanol through sugarcane and sweet sorghums for many years. In the United States, ethanol production has focused primarily on grains as the primary feedstock. More recently, the use of biomass to ethanol has come to the forefront of policy discussion and research. Basically there are three sources of feedstock currently being used worldwide: sugar sources, grain, and biomass.

Sorghum is the fifth largest crop grown in the United States. Typically it has been used as a feed grain; however, new uses of the crop lend themselves to new markets for US farmers. These new markets include traditional and functional food uses and new industrial uses, such as ethanol production.

Grain sorghum is used interchangeably with corn in ethanol production facilities coming online in the sorghum belt. Sorghum is used in 12-20% of the total ethanol production in the US. Some of the advantages of sorghum include the following:

- Non-GMO (see USDA Statement at: http://archive.gipsa.usda.gov/rdd/transgenic_statements.pdf)
- (Dry Distiller Grains) DDG's equal to corn (see NCGA site: http://www.ncga.com/ethanol/pdfs/111005DGFRDairy.pdf)
- Higher protein content in DDG (see KSU site: http://www.ddgs.umn.edu/articles-beef/2006-Harborth- Comparison of corn and--.pdf)
- Equivalent ethanol production to corn (see KSgrains site: http://www.ksgrains.com/ethanol/kseth.html)
- Less water required to produce sorghum (see Panhandle water planning project: http://www.twdb.state.tx.us/rwp/a/Submitted_Files/Appendix O/WMS for Reducing Irrigation.doc)
-

Sweet sorghum is currently being used in India (see ICRISAT web site and NSP website: http://www.icrisat.org/Biopower/Index.htm and http://www.sorghumgrowers.com/Portals/9601e447-03e0-4aad-9c41-e3f718fe1956/ICRISAT.pdf), South America, and the Philippines to produce ethanol.



Rice growing next to sorghum on the Stoesser farm in Dayton, Tx. The family farm incorporates rice, sorghum, corn and soybeans into their yearly rotation.

Under current systems, the sweet sorghum is harvested, and then the stems are crushed and juice extracted at a mill, similar to sugar cane. However, some harvesters are available to extract the juice in the field and leave the residue, called bagasse, in the field to be gathered at a later time (see work at OSU: http://osu.okstate.edu/index.php?option=com_content&task=view&id=87&Itemid=90 and http://www.sorghumgrowers.com/Portals/9601e447-03e0-4aad-9c41-e3f718fe1956/osu.pdf).

Once the juice is extracted, it is fermented and ethanol is produced. This ethanol is then distilled and dehydrated using the same equipment that is used in ethanol production from grain sources. The bagasse in most sugar cane mills is used to produce electricity to power the plant, with the excess sold to power companies. Some sweet sorghum production scenarios use this method for sorghum bagasse, while others use a methane digester to produce both electricity and fertilizer. There is very little data (if any) on the amount of electricity and fertilizer produced using sweet sorghum bagasse in a methane digester. Current work on sweet sorghum to ethanol is being conducted in Florida with a USDA grant. The project is looking at different varieties of sweet sorghum and also evaluating the production techniques and costs of producing ethanol from sweet sorghum.

Work is also ongoing to develop sweet sorghum hybrids that will increase both biomass and sugar yield (see work at TAMU: http://www.sorghumgrowers.com/Portals/9601e447-03e0-4aad-9c41-e3f718fe1956/tamu.pdf).

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Sorghum continued...

