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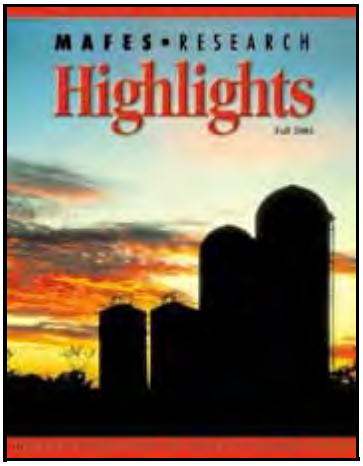

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From the Director

I've been fortunate to have had the opportunity to visit 53 countries in my lifetime. One of the striking things I've seen in my travels is that food is a unifying theme among all peoples, regardless of borders or cultures.

In developing countries, poor nations or those torn apart by war, food is of prime concern because of low availability, high cost and lack of arable land. In this country, food is less of a concern because we have a wholesome, safe, economical and dependable food supply. Food is cheaper in the United States than anywhere else in the world, and Americans spend less of their income on food than citizens of other nations.

It is easy to understand how we might become complacent about our food supply with the richness of our land and the ease with which we obtain nourishment in this country. However, unless we find better ways to deal with the byproducts of food production, more efficient means to produce our food and methods to control diseases of crops and food

animals, we may encounter difficulties with sustaining agriculture at a level sufficient to feed a growing world population.

MAFES understands the importance of agriculture to our society and appreciates the challenges that our producers face meeting the nutritional needs of our state, country and world. Research at the MAFES headquarters on the Mississippi State campus and at locations around the state is focused on helping Mississippi farmers to continue providing a safe and dependable supply of food.

One challenge facing Mississippi producers has environmental origins. There are at least 400 soil types in Mississippi, and not all are ideal for growing existing crop varieties. MAFES scientists are developing new high-yielding varieties adapted to particular crop production regions around the state. Researchers also are endowing crops with genes that make them resistant to pests and disease, and they are looking at ways to provide heat tolerance traits to economically important crops.

Crop production is not the only agricultural area to benefit from MAFES research. Our scientists also are working diligently to find best management practices that improve food animal health and production, while reducing input costs. We are proud of our efforts to combat the disease-causing organisms that affect livestock.

Agriculture can only be sustainable if we are good stewards of our natural resources. So today, we continue our efforts to determine how to manage and recycle the byproducts of food production. We are also finding new uses for these byproducts.

This fall issue of *Highlights* centers on food research at the Experiment Station. I'm confident that MAFES research programs in this area will continue to provide support for our farmers as they meet society's food needs.

Vance H. Watson
Director

NMREC Serving the Agricultural Needs of Northeast Mississippi

By Charmain Tan Courcelle

The North Mississippi Research and Extension Center was established in 1989 with the goal of supporting the agricultural sector and citizens of northeast Mississippi. Operating through four existing branch stations in Verona, Pontotoc, Holly Springs and Prairie, the center has since continued its mission through research and education programs in agronomy, forestry, horticulture, animal science and family life.

Verona is home to the Northeast Mississippi Branch Experiment Station, which also serves as NMREC headquarters. Here, researchers have focused their efforts in the areas of row crop production systems, ornamental and vegetable research, and cultivar evaluations. Recently, the station also launched a new program in medicinal herb development with collaborators at the University of Mississippi (*MAFES Research Highlights*, 64:1).

Following is a description of a small number of projects that take place at the Northeast Mississippi Branch Station.

Narrow Row Solution to Sicklepod

Recently, vacuum planters, which place seed at more uniform distances within rows, have become available for planting soybeans in narrow rows. MAFES agronomist Normie Buehring is evaluating how sicklepod control and soybean yield are affected by row width, seeding rates and uniform seed spacing in a Roundup weed control system.

Sicklepod (*Cassia obtusifolia*) is a common annual weed pest found throughout the Southeast. It has been one of the most difficult soybean weeds to control and can reduce soybean yields up to 35 percent.

