



Texas Rice

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Rice Farming Enhances Wildlife Habitats

Anahuac National Wildlife Refuge is one of more than 540 refuges that comprise the National Wildlife Refuge System, a network of lands and waters managed by the United States Fish and Wildlife Service; which was set aside for the benefit of wildlife and the public. On March 14, 1903 the National Wildlife Refuge System was created when President Theodore Roosevelt signed an Executive Order to establish Pelican Island as a bird reservation along the central Atlantic coast of Florida. In 2003, the National Wildlife Refuge System celebrated 100 years of conserving wildlife and habitat through refuges.

The Anahuac National Wildlife Refuge was established in 1963 on 12,000 acres at the juncture of Oyster Bay and East Bay in Chambers

County. The refuge doubled in size by 1982, when the Nature Conservancy, a nonprofit organization based at Arlington, Virginia, purchased an additional 12,670 acres from Ralph J. Barrow's ranch.

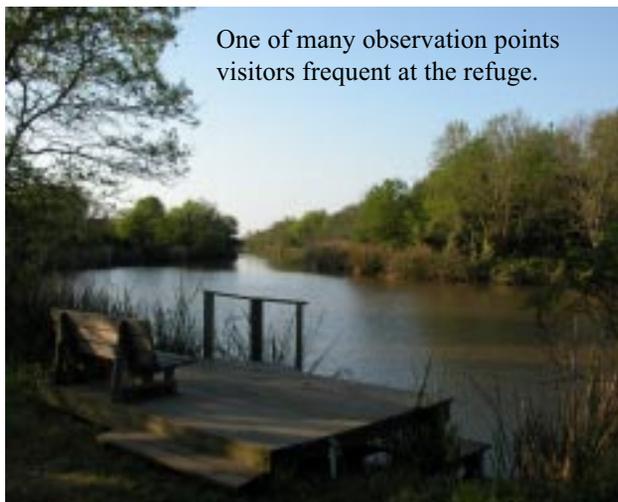
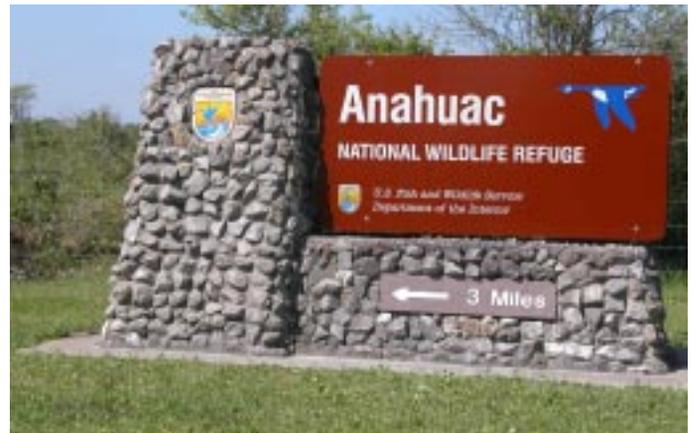
The refuge provides a safe habitat for a multitude of species. Between October and March, visitors are likely to see as many as 27 species of ducks, including green-winged teal, gadwall, shoveler and northern pintail. Huge flocks of snow geese, some times in excess of 80,000, feed within the refuge. During spring and fall migrations, warblers and other songbirds can be seen or heard on walks in small wooded areas. The sound of migrating songbirds is contrasted by the bellow of alligators in search of a mate, as you catch sight of the reptiles sunning themselves on the banks.

Though not commonly seen during daylight hours, river otter, raccoon, skunk, muskrat, and opossum

are among some of the more common refuge residents. Bobcats are frequently seen crossing the roads or slipping through the vegetation early in the morning.

The refuge also provides numerous educational opportunities, from graduate students conducting research, to birdwatching enthusiasts, to elementary school children who want to take an interesting field trip. According to the refuge manager, Kelly McDowell, they get over 70,000 visitors a year, from as many as 30 different countries and every state in the union. "Birdwatchers come to see the shorebirds and the songbirds," said McDowell, "and our peak season is in full progress right now."

The refuge offers several prime sites to view the wildlife. Shoveler Pond is a 250-acre permanent wetland area that is home to purple gallinule, marsh wren, American bittern, waterfowl and a lot of alligators. There is a two and a half



One of many observation points visitors frequent at the refuge.

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From the Editor...

Rice and the Environment



This issue of *Texas Rice* provides insight into a seldom-discussed secret – Agriculture can be very good for the environment! While some Texas agriculture commodities plant a lot more acreage and employ more people, none have the record that rice has of contributing so greatly to environmental quality and wildlife habitat abundance and stability. Rice fields in many respects mimic marshes. The temporary holding of water between levees allows for degradation of pollutants and settling of particulate matter. This results in the water that leaves a rice field being a higher quality than the water that enters the field, in essence providing water treatment capacity free of charge.