Sorghum can produce a considerable amount of biomass on limited irrigation and limited input. Several research groups have been evaluating sorghum for biomass yield through forage production trials (see research from Bushland: http://amarillo.tamu.edu/programs/agronomy/publications/Forage%20Sorghum/06silagetrial). Research is also underway at various universities to evaluate sorghum as a potential biomass crop for energy (see KSU research: http://www.sorghumgrowers.com/Portals/9601e447-03e0-4aad-9c41-e3f718fe1956/ksu.pdf). The DOE has conducted preliminary research on sorghum composition and though the hybrid and variety used are very old, sorghum biomass compositional data compared well to that of other biomass crops such as corn, switchgrass and sugarcane (see DOE site: http://www.eere.energy.gov/biomass/progs/search2.cgi?9663 for both sweet sorghum and forage sorghum analysis). Though the DOE did not list sorghum in their table for an "Ideal" biomass crop, the National Sorghum Producer's have developed the same table inserting sorghum as a column in the table (see NSP website: http://www.sorghumgrowers.com/Portals/9601e447-03e0-4aad-9c41-e3f718fe1956/Sorghum%20and%20Switchgrass%20in%20Biomass%20Ethanol%20Production.pdf). It is quite evident that sorghum fits very nicely into the DOE's definition of an "Ideal" biomass crop and in fact has some distinct advantages over other crops for this distinction. One distinct advantage is that sorghum will be the second major cereal crop to be sequenced (see JGI site: http://www.jgi.doe.gov/sequencing/allinoneseqplans.php). The sequence will allow for genomic research on conversion of sorghum biomass into ethanol and what genes are critical for the optimization of the crop into a more efficient bioenergy crop.

So why sorghum? It is one of the few agricultural crops that fits into all the proposed schemes for biofuel production. Currently used as feedstock in grain-ethanol process, it can also be used in a sugar-to-ethanol production scheme, and will be a major player in the biomass-to-ethanol production scheme because of its high yield production in limited water and input cropping systems. Additionally, sorghum has a well established seed industry and an robust research record.*

Article by Dr. Jeffery Dahlberg. For more information email jvnd@sbcglobal.net

Field Day continued...

impact sorghum and has been recently involved in coordinating research efforts and funding for research on sorghum as a biofuels crop, with special emphasis on sweet sorghums and cellulosic sorghum.

And finally, Jackie Prince, an Arkansas farmer, will discuss his experiences in biofuel production. Over the past two years Mr. Prince has been involved with a University of Arkansas leadership development program called LeadAr. This past February, the program completed courses with an international study tour of Brazil. The group covered most every aspect of Brazilian life. Being a farmer and having served on several biofuels coalitions, Mr. Prince was particularly interested in Brazil's agriculture and biofuels industry. While biofuels are relatively new to the U.S., Brazil's government started a biofuels program, ethanol in particular, in 1975. Brazil succeeded in accomplishing the goal of energy self-sufficiency last year, and is now working with other Latin America countries achieve energy independent. Prince believes that while biofuels have provided optimism in the U.S. farm sector, reality proves we are lagging far behind several other countries. But whether we catch up or not, if we follow biofuels production and usage as seen in Brazil or the E.U. we have only just begun to realize the impact the biofuels market will have for American agriculture.

After the morning program field day guests will be treated to a complementary barbecue lunch. Following lunch, guest are welcome to participate in the afternoon tour by Drs. M.O. Way and Lee Tarpley, who will offer information on potential biofuel crops being evaluated at the Beaumont Center, including energy cane, sorghum and soybeans.

Also, Jefferson county Agriculture agent Kelby Boldt will present a tour of the new forage trials being conducted at the Center. This demonstration includes most of the traditional forage varieties that are grown in southeast Texas, and several new varieties that have been publicized in recent years. Interested persons may access published results by contacting the Jefferson County Office of the Texas Cooperative Extension at 409-835-8461.

We encourage all local farmers and the general public to take advantage of this opportunity to learn more about research being conducted at the Texas A&M Center in Beaumont. For more information about the annual field day call 409-752-2741.*

The Benefits of Aerial Hunting for Feral Hog Management in Texas

Hogs are an Old World species that date back before the Ice Age. There is evidence that indicates early man hunted swine for food. According to Walker's Mammals of the World (Nowak 1991), the first swine (*Sus scrofa* L.) in the United States were those brought by the Polynesians to Hawaii around A.D. 1000, and those introduced by the 16th century Spanish explorers to the southeast. Since that time, these populations have grown into large, feral populations. The term "feral hog" refers to European or Russian wild boars, domestic swine that have become feral, and hybrids of the two. These feral hogs have since spread throughout much of the United States. Texas is home to an estimated population of 2 million animals, about 50 percent of the entire population in the United States (Mapston 2004). Feral hogs in Texas range across most of the state, with the exception of far west Texas and the extreme western edge of the panhandle.