“We’re working on finding out what the optimal uniform seed spacing and seeding rate in a Roundup weed control system is that can optimize both soybean yield and sicklepod control,” Buehring said.

In previous research with conventional soybean varieties and planting methods, Buehring compared soybean yield and sicklepod control in fields with varying seeding rates and row widths. Seeding rates ranged up to three times the recommended rate, and row widths varied from 7.5 to 30 inches. Experimental treatments used single or sequential herbicide applications.

“Shading is an important element in weed control,” Buehring explained. “We wanted to know if the canopy could be closed quickly (using narrow row widths), could we save on an herbicide application?”

Results from Buehring’s studies showed that the greatest soybean yield and sicklepod control were obtained from treatments that used twice the recommended seeding rate, sequential herbicide applications (preemergence followed by postemergence herbicide application), and row spacing of 7.5 or 15 inches. Under optimal growing conditions, the 7.5-inch rows provided greater yield than the 15-inch rows.

“At three times the seeding rate, with no herbicides and optimum growing conditions, we got excellent late-season sicklepod control, but soybean yield was lower than with sequential herbicide applications,” he said.

Buehring said that soybean variety is another factor that influences row width choice for weed control.

“Under adverse growing conditions, short-stature, determinate varieties show increased sicklepod control with 7.5-inch rows, but no difference in yield,” Buehring said. “We did not see any advantage for sicklepod control at 7.5-inch row widths with the taller, indeterminate or determinate varieties.”

Preliminary results from Buehring’s 2000 study indicate that uniform seed spacing in rows less than 10 inches can reduce the recommended seeding rate by 25 percent, while providing good sicklepod control and soybean yield. Compared with 19-inch rows planted with the vacuum planter at the recommended seeding rate, narrow rows planted with the vacuum planter yielded 9 percent more. Likewise, the narrow-row, vacuum-planter system

yielded 14 percent more than 15-inch rows planted with a conventional drill system at the recommended seeding rate. This study will be continued to determine the consistency of the first-year results.

Swine Effluent — Organic Fertilizer for Vegetables?

Swine effluent is often sprayed onto pastures as a fertilizer for forage crops, but could it also be adapted to vegetable production? That was the question MAFES horticulturist Kent Cushman wanted to answer.

For the past three years, Cushman has worked with help from the staff at the Pontotoc Ridge — Flatwoods Branch Experiment Station's swine unit to determine the fertilizer value of swine effluent and the factors that might influence use of this material in tomato production.

"I was struck by how lagoon effluent from swine production facilities in North Carolina was being sprayed onto fields as a fertilizer and as a way to dispose of waste," Cushman said. "I wanted to know if we could find an alternative to spraying effluent everywhere, for example, by precision applying it to vegetable plots."

Cushman said he thought the plasticulture systems frequently used for vegetable crops could provide a precise delivery method that would minimize air and water quality concerns associated with broad spray application of effluent and contain the odor from the waste as well.

In plasticulture production systems, raised vegetable beds are irrigated with drip tubes and covered with a polyethylene plastic film, which serves as mulch. The plastic mulch protects the soil from rainfall, reducing the chance of runoff. It also reduces soil water evaporation, decreasing the loss of volatile gases, such as ammonium, to the atmosphere.

The first question Cushman addressed was whether additional management steps would be required to use plasticulture for swine effluent application. One of Cushman's concerns was that the particulate matter in swine effluent might pose a problem for the small openings in drip irrigation tubes.

"There is a lot of sediment in swine effluent, and the microbial population is also high," Cushman said. "We didn't know whether there would be clogging problems or if extra filtration and treatment methods would be required."

Contrary to his expectations, Cushman found that a filtration setup typical of most drip irrigation systems removed clogging as a factor for consideration. He said one possible reason for this is the swine effluent used in these studies was delivered to holding tanks before field application, which could have allowed suspended material to settle out.

Runoff containing excess phosphorus has been implicated in poor water quality. Because the phosphorus-to-nitrogen ratios in animal waste are often higher than what a plant requires, Cushman also evaluated the nutrient composition — or fertilizer value — of swine effluent.

