Texas Rice

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Combine Harvester Efficiency: Material Other Than Grain Or Money On The Ground?

After several minutes of walking through a rice field that has just been harvested, it is usually very difficult to find more than a few grains that have been left behind.

Drying and storage bins at the Gertson farm in Lissie.

From such observations it is easy to conclude that rice combines are extremely efficient. But this might be misleading, given that the choppers and spreaders do a good job of cutting plant material, including grains, into small pieces. How much rice does a combine leave in the field? Results from an informal survey of about 20 Texas rice farmers suggest that the large majority of producers think that rice combines typically leave less than 200 lbs of grain per acre. Just how important is a 200 lb/ac yield loss? More importantly, is a 200 lb/ac combine yield loss realistic, and if not then how much grain does a combine leave behind when harvesting a rice field?

In 1999, a meeting was held between Dan Mathews, Des Woods, and Ted Wilson to discuss the question of combine harvester efficiency. After making a few test cuts with a new combine, with the chopper and spreader turned off, samples coming out the back of the combine were taken to the Beaumont Center and processed. There was a sufficiently large number of rice grains in these samples to suggest the need to take a closer look at different factors affecting rice harvester efficiency. Although it might be okay to leave a few grains on the ground for migratory fowl, it made sense to develop information on how to prevent combines from leaving too much money on the ground.

The preliminary study mentioned above ended up spawning the "birth" of the Texas Rice Combine Test. Since the initial discussions and preliminary field study, two detailed field experiments have been conducted. In the rest of this article, we will discuss the methods used to determine combine efficiency and provide an overview of some of the major results.

Field Methodology

The Texas Rice Combine Test has now been conducted during both 2000 and 2001, on main crop rice in commercial fields located west of Katy and east of Brookshire, Texas. Each year, the test fields were planted to the variety Cocodrie in fields having Katy Prairie soils. Des Woods, the owner of these fields, practices a three-year rotation, with one year of rice followed by two years of fallow. During each year, three combines were tested, one each from Case, Caterpillar, and John Deere. The combines used each year are described in the following combine article. The rice was cut at a 17-inch height. Stubble height was measured at three locations within each cut to verify header height. For each combine and each combine speed the cutting width

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From the Editor...

The cover story in this issue focuses on harvester efficiency. Based on results from a two years study conducted at Katy, Texas, this topic is much more important that many of us had ever thought. After months of hard work and investment of money on equipment, supplies, and personnel, all necessary to growing a good crop, our producers are left with harvesting their fields to bring home that paycheck. We are all used to seeing some grain left on the ground following harvest. But, most of the producers, dealers, implement manufacturers, and researchers who were involved with this study were surprised by the amount of grain that a combine can leave on the ground if the operating speed is too high or if the moisture condition of a field is too wet. Improper operation of a combine can leave much or all of a producer's profits on the ground, and for the birds, so-to-speak. I am hopeful that this month's cover article will provide information that will be useful to producers in managing their combine so as to improve their harvests and profits by, in some cases, a substantial amount.

This is the eighth issue of *Texas Rice*. Nearly 1,000 individuals now receive *Texas Rice,* either through the mail or via the internet, with about 95% of all copies going to folks in Texas. Requests have come from numerous states, including most of the US rice belt and from several universities and rice businesses across the US, and the number of requests keeps on growing. Users include rice producers, implement dealers, seed producers, students, scientists, and state and federal government policy makers. We receive requests from around the world, from as far away as China, Malaysia, West Africa, South America, and parts of Europe. All indications are that the popularity of *Texas Rice* will continue to increase, but always remember, our foremost reason for producing *Texas Rice* is to help our rice producers. The faculty and staff at the Beaumont-Eagle Lake Center will do their best to continue to make *Texas Rice* useful, informative, and interesting to our producers.

We hope that you have enjoyed *Texas Rice* as much as we have enjoyed producing it. Publication will resume in January with an issue anticipated each month through October. The January issue will provide an overview of the Foundation Seed Program and the Texas Rice Improvement Association support staff at the Beaumont Center and an article highlighting several of the rice seed companies in Texas. I hope you will continue to read *Texas Rice.* I also hope you will continue to send me your suggestions. If you have a topic or idea that you would like us to consider adding to the newsletter, please contact me or Jay Cockrell and we will see what we can do.

Sincerely,

T. T. Wilson

Ted Wilson
Professor and Center Director

Crop formation spotted near Brookshire, Texas. Created by Kenneth Hlavinka '90 and Brian Hlavinka '93 proves that there is intelligent life making strange crop formations in Texas. Photo by Garry McCauley.

Inside This Issue

Cover Story:
Combine Harvester Efficiency

Grower Profile...

Ford Frost and Stevie Devillier: A Winning Combination

Farming enterprises come in all shapes and sizes, but it seems the critical component for success is in the people. Ford Frost and Stevie Devillier have enjoyed a win-win situation for over 20 years.

For Stevie Devillier the day started like most others in the springtime, he was on a tractor planting rice. The particular field he was in was a piece of property he had been tenant farming for several years. A car pulled up and two men got out, an older gentleman and his son. They informed Stevie that they had purchased the property, and if he wanted to continue the tenant farmer relationship, he would have to become accustomed to doing things a little differently. As it turned out Ford Frost and his father, J.M. Frost III, did things differently in a way that made sense to Stevie, and the relationship has continued to prosper.

The Frost family came to Texas in 1853 from Tennessee. Ford's great-grandfather operated a rice irrigation company in the Fullshire area. Because Ford's great-grandfather operated the canal company, his grandfather became interested in rice farming. During the Great Depression the family lost nearly everything, and it wasn't until they found oil on their land that things began looking up. Growing up Ford remembers his dad spending long hours in the field with his cattle and horses. Ford's uncles were in charge of the rice farming part of the family business. As an only child, Ford spent a great deal of time helping his dad in the farming/ranching operation.

After high school, Ford continued his education at Trinity University in San Antonio where he received a BS in Economics. His wife of 18 years, Claudia, practices law in Houston. They have one daughter, Sparky, who attends a girls school in Virginia. She has shown horses since she was 7 years old, and has won numerous awards for showmanship at a very competitive level.

When asked about his role in the farming operation, Ford insists that Stevie is the driving force in their success. But Ford certainly knows the business of farming. Several years back producers were looking for a way to build a sugarcane mill in Texas, as our climate is compatible with sugarcane production. The amount of money required to finance the mill was more than any one, or even several investors, could gather. Ford came up with an innovative solution that stands to benefit Texas Agriculture for decades to come. Together with Bob Randolph of Vinson & Elkins law firm in Houston, Ford petitioned the state legislature to provide the legal framework for Agricultural Development Districts in Texas. This allows for the sale of tax-free bonds that can be used to finance any agricultural enterprise. The governing board is appointed by the County Commissioners, and is mostly comprised of farmers and ranchers. Although the sugarcane mill has been put on hold, the Districts have the potential to finance many other agricultural pursuits, certainly a boon for our ailing farming infrastructure in Texas. *See page 10 for full story.*

Meanwhile, back at the ranch, Stevie Devillier keeps the Frost farming venture in the black. Innovation is the buzzword for success, and together Stevie and Frost are continually searching for better ways to farm rice. They attend the rice field days at Stuttgart, Crowley and Beaumont, and regularly take part in the RTWG meetings held biennially. Some not-so-conventional practices that have proven successful in their operation include conservation tillage, contouring rather than laser leveling, fertilizer injection at planting, the use of tracks and balloon tires to reduce com-

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paction and stripper harvesting.

Conservation tillage is not a new concept, but Stevie has added a few twists that make the system work even better. They practice a four-year rotation, rice one year and cattle for three. After the third year of cattle, the ground is worked in the fall with a 'paratill', a specialized piece of equipment from Bingham Brothers in Lubbock. The tool works the ground to 14 inches deep, but does not flip the soil

Balloon tires mean less compaction, especially important in a conservation tillage system.

profile. Topsoil stays on top, and subsoil stays below. It simply aerates the ground, and penetrates to a depth that rice roots will normally grow. This eliminates the problem of a sudden increase in soil density at 4 inches (depth of conventional tilling), which may cause the rice roots to grow sideways rather than down. The deeper tillage also prevents salt from building up in the topsoil, as water can then flush it out of the root zone. The following spring, Stevie plants the rice with a no-till drill directly into the overwintering weeds. After the rice is planted, he goes back with Command and Round-up to kill the existing weeds. The weed roots aerate the soil, while at the same time holding particles in place so that deep cracks will not form prior to permanent flood and allow sunlight to penetrate. This prevents weed seeds and red rice that may be trapped below the surface from germinating.

To establish a uniform flood Stevie practices contour leveling, which follows the natural lay of the land. He believes that the practice of laser leveling large fields removes too much topsoil, which can be detrimental in a region where the topsoil is a bare 4" to start with. He said they may eventually invest in a laser rig, but will never move more than an inch of soil in any given field. They pull modest levees after planting, and then reseed to establish a levee crop. The levees are high enough to hold water in a cut, but still low enough to run water over if necessary. Their water comes from the Devers canal system, which is why they decided against ratooning this season. The canal quit pumping September 15th and the risk of not having water to finish the ratoon crop was too great.

Liquid fertilizer (150-30-15 plus sulfur and manganese) is the mainstay of Stevie's fertilizer operation. They have a 1000-gallon tank that follows the planter, and fertilizer is injected into the soil as the seed is drilled. This has enabled him to reduce the amount of fertilizer by 30% from the recommended rate, as less nitrogen is lost to the atmosphere. He injects 150 units of N at planting, and then top-dresses 25 units of standard pelletized nitrogen onto dry ground just before permanent flood. He flies on PD nitrogen only if the chlorophyll meter indicates a need. This practice has improved the performance of the rice while at the same time reducing costs.

Another practice that improves rice plant growth is the use of track systems and balloon tires on the tractors, combines, auger carts and fertilizer wagon. In their minimum tillage system, reducing compaction is a necessary practice in order for roots to develop properly. According to Ford, a tractor with a tract system exerts 3 lbs/sq.in. of pressure compared to a man walking which exerts 6 lbs/sq.in. This is a fairly

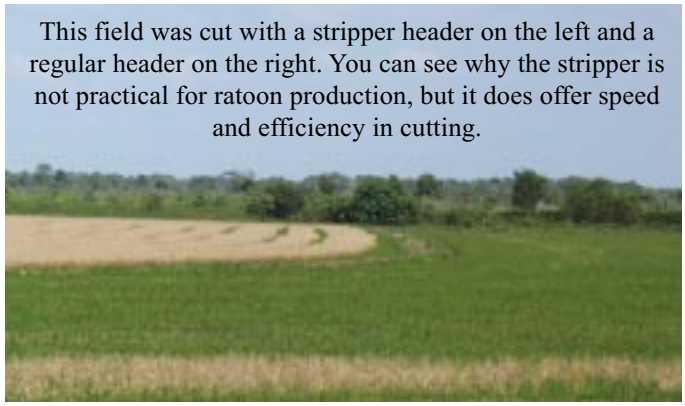
Freid Leonards and Stevie often team up to get the work done, an informal partnership that goes back many years. Stevie said at 87, Freid can still work circles around most people he knows.

incredible comparison, considering the weight of a 225 hp tractor. Eventually Stevie expects that all their equipment will be outfitted with the tracts or balloon tires. This will be possible, as Ford believes strongly in re-investing the profits from the rice production back into the farming operation.

The latest investment was in a stripper header for the combine. This strips off only the grain portion of the rice plant just below the panicle. And while it is not suitable in situations where the farmer plans to ratoon, it does allow a more efficient first harvest. The stripper combine can run at roughly 4.5 mph compared to 2.5 mph for regular combines. This means that harvest can be completed quickly, using less man-hours than conventional combining. Stevie often goes back and bales the straw to use as winter feed for his Brahma/Limousine cattle.

Close up shot of a stripper header showing the panicle remains after the grain has been harvested.

As for crop protectants, they use Icon along with a fungicide and bactericide as well as zinc and gibberellic acid for seed treatments. Stevie does the scouting on his crop (200 acres) as well as Ford's (750 acres), and applies herbicides and pesticides as needed. This past season only required one application of Quadris and Sevin XLR for stinkbugs. Stevie and Ford have an excellent relationship with the Beaumont Center scientists, and call on them frequently when problems arise that need expert advice. (Or when hunting season opens and the ducks are plentiful!) Stevie is an avid hunter/fisherman/outdoorsman and enjoys the company of others who have similar interests.



This field was cut with a stripper header on the left and a regular header on the right. You can see why the stripper is not practical for ratoon production, but it does offer speed and efficiency in cutting.

The Devillier family has a long history of farming rice in the Winnie area. Stevie's great grandfather was a rice farmer, as was his grandfather, father and uncles. He planted his first crop in the spring of 1974 at the age of 15, which is fairly incredible considering he played high school football. Stevie has two older brothers, Randy, who works in construction, and Culley, who also farms rice. His dad Jerry still farms, and is a driving force in the family business. In addition to the rice and cattle, Stevie also has 65 acres of crawfish, which are not part of the rice rotation. He said they were a little small last year, but hopes that this coming season will be more productive. The Devilliers have 14 - 24' dryers that hold 1500 barrels each, and they market through Riceland Foods Texas pool.

Stevie has two girls, Tracy, a freshman at Texas A&M and Amy, a freshman at Winnie High School. The last stop we made the day of the interview was a beautiful 11-acre pond on property that has been in the Devillier family for several generations. Stevie invested in the property a few years back and has worked to improve its recreational value. He hauled in sand and built up a beach area for his young nieces and nephews to play on, and purchased a giant floating trampoline, which, according to Stevie, has been as much fun for the grown-ups as it has for the kids. The pond has native perch, but Stevie stocked it with Florida bass this spring. So when he is not tending rice or working cattle, you might find Stevie sitting at the end of the pier with a line in the water. *

Stevie with his dad Jerry, who also farms rice in Chambers county. They often team up to get the crop planted or rice harvested on time.

Article and photos by Jay Cockrell.

was measured at three locations. The total length of each cut was estimated with a Bushnell binocular laser range finder. The accuracy of this instrument was determined by also measuring several cuts using a 100-meter measuring tape. Combine yield was obtained by taking lbs/cut, converting these green weights to 12% grain moisture weights, then multiplying the grain weight per cut times 43,560 (the number of ft^2 in an acre), then by dividing by the number of ft^2 made by a cut.

In 2000, the rice was harvested over a two-day period on August 1 and 2. About 8 inches of rain fell the previous day. The combine test consisted of three replicates of each machine harvesting at each of four operating speeds (1-mph, 2-mph, 2.5 mph, and 3-mph). Harvesting for the first replicate started at 4:00 pm, with all four speeds completed by 6:00 pm. Harvest for the second replicate started at 6:00 pm, with all four speeds completed by 8:00 pm. Harvest for the third replicate started at 12:15 pm the following day and was completed at 2:00 pm.

Each test for a specific speed consisted of a 300-foot cut into the field and a return 300-foot cut. Each combine operator was instructed to leave a 2.5 foot uncut strip between cuts to insure that each combine had a full header width cut. The front and back of the 300-foot wide test areas were harvested prior to the start of the test. Each combine emptied its load into a dual-tandem trailer. The weight of each test cut was automatically calculated with weighing scales located under the truck and trailer containing the weighing bin.

Grain samples were collected for each replicate of each speed and graded for defects, e.g. broken grain, hulled grain, insect damage, and foreign material. Grain samples were taken after about one minute of dumping time from each combine's auger. The moisture content of the harvested grain was estimated at the grain elevators. Straw samples were collected from the rear of each combine on a 2-meter x 2-meter metal catch pan. Samples were not collected until combines were fully loaded. Three pans were manufactured and donated to the project by Dan Mathews with Mustang Caterpillar. The trays were suspended from the belly of each combine and released by pulling a rope that disengaged a pin, after the combine had traveled at least 150 feet into a cut. As the rear of a combine passed over a tray, its contents were dumped into the tray by the combine. Straw choppers, spreaders, chaff spreaders and any other device spreading or altering the flow of material from each machine were deactivated or removed prior to the test. This was done to prevent grain that had passed through the combine from being obliterated.

The material collected this way is referred to as "Material Other than Grain" or MOG for short. The MOG samples were collected in fine-mesh 100-gallon nylon bags (20" x 36"), with up to six bags required to empty the contents of each 2 m x 2 m pan. Each MOG sample collected leaf, stem, and grain from an area equal to the width of a combine x 2 m deep cut. MOG grain yield was obtained by first drying the samples to 12% moisture, then threshing the samples to remove everything but grain, then multiplying the grain weight per MOG sample times 43,560, then by dividing by the number of ft^2 represented in a MOG sample.

Closer examination of the data indicates that the MOG sampling does not account for all of the grain that is lost during combining.

Each dealer or manufacturer provided an operator for the test. An independent observer was appointed to ride with each machine to verify that all test procedures were met during combine operation, and to take notes on each combine's general performance, e.g. engine loading and tire or track slippage. Operators were allowed to preset their machine to their own specifications prior to each replicate of a particular speed. These settings were maintained and not altered throughout a single tested speed.

In 2001, the rice was harvested on August 15. Conditions were ideal. Harvesting started at 11:00 am, with the final cut completed by 4:30 pm. The experimental procedures were essentially the same as used the first year, but with each combine also conducting a single cut at 3.5-mph and 4.0-mph. In addition, each replicate consisted of a single 600 foot cut, instead of two 300 foot cuts. Each observer

riding in the combine also recorded the starting time and stopping time for each cut. This allowed for a precise estimate of the speed of each combine during a cut. Each observer in each combine, each MOG sample coordinator (one for each combine), and the study coordinator each used 2-way radios to communicate.

Data Analysis

The harvested yield (lbs/ac), MOG grain yield (lbs/ac), whole kernel yield (%), total milling yield (%), harvest yield value ($/ac), estimated yield loss (lbs/ac), and estimated yield loss value ($/ac) were analyzed using analysis of variance, with the effects of year, combine type, and combine speed as factors. An economic analysis of the data was performed, assuming a loan + deficiency loan payment of $7.95/cwt with a $0.055 premium or penalty for each percentage point about a 55/70 whole grain/total milling yield percent.

Results

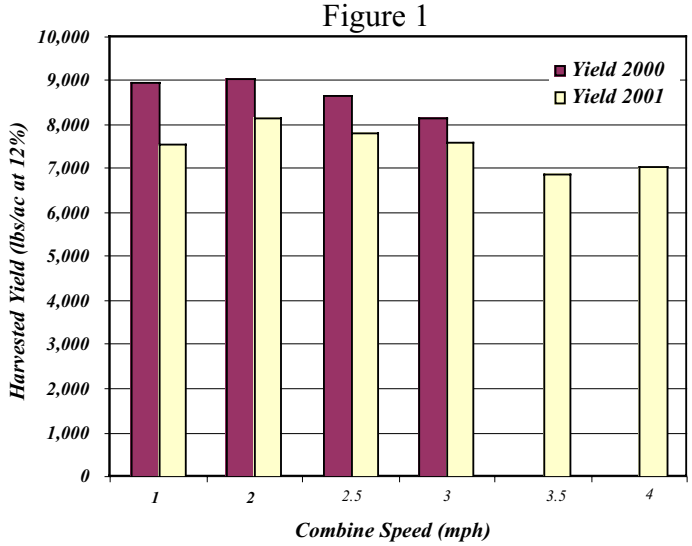
Table 1 summarizes results from the 2000 and 2001 Texas Rice Combine Study.

Table 1. The impact of year, combine type, combine speed, and the interaction of these factors on harvested yield (lbs/ac), MOG grain yield (lbs/ac), whole kernel yield (%), total milling yield (%), harvest yield value ($/ac), estimated yield loss (lbs/ac), and estimated yield loss value ($/ac). The level of importance for a factor is indicated by * (significant), ** (moderately significant), *** (highly significant), or ns (not significant).

Source	Harvested Yield	MOG Yield	Whole Kernel Yield	Total Milling Yield	Harvest Yield Value	Estimated Yield Loss	Estimated Yield Loss Value
Year	***	***	ns	***	***	***	***
Combine	ns	**	ns	ns	ns	**	**
Speed	***	***	ns	ns	**	***	***
Year x Combine	ns	**	ns	*	ns	*	*
Year x Speed	ns	***	ns	ns	*	***	***
Combine x Speed	ns	ns	ns	ns	ns	ns	ns

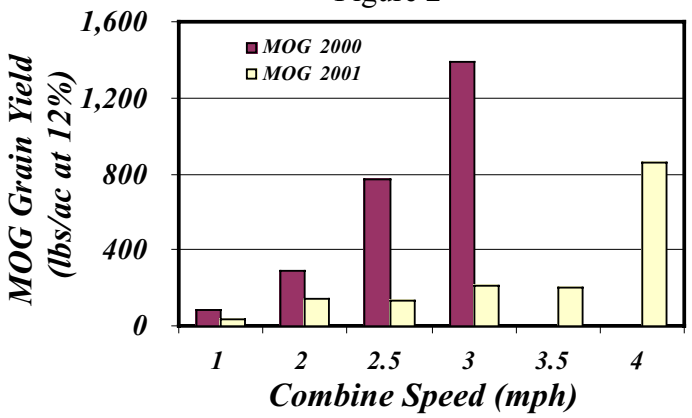
Harvested Yield - Harvest yield was significantly affected by both year and combine speed, but not by the type of combine used in the study. None of the interactions between ***Year***, ***Combine***, and ***Speed*** significantly impacted harvested yield. For both years, the highest yields were obtained when the combines were run at 2-mph, with slightly lower yields at 1-mph, with yield decreasing as speed increased above 2-mph (Fig. 1). The significant affect of ***Speed*** was largely due to a decrease of 891 lbs/ac and 1254 lbs/ac for 2000 and 2001, respectively, comparing the highest and lowest yielding speeds. The greater decrease in yield recorded during 2001 was due to the combines also being run at two higher speeds during that year. Excluding these two speeds, the decrease in harvested yield as speed increased from 1-mph to 3-mph during the 2001 study was 605 lbs/ac., or only about 2/3rds of what was observed during the previous year. Although we do not have sufficient data to determine the cause of this decrease in grain loss in 2001, it is probably safe to assume it was due to the harvesting conditions being near optimum during 2001, in contrast to 2000 when the fields were greener, had more foliage, and had a large amount of moisture on the foliage, particularly during the morning.

Figure 1



MOG Yield – The weight of grain recovered from the MOG samples in general increased with increased combine speed (Fig. 2). In 2000, an average of 1391 lbs/ac of grain was collected from the MOG samples when operating the combines at 3-mph. In contrast, in the 2001 study the amount of grain

Figure 2



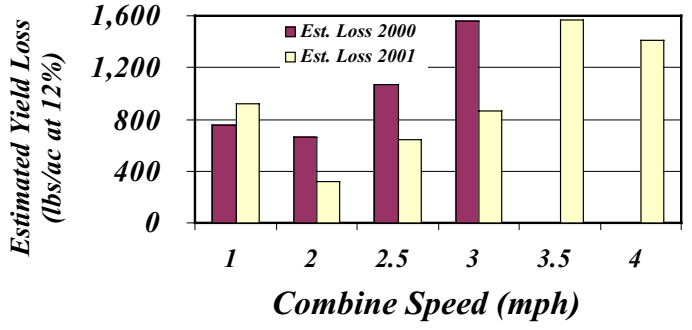
recovered from the MOG samples was 213 lbs/ac at 3-mph and 864 lb/ac average at 4-mph.

When the MOG grain loss estimates are added to the harvested yields, the totals should be the same for all speeds and all combines but they are not. Closer examination of the data indicates that the MOG sampling does not account for all of the grain that is lost during combining.

Total Yield Loss – The actual loss in yield was often much greater than what the MOG pans collected.

Figure 3 shows the estimated yield that was lost when averaged across combines for each of the speeds. Grain losses from the combines was the least when the combines were operated at 2-mph, and increased rapidly at higher speeds. The greater yield loss at 1-mph, contrasted with 2-mph, is possible due to the combine not loading properly at extremely low speeds. On a percentage basis, average grain loss was 9.4% at 1-mph, 5.4% at 2-mph, 9.3% at 2.5 mph, 13.2% at 3-mph, 18.6% at 3.5-mph, and 16.7% at 4-mph. The data for the two higher speeds is less reliable due to these speeds only being tested the second year of the study with there only being one replicate of each speed for each combine.

Figure 3



During the 2001 study, we documented that at least one of the combines was losing in excess of 100 lb/ac from a leak in its hopper. A manager at one of our local farm equipment dealerships said that he conducted a small study that showed that losses through leakage may be greater than previously thought.

Grain Quality – None of the factors examined during the study had a significant impact on whole grain milling yield. Whole grain milling yield was high both years, averaging 66.2% in 2000 and 65.3% in 2001. However, ***Year*** and the ***Year x Combine*** interaction both had a small but significant impact on total milling yield. Total milling yield was high both years, averaging 71.9% in 2000 and 73.3% in 2001. The significant ***Year x Combine*** interaction was of little economic importance given the small differences in total milling yield comparing combines each year, with a 0.75% and 0.67% difference comparing the best and worst combine, during 2000 and 2001, respectively.

For a 1,000-acre rice operation and a 7,000 lb/ac crop, this equals $28,000/year decreased profits. Small numbers can add up quickly!

Economic Loss – The total yield loss for both years combined averaged $74.12/ac. The loss was highest in 2000 and lowest in 2001, averaging $87.97/ac and $60.28/ac, respectively. The higher losses in 2000 were largely due to the greater amount of moisture on the plants at harvest that year. This result was confirmed by examining the relationship between total grain loss and grain moisture for the three sets of cuts. The average total yield loss was 1284 lbs/ac for the first set of cuts, 994 lbs/ac for the second set, and 763 lbs/ac for the third set. The corresponding average moisture content of the grain was 20.15%, 19.39%, and 18.78%. Although not measured, the lesser amount of moisture on the surface of the plants for the second and third cuts likely had an even greater impact than did grain moisture on harvester efficiency.

Conclusion – The results from the 2000 and 2001 combine study suggest that the most economical speed for harvesting rice is about 2-mph. But even at this

speed, the combines lost an average of 5.4% of the grain. For a 7000 lb/ac crop, this would equal a 378 lb/ac loss. Even at the best operating speeds, the combines that were tested averaged yield losses

Table 2. Yield loss value ($/ac) for each combine at each speed.

	2000		2001	
Combine Speed	Average		Average	Grand Average
1.0 mph	65.46		79.77	72.62
2.0 mph	57.94		28.22	43.09
2.5 mph	93.12		56.23	74.68
3.0 mph	135.34		76.89	106.11
3.5 mph	-		138.61	-
4.0 mph	-		124.96	-
Average (4 lowest speeds)	87.97		60.28	74.12

totaling $57.94/ac and $28.22/ac for 2000 and 2001, respectively, or $43.09/ac when averaged across years. For a 1,000-acre rice operation, this would equate to a $43,000 average loss per year. If applied across the Texas rice belt, it amounts to a $9,000,000/year loss in rice producer profits.

The yield loss estimate shown in Fig. 3 suggests that the best speed for operating a combine is probably between 2 mph and 2.5 mph. For every 1/2 a mile per hour increase in speed the combine loses about 375 - 450 lbs/ac. In our large scale field study, this equates

Table 3. The effect of moisture on total yield loss, averaged across speeds.

Cutting Period	Harvested Yield (lbs/ac) at 12%	Total Yield Loss (lbs/ac) at 12%	Average Moisture Content %
4:00- 6:00 pm day 1	8432	1284	20.15
6:00-8:00 pm day 1	8722	994	19.39
12:15-2:00 pm day 2	8953	763	18.78
Average	8702	1014	

to a $36/ac decrease in profits for every half mile per hour increase in speed or looking at it differently, this amount was equal to a $0.40 per cwt decrease in profits for each half mile per hour speed increase. For a 1,000-acre rice operation and a 7,000 lb/ac crop, this equals $28,000/year decreased profits. Small numbers can add up quickly!

These results are extremely interesting and suggest the need for additional combine research. Additional testing should be conducted at speeds closer to 2-mph. The results also suggest there might be considerable value in conducting a detailed study of the efficiency of one or more combines using different settings including but not limited to concave setting, rotor speed, and engine speeds. Also, with many fields being harvested using older equipment it would be valuable to determine the efficiency of these older combines. It is conceivable that loses might be considerably higher. Even a small change to a combine setting could mean the difference between many of our growers making a profit instead of a loss.

(left to right) Des Woods, Phil Steffens and Ted Wilson discussing strategy on site at the 2001 Combine Test in Katy.

The authors of this article are L. T. Wilson, J. Medley, R. Eason, G. McCauley, and Jack Vawter. Special thanks to Des Woods and Dan Mathews for the original idea for the combine research, Mr. and Mrs. Des Woods for the generous use of their rice fields, the TRRF Board for encouraging the work, and Ray Allen, John Aubin, Mike Burnside, Randy Carlz, Scott Carr, Kyle Cranek, Wayne Collins, Daniella De LaRue, Patrick Dougherty, Christina Fernandez, Jeff Gray, Michael Henrickson, Alan Hescamp, Joe Holden, Terry Hlavinka, Hal Koop, Steve Landry, Dan Mathews, Jim Minnihan, Ron Moron, April Nelson, Don Perekovich, Phil Steffens, Chuck Stephens, Wayne Sturdivant, Alan VanNahmen, and Adam Zimmermann for all of the hard work they did in making this study a success. *

Agricultural Development Districts

Although Texas is one of the leading agricultural states in the nation, we currently only process roughly 10% of the commodities we produce. For many years, increased value-added processing of agricultural products has been a goal of our state legislators and department of agriculture. HB 1880, sponsored by Rep. David Swinford, was enacted this year to help producers realize this goal. It enables producers to create Agricultural Development Districts for the purpose of processing an agricultural commodity grown here in the state. In essence, it will allow producers to use their land and commodity as capital to establish an agricultural processing enterprise.

Here's how it will work: Those wishing to form a district will petition the Commissioners Court in the county where the facility will be located. At least 10 district residents or landowners must petition to form the district. The County Commissioners must approve the project in a public hearing. The project must then be approved by the TDA. The Attorney General's office must approve the sale of bonds to finance the district. A qualified management contract for operation of the facility by outside entity must be secured.

The district will initially be governed by a board appointed by the Commissioners Court, and then elected thereafter. Once established, the board will commence building the facility to process the particular commodity they are producing. For start-up capital, the board may use various sources including the Texas Agricultural Finance Authority, which is administered through the TDA. Also, as a governmental entity, the district may offer tax-free revenue bonds to finance the facility. Of course, the marketability of the bonds will depend on the feasibility of the project. Another selling point to encourage purchase of the bonds is the amount of assessed land and commodity within the district. The district may levy assessments upon property located within the district whose owners voluntarily formed the district. These assessments may be levied upon acreage and/or production and may be pledged to the payment of any bonds issued, essentially collateral to insure interest payments on the bonds. In most cases, assessments would be imposed only if the processing facility does not generate enough revenue to pay interest on the bonds.

The revenue generated by the district will flow back to the producers in two potential ways: 1) the district may contract the operation of the facility to a cooperative made up of producers in the district; or 2) the district board could contract with producers in the district to supply the particular commodity and pay an increment above market price equal to a pro-rata share of excess revenues realized. Either way, producers could realize profits from the processing that would stay in their own community.

The concept of a special district created to help the development of certain areas is not new. There are many districts and authorities that fund various services and projects, such as convention centers and music halls, mostly in urban areas. Like HB 1880, most of these districts finance projects with bonds and use assessments. Unlike such districts, no land is included in an Agricultural Development District unless that property owner voluntarily joins the district. Ag districts seek to provide some of the same capital acquisition mechanisms to rural areas that have long been used by urban areas for developmental purposes. *

Article by Jay Cockrell.

Allelopathic Activity in Rice for Controlling Major Aquatic Weeds

Of the more than 16,000 rice accessions or varieties from 99 countries in the germplasm collection of the U.S. Department of Agriculture's Agricultural Research Service, a substantial number have been evaluated for allelopathic effects on aquatic weeds-about 12,000 for ducksalad [Heteranthera limosa (Sw.) Willd] and around 5,000 for redstem (Ammannia coccinea Rottb.). In field tests during 1988-90, researchers identified 412 rice accessions that produced an area of allelopathic activity around the rice plant greater than 10 cm for ducksalad and 145 accessions produced the same area of activity for redstem. The accessions demonstrating allelopathic effects on ducksalad originated in 31 countries. A hybrid between PI 338046 (allelopathic) and Katy (nonallelopathic) had superior agronomic characteristics in field tests, and significantly fewer ducksalad plants were found growing with this hybrid in greenhouse tests. Preliminary genetic data indicate that allelopathic activity in rice is quantitatively inherited. *

From www.irri.org/allelopathyabstract.html#1

Behind the Scenes of the Combine Study

Close to 50 people participated in the Combine Study in 2001, and nearly as many came to Katy last year to insure the project's success.

Most people don't realize how much effort goes into research projects when the final analysis is put on paper. Once the results are published, it is easy to overlook the details and commitment of time and resources necessary to achieve the outcome. The Combine Study in particular took a tremendous effort, not just by the researchers, but the farmers and equipment dealers as well.

Special thanks goes to Des Woods for lending his experience and expertise, not to mention the land required to undertake such a large project. Des helped evaluate the field of Cocodrie two days prior to the harvesting to determine the best site for the test. He identified an area that was of sufficient size, with even stands, no levees or ditches, firm ground, and uniformly matured rice. Knowing that the test involved harvesting the rice at different combine speeds, and losses during the higher speed passes would be inevitable, I asked Des if he was concerned about the personal economic loss due to lower yields in his field that was used for the study. Without hesitation he replied, "The information gained is much more valuable than the rice left on the ground."

Other producers involved include Hal Koop, who brought a group of local farmers to observe the study, and Mike Burnside also came to observe. Mike said, " I guess I looked like I needed something to do, because they put me to work testing moistures." Mike felt the study was well planned and executed, and would provide valuable information to the growers, regardless of the color of their combine.

The equipment dealers and manufacturers also provided valuable advice and services throughout the project. For Terry Hlavinka with Case IH; Alan VanNahman and Dan Mathews with Caterpillar; John Aubin, Chuck Stevens and Scott Carr with John Deere, I would like to extend my appreciation for time spent in numerous interviews learning more about what each company has to offer our Texas rice farmers. The following is a summary of the particular attributes of each of the combines used in the study, highlighting the unique advancements that each company has made towards the end goal of helping our producers get the most out of their harvest.

CASE - Hlavinka Equipment Company is a family owned and operated Case IH dealership with over 62 years experience in the ag industry. They have stores in East Bernard, El Campo, Nome, Rosenburg, Bay City and Taft. Terry is the General Manager, and grandson of J.C. Hlavinka, who started the company in 1939. Terry's dad Joe is the President, and he started working in the family business in 1950 along with his brother Bill, who was a partner until 1980. Bill's son Steve is the Parts Manager, and Charles, Joe's brother, does business management consulting for the family operation. In visiting with Terry on the phone, I learned a great deal about the special features of the Case 2300 Series Combine, and the advantages it offers farmers.

I also learned the 2300 Series, with its unique Axial-Flow rotor, won the 1998 AE50 Award presented by the American Society of Agricultural Engineers in recognition of the year's most innovative products. According to Terry, the Axial-Flow combine rotor is a single, in-line rotor that offers gentle, multi-pass rotary threshing. Crop material spirals rearward remaining in the threshing section for longer than in a conventional cylinder and concave system. That means more grain in the tank and less damage to the fragile

continued on next page

seeds. Another advantage is that the Axial-Flow rotor is a single moving part that provides threshing and separating, which leads to fewer adjustments and better reliability. Says Terry, the rotor is especially good for tough-stemmed crops such as rice.

Another feature of the 2300 Series Case combine is the patented Cross-Flow cleaning system. It delivers a uniform airflow across the entire sieve, for maximum cleaning efficiency. The system works by creating a vortex in its center, which draws in and sends out large volumes of air. The unique aerodynamic action of the vortex also reduces horsepower requirements and noise. And the sieve has been redesigned into three sections, which gives farmers greater flexibility in fine-tuning for different harvest conditions explained Terry. This can be done from the cab, as the new tailings monitor gives continual updates on grain output and quality.

In keeping up with the latest computer technology, the Case IH 2300 Series offers the AFS, or Advanced Farming Systems control board. The four main components are a moisture sensor, flow sensor, the Universal Display Plus (which continually takes reading from the flow and moisture and stores the data on a PC card), and the 12-channel GPS receiver. The receiver is so accurate it can fix your longitude and latitude to one meter. And the flow and moisture sensor have no moving parts, for better reliability and longer life.

For more information about the Case IH 2300 Series Combines call Terry Hlavinka at 979-335-7528 or log on to www.casecorp.com

CAT - Mustang Tractor and Equipment Company has been the southeast Texas authorized dealer for Caterpillar since 1952. They are a family owned dealership headquartered in Houston with locations in Beaumont, Bryan, El Campo and Lufkin. Wayne Collins is the Agricultural Manager. Dan Mathews is the Mustang Tractor and Equipment Sales Rep, and works out of El Campo. Alan VanNahman provides marketing support for Cat dealers and farmers nationwide, with his home office in Nebraska. The day I talked with Alan he was attending the Farm Progress Show in Indiana, and happened to be in a cornfield checking on the progress of harvest using a Caterpillar Lexion Rotary Combine.

According to VanNahman, the Cat Lexion has several unique features that are especially beneficial for harvesting small grains such as rice. The heart of the threshing system is the Accelerated Pre-Separation (APS) cylinder. This preserves grain quality and maximizes performance by feeding the crop to the main threshing cylinder at a constant speed, angle, width and thickness. Up to 30% of the crop is pre-separated and goes directly into the cleaning system. The remainder of the crop is fed into the main threshing cylinder for further processing. The concaves for the APS and threshing cylinders can be adjusted from the cab as conditions change, and since the Lexion is equipped with full-width performance monitors across the entire length of the cleaning system, the operator can know exactly what adjustments need to be made to optimize harvest. And as Dan Mathews pointed out, this can be very important for combining rice, as conditions can change in an instant. The threshing system also has hydraulic overload protection, which will open up to allow obstructions to pass through and then return to the original setting. Just behind the main thresher is the chevron impeller, designed to divide the crop evenly as it enters the two rotors.

Mathews also emphasized that the dual rotor design in the separating system increases productivity by using large capacity rotors, which insures high centrifugal force and a thin crop mat. And in fragile crops you can set the rotary separation system to provide additional threshing as well as separation. This dual function allows the main threshing cylinder to operate at a slower speed, which contributes to higher grain quality. The Lexion is also equipped with a visible returns window that allows the operator to monitor the volume of returns. The upper and lower sieves can be adjusted independently to fine-tune the harvest, and with the optional electric sieve adjustment, this can be done on the go from the cab of the combine. The sieve system is ventilated by turbine fans to gently separate

chaff from grain, and the volume and direction of air can be adjusted to assure a clean sample.

Although not used in the Combine Study, Caterpillar recently introduced a Laser Pilot system that automatically steers the combine allowing the use of the full header width, and frees the operator to adjust and optimize machine settings. A laser scanner, equipped with two sensors, is attached to the side of the header. One sensor emits a constant stream of light signals in a 12º swath up to 45 feet in front of the combine. The light signals bounce off the standing crop and stubble and are deflected back towards the laser scanner. The second sensor receives theses signals. Light signals bouncing off standing crop take less time to return to the sensor than light bouncing off the stubble, which allows the machine to make adjustments. This feature can greatly reduce operator fatigue and increase productivity, a definite plus for farmers.

For more information about the Caterpillar Lexion Combine call Mustang Tractor and Equipment Sales Rep Dan Mathews at 979-543-3389.

JOHN DEERE - Chuck Stephens is the General Service Manager for all the Shoppa's Farm Supply locations, and Scott Carr is in sales at the Eagle Lake location. Both were very involved in the Combine Study in 2000 and 2001. Shoppa's is a family owned authorized John Deere dealership since 1922. Owners are Alan Hescamp as General Manager, and Chris and Jim Shoppa. John Aubin is a Product Specialist for John Deere combines, and works out of the

training center in Dallas. He has been with the company 25 years and has extensive experience in training dealers and customers on optimizing performance of the John Deere combine. He said the model used in the 2001 TAMU Combine Study was the 9650 CTS with a 25' draper header. The Cylinder Tine Separator (CTS) was introduced by Deere in 1991, and has increased efficiency by as much as 15%, says Aubin. It utilizes two counter-revolving tine separators, with the primary countershaft and pumps direct driven, reducing the number of belts and chains for improved efficiency. The tines penetrate and comb the crop material, so that it is fluffed and not flattened. As straw spirals toward the rear, Deere's exclusive pull and release action frees trapped grain, reducing loss. And according to Aubin, the side by side separator system provides a wide opening that can handle large volumes of dry or *moist* material, which make it especially well suited for rice.

Once the grain is free, it falls from the dual tine separators onto a conveyor that carries it to the cleaning shoe. The Quadra-Flo Plus cleaning system boost capacity and make it easier to fine-tune cleaning performance, says Aubin. There are lights on the entire cleaning shoe area, making adjustments easier. The pre-cleaner, chaffer and sieve are powered by four dual-flow fans, which push a constant stream of air in two directions. In the grain tank, the 9650 CTS has a 240-bushel capacity. And new sensors mounted on the tailings-return elevator provide an accurate measurement of tailings volume, which is displayed in the cab. According to Aubin, there are several options for managing chaff, depending on what the grower needs. There is the economical straw spreader, fitted with six large rubber impellers that produce a wide spread pattern. Or growers can choose the hydraulic-drive chaff spreader, which can handle large volumes of chaff and spread it uniformly in a wide area. For those that require finely shredded residue, a fine-cut chopper option is available. To switch to windrowing takes less than 5 minutes, and there is no need to remove the chopper from the combine.

On the ground, Deere offers the standard tires, plus 68x50x32 logger tires, as well as tracks. The rubber-belted tracks have air bladder suspension and pivoting bogey wheels for excellent traction and shock absorption. Their large footprint (32' wide belt) distributes the combine weight evenly, exerting as little as 10 psi. This reduces soil compaction, which can be important for growers practicing conservation tillage.

For more information about John Deere combines, contact John Aubin at 214-902-3573, or contact your nearest Shoppa's Farm Supply in Eagle Lake, Bay City, El Campo or Edna. Shoppa's also specializes in the full line of Reynolds, John Deere, and Miskin scrapers for precision land leveling. *

Article by Jay Cockrell.

State, National and International News...

Farm Bill Update

USA Rice Federation - House Passes H.R. 2646, Farm Security Act; Boehlert/Kind amendment defeated, Clayton amendment cuts AMTA by $.05/cwt. The U.S. House of Representatives approved H.R. 2646, the Farm Security Act of 2001, by a vote of 291 to 120 on Friday, October 5, 2001.

One amendment of great concern to the rice industry was the Boehlert/Kind amendment. This would have taken $1.9 billion per year in funding from the commodity title and moved it to the conservation title. This amendment was defeated by a vote of 200 to 226. This amendment had solid support from rural and urban representatives, as well as Ducks Unlimited. The U.S. Rice Producers' Group and Rice Millers' Association expressed deep disappointment of the support extended by Ducks Unlimited for the Boehlert/Kind amendment.

The Clayton amendment that was adopted changes the base bill. This amendment takes $100 million per year from the fixed, decoupled Agricultural Market Transition Act (AMTA) payment and moves the money to rural development. This amendment passed 235 to 187. Early estimates suggest that this will lower the proposed rice AMTA payment by $.05/cwt, from $2.35 to $2.30. The trade title of the House-approved farm bill contains $200 million anually in funding for the Market Access Program and $37 million per year for the Foreign Market Development Program.

With House action complete, our attention turns to the Senate.

EU Reaction to House Farm Bill

House Agriculture Committee Chairman Larry Combest (R-Texas) has called into question the message U.S. agriculture trade officials are sending in talks with the European Union.

"Reaction to the House farm bill by the European Union's Commissioner raises a red flag and a huge, huge question mark - what have our negotiators been saying? There is nothing in the House farm bill that artificially drives production, and nothing that takes away from our trading capabilities. The counter cyclical approach to farm supports is virtually unanimous among farmers, but is apparently rejected by U.S. negotiators," said House Ag Chairman Combest. "America's trade negotiators must not give up just to appease other countries."

A news release from the European Union's Franz Fischler, Commissioner for Agriculture, has questioned American farm policy, following the adoption by the US House of Representatives October 5, 2001.

Said the EU's ag commissioner, "I am surprised by the text as voted by the House of Representatives, because it doesn't seem to fit with what the US has been saying in the agricultural negotiations in Geneva. This attitude puts the U.S. in the ambiguous position of defending one line in Geneva while another line is supported by the House of Representatives."

For more news from the U.S. House of Representatives see AgPress@mail.house.gov

Farm Bill Focus Turns To The Senate

USA Rice Federation - After the House of Representatives last week passed H.R. 2646 by a veto-proof margin, the pressure is on the Senate to consider farm bill legislation before leaving Washington, anticipated in the next four to six weeks. Reports from Capitol Hill indicate that Majority Leader Tom Daschle will give Chairman Tom Harkin two to four weeks to produce a bill from the Agriculture Committee. If the Committee is unable to report a bill, Daschle could move the House bill to the Senate floor for amendments and debate.

The majority and minority staffs of the Senate Agriculture Committee have been meeting for several weeks on the non-commodity titles of the bill. The two sides agree in principle on several titles. Credit, trade, forestry and research appear to be less controversial than the conservation and commodity titles that spend the bulk of the agriculture budget. USA Rice has been strongly urging Senate support of the farm safety net provisions passed by the House.

However, there is interest in the Senate to be more supportive of conservation programs. USA Rice presented the U.S. Rice Producers' Group's conservation white paper and practices matrix, which describe producer conservation activities and associated costs. Senate staffers reported that the work done by USRPG's Conservation Committee was the best piece of conservation work they had seen from any of the commodity groups.

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Excerpt from a statement made on the Senate floor, October 10th by Senator Byron Dorgan, D-North Dakota.

I want to speak for a moment about another priority, one that ranks right near the top, in my judgment. As soon as we finish the legislation dealing with aviation security, the antiterrorism bill, and the appropriations bills, we need to turn to the farm bill. If one does not come from farm country, they may not understand the need for a farm bill, but let me describe the urgency of this Congress passing a decent bill that gives family farmers a chance to make a living.

We have been living with a farm bill called the Freedom to Farm Act, which has been a terrible failure for family farmers. It literally has pulled the rug out from under family farmers in our country. Last Friday (October 5th), the House passed a new farm bill, and good for them. The bill that was passed by the House of Representatives is better than the current farm bill that is now in place.

Now the Senate has an obligation to take up a farm bill and pass it before we finish our work this year. We must do that. We do not have the choice. If we do not pass a new farm bill this year and accept the challenge with the House having passed its bill, we will shortchange American farmers in a significant way. There are many families hanging on by their financial fingertips wondering whether they are going to be around to plant the crop next spring. I hope this Congress will say to them that family farmers matter to this country, they strengthen this country, and we are going to give them a farm bill that provides counter-cyclical help when prices collapse so they can stay around and be part of our country's future.

Now why is that important? One reason is one I have talked about a long time in this Chamber, and that is from both an economic and social standpoint, family farms are important to this country's character and its future. Family values have always rolled from family farms to small towns to big cities, nurturing and refreshing the value system in our country. Having a network of family farm producers producing our food in this country produces more than food. It produces communities, it produces a lifestyle, it produces character in rural America that adds to this country and who we are.

Farmers deserve our help during the tough times, and it is my hope the Senate will understand its responsibility right now in the next several weeks to take up the challenge of the House and pass a farm bill, a good farm bill, that says to family farmers we are standing with them, we are standing behind them, and we want to provide a bridge over price valleys to try to help them through these tough times. If we do that, it also will strengthen our country. That also will strengthen our economy. We will not have economic recovery in this country if we say it does not matter what happens to those who live on the land; it does not matter what happens to family farmers.

This Farm Bill is about dreams, about families, about kids….about our future. *

Scholorship Applications

USA Rice Federation - All entry forms for the National Rice Month Scholarship program must be submitted to USA Rice by Wednesday, Oct. 31, 2001. As outlined in the August 3 issue of the USA Rice Weekly, high school juniors and seniors whose families are directly associated with the rice industry are eligible for the contest.

Twelve scholarship winners are selected nationally from the six rice-growing states, and one national grand prize winner will receive a $2,000 scholarship prize and an all-expense-paid trip along with a chaperone to the USA Rice Outlook Conference in St. Louis, Mo., Dec. 2-4, 2001.

Mail scholarship applications to: USA Rice Federation, ATTN: Molly Johnson, P.O. Box 740123, Houston, Texas 77274. If you need an entry form or additional information, please contact Molly Johnson in the Houston office as soon as possible.

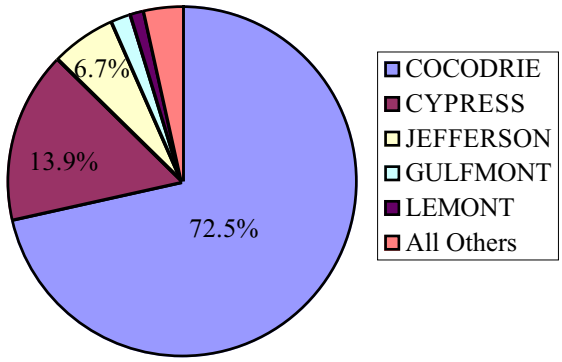
Tell Us What You Did And Get $25!

As part of our efforts to better appreciate the impact of National Rice Month, USA Rice would like to hear from producer members and community organizations about their promotions . Please write a description of your National Rice Month 2001 promotion activities, and USA Rice will send you an apron and a $25 gift certificate good for National Rice Month promotional materials for next year. Send to USA Rice Federation, ATTN: Molly Johnson, P.O. Box 740123, Houston, Texas 77274. You may also send material via e-mail: molly@usarice.com. *

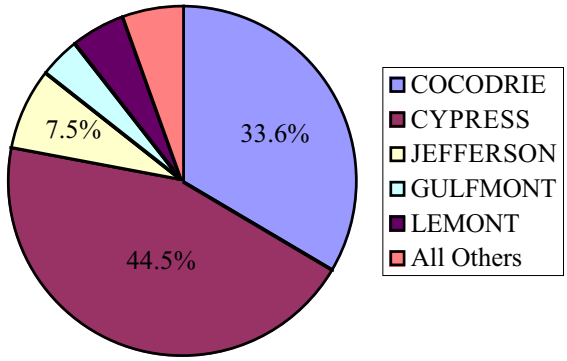
Rice Crop Statistics Report

The following charts show the percentage of acreage planted in Texas by variety for the current and previous crop year. The 'other' catagory are varieties with less than 1% of the acreage and include CL 121, CL 141, Saber, Dixiebelle, Maybelle, Wells, XL 6, XL 8, RT 1008, Texmati, Jasmine 85, Risotto and Bengal. Acreage of the Clearfield varieties is expected to increase next year, assuming approval by Canada EPA. Saber acreage should also increase as growers evaluate its superior grain quality and good disease resistance.

2001
Percent Acreage by Variety



2000
Percent Acreage by Variety



Web Resources

Ag Census for the U.S.
govinfo.library.orst.edu/cgi-bin/ag-list?01-state.usa

English-Spanish On-line Dictionary
dictionaries.travlang.com/EnglishSpanish/

Weather Forecasts
www.accuweather.com/

Vascular Plant Image Gallery
www.csdl.tamu.edu/FLORA/gallery.htm

Web Resources for Weed ID
www-aes.tamu.edu/mary/Wdid.htm

American Seed Trade Association
www.amseed.com/

East Texas Seed Company
www.easttexasseedcompany.com/

Farms.com – Best Source for Farmers
www.eharvest.com/

Glossary of Rice Terminology
www.riceweb.org/glossary/Terms.htm

ARS Natural Resources and Sustainable Ag Directory
hydrolab.arsusda.gov/arssci.html

Grants for Farmers
www.griffin.peachnet.edu/sare/callpage.html

Insects on WWW
www.isis.vt.edu/~fanjun/text/Links.html

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