Feral hogs are extremely adaptable to different environments. Their adaptability and high reproductive rates have allowed their populations to increase dramatically. According to Mapston (2004), the feral hog is the most prolific wild mammal in North America. With proper nutrition a feral hog population can double in as little as 4 months. Under adequate conditions a female can begin reproduction as early as 6 months of age. A sow may have 2 litters every 12 to 15 months, with an average litter containing 4 to 8 young, and a sex ration of 1:1. The young are usually weaned at 2 to 3 months.

The feral hog's diet is extremely varied. They require a diet that is high in protein and energy, and they will roam great distances in searching for food. The feral hog is an opportunistic omnivore, eating almost anything it can find. Their diet most often consists of vegetation, animal matter, and mast. They have even been known to prey on other animals as well as cannibalize their own.

Given these factors, it is easy to recognize that feral hogs are quite often detrimental to the resource manager. This paper serves to outline the benefits of aerial hunting as an ongoing management tool for feral hogs in Texas. This study was conducted on three separate occasions, all within the same year on the same properties. Data collected provided conclusions for future aerial hunting success in Southeast Texas.

Management Area

The study area was located in Matagorda County, Texas on 81,000 acres, approximately 60 miles south of Houston, Texas. This southeast Texas County is historically characterized by post oak savannah and coastal prairie habitat types although much of the habitat has been altered for crop production, including corn, grain sorghum, soybeans, and rice. Feral hog management was conducted throughout these habitat types as well as improved pastures and both fresh and saltwater marshes. All these habitat types provide ideal areas for feral hogs to thrive.

Control Efforts

Historically, feral hogs have occurred in southeast Texas, causing resource managers to seek a wide variety of methods to try and successfully manage them. Feral hogs cause considerable damage to crops and pasture land in the coastal plains of Texas. Not only do feral hogs cause damage to the resources, but they also directly compete with domestic livestock and native wildlife for habitat and food, serve as vectors for disease, and host numerous internal and external parasites. Cage traps, snares, shooting, and dogs are some of the more commonly used methods by managers.

These techniques, while somewhat effective, often fail to provide the level of control needed to reduce damage. The amount of damage that the managers within the study area reported prior to the aerial hunting operation is shown in Table 1.

Table 1. Losses prior to control efforts (estimated annually) in the study area located in Matagorda County, Texas on 81,000 acres.

Resource Damaged	Monetary Loss
Pasture and Rangeland	$125,000
Cropland	$287,000

USDA-APHIS-Wildlife Services has a cooperatively funded program in Matagorda County. This program provides one full-time employee who is responsible for conducting all wildlife damage man-

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agement activities in the county. Additional personnel provide assistance with special projects, such as aerial hunting. Due to the size of the county and the workload, control efforts dedicated specifically to feral hog control are not sufficient to substantially reduce feral hog damage. Wildlife Services personnel use cage traps, snares, shooting, dogs, and aircraft to manage feral hog populations.

Aerial Operations

Texas Wildlife Services' aerial hunting operations are conducted using a helicopter or a fixed wing aircraft. The helicopters used in the program are Hughes 500's. The fixed wing aircraft are Piper Supercubs. For the Matagorda County operation, a Hughes 500 was used. The flight crew for aerial hunting operations includes a pilot and a gunner. Aerial hunting operations were conducted using a 12 gauge shotgun and 3 inch magnum #1 buckshot to dispatch feral hogs.

In addition to the helicopter crew, several support personnel are needed as ground crew. This crew is usually comprised of a fuel hauler, whose job it is to meet the helicopter on site and refuel it when necessary and several support personnel. The support personnel perform various jobs including emergency contacts, locating landmarks used by the flight crew to identify property boundaries, drives to push animals out of brushy areas, carry needed supplies, and back up gunners. Normally on an operation of this magnitude a total of 6-8 employees are needed to ensure the project runs safely and efficiently.

Results

Wildlife Services conducted aerial hunting operation on three separate occasions in the project area. Aerial hunting operations were conducted during April 5-7, 2005; May 31-June 1, 2005; and August 3-5, 2005. The latter date was chosen to correspond with the annual rice harvest as feral hogs often damage these fields immediately prior to harvest. Unlike some other areas in the state, the amount of vegetative cover is not as critical to the success of aerial operations in the study area. The large areas of relatively sparse cover, typical in this area of the county, allows for easy spotting of target animals. Therefore, aerial hunting operations can be effective during spring and summer months when temperatures typically range between 25ºC to 34ºC. The study area had experienced a period of dry weather as well. This weather pattern was typical for the area during the time period aerial hunting operations were conducted. These weather patterns were also a factor in determining the time of year to fly. Because of the dry and warm weather, the feral hogs tended to be concentrated around wet areas in the habitat. This led to the success of the operation, as it allowed the aerial hunting crew to locate the hogs with a minimal amount of searching. The results for each hunting operation are listed in Table 2.

Table 2. Results of aerial hunting operation in the study area located in Matagorda County, Texas on 81,000 acres.

Dates	Hours Flown	Feral Hogs Removed	Weather Conditions
April 5-7, 2005	18	581	25ºC-28ºC Dry
May 31-June 1, 2005	9.5	243	30ºC-32ºC Dry
August 3-5, 2005	8.4	73	32ºC-34ºC Dry

The decrease in the number of hogs taken from the first project to the last project can be explained by two factors. The number of hogs removed is likely to decrease as the population is reduced unless the population recovers significantly as a result of reproduction or immigration. The short time period between flights did not allow for a large population increase due to reproduction in the local population. However, immigration may be a major factor when hogs are attracted to an area as the result of available water and food supplies during periods when these supplies are limited over a large area. Immigration did not appear to be a major factor during the period when this operation was conducted. Additionally, the temperature was increasing. This leads to a decrease in hog activity during daylight hours and they frequently seek dense cover during this time period to escape the heat. It should be noted that during the later dates, hunts were conducted during the early morning and late afternoon hours. During the April and May hunting operations, flights were conducted throughout the day.

Conclusions

Aerial hunting can be an effective tool for reducing damage caused by feral hogs. It does, however, have its

continued on next page

Feral Hogs continued...

limitations. Aerial hunting may not be cost effective during hotter months of the year unless preliminary scouting indicates that hogs are concentrated in areas where they can be observed and taken from an aircraft. The density of hot air, common in the coastal areas during the summer months, limits helicopter maneuverability and payload. Weather conditions also push the feral hogs into dense vegetative cover. It is often impossible to locate the hogs in this cover. Vegetative cover should be short and less dense to allow the helicopter pilot and gunner to locate the hogs and then maintain a low, safe altitude to make effective shots. Local and State laws should also be consulted when planning aerial hunting operations. With today's aviation security mind set, it is imperative the control area be evaluated to determine the safety of conducting low level flight operations, as temporary flight restrictions, TFRs, and notices to airmen, NOTAMs, can change daily. During these operations the South Texas Nuclear Power Plant "No Fly Zone" was directly over some of the areas that were to be flown. The flight plan had to be altered to avoid these areas.

It should also be noted that to successfully conduct an aerial hunting operation, widespread landowner participation and support is needed to secure a large contiguous work area. This requires extensive preliminary operations such as contacting landowners, coordinating the aerial hunting activities, scouting areas, and using the data collected from scouting along with reports from the landowners to determine where the largest concentrations of feral hogs are likely to be. When conditions are optimum, although relatively costly at $600 an hour, aerial hunting can be used to remove large numbers of feral hogs in short periods of time resulting in fewer economic losses to land owners and resource managers. *

Article by Douglas Steen, USDA-APHIS-Wildlife Services, 979/845-6201, or email doug.s.steen@aphis.usda.gov

An easily constructed hog trap that can capture over a dozen animals at a time. Photo courtesy of Texas Cooperative Extension.

A Better Feral Hog Trap

Bigger is better when it comes to trapping feral hogs. As Texas' feral hog population continues to destroy crops and rangeland across the state, small traps are a popular control method among landowners with only a few hogs on the premises. But when feral hogs invade in double digits, constructing a trap as big as your living room is not out of the question.