"We found swine effluent to be lower in phosphorus compared to nitrogen, so the (amount of) phosphorus is not a problem," Cushman said. "But soils are also classified by their

phosphorus content. In soils with high or very high levels, more management in phosphorus content for application of swine effluent would be required."

Cushman also found that swine effluent produced tomato yields "equal or superior to" inorganic fertilizers.

While Cushman has found swine effluent easy to work with and valuable as a fertilizer, he cautions that food safety issues surrounding the use of animal waste in production of fresh produce present a major hurdle.

"Using raw manure in vegetable production is strongly discouraged because of the potential for contamination of produce with pathogens," Cushman said.

Cushman said he hopes a method to neutralize this threat easily will be soon coming. Until then, he is collaborating with Hart Bailey and Bob Wills, both researchers with the College of Veterinary Medicine at Mississippi State, to assess food safety issues associated with this practice.

"This year, we're investigating whether or not there are human pathogens present on produce coming from vegetable plots that have been fertilized with effluent," Cushman said.

The team has collected 640 tomatoes from Pontotoc vegetable fields treated with swine effluent and 320 tomatoes from fields in Verona that have not been exposed to the waste. Bailey and Wills are now analyzing the samples for the presence of total coliform bacteria, which include *E. coli*, to determine food safety risks.

NMREC staff members are involved in many partnerships like this. Their list of collaborators includes scientists at Mississippi State, other branch experiment stations, the University of Mississippi and the U.S. Department of Agriculture. In addition, Cushman's research at the Wiley L. Bean Swine Demonstration Unit in Pontotoc has been supported by the Mississippi Pork Producers Association since 1997.

Research Comes Up Sunflowers

Scientists at the Northeast Mississippi Branch are also involved in projects to develop alternative crops for Mississippi producers. One such effort is led by MAFES horticulturist Crofton Sloan, who is searching for flower species and cultivars that may be used to establish a cut flower industry in this state.

The Society of American Florists estimates 2000 retail sales for floriculture items at more than $15 billion. Sloan said he hopes his research will help bring a share of this market to Mississippi.

"A lot of flowers are bought and sold in Mississippi, but few are grown here," Sloan said. "We're not going to be able to grow everything, but what we want to know is what can be grown in Mississippi successfully that will be acceptable to the market."

This past summer, Sloan evaluated three flower genera — or families — that he selected based on information from seed companies and other universities in the South. He tracked the growth performance of sunflowers, celosia and zinnias in field production, which was

chosen over greenhouse production to minimize the expense of greenhouse construction and maintenance.

The field-produced flowers were of good quality and performed well in Mississippi's hot weather conditions, but Sloan said he needed to know whether they would also fare well in the cut flower industry. To determine industry response, he worked closely with wholesale and retail florists in Lee County.

"The initial feedback we received indicated that the sunflowers we produced are of good quality, although we do need to work on color and petal count. The celosia also got a good response from florists," Sloan said. "The third type of flower we grew, zinnias, enjoyed good demand at farmers' markets from consumers, but not too much interest from florists."

Sloan will use input from the industry to further refine his list of candidate flower types and to find the best flower varieties that can be grown in Mississippi at the quality and quantity required by florists. This fall and spring, he will evaluate snapdragons, delphiniums, larkspur and Asiatic lilies for growth in Mississippi climes and for their marketability.

"Mississippi has mild falls and springs; we'd like to see if we can take advantage of that by extending the flower-growing season," Sloan said.

Sloan noted that Mississippi growers could also have a local advantage in regional and statewide flower markets from reduced transportation costs and increased shelf life.

"Cut flower production is probably not for the large-scale producer, but for the vegetable, nursery or orchard operator, it could provide a supplemental income and an opportunity to diversify," Sloan said.

This project is part of MAFES' efforts at alternative crop production and is funded by the U.S. Department of Agriculture.

Program Helps Dairy Farmers Learn Futures

By Bonnie Coblentz

Some Mississippi dairy producers have been given the opportunity to manage risk through cost share participation in the milk futures market.