In addition to the benefits of improved water quality, rice production provides significant benefits to both resident and migratory wildlife. Previous studies by Texas A&M University System researchers have shown that rice production provides habitats for more than 70 species of birds and studies have documented the relationship between rice acreage and the size of important migratory waterfowl populations, including snow geese, white-footed geese, and Canadian geese. In addition, because rice production disperses water along a wide area of the coast, it affords food and habitat for wildlife far beyond what occurs with many natural river ways.

Contrary to what some believe, environmental preservation can make good business sense. Here are some of the facts: An estimated 25% of Texans participate in bird watching, and bird watchers spend about \$1.2 billion per year on ecotourism related expenses in Texas. In addition, each year 330,000 people hunt migratory birds in Texas, spending over \$50 million per year. With 85% of all hunting in Texas taking place on private lands and with migratory bird hunting so important along the Gulf Coast, rice production is no doubt a significant contributor to the huge success of ecotourism in Texas.

Many of our Texas rice producers benefit from their environmental stewardship. Alternate income through

hunting leases provides business diversification and a cost-effective way to insure a farmer's economic stability. This income is what has allowed many of our rice producers to stay in business during rice market downturns. With this said, the benefits that Texas rice producers receive as a result of their environmental conservation is greatly exceeded by the environmental and economic benefits they provide to Texas and the U.S.

As population pressures in the U.S. continue to increase, so do the challenges of preserving both our environment and our agricultural lands. From 1990 to 2000, agricultural lands in the U.S. decreased by 3%. In geographic areas where population growth is particularly high, the encroachment of urban sprawl on agricultural land is even that much more steep.

An interesting approach to environmental preservation, which has caught on in parts of Europe and to a small degree in the U.S., is the creation of green-zones, or green-belts. Green-zones can in some cases be for either agricultural production or for wildlife habitat preservation. Maybe we should all be pushing our government to designate a large part of the Texas rice producing areas as agricultural green-zones, and to provide economic incentives in recognition of the incredible value they have to our environment. What better place to start than the Texas Gulf Coast, where environmental and agricultural preservation can be one and the same.

Sincerely,

A handwritten signature in black ink that reads "L.T. Wilson".

L.T. Wilson

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

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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.

Early Season Checklist

As the season kicks in full swing, most growers have their rice planted by now. The following checklist summarizes early season problems to watch out for and some solutions that may help.

Stand Establishment

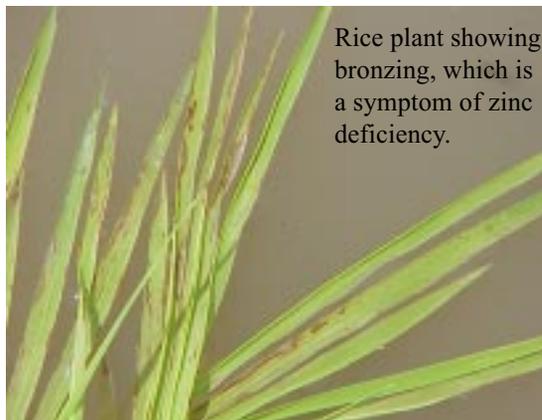
Good seedbed preparation, adequate moisture, planting depth, seeding rate, planting date, seed treatment and high germination rates all factor in to excellent stand establishment. In general, the recommendation for seedlings per square foot is 20-25 for low tillering semidwarfs such as Jefferson, 15-20 for varieties like Cocodrie, and 10-15 for strong tillering types such as Jasmine 85 or hybrid lines.

If for some reason, the seedling per square foot is drastically lower than recommended, growers have some tough choices to make. They can either re-plant entirely, which means they will be outside the planting dates for optimum yield and ratoon potential; they can fly on sprouted seed, which may lead to varying maturity at harvest; or they can go with a thin but uniform stand and try to compensate with increased nitrogen early to stimulate tillering. Regardless of the choice, early scouting is critical since the decision will have to be made quickly.

Fertilizer Management

Stored carbohydrates used by the developing seedling is depleted at about the three-leaf stage. Micronutrient deficiencies can appear suddenly at this stage, as the young seedling first becomes dependent on the soil for its nutrients.

Zinc deficiency can be recognized when the midribs of younger



Rice plant showing bronzing, which is a symptom of zinc deficiency.

leaves become chlorotic. Flood establishment can worsen zinc deficiency, especially in deeper, cold water. Also, leaves may lose sturdiness and float on the floodwater; then bronze, brown and eventually black blotches

and streaks appear in lower leaves and follow with stunted growth.

With iron deficiency, the younger leaves become chlorotic, and then start dying after 3 to 7 days. Extreme iron deficiency may mimic the symptoms of Command damage, where the entire plant turns white.

Nitrogen stress will be evident by an overall yellowing in the field, and may be due to inadequate pre-plant application or a nitrogen loss due to poor water management.

Nitrogen deficiency is sometimes confused with iron deficiency, but with nitrogen deficiency the older leaves yellow first, then the entire plant yellows. The

reason is that iron is less mobile in the plant than nitrogen, so when it is lacking, it is the newer leaves that turn yellow first. Also, rice is more sensitive to iron deficiency than common weeds, so the iron deficient rice plants will yellow, but the weeds stay green. With nitrogen deficiency, the weeds and rice will both look yellow.

Phosphorus deficiency is evident by tall, spindly plants in the early growth stages and later by lack of tillering and delayed head-



This photo shows a rice seedling exhibiting the symptoms of a Command application. Generally the plant will recover in 1 -2 weeks.



R: The light yellow band on these rice plants indicate a short period of cold temperature. L: This seedling shows cold damage over a longer period of time.

The seedlings will show a brown discoloration at the soil line and older leaves will show burning from the tips moving inward. Damage is more severe where soil is compacted, and if the salt concentration is high enough, it will desiccate the entire plant. High saline irrigation waters contribute most to salt build-up, but excessive fertilizer applications may also aggravate the problem in dry soil. Flushing, or rainfall, will help wash away the salt if fields are drained quickly. Do not let ponded water evaporate from the field, as that will leave the concentration of salt behind. Therefore, good drainage is important in preventing salt accumulation.

ing. Also, if a field remains yellow, even with adequate nitrogen, this could indicate low phosphorus.

Temperature Effects

Temperature is a major factor influencing germination and seedling development. Germination and seedling growth begin very slowly at about 60°F and accelerate as temperatures approach 68°F. It is important to note that cold damage can occur even if daytime temperatures remain high, but nighttime temperatures fall below 60°F.

Extremely early plantings of rice are particularly subject to cool temperature seedling injury. Symptoms may include a white band across the leaf or stem where chlorophyll development was inhibited due to low temperatures at the soil surface. Cold stress can also cause an overall pale green condition in the field, which can be mistaken for nitrogen deficiency. If the field is a uniform pale green then it is cold stress, if the levees are darker than the cuts and the fields are spotty, then it is low nitrogen. Cold-stressed plants are very susceptible to herbicide injury, so it is best to let fields recover from cold stress before applying herbicides. In addition, weeds that are recovering from cold are not actively growing, so herbicide applications at this time would not be effective anyway.

Salt Damage

Dry winds can cause a concentration of salts to accumulate on the soil surface, especially in sandy loam soils.

Early Season Water Management

Good early season water management should provide soil moisture for rapid growth of rice seedlings and maintain high nitrogen fertilizer efficiency. Young rice plants grow well under alternating moist and dry soil conditions, but denitrification (conversion of soluble nitrogen to nitrogen gas) can seriously reduce the soil's nitrogen level under these circumstances. If possible, growers should keep the soil saturated to promote good seedling development, minimize nitrogen loss, and help with herbicide efficiency.

Scouting for Insects, Weeds, Diseases

Early season insects to watch for are chinch bugs, fall armyworms, aphids, thrips and sometimes mites. Symptoms of chinch bug damage include striping, stippling and yellowing of leaves. Adults overwinter and move into fields when the rice emerges. They lay elongated orange eggs on the rice stems or on the soil next to the seedlings. Thrips cause similar damage but their eggs are harder to spot as they are inserted into plant tissues. Just before hatching, the egg "squeezes" out of the tissue and the first instar emerges.



Flushing fields in dry weather is necessary to prevent seedling stress.

Fall armyworms can be especially devastating because of their rapid growth rate. The first and second instars are

Grower Guide continued...



The holes, or divots, indicate blackbird damage in seedling rice.

very small, and don't do much damage, but they can reach the fourth and fifth instar rapidly (especially in warm weather), then the damage to young rice plants can be severe.

Similarly, aphid populations can explode in a short time because the females are born pregnant and bear live young. They are usually found in colonies on the underside of leaves. If you observe lady beetles or ants on the rice this generally indicates an aphid presence. (Lady beetles eat them and the ants tend them for the honeydew they excrete.)

Mites are generally only a problem in hot dry conditions, but sometimes springtime weather accommodates their growth. They are very small, and reddish in color. If you hold a white piece of



Plant on the right exhibiting phosphorus deficiency in the early tillering stage.

paper under the plant and thump the leaves, you can see the mites moving around on the paper.

Weed growth should be monitored closely and appropriate measures taken early, as young weeds are more easily controlled with herbicide treatments. It's important to positively identify the weed seedlings, as some look very

similar in the early stages, but are controlled by different herbicides. (See March 2004, *Texas Rice*.)

It is important to carefully plan herbicide/pesticide applications to avoid problems with interactions that cause phytotoxicity. For example, rice plants can be damaged if propanil is applied within 14 days of a carbaryl application or within 14 days of a methyl parathion application. Check the *Rice Production Guidelines* for a complete listing of chemical specifications and warnings, and always read the labels.



Photo courtesy of Joe Krausz, Texas A&M. These symptoms are characteristic of seedling disease caused by the soil-borne fungus *Rhizoctonia solani*. It often causes a discolored, sometimes slightly sunken area (canker) on the lower stem.

Early season diseases to watch for include seed rot and seedling blight, which are caused by various soil-borne and seed-borne fungi. These can cause irregular, thin stands and weakened plants. Fungicide seed treatments have been shown to increase seedling survival. Other factors that reduce early disease problems include

shallow planting into a well-prepared seedbed, avoiding planting too early in the season, and using healthy, disease free seed.

Blackbirds can be a problem in newly emerged rice, especially in fields bordered by trees that may serve as a roosting area. Diligent patrolling is necessary, especially in the early morning and late afternoon. Noise cannons in conjunction with shotgun patrols can also be effective. Growers that have severe bird problems should consider participating in the blackbird baiting program conducted during the winter months by the Texas Wildlife Management Services. (See Winter 2004, *Texas Rice*.)

For a successful growing season, producers should begin scouting early and continue scouting often. Problems are best handled if they are addressed in a timely fashion, rather than waiting until things reach crisis level. With all the unknowns regarding the weather and the marketplace, these are things a grower can do to be successful. *

Anahuac National Wildlife Refuge continued...

Alligators are a common site in many of the refuge ponds and moist soil units.



Birdwatchers make up a large majority of the refuge visitors list.



mile auto tour around the pond, with many interesting stops along the way, including a 750 foot boardwalk that offers visitors an opportunity to be immersed in the cane, get a water-level view of life in the marsh, and stroll among a multitude of wetland wildlife. There is also an overlook made of recycled plastic that provides an excellent vantage point for observing the pond's wildlife.

The Willows, a seemingly insignificant stand of willow trees near the refuge headquarters, are internationally known, and have been featured in over 30 publications about birdwatching. The stand provides crucial habitat for many of the neotropical migrants exhausted after their 600 mile journey across the Gulf of Mexico. Spring migration has been known to produce 17 species of migrants in a single tree! The Willows is a must for those looking for warblers, tanagers

and vireos in the midst of spring migration.

Moist Soil Units are fields with permanent levees and water gates that are designed for the benefit of a multitude of shorebirds. During the winter months large concentrations of waterfowl can often be found feeding on native plants like sprangletop and duck potato. In the spring and summer, the units are flooded to produce pair and brood habitat for nesting mottled ducks and fulvous whistling ducks, as well as to provide habitat for migrating shorebirds. Roseate spoonbills, egrets, ibis and herons are just some of the wading birds that make use of the wetland year-round. Visitors can easily enjoy views of the units from adjacent roads and a newly constructed overlook.

A number of these permanent water structures have been made possible through collaboration with Bill Stransky, director of Texas Rice Industry Coalition for the Environment. Texas R.I.C.E. is based in Pierce, Texas on the historic Shanghai Pierce Ranch. Stransky recently wrote a grant proposal to the Houston Endowment and received funding to create a demonstration moist soil unit at the Anahuac refuge. Their goal is to educate landowners about the benefits of creating this type of habitat area on their own property. Besides creating a sanctuary for wildlife, the soil is improved and the field can go in and out of rice production as the market dictates. And, as waterfowl hunting continues to gain popularity, leasing these areas can prove very lucrative for landowners.

The East Bay Bayou Tract is 300 acres of rice fields and moist soil units. The north parking area provides a covered overlook to view wildlife, and access to a one-mile stretch of trail along the bayou. The wooded banks of East Bay Bayou are great spots to enjoy viewing hummingbirds, warblers and occasional alligators. Access to this trail is also available at the south parking area, where visitors can launch a canoe or kayak for excellent wildlife viewing from the water.

As an area resident, McDowell has seen the benefits all these visitors bring to the area. "Refuge visitors eat in our restaurants, stay in our hotels and buy

Refuge manager Kelly McDowell, conferring with Butch Fancher, a private contractor working on a permanent wetland project.



Anahuac National Wildlife Refuge continued...



A multitude of flower species can be found in the refuge all year round, but they are especially abundant in the springtime. Left: A wetland area with primroses, native grasses and reeds provides habitat for waterfowl, various invertebrates, turtles and alligators. Middle: The cardinal flower, a favorite for butterflies, thrives along stream banks and bayous. Right: Lantana is planted in the refuge butterfly garden, and provides bold color from March through November. It also attracts hummingbirds and honeybees.

products from our shop owners,” said McDowell. “Eco-tourism is good for everyone.”

Across the country, the National Wildlife Refuge System is a major economic engine for surrounding communities, adding millions of dollars in jobs and retail sales. According to a study conducted by the U.S. Fish and Wildlife Service, more than 35.5 million visits to the nation’s 540 refuges fueled more than \$809 million in sales of recreation equipment, food, lodging, transportation, and other expenditures in 2002.

As refuges generated recreation spending, nearly 19,000 jobs were created and more than \$318 million were generated in employment income. The 2002 employment statistics were nearly double the 1995 figures, when 10,200 jobs were attributed to the existence of refuges and about \$163 million was generated.

The \$1.12 billion total for sales and tourism-related revenue, plus employment income, is nearly four times the \$320 million that the National Wildlife Refuge System received in FY 2002 for operation and maintenance.

“We have invested in national wildlife refuges because they are a unique and extraordinary way of conserving America’s great outdoor heritage,” said Fish and Wildlife Service Director Steve Williams. “The economic benefits from refuges would make venture capitalists envious.”

But aside from the economic benefits, national refuges are a good place to get away with friends and family and enjoy the great outdoors. “National Wildlife Refuges are wonderful places where people can enjoy quiet and solitude and unfettered natural beauty in an increasingly crowded and busy world,” said Interior Secretary Gale Norton

For more information about the Anahuac National Wildlife refuge call Kelly McDowell at 409-267-3337 or visit their website at <http://www.fws.gov/southwest/refuges/texas/anahuac/index.html> *



The Common Moorhen is a colorful contrast in the refuge wetlands, where they feed primarily on aquatic vegetation.

Grower Profile... Farming Rice on the Anahuac National Wildlife Refuge

In conjunction with other management strategies, 600 acres of rice is produced annually on the refuge.

“Rice is a wildlife friendly crop,” said refuge manager Kelly McDowell, “and farming rice on the preserve benefits the farmers and the birds.” On the 24,000 acre Anahuac refuge, rice production is considered another management tool used to enhance wildlife habitats - for migratory waterfowl, native shorebirds and a host of mammals, amphibians and reptiles.

The farmers work on a standard cash rent basis, except that they receive the government payments rather than the landowner. In addition, there are some restrictions that apply which the farmers must agree to adhere to, such as the timing of field preparation for the coming year. “It’s important that the fallow fields are not disked too early in the year, while the songbirds that nest in the tall grasses are still nurturing their broods,” said McDowell.

Throughout the growing season, the farmers must follow strict Integrated Pest Management practices, and only spray chemicals when scouting indicates pest pressure has reached the economic threshold.

Once the main crop is harvested, flood is reestablished (with no water cost to the farmer) and held throughout the winter. The second crop is left for the wildlife, but the farmer is expected to maintain the levees for the remainder of that cycle.

Of the four growers who produce rice on the refuge, Buster Penick has been around the longest. Buster is a third generation farmer, who put in his first rice crop in 1946. He has been farming 70 to 80 acres of rice in the refuge since the early 1980’s, but he said he would probably retire within the next few years. Although there are more restrictions for farming on the refuge, he said he really likes the staff and they have been very easy to work with, especially refuge manager Kelly McDowell.

Wayne Morris and his son Daryl have been farming around 70 acres of rice in the refuge since the early 1990’s. Wayne also works for the Chambers Liberty County Navigation District, which supplies water to the farmers in that area. For the past few years they have grown Clearfield 161, and are pretty happy with



L to R: Cade and Leon Langley, with one of their longtime employees, Gerardo Chavez.

its performance. Their fields are laser leveled, and much care went in to seedbed preparation. The crop was drill-seeded, about 1/2” deep, and Wayne said he would wait a couple of days to see if the rain came before flushing.

They put out base fertilizer just after flood, and the first nitrogen application goes out when the rice is about 30 days old. The last nitrogen goes out at PD, for a total of 170 units. Wayne said he is careful to follow the guidelines prescribed by BASF for using the Newpath herbicide to control red rice. In addition to the 70 acres on the refuge, Wayne and Daryl also farm rice on 110 acres of private land, and run 500 head of cattle.

Leon Langley is a third generation farmer with an eye towards innovation. This year he has 470 acres of rice in the refuge and 600 acres on private land, all farmed organically. Leon started out as a conventional farmer, but switched to organic about 12 years ago. For the Langley family, organic is more a way of life than a way to make a living. “I want to give more than I take,” said Leon, “and leave things better than they were before I came.” That’s what makes his co-operation with the refuge especially satisfying, since he is contributing to the enhancement of wildlife along the Gulf Coast.

Leon farms with his son Cade, who carries his full share of the responsibilities for the farming operations.

Grower Profile continued...

At 21 years old, Cade can rightly be considered a veteran farmer, as he started driving the tractors when he was only 10 years old. And even further back than that, he was riding along side his dad as they worked the fields together.

Working the fields properly is one key to the Langley's success. "Everything depends on good seedbed preparation," said Leon, "if the seedlings get a strong start, then you've gone a long way towards a successful season." Close attention to detail is a critical factor in farming, especially organic farming. When cultivation practices and water management are your only weed control options, you have to stay on top of things. Leon's hand-on management style means he is continually scouting the fields, at every stage of the crops development.

One year, while inspecting seedlings at the 3-leaf stage, Leon discovered a bad infestation of armyworms. He also noticed a fair amount of fire ants, and thinking how he could use them to his advantage, decided to bring water into the field. Sure enough, when the water began to rise, the ants and the armyworms began moving up on the plants. In the battle for high ground, the armyworms lost out and were all but eradicated.

This type of close attention, and creative thinking, is what makes the Langley operation successful. "For us, there is no single recipe for producing a good crop," said Leon, "every year is different, every field is different. You just have to stay on top of things and be willing and able to make adjustments, and sometimes that means trying something new."

One of the things Leon is considering is compost tea. In researching the topic, he read that compost tea not only provides nutrients, but also enzymes, growth hormones and beneficial microbes that help the plants assimilate nutrients already present in the soil. He is considering several techniques to deliver it to the plants, and will most likely begin experimenting with the idea this season.

The Langley family owns a processing facility in China where they dry, mill and store all their own rice. Leon markets his rice as well, and believes strongly in the organic certification program. "For the industry's long-term success, it's important that all organic farmers follow the strict letter of the law," said Langley, "the American consumers deserve nothing less." *

Learning About Wildlife in the Wild

The outdoor education program at Anahuac National Wildlife Refuge is free to all schools and organizations. Designed for students in kindergarten through fifth grade, participants learn about insects and wildlife, and the plants that support this important ecosystem.

The hands-on educational classes include:

Kindergarten - Nature Discovery: Children explore the outdoors and discover that nature comes in all sizes, has various shapes and covers a wide spectrum of colors.

First Grade - Nature's Internet: Weaving food webs and playing fun games, children discover how all things are connected in nature.

Second Grade - Amazing Adaptations: Plants and animals all have to adapt to survive. Through exciting games and presentations, students learn how adaptations provide advantages in nature.

Third Grade - Insect Exploration: Participants learn about insect anatomy and biology. They then become entomologists for the moment, using sweep nets to collect, identify and examine live specimens.

Fourth Grade - Wonders of Wetlands: This class teaches the importance of wetlands to wildlife and people. Using dip nets, students search for many of the inhabitants of the refuge's marshes.

Fifth Grade - Reptile Mania: Alligators, amphibians, turtles and snakes are the focus. Students learn about these common residents of the Anahuac refuge.

All classes are conducted outdoors and are approximately one to one and a half hours in length. Reservations are required for these popular, free classes. For more information, please call the Anahuac NWR at 409-267-3337. *



Better Understanding the Most Destructive Disease of Rice

Rice farming is the largest single use of arable land for producing food, with more than 300 million acres worldwide. Rice is the staple food for the largest number of people on earth and accounts for 23 percent of the total calories consumed, according to the International Rice Research Institute.

Now imagine a plant pathogen that destroys enough rice every year to feed 60 million people, a pathogen so clever in its genetic design that it can mutate faster than breeders can develop resistant varieties.

Understanding rice blast, *Magnaporthe grisea*, has been a priority for researchers over the past several decades. Recently, Texas A&M University professor Dr. Daniel Ebbole collaborated on an international project that led to the sequencing of the rice blast genome.

On April 21, the researchers presented their findings in the journal *Nature*, and already the article is receiving worldwide attention from research teams working on blast resistant rice varieties.

“This is a very important step in understanding how to control rice blast disease,” Ebbole said, “especially since there are many different races of rice blast fungus out there. The race defines which cultivars are resistant or susceptible to the pathogen, and the sequence reveals the genes of the fungus that can define race.”

In sequencing *M. grisea*, scientists learned it contains a unique family of G-protein-coupled receptors. These receptors are the ‘eyes’ of the fungus, and relay basic information, such as when it has found a suitable host plant, to more complex reports on what defenses the host plant may have. Once the protein assimilates the information, a signal within the cell determines what action should be taken to initiate the infection.

“There are several avenues that lead to infection, but we believe the primary mechanism is the use of a special cell, called the appressorium, which uses turgor pressure to punch through the leaf surface,” Ebbole said. These cells can be thought of as tiny jackhammers, which produce as much pressure as occurs at 750 feet below sea level.

“In addition, the fungus contains an arsenal of proteins that secrete enzymes that degrade the waxy poly-



Members of the Texas A&M team that worked on the blast sequencing project. *L to R*: Kiran Bhattarai, research assistant; Elena Kolomiets, research assistant; Michael Thon, assistant professor; Daniel Ebbole, professor; and Yue Shang, graduate student.

mer of the leaf cuticle. This further paves the way for infection of the host plant,” said Ebbole.

The host plant does have its own defenses, though, for example, an enzyme called chitinase, which can degrade the cell wall of the fungus. However, the *M. grisea* has chitin-binding proteins that neutralize this threat.

Researchers have found that the blast fungus also has a high degree of genetic variability, with extensive copies of repetitive DNA. This leads to novel pathogenic variants capable of infecting formerly resistant host plants.

Because blast resistant varieties don’t always stay resistant under field conditions, protecting against them has challenged rice breeders. “Our research should help with this problem,” Ebbole said, “as the genome sequencing of the rice blast fungus will help scientists better understand the mechanisms a plant needs to resist infection.”

In addition to better breeding lines, the research will also help in the development of new fungicides that can block avenues of infection, creating a protective layer around the host plant, namely rice, said Ebbole.

Texas A&M has a diverse group of scientists who study fungi such as rice blast as part of the Program for the Biology of Filamentous Fungi. In addition to Ebbole, Assistant Professor Michael Thon, Research Assistant Elena Kolomiets, and graduate student Slavica Djonovic participated in studying the rice blast genome sequence at Texas A&M.*

State, National and International News...

Payment Limit Battle Takes Another Turn

WASHINGTON, DC - It appears now that the reports of the demise of the Bush administration's quest for lower payment limits to help reduce the federal budget deficit could have been somewhat exaggerated.

On April 12, Agriculture Secretary Mike Johanns told Senate Appropriations Committee members he realized some of the administration proposals, such as the reduction in payment limits, were sensitive, and he was willing to work with Congress on other cost savings recommendations.

At least two members of Congress and several media organizations took that to mean Johanns was backing away from the administration's insistence that payments be capped at \$250,000 per farmer. But 24 hours later, media outlets received the following e-mail from USDA's press office:

"I would note for you that we are still supporting the call in the president's budget to tighten payment limits, and we have not, nor do we intend to withdraw that proposal, which we think is very reasonable and an important part of achieving our main goal: to reduce the budget deficit in half by 2009."

Johanns told reporters he never intended to imply any lessening of support for the president's budget. "I am absolutely committed to the president's proposals," he said, "and he's got it right. You know, his whole notion here is, we've got to get the deficit under control. High deficit is not good for agriculture, and every farmer and rancher knows that. They deal with interest rates; they deal with the need to balance their budget. It gets back to the point that we have to be a part of this; we have to be ready and willing to do our fair share here. Every federal department is being asked to do the same."

By the end of the week, farm organizations issued statements praising Johanns for at least being willing to work with Congress on the budget plan. Their words had an edge to them, however.

USA Rice Federation officials focused on Johanns "sensitive" comment. "We hope that sensitivity will soon lead to constructive, successful dialogue between farmers, Congress and the administration, and that's next year's federal budget will not hurt farmers and their families."

So farmers, lenders, chemical suppliers, seed companies and all the other entities that have a stake in southern row crop agriculture are still under the gun on payment limits. And Rep. Bonilla and Sen. Blanche Lincoln, D-Ark., and others who thought they saw a light at the end of the tunnel now have to wonder if it's an oncoming train.

Excerpted from an article by Forrest Laws, email flaws@primediabusiness.com

Extract Value from Rice Bran

BATON ROUGE - Extracting vitamin E from rice bran may become more cost effective and provide an expanded market for the rice by-product if research in the LSU AgCenter's Department of Biological and Agricultural Engineering proves out.