"If you're trying to trap a big group, small traps are not the way to go," said Dr. Billy Higginbotham, Texas Cooperative Extension wildlife specialist at Overton.

As an alternative, Higginbotham recommends constructing a teardrop-shaped trap using sheep or goat panels 30- feet wide by 50-foot long. The panels can be secured by using T-posts. The gate to the trap is placed at the neck of the teardrop.

"You need to use a gate that's hinged or a saloon door that's spring-driven," he said. A welder can construct the saloon gate using two small sheets of flat iron welded to rebar at the bottom of the gate. This will prevent escape attempts at the bottom of the gate. Next, Higginbotham recommends digging a small pit

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Feral hogs are generally a very group orientated family unit. Dispersal of the young usually occurs at puberty between 6 months and one year after birth. Virgin females called gilts will generally stay with their mothers to form groups called sounders until environmental pressures regulate that she join another sounder or start her own sounder.

State and National News

Farm Bill Update

In meetings with representatives of the rice industry and separate press briefings, House Agriculture Committee Chairman Collin Peterson laid out his plan to move forward the 2007 Farm Bill process. Peterson explained that he plans to present two different bills to his committee in July. The first bill will extend and amend the traditional commodity, conservation, and other Farm Bill programs, and will be completely funded to meet the Congressional "pay go" rules. A second bill will include several additional provisions that propose to use "reserve funds" that will provide enhanced funding for programs aimed at conservation, fruit & vegetable producers, nutrition needs, renewable energy, permanent disaster programs, and more. This enhanced funding would be provided only if budget offsets are found.

Agriculture subcommittees have approved sections of a bill that have included extensions of key provisions of current law and increased authorized spending by $12 billion. Peterson believes the two-bill approach is best because he wants to write a new bill rather than extend the 2002 measure. However, without a formal proposal by early July, only an extension is possible. Peterson said the two-bill approach will clarify what can be funded with and without offsets. Democrats and Republicans already have been "complaining" to their leadership about the need for more money for the farm bill. The first bill would include all the programs in the 2002 farm bill but with no increases in food stamps. It would make some changes in commodity programs, include $685 million in mandatory spending for specialty crops. This bill would also reauthorize the Wetlands Reserve Program, which has expired, at 1.5 million acres. The bill also would have provisions to discourage farmers from breaking up new ground for crops, assist minority farmers and establish mandatory funding for conservation in the Chesapeake Bay region for the first time. These changes would be achieved by successively raising about $3 billion over 5 years and an additional $5 billion over 10 years. The money would be raised by eliminating the early payment of the direct payment and countercyclical payments program in the last year of the five year bill, and by changes in the crop insurance program.

Excerpted from http://www.usriceproducers.com/

From the Editor continued...

the future of bioenergy production in the Texas Gulf Coast. Currently, much of the conversion research is directed at producing ethanol. However, technology exists to produce a range of biochemicals from plant biomass, and some feel it will soon be economical to produce gasoline and diesel from plant biomass.

Scientists at the Beaumont/Eagle Lake Center are working hard to develop production and management systems for candidate bioenergy crops. Research is underway on flax for industrial lubricant production and on energy cane, sugar cane, different types of sorghum, and even a high biomass type of rice, for ethanol production.

The high biomass rice research deserves a special comment. Unlike conventional rice, where the goal is to produce high grain yield, the goal of our high biomass rice research is the production of cellulose biomass. The selection methods used in developing a high biomass rice plant type is polar opposite to what is required to produce high grain yield. In fact, high grain yield actually limits biomass production. While Beaumont scientists have identified rice plant types that produce high grain yield and provide major increases in stem biomass, these plant types tend to lodge more, and ultimately, are probably not the best route to take to produce the highest biomass yields.

A successful high biomass rice type will likely produce small panicles, a large number of nodes (leaves), and will be extremely tall, possibly 10' or greater in height, in many ways resembling an intermediate between switchgrass and photoperiod sensitive tropical sorghum. In the past, this is the type of rice that our rice breeders worked hard to eliminate from the breeding program. Isn't it interesting that this type of plant is what is needed to achieve high rice biomass yields.

Please keep on sending us your suggestions.

Sincerely,

L. T. Wilson

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

Feral Hogs Traps continued...

near the back of the pen, which will hold shelled corn, soured mash or other bait to attract the hogs. The bait pit will also include the trip wire used to close the front gate when triggered.

Higginbotham advises applying bait both outside and inside the trap, leaving the gate open for several days. The hogs will become acclimated and attract large numbers inside the trap once the trip door is set "This technique will allow a whole pack to be caught at one time, as many as 20 to 25 hogs," Higginbotham said. Once the hogs are trapped, Higginbotham said the expense of buying panels and shelled corn can be recovered. "There are some meat processing companies that are paying 60 cents a pound for hogs weighing more than 250 pounds. They are also paying a bonus of $10-$20 a head," he said.

Feral hog control is a continuous process and is even more effective when neighbors are working together, Higginbotham said. "When we look at management of feral hogs, think of them as four-legged fire ants," he said. "We can control the numbers, but as far as eradicating them off the earth, that's probably not going to happen." Higginbotham said "We can become even more effective if we trap and do it with our neighbors. I think eradication is fleeting and temporary. I can keep fire ants out of my yard and my neighbors can apply control methods, but if we don't keep up the effort, they're going to be back."

For more information on feral hogs, go to the Web at http://feralhog.tamu.edu. *

Excerpted from an article by Blair Fannin.
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Rice Crop Update

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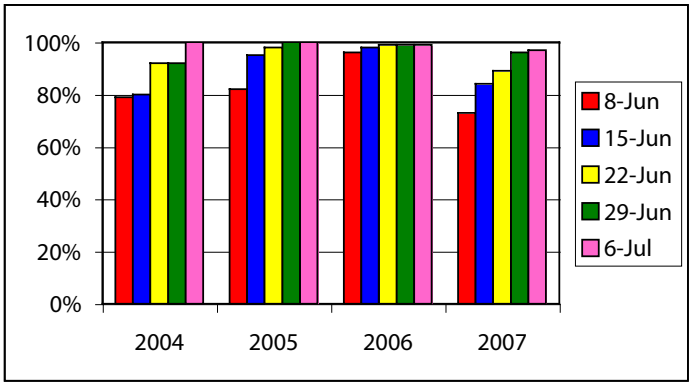

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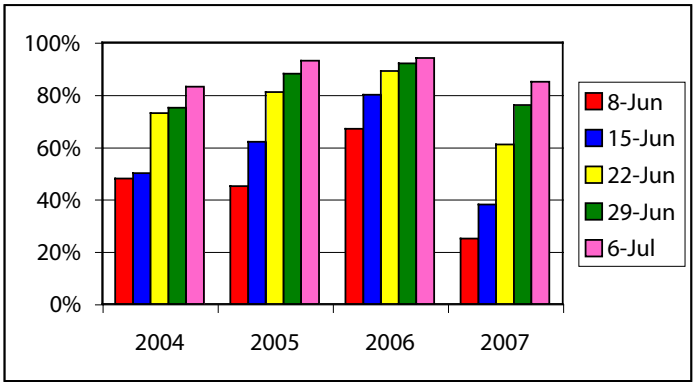

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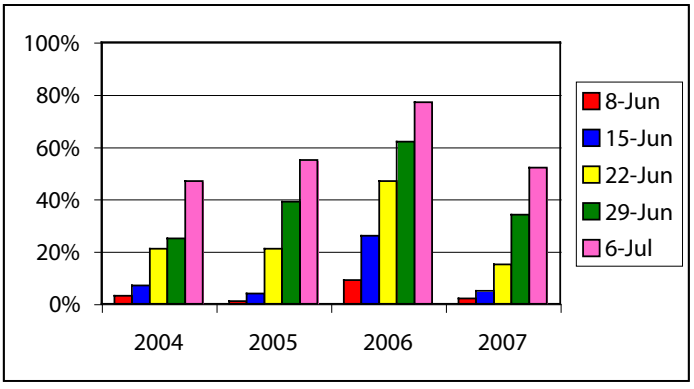

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