Walthall County dairy farmers have a unique opportunity to enter the dairy futures market at reduced costs through the US Department of Agriculture's Dairy Options Pilot Program (DOPP). DOPP pays 80 percent of the premium and part of the brokerage fees for qualified participants who buy "put options" in the milk futures market. Put options are bought to establish or lock in the minimum price a producer will receive for milk at a selected future date.

Lamar Adams, MSU Extension Service agent for Walthall County, said eight of the county's 62 dairy producers have been trained in dairy futures marketing. More training will be done in the next few weeks.

“Producer prices for milk are extremely volatile and follow a seasonal pattern,” Adams said. “Over the last few years, we’ve seen some pretty severe increases and decreases, so anything a dairy farmer can do to try to ensure stability in milk income should be a benefit.”

One way to introduce price stability is through put options on milk futures contracts.

“The intent is not to guarantee a higher price for that milk but to buy an insurance policy against falling milk prices,” Adams said. “You pay a premium to guarantee a minimum price.”

Put options are offered on Class III milk, which is used primarily for cheese, and on Class IV, which is used primarily for butter and milk powder. By locking in a minimum price, put options protect producers from downward price movements, but they allow producers to sell at higher prices with no penalty if prices increase.

Bill Herndon, MAFES agricultural economist, said put options are available in 25-cent increments, and option contracts can be bought in either 100,000- or 200,000-pound units. Premium fees fluctuate moment to moment, as do the futures price and the cash price. Dairy producers must consider these and other factors when deciding whether to buy a put option and at what price.

For example, to use a put option price of $15.50 on Class III milk for September, producers must first estimate the basis, which is defined as the difference between the expected cash price and the futures price at a particular time. If the basis is $1.50, add this to the $15.50 desired price for a total of $17.

Then, subtract September’s premium of 38 cents a hundredweight, bringing the locked in price to $16.62, which is the minimum price the producer locks in with this put option example. Premium fees on a 100,000-pound contract under this scenario are $380, and brokerage fees usually are about $50 in Mississippi.

“DOPP pays 80 percent of the premium and a maximum of $30 in brokerage fees,” Herndon said. “In this example, USDA would pay $334 and the farmer would pay $96 to assure a minimum milk sale price in September of $16.62 a hundredweight.”

The DOPP program will cost share a maximum of either 600,000 pounds of milk per producer or the producer’s selected six consecutive months of production, whichever is less. Producers can still deal in the futures market after reaching the cap, but without cost share assistance from the USDA.

Herndon said USDA is offering the program through its Risk Management Agency as an educational outreach for dairy producers on price risk management. Milk futures are available on the Chicago Mercantile Exchange and were first offered in 1995.

“DOPP is a demonstration program to get farmers introduced to the milk futures market,” Herndon said. “It helps defray most of the cost of getting acquainted with this risk management alternative.”

To take part in DOPP, dairy farmers must be located in a participating county. Walthall County was the only county placed in the program in December, and Adams said USDA

expects to add more Mississippi counties next year.

Currently, the program is scheduled to last for one year, but Adams said he expects it to be extended.

“Farmers have been marketing grain and other crops for years in the futures market, but until recently, there was no futures market for dairy products,” Adams said. “Since it’s relatively new, most dairy producers haven’t forward marketed any products, so USDA is offering this program to introduce them to this risk management tool.”

Kenaf Studied as Alternate Forage

By Bonnie Coblentz

A two-year trial pitted kenaf against pearl millet and a mix of dallisgrass and bermudagrass to see which forage brought the best results in cattle production.

More questions may have been raised than were answered, and MAFES researchers would like to conduct the tests over a few more years to learn more.

Kenaf is a non-native annual that produces tremendous forage mass. It has a main stem with branching leaves and becomes fibrous if allowed to grow too tall. It is often used as an industrial fiber but has many nutrients valuable for cattle growth.

Pearl millet is an annual similar to kenaf but more grassy. It is already used extensively in the state as a forage. Dallisgrass and bermudagrass are perennial summer forages.

Brian Rude, MAFES ruminant nutritionist with the MSU Department of Animal and Dairy Sciