MAFES RESEARCH

HIGHlights

Volume 66, Number 4

FALL **2003**

Mississippi Agricultural and Forestry Experiment Station

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from the DIRECTOR

Summer and fall are busy times at MAFES facilities across the state, with research plot work in full swing during the growing season, followed by harvest activities. The summer and fall months also are when the staffs of the various research and extension centers and branch stations invite the public to come see their work and to visit with MAFES scientists and Extension personnel.

This issue of Highlights contains reports on several of this year's field days. More will be covered in the winter 2004 issue.

There's also a story in this issue about a type of research project that's gaining importance for Mississippi and the rest of the nation. MAFES agricultural engineers are working with colleagues in MSU's Swalm School of Chemical Engineering to efficiently produce chemicals such as ethanol and acetate from cotton gin waste, rice husks, sawdust and other agricultural products and byproducts.

A Biomax gasifier, one of only six such units in the world, was recently installed on the Starkville campus for use in the project. The state-of-the-art equipment and the expertise of the scientists involved have positioned Mississippi State as a leader in gasification research. This could play an important role in helping reduce the nation's dependence on imported oil.

This is just one example of how MAFES research is helping Mississippi agriculture and industry play new and important roles for the state and nation.

Vance H. Watson

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Director

Volume 66, Number 4 FALL2003

MAFES RESEARCH HIGHlights

MISSISSIPPI AGRICULTURAL AND FORESTRY EXPERIMENT STATION

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Bob Ratliff

Community Power Corp. technicians Mike Walker, left, Jim Diebold and MAFES agricultural engineer Alex Thomasson during installation of the Biomax gasifier.

Researchers

'gasify' agricultural waste

By Bonnie Coblentz

MAFES and other scientists at Mississippi State are converting grasses and agricultural waste into energy, hoping to lower ethanol's cost enough to compete with gasoline as a fuel.

The MSU researchers, along with colleagues at Oklahoma State University, are pursuing the conversion of biomass from switchgrass or agricultural byproducts into energy. This energy is in the form of either biofuels, such as ethanol, or electricity.

Mississippi has an estimated 4.75 million acres in crop and hay production. Jerry Gilbert, head of MSU's Agricultural and Biological Engineering Department, said the state has the potential to produce almost 13 million tons of biomass. This would come from dedicated acreage and salvaged agricultural residues, cotton gin and forest byproducts, and chicken litter.

"If the infrastructure were in place, Mississippi theoretically could convert its future waste and cultured biomass into 948 million gallons of biofuel or 7.58 billion kilowatt hours of electricity. That's enough to power 702,000 average homes for a year," Gilbert said.

MSU and OSU are looking at the gases produced in a gasifier by different plant-based materials and how efficiently these gases can be converted into energy. Gilbert said any cellulose-based material can be put into a gasifier and used to produce a synthesis gas, or syngas.

"Syngas is produced by burning plant material at a very high temperature to produce a mixture of gases such as carbon monoxide, carbon dioxide, hydrogen and methane," Gilbert said.

These gases can be directed into a generator to produce electricity or sent into a bioreactor to produce ethanol or some other desirable biofuel. A bioreactor is a vessel in which bacteria are grown in solution. Syngas is bubbled through the bioreactor where bacteria convert the gas through fermentation into compounds that are useful to industrial processes.

MAFES agricultural engineer Alex Thomasson and MSU chemical engineer Mark Bricka are using a Biomax gasifier— the only such unit in Mississippi and one of only six in the world—to determine how to efficiently convert various biomass materials into gases and, subsequently, into energy-related and value-added chemicals such as ethanol and acetate. The machine, which arrived on campus in mid-August, is built by Community Power Corp. of Littleton, Colo.

"The gasifier has been designed for wood chips, and requires materials to be uniformly dense. Since several differ-

"SYNGAS IS PRODUCED BY BURNING PLANT MATERIAL AT A VERY HIGH TEMPERATURE TO PRODUCE A MIXTURE OF GASES SUCH AS CARBON MONOXIDE, CARBON DIOXIDE, HYDROGEN AND METHANE."

JERRY GILBERT

ent substances are going to be tested in the gasifier, a way had to be developed to use different materials in it," Gilbert said.

MAFES agricultural engineer Eugene Columbus found a used John Deere cuber that will form cut grasses into 1 1/4-inch cubes that can be fed directly into the gasifier.

"This will reduce transportation costs and possibly storage costs by doing the processing in the field," Gilbert said.

OSU researchers designed their own gasifier, which uses a fluidized sand bed to incinerate biomass materials placed inside. With both land-grant universities working on this project, researchers will be able to test both different and similar biomass materials and the results of two different gasifiers.

Gilbert said producing ethanol from plant material using a gasifier and bioreactor is currently not as economical as producing it the traditional way through corn fermentation, which produces a known amount of ethanol. Ethanol has a higher production cost than do petroleum-based fuels. However, the research has the potential to dramatically reduce the cost.

"There's always a desire to find a better organism to produce ethanol," Gilbert said. "The goal of finding microorganisms for bioreactors is to identify and isolate these organisms that are better suited to ethanol production. Increased ethanol production by newly identified organisms will mean lower production costs for ethanol."

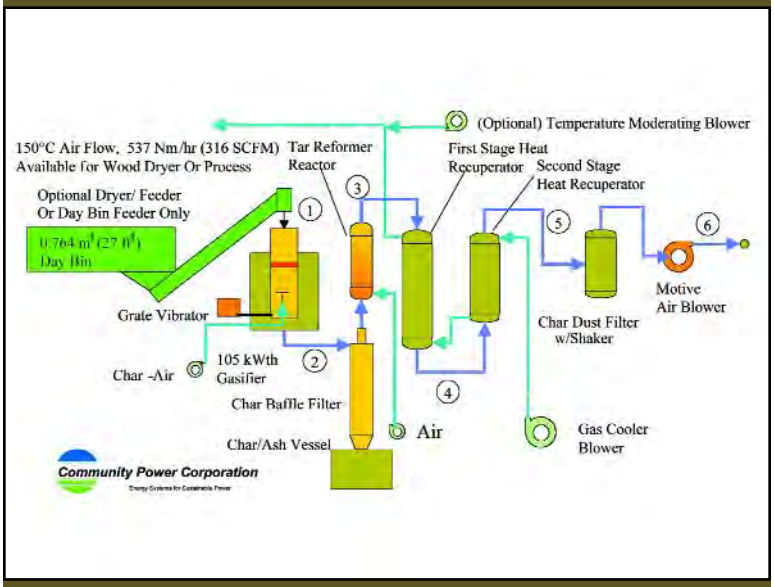
While researchers are trying to find microorganisms that produce greater amounts of ethanol, they are also looking at using different biomass materials to produce syngases of varying compositions. Microorganisms will respond differently to different syngas, and researchers want to learn what results will occur.

At MSU, MAFES is coordinating this research along with the Swalm School of Chemical Engineering. The effort also involves MSU's Extension Service, College of Arts and Sciences and the Diagnostic Instrumentation and Analysis Laboratory.

In a related MAFES-funded study, scientists in the Forest and Wildlife Research Center are looking to the forests as a future source for chemicals. They are studying a process that turns sawdust-sized wood particles into "BioOil" for use in specialty chemicals, wood preservatives and polymers.

Marco Nicovich

Graduate student Lin Wei feeds wood chips into the gasifier.



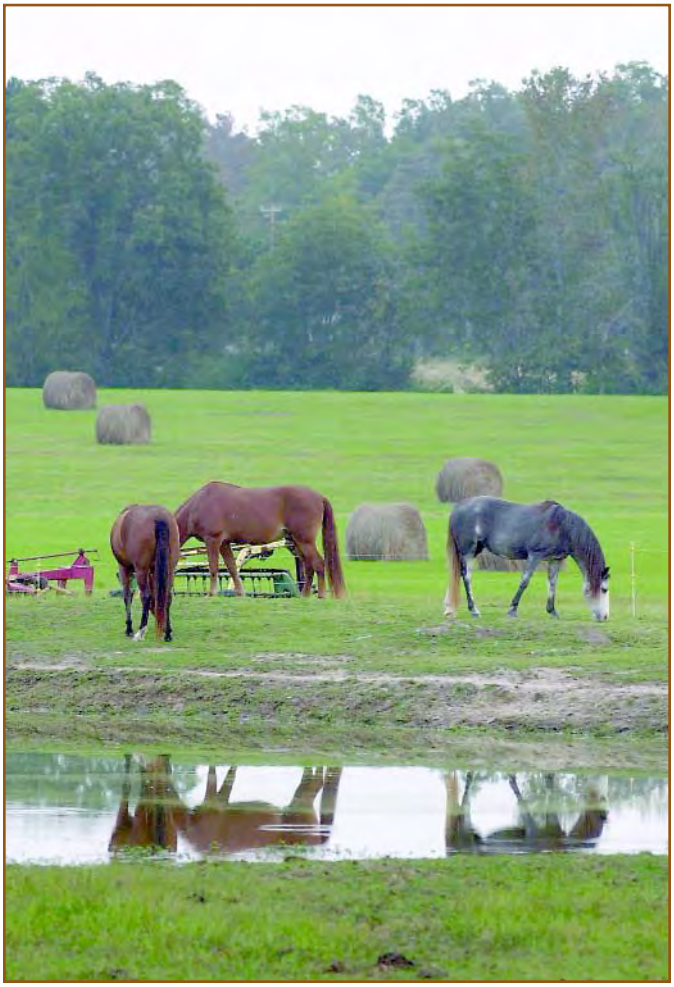
The gasification process.

Marco Nicovich

Wood chips used in the gasification process.

Infrastructure Investment...

Study reveals impact of Mississippi's horse industry



Jim Lytle

By Linda Breazeale

The first phase of an economic impact study has revealed almost a billion dollars are invested in the Mississippi horse industry's infrastructure.

MAFES agricultural economists completed the study of the industry's investment in arenas, barns, towing vehicles, horse trailers, fencing and land.

Mississippi's Horse Industry Facts – 1997

Horses	75,000
Owners	21,500
Arenas	321
Trucks	21,500
Trailers	21,500

Investment

Public arenas	$70,000,000
Private arenas	6,500,000
Barns	183,800,000
Trailers	209,900,000
Vehicles	376,200,000
Land	112,500,000
Fencing	26,900,000
Total	**985,800,000**

James Hamill and Randy Little concluded that horse owners have an invested value of almost $986 million in a state with about 75,000 horses. While that figure is above either Arkansas' or Louisiana's horse numbers, it is considerably lower than Tennessee's 190,000 or Alabama's 130,000 horses.

"Even though Mississippi is home to the second largest American Quarter Horse Association show in the world, very few people know anything about our state's equine industry," Little said.

The National Agricultural Statistics Service discontinued its inventory of horses in the 1950s when mechanization caused a significant decrease in numbers. However, growth in the horse industry in the last decade motivated the NASS to publish population estimates in 1999.

Public, Private Arenas

"One thing we found was a tremendous increase in public arenas in recent years. In 1995, the Mississippi Legislature provided $10 million in matching funds of up to $500,000 per entity for livestock facilities. They appropriated an additional $5 million in 1997," Little said.

Little said public funding for livestock facilities resulted from needs created by youth activities and the adult activities that followed. One major facility constructed in 1997 as a result of state legislative support is the Mississippi Horse Park, Agricenter and Fairgrounds located on MSU's Leveck Animal Research Center. General obligation bonds supported $3.5 million for the facility's construction. An additional $2.5 million was appropriated to the Mississippi Department of Agriculture and Commerce to build an adjacent 5/8-mile track to support the state's Standardbred horse industry.

A 1997 survey indicated that 72 public arenas are located in 64 of Mississippi's 82 counties.

"Public funding of these facilities has generated an expenditure of more than $70 million since 1995," Little said. "No other state has made such a commitment to public livestock facilities."

The same survey revealed 249 private arenas in 70 counties. The total estimated value of all private arenas is $6.5 million.

Horse Barns

Using comparable percentages from studies conducted by the American House Council and Texas researchers, the MSU economists speculate that 21,500 Mississippians own 3.5 horses each and a total of 17,800 barns.

"If the average value of a barn is $14,000, then the average inventory value would be $3,787 per horse for stabling," Little said. "With the assumption that horse owners have an average investment of $4,900 for a two-horse barn, the average investment of $2,450 per horse was used to determine the total investment in barns of almost $184 million to house 75,000 horses."

Transportation Issues

If Mississippi horse owners are similar to Texans, 98 percent have trailers and towing equipment.

"We believe the average investment per trailer to be almost $10,000 and the state's total figure to be almost $210 million," Little said. "With an average of about $17,500 per towing vehicle, that would make the state's total investment near $376 million."

Land, Fencing

The economists assumed one acre per horse and a minimum of $1,500 per acre for a total land investment of almost $113 million. Fences can vary from very expensive to moderate, but if horse owners used wooden fences around 3.5 acres, the average farm would require $2,500 in fencing for a state total of almost $27 million.

Total Investment

"The analysis of the state's horse industry reveals not only that Mississippians love horses, but that there are significant amounts of private and public investment in the industry," Little said. "The almost $1 billion investment illustrates the substantial impact that the Mississippi equine sector has on the state's economy."

Jim Lytle

Jim Lytle

Expo attracts garden fans

Bob Ratliff

Bob Ratliff

More than 600 avid gardeners and those who just enjoy seeing flowers and other plants participated the annual Garden Expo Sept. 20 at the Hiram D. Palmertree North Mississippi Research and Extension Center in Verona.

The event included walking and wagon tours of the center's fruit, vegetable, flower and other research plots.

Homeowners with "mystery" plants in their yards brought them to the Expo's plant identification booth, while others sought help for ailing plants from the "Plant Doctor."

A new activity for 2003 was the Scarecrow Trail, which featured more than 40 scarecrows in the Magnolia Botanical Gardens and other locations at the center.

Featured speakers included gardening columnist Felder Rushing and Nellie Neal, the "Garden Mama."

Bob Ratliff

NORTH MISSISSIPPI

BOASTS A BUMPER CROP OF SCARECROWS

"Lions and tigers and bears, oh my," Dorothy exclaimed in the "Wizard of Oz." While there are no lions, tigers or bears, one of Dorothy's traveling companions would feel right at home at the North Mississippi Research and Extension Center in Verona.

The center's Scarecrow Trail opened to the public Sept. 20 and remained open through Oct. 17. The trail wound through flower gardens filled with roses, irises and other flowers, and landscape plants. More than 40 scarecrows were strategically located along the garden paths.

"This was the first year for the Scarecrow Trail," said Alice Nunnelley, scarecrow project chairman of the North Mississippi Extension Horticulture Center Master Gardeners. "The trail was created to introduce youth to gardening, to encourage them to want to learn more about gardening and to have fun participating the 4-H Junior Master Gardener program."

The trail was sponsored by the Master Gardeners, the Mississippi State University Extension Service and the Tupelo Convention and Visitors Bureau.

The idea for the Scarecrow Trail, Nunnelley said, came from similar exhibits in her native Pennsylvania and at Alabama's Huntsville Botanical Gardens.

Bob Ratliff

The scarecrows were made for a competition sponsored by the Master Gardeners and the Tupelo Visitors and Convention Bureau.

"Many of the scarecrows were made by area elementary and middle school classes," said Extension Master Gardener state coordinator Lelia Kelly. "Businesses, individuals and civic organizations also used their talents to create scarecrows for the trail."

The creations ranged from the traditional overall-clad straw protectors of gardens from marauding crows to a giant "bugzilla."

The trail is expected to become an annual event at the North Mississippi Research and Extension Center.

Bob Ratliff

Crofton Sloan

Bob Ratliff

Pontotoc tour covers major area crops

Research with northeast Mississippi's major row crops was in the spotlight at the Pontotoc Ridge-Flatwoods Branch Experiment Station's annual Agronomic Research and Demonstration Tour.

The Aug. 7 event featured tours of corn, soybean and cotton research plots, as well as a program for area sweetpotato growers.

Agronomist Erick Larson gave tour participants an update on the state's 2003 corn crop and agronomist Mark Shankle discussed signal grass control treatments in the corn plots at the station.

Representatives of seed companies with soybean and cotton plots at the station discussed currently available varieties and ongoing work with variety development.

The cotton tour conducted by MAFES agronomist Joe Johnson and USDA-ARS agronomist Haile Tewode included research plots where chicken litter is being applied to no-till cotton.

The research project, Tewode noted, is the only one of its kind and is showing positive results.

Bob Ratliff

Bob Ratliff

HOLLY SPRINGS
TOUR SPOTLIGHTS BEEF AND DAIRY RESEARCH

The opportunity to get a firsthand look at research and learn about new production and management strategies brought about 50 producers to the Sept. 18 North Mississippi Beef and Dairy Field Day at the North Mississippi Branch Experiment Station near Holly Springs.

During the morning program, MSU College of Veterinary Medicine professor Wayne Groce updated the group on herd health and biosecurity issues. He discussed how recent disease outbreaks in livestock overseas have been handled and the implications for biosecurity in the U.S.

Baleage management and economics were the topics of a presentation by Mike McCormick, resident coordinator of the LSU AgCenter's Southeast Research Station in Franklinton, La.

Baleage, he said, is silage usually made in large round bales and stored in airtight stretch wrap. Its advantages over hay include production of higher quality forage with less equipment and reduced field and storage losses.

The morning program also included presentations on integrated resource management by Mississippi State's IRM coordinator Webb Flowers and management techniques for improving reproductive efficiency by Tim Dickerson, an MSU graduate student in animal physiology.

During the afternoon tour of the station, the producers received an update from area extension livestock agent Mike Howell on management strategies used in the 40-head commercial beef cow/calf prototype herd.

MAFES scientists Angelica Chapa and Terry Smith discussed and demonstrated the tunnel ventilation system being studied at the station's dairy barn. They are using fans to pull air across dampened cooling cells to lower temperatures inside the barn during hot weather.

The system keeps the barn an average of about 9 degrees Fahrenheit cooler than the outside temperature, Smith said. They have noted benefits to the 20 dairy cows housed in the barn, including reduced respiration rates and increased feed consumption. Air quality and other aspects of the study are continuing.

The final stop on the tour was a 6-acre pasture that has been in continuous production of Marshall ryegrass since 1949 without any seed being added. Marshall ryegrass, assistant superintendent Donald Pogue explained, was developed at the station from a common annual ryegrass that originated in Oregon. It was released as the Marshall variety by MAFES in 1980.

Bob Ratliff

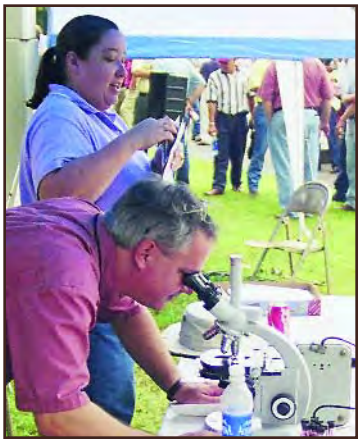
Bob Ratliff

Bob Ratliff

Bob Ratliff

Cotton FIELD DAY

Bob Ratliff



Bob Ratliff

Periodic showers dampened poster presentations, but not the enthusiasm of presenters or attendees at the Delta Research and Extension Center's 2003 Cotton Field Day.

Almost 200 producers and others were on hand for tours of the center's cotton research facilities, presentations on current research and discussions of research needs with MAFES and USDA/ARS scientists.

Cotton Field Day activities included a variety of reports:

- Fertility in cotton/corn rotations and spatial yield variability by agronomist Wayne Ebelhar.
- Evaluation of irrigation and tillage practices by agricultural engineer Lyle Pringle.
- Evaluation of spatial and remote sensing technologies used in integrated crop management by entomologist Aubrey Harris.
- Variety trials and developments in Delta Research and Extension Center lines by plant breeder John Hicks.
- Physiological consequences of drought stress by USDA/ARS cotton geneticist Joe Johnson.
- Weed management and harvest aid strategies by plant physiologist Charles Snipes
- Evaluation of chemical and cultural control of cotton insects by entomologist Jim Robbins.
- Evaluation of row spacing and plant patterns by agronomist Steve Nichols.

Also on hand for both Cotton Field Day and Rice and Soybean Field Day were an application technology exhibit by USDA/ARS agricultural engineer James Hanks and agricultural weather exhibits manned by MSU Extension Service weather technician Mark Silva and USDA World Agricultural Outlook Board scientists Nancy Lopez and Bart Freeland.

Rice & Soybean FIELD DAY

Bob Ratliff

Bob Ratliff

Bob Ratliff

Skies cleared for the second day of the Delta Research and Extension Center's annual field days. Almost 200 producers and others interested in rice and soybean production attended the Aug. 14 activities.

Presentations on the MAFES and USDA/ARS research under way at the center included a variety of reports:

- Soybean seed quality, varietal testing and development by USDA/ARS geneticists Bob Paris and Rusty Smith.
- Evaluation of fertility practices in conventional and hybrid rice cultivars by rice specialist Joe Street and agronomist Tim Walker.
- Rice weed control by plant physiologist Mark Kurtz.
- Control strategies for horseweed and other difficult-to-control weeds in Roundup Ready crops by weed scientist/extension soybean specialist Dan Poston and USDA/ARS biologist Trey Koger.
- Effects of flooding and fungicide treatments on early soybeans by agronomist Lingxiao Zhang and postdoctoral assistant Steve Kyei-boahen.
- Soybean variety trials by MAFES Variety Evaluations manager Bernard White.
- Management of diseases in soybeans and of insects in rice by plant pathologist Gabe Sciumbato and entomologist Jim Robbins.
- Impact of *phomopsis longicolla* on seed quality; limits of soybean nitrogen fixation by USDA/ARS geneticist Jeff Ray and USDA/ARS plant pathologist Alemu Mengistu.
- Evaluation of rice breeding lines and interaction of nitrogen fertility by agronomists Dwight Kanter and Wayne Ebelhar

Bob Ratliff

Research shows promise

of deeper catfish ponds

Jim Steeby

Jim Steeby, left, and Craig Tucker monitor the accumulation of mud on pond bottoms.

Jim Lytle

By Bonnie Coblentz

One of the costs of operating a catfish farm is rebuilding ponds once a decade, but research is showing that if they are built deeper, they will last longer.

Jim Steeby, Extension aquaculture specialist with the Southern Regional Aquaculture Center in Stoneville, spent much of the summers of 1999 and 2000 documenting pond ages and the depth of sediment accumulated on pond bottoms. Catfish ponds have historically been built about 4 feet deep and must be rebuilt every eight to 10 years.

The pond-depth research is being conducted under the direction of MAFES aquaculture scientist and SRAC Director Craig Tucker as part of Steeby's doctoral program.

"Two things happen to ponds as they age," Steeby said. "Erosion on the sides of the ponds tends to make them fall together, and soft mud accumulates on the bottom, which makes harvest and pond manipulation difficult."

This sediment has a pudding-like consistency and doesn't compact well. It uses up a lot of oxygen intended for the fish, and eventually takes up most of the space in the pond. In old ponds, this muck can be as much as 3 feet deep, leaving only about 1 foot of operational space for growing catfish

Steeby said shallow ponds have to be aerated two to three times more often than do ponds of a desirable depth. In order to aerate each time, the equipment has to function correctly, the electricity has to be on and a crew must be on hand to monitor the situation.

"Risk factors start multiplying when the water column is made shallow by the pond filling up with sediment," Steeby said. "There's no capture space for oxygen and no space for the plankton to work for you. The more dependent you are on aeration, the higher your risk is."

Based on this research, producers should budget $80 to $100 per year per acre of pond to rebuild. At the end of the pond's life, it costs $800 to $1,000 an acre to rebuild the pond, or about 70 percent of the cost of the original construction.

MAFES researchers propose building catfish ponds up to 3 feet deeper, for an average depth of 6 to 7 feet.

"There is an initial higher cost to building deeper ponds," Steeby said. "Your electrical savings over the pond's lifetime, however, will probably offset a good part of the expense, plus your overall risk is lowered."

"If we build the ponds a little bit deeper to start with, we can have a good operational depth and use it out to 15 years," Steeby said. "Ponds built 3 to 5 feet deep must be rebuilt every 10 years, or you can build them deeper and go 15 years without reconstruction."

At $1,100 to $1,200 per acre, the deeper ponds cost more to build than traditional ponds, but there are savings over the long run.

"There is an initial higher cost to building deeper ponds," Steeby said. "Your electrical savings over the pond's lifetime, however, will probably offset a good part of the expense, plus your overall risk is lowered."

Another cost of rebuilding ponds is the time the pond is out of production. When using a bulldozer to rebuild, the pond loses one production cycle. However, if using a dirt pan, the pond must be given time to dry to 10 to 20 percent moisture, a process that can take two years.

"I haven't met any farmer who didn't think that it was money well spent building a deeper pond," Steeby said.

Tucker called building deeper ponds a fairly simple technique that is the only economically feasible solution.

"Catfish farming produces a fairly low-cost product by working with a fairly crude production system, an earthen pond. You could line the pond with plastic, but it would be too expensive, so you're stuck with a fairly crude system," Tucker said. "You have to work with the pond and understand it and try to manage it most efficiently."

He added that levees between ponds must be wide enough to allow equipment to drive over and should be designed with the correct steepness to limit erosion. A cover crop further limits erosion, slowing the accumulation of sediment on the bottom of the pond. The next improvement that can be made is to dig the pond deeper, but not too deep.

Tucker described the three-way balance needed to maintain quality catfish ponds.

"The shallower the pond, the cheaper it is to build," he said. "But if it's too shallow, it's very difficult to seine. Ponds that are too deep have water quality problems, as water stagnates on the bottom, but deep ones allow sediment to accumulate longer before filling up the pond."

Jim Lyle

The sides of ponds deteriorate as they age.

'Hay Day' aims to make livestock farming more profitable

By Errol Castens

The Northeast Mississippi Daily Journal

The sun didn't shine much, and rain threatened off and on, but hay was on the mind of about 160 livestock producers, researchers and vendors gathered here for a "hay day" hosted by the Brown Loam Branch Experiment Station.

Aimed at helping the state's livestock owners make better use of their spring and summer forages for winter feed, the workshop also featured equipment demonstrations, insights on grazing cattle on corn and a look at how the 2002 Farm Bill can benefit stockmen.

"Eighty percent of the beef producers in Mississippi are small operators," said Butch Withers, head of the Central Mississippi Research and Extension Center, which includes Brown Loam, "but their hay management and cost-cutting are just as important as for larger producers."

Bob Ratliff


Bob Ratliff


Bob Ratliff


Bob Ratliff


Bob Ratliff

Hay 101

David Lang, associate professor of plant and soil sciences at Mississippi State University, gave an overview of haying basics.

"High-quality hay doesn't just happen," he said. "If you cut your hay when it's old and stemmy, you're not making hay of good quality." Optimum maturity for cutting, he said, is between 4 and 5 weeks.

While weather is obviously a factor in hay quality—rain can leach nutrients and cause molding—spring and early summer forages are of significantly higher quality than August and September cuttings. Lang also cautioned against baling hay with too much moisture, which can lead to spoilage and even spontaneous combustion.

Quality hay, Lang said, is crucial for profitable livestock operations by reducing the need for purchased feed supplements.

Farm Bill Programs

Delmer Stamps of the USDA Natural Resource Conservative Service said when President Bush signed the 2002 Farm Bill it gave livestock producers access to more cost-sharing programs than in the past.

"Cattle people haven't gotten a lot from the farm bill in the past," he said, "so they're anxious to participate."

Several NRCS-administered programs are applicable to livestock producers, including Conservation on Private Grazing Land, Conservation Security and National Framework for Environmental Stewardship.

The Environmental Quality Incentives Program (EQIP) provides both technical and financial assistance on such concerns as sedimentation, animal waste management and pond renovation. Applications are available at any NRCS office, and deadline to be considered in the first round of awards is June 13.

Grazing Corn

Mike Boyd, MSU professor of animal and dairy science, offered an overview of a promising corn grazing system. Starting with 700- to 800-pound stocker steers, his experiment averaged gains of nearly 4 pounds per animal per day for about 90 days at per-pound costs of less than one-fourth those at a feedlot.

"Marginal corn land works really well in this system," he said. With no more field equipment than a tractor, a no-till planter and a spray rig, the system returned $157 an acre, far above the profit potential of harvesting the same fields for grain.

While Boyd would not guarantee the grazing technique to be foolproof, "It's a system you're going to see a lot," he said. "There's a lot of money in it."

"Hay Day" was a joint effort of the Mississippi Agricultural and Forestry Experiment Station, Mississippi State University Extension Service, Mississippi Cattlemen's Association, USDA-NRCS and the Mississippi Forage and Grassland Council.

Jim Lyle

By Linda Breazeale

Researchers and students are gaining information at Mississippi State University from a fully functional cotton mini-gin, the nation's only complete operational gin on a college campus.

MAFES agricultural engineer Eugene Columbus said the 3-year-old gin has been useful in teaching students and in ginning cotton from MAFES research plots. The mini-gin has the ability to accommodate producers' and industry's needs by processing cotton samples too small for a commercial cotton gin.

MAFES researchers use the gin to process some of their larger research plots. Samples are taken to evaluate moisture content, yields, U.S. Department of Agriculture classing and fiber quality. The mini-gin, which can process one bale an hour, also helped evaluate a new cotton-picker this fall in a joint research effort by MSU's Extension Service and the North Mississippi Research and Extension Center. Cotton Incorporated is funding the study.

MSU

cotton gin serves educational, research purposes

The gin laboratory, located in the Pace Seed Lab at MSU, is valued at $2 million. The university was able to construct the equipment for less than one-eighth that cost.

"The gin cost MSU less than $250,000 to build, thanks to equipment donations by the Lummus Corp. and Continental Eagle Corp. The Southern Cotton Ginners Association and Foundation and several individuals also contributed to the project," Columbus said. "Those donors recognized the need for this type of educational opportunity on a university campus."

Columbus said gins have changed very little operationally over the years, but he still has goals for expansion and improvement of the mini-gin.

"Plans to improve the facility include adding a suction unloading system to allow us to take cotton from trailers. We want to add Programmable Logic Controllers to monitor cotton flow, shaft speeds and process throughput," Columbus said.

Two noncommercial, small-scale gins exist in the United States, both in Mississippi: the MAFES-Agricultural and Biological Engineering mini-gin and one at the U.S. Department of Agriculture's Cotton Ginning Lab in Stoneville. A third gin is under construction at the University of Georgia.

"The cotton gin is designed to take MSU's education a step further by offering an experience not available anywhere else." Columbus said. "Graduates of MSU's gin management and technology program gain the technical and business knowledge necessary to operate in the cotton industry."

Once at MSU, students can pursue a bachelor's degree in agricultural engineering technology and business with an emphasis in gin management and technology.

"Graduates from the gin management and technology emphasis are uniquely qualified for fiber processing industries," Columbus said. "They have the necessary experience and educational background to effectively manage complex ginning systems. Half of our graduates are working in cotton gins and the others are in agriculture-related jobs."

Research explores narrow-row cotton for the South

Narrow-row cotton has been on the minds of Mississippi and other producers in the South since the 1960s. The idea of close-row, high-population cotton requiring only a few bolls per plant for acceptable yields with limited inputs is attractive. The narrow-row hurdles, however, have been the lack of a suitable harvester and concerns within the ginning and textile industries about trash.

Both of those concerns are being addressed by a MAFES project that grew out of the 2003 Beltwide Cotton Conference.

"Previously, a spindle harvester for narrow-row cotton was not available, but John Deere introduced a 15-inch spindle picker at the 2003 Beltwide," said Herb Willcutt, a Mississippi State University Extension Service agricultural engineer and a project coprincipal investigator. "Research by the manufacturer in Australia has been encouraging and that country now has several thousand acres in narrow-row cotton. We wanted to incorporate the new equipment and evaluate narrow-row production under our conditions."

Until recently, he added, narrow-row cotton could only be harvested with stripper harvesters because of the dense plant populations. Heavy dew and high humidity during the harvest season allow stripper harvesting only a few hours a day in the Midsouth and Southeast.

"The availability of harvest equipment that can operate under our conditions while sending less trash to the gin opens up new possibilities for narrow-row cotton in Mississippi and other southern states," Willcutt said.

Support from Cotton Incorporated and equipment donations from John Deere and Great Plains Manufacturing allowed narrow-row plots to be planted at the North Mississippi Research and Extension Center in Verona and in the fields of private cooperator Keith Morton in Tippah County. In addition to Willcutt, principal investigators include MAFES agricultural engineer Eugene Columbus and MAFES agronomist Normie Buehring. Other project participants include Extension agents Tim Needham and Jay Phelps.

In 2003, a donated Great Plains planter was used to plant several variations of 15- and 30-inch row plots at Verona and in Tippah County. A 15-inch spindle picker row unit provided by John Deere and mounted on a MAFES plot picker is being used for harvesting.

This year cotton planting was delayed by wet field conditions, so the first year of the study involves a late harvest.

"First year observations indicate the plants in the 15-inch rows started blooming a few days earlier than the wider 30- and 38-inch rows," Buehring said. "The skip-row treatments had more bolls per plant than the plants in the solid-row treatments. Our objective is to determine the influence the various row patterns have on harvester efficiency, gin turn-out, lint yield, fiber quality, gross returns, and net returns."

The MAFES mini-gin also is an important resource for the narrow-row project.

"Commercial gins are not equipped for running small amounts of cotton and it would be difficult and expensive to get the data we need for this project from a commercial gin," Columbus said. "By having the small-scale gin available at MSU, we can collect detailed moisture content data, fiber length measurements, grade information and other data more efficiently, economically and faster than if we had to depend on an outside source."

The narrow-row project will continue through the 2005 cotton season.

Jim Lytle

Eugene Columbus checks the lint produced by the mini-gin.

Jim Lytle

Commercial gins are not equipped for running small amounts of cotton.

IN BRIEF

Keith Remy

Glover Triplett, left, and Dave Van Doren

Triplett honored for no-till work

MAFES scientist Glover Triplett has been honored by Ohio State University for his pioneering work in no-till research

More than 40 years ago, he and soil physicist Dave Van Doren established corn no-till research plots at Ohio State University's Ohio Agricultural Research and Development Center near Wooster.

When Triplett, now a MAFES agronomist, and Van Doren began their research in 1962, few farmers were using the less-invasive production practice. Today, U.S. farmers use no-till on more than 50 million acres to reduce soil loss and increase organic material and moisture levels in soils.

Although Van Doren has since retired and Triplett also retired from Ohio State and began his second career at MSU, the Ohio project has continued and after more than four decades, the Ohio plots are the longest continuous no-till research plots in the world.

The OSU site of their research has been named the Triplett-Van Doren No-Tillage Experimental Plots in their honor.

Marco Nicavich

Nationally acclaimed artist Orren Mixer worked earlier this year to retouch his 1963 painting of MSU's South Farm. The 20-by-5-foot work originally hung in Ballew Hall. It was recently relocated to the fourth-floor lobby of the Wise Center, where it greets visitors to the Department of Animal and Dairy Sciences. Mixer, an Oklahoma resident, was on hand for Sept. 11 ceremonies formally installing his artwork in its new home.

Poplarville horticulture lab under construction

State Legislator Herb Frierson, left, Senator Joe Stogner and Vance Watson unveiled an artist's drawing of the new Southern Horticultural Laboratory.

Bob Ratliff

Construction of a new 30,000-square-foot horticulture laboratory/office complex began this fall at the South Mississippi Branch Experiment Station in Poplarville.

The $10 million Southern Horticultural Laboratory in Pearl River County will house research laboratories and offices for U.S. Department of Agriculture and Mississippi State University personnel. The laboratories will be used for ornamental horticulture and small fruit research.

The Poplarville facility will be the only major horticultural research facility on the Interstate 10 corridor between Florida and California, said Vance Watson, MAFES director and Mississippi State University interim vice president of the Division of Agriculture, Forestry and Veterinary Medicine.

"Horticulture, including commercial nurseries and landscaping enterprises, is a billion dollar industry in Mississippi," he said. "It's important that we do whatever it takes to support that industry."

State Senator Joe Stogner of the 40th district, which includes parts of Lamar, Marion, Pearl River and Walthall counties, noted that the work conducted at the new facility will have long-term economic benefits for south Mississippi.

"The research we do today will impact our lives 10 years down the road," he said. "This type of investment is important in drawing industry to our state."

Marco Nicovich

Marco Nicovich

Marco Nicovich

UPDATES

Marco Nicovich

MSU employees honored

Employees of Mississippi State University's Division of Agriculture, Forestry and Veterinary Medicine were recently honored with Rosalind and Rodney Foil Teamwork and Louis and Doris Wise Support Staff awards for outstanding service. The awards are presented each year in honor of the former DAFVM vice presidents and their wives. Recipients of the 2003 awards are, from left, Foil Award, Charles Hill, associate director, Remote Sensing Technology Center; Wise Technical Award, Cynthia Hemphill, financial/budget manager, Forest and Wildlife Research Center; Wise Research Award, Russell Coleman, agricultural technician, Delta Research and Extension Center; and Wise Support Staff Award, Donna Schmitz, assistant information processor, Mississippi State University Extension Service.

Madsen assumes research and extension duties

John Madsen

John D. Madsen has been named an assistant research/extension professor in the Department of Plant and Soil Sciences and the GeoResources Institute.

Before coming to Mississippi State, he was an assistant professor of biology at the Minnesota State University, Mankato from 2000 to 2003, and a research biologist in the Environmental Laboratory, U.S. Army Engineer Research and Development Center, Waterways Experiment Station (WES) in Vicksburg from 1991 to 2000. At WES, he conducted research on the ecology and management of invasive aquatic plants across the United States.

Madsen holds a bachelor's degree from Wheaton College in Wheaton, Ill., and a master's and doctrate in botany from the University of Wisconsin-Madison. He is a past editor of the Journal of Aquatic Plant Management, past associate editor of Wetlands, and a former member of the editorial board of the Journal of Freshwater Ecology.

Turner new agricultural economics head

Steven Turner

Steven Turner has been named head of the Department of Agricultural Economics. He assumed his new duties on August 1.

Turner came to Mississippi State from the University of Georgia, where he was a professor in the Department of Agricultural and Applied Economics. He joined the faculty at UGA in 1986 after receiving a doctorate from Virginia Tech and taught courses on futures and options markets, agricultural prices, agricultural marketing, and food and fiber marketing.

The new department head's primary research areas are in landscape plant and livestock marketing, with an emphasis on the pricing and trading of these products. He also served as president of the Southern Agricultural Economics Association in 2002.

Walker new rice agronomist

Timothy Walker

Timothy W. Walker assumed duties as an assistant research professor/rice agronomist at the Delta Research and Extension Center.

He earned his bachelor's in chemistry and a doctrate in agronomy at Mississippi State.

His duties include verification and validation of current soil test recommendations for high-yield rice production. He also evaluates the use of precision agriculture technologies in rice production and works to determine Best Management Practices for water and nutrient management in rice production systems.

Parish joins animal and dairy science

Jane Parish

Jane A. Parish has joined the Department of Animal and Dairy Science as an assistant extension/research professor.

She came to MSU from the University of Arkansas, where her duties included implementation of statewide beef cattle extension programs.

Parish earned her bachelor's in animal science and agricultural economics from Texas A&M University and a master's in agricultural and applied eco-

Jiaxu Li

Yean-Sung Jung

nomics from Texas Tech University. Her doctorate is in animal science from the University of Georgia.

New biochemists join staff

Two new biochemists, Jiaxu Li and Yean-Sung Jung, have assumed research and teaching duties in the Department of Biochemistry and Molecular Biology.

Li earned his doctorate in plant physiology at Pennsylvania State University, a master's in biochemistry at China's Hebei Normal University and a bachelor's in biology at Shenyang Normal University, also in China.

Prior to coming to Mississippi State, Li was a postdoctoral fellow at Harvard Medical School and a postdoctoral scholar at Penn State.

His research at MSU includes the use of proteomics and genomics approaches to determine how plant cells sense and respond to stimuli, with a goal of improving stress tolerance of crop plants.

Jung earned his doctorate in biochemistry at the University of Nebraska-Lincoln, a master's in biological science and engineering at Korea Advanced Institute of Science and Technology in Seoul, Korea, and a bachelor's in agricultural chemistry at Seoul National University.

He was a postdoctoral researcher at the University of California-Irvine before coming to Mississippi.

At MSU, his research includes work with regulations of genes and bacteria, which has applications to plant production and to plant and animal diseases.

Wes Schilling

Schilling new food scientist

Wes Schilling has joined the Department of Food Science and Technology as an assistant professor.

Schilling earned his doctorate in food science at Virginia Tech. He also holds master's degrees in statistics and in food science and a bachelor's in food science, all from Virginia Tech.

His research interests include the use of soy protein, modified food starch and milk proteins in the formulation of high-quality deli meats.

Sandun Fernando

Fernando assumes ag engineering duties

Sandun Fernando has joined the Department of Agricultural and Biological Engineering faculty as an assistant professor.

He is teaching and conducting research in the areas of biofuels, biomass gasification, renewable energy, and feedstock handling and conditioning.

Fernando earned his doctorate and master's, both in biological systems engineering, at the University of Nebraska-Lincoln. He also holds a bachelor's degree from the University of Peradeniya in Sri-Lanka.

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