Rice bran is a good source of antioxidants, but getting it economically has proved to be a stumbling block, said Marybeth Lima, who's developed a way to get rice bran with higher concentrations of the antioxidant.

Rice bran has been considered a low-value animal feed, but Lima has discovered antioxidants such as vitamin E can be found in different concentrations in different bran layers. She's devised a method of stripping off the bran in three fractions and measuring the concentration of oil in each.

"Antioxidants aren't uniform in each fraction," she said. "So taking only a part of the bran provides buyers with a product with a higher concentration of vitamin E." Lima also has learned the concentration of vitamin E varies by layer - outer, middle or inner - depending on the rice variety.

She can determine which fraction contains the highest concentrations of the desired antioxidant, she said. This translates into machine settings that will yield a high-value fraction of rice bran from which antioxidants can be extracted.

Lima said her next step is to identify high-value fractions of hypoallergenic proteins, cholesterol-reducing products and rice bran sacchride, an anti-tumor compound, which also are contained in the bran layer.

Excerpted from an article by Rick Bogren, LSU AgCenter, e-mail rbogren@agcenter.lsu.edu

Upcoming Conference: How to Do Business with Cuba

Thanks to changes in federal trade sanctions law, exporting food to Cuba is now not only possible, it promises to be very profitable for Texas agricultural producers.

“The sanctions changed in 2000. In 2004, U.S. agricultural exports to Cuba were \$385 million, \$55 million more than the previous year. The total to date so far is about \$800 million,” said Dr. Parr Rosson, economist with Texas Cooperative Extension. Rosson is the program planner for “Doing Business with Cuba,” a half-day conference scheduled for May 11 at the chamber of commerce offices in Tyler.

Currently, few Texas businesses have taken advantage of the lifting of the sanctions. The lion’s share of exporting has been done by Midwestern states. But that doesn’t mean Texas businesses can’t profit from trade with Cuba, he said.

In addition to wood products and lumber, Rosson sees an opportunity for Texas businesses to ship cattle, frozen broilers, beef and processed meats, fish, rice, processed foods and snack foods. For example, in 2004, rice was the top U.S. export to Cuba, with sales topping \$64 million, seven times the amount for the same period in 2003. Cuba is now the third largest market for U.S. rice behind Japan and Mexico, Rosson said.

The program will begin with registration at 8 a.m. at the Tyler chamber of commerce building at 315 S. Broadway. Registration for the conference is \$25.

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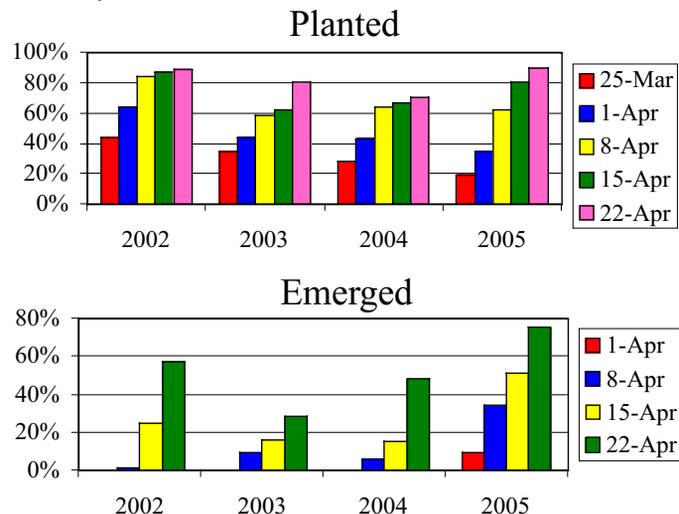
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Rice Crop Update

Preliminary estimates indicate 2005 Texas rice acres may be 200,750 acres which is below the 216,545 acres planted in 2004. Estimates are as of April 22 and represent an 11 percent statewide reduction. It appears the acreage reduction is highest in the Eastern Zone, about 23 percent. The Northwest and Southwest Zones have estimated reductions of 6 and 10 percent respectively. However later plantings may modify these estimates.

Plantings in 2005 are running about 3 to 5 days later than the 2002-2004 statewide average. A wet winter delayed plantings but the subsequent dry weather has allowed plantings to progress faster than normal. The East Zone plantings are about 3 days later than the 2002-2004 average. The Northwest Zone plantings are about 3 to 6 days later and the Southwest Zone plantings are about 6 to 9 days later than the 2002-2004 average. Near record low temperatures has delayed seedling emergence and has stressed seedlings in many fields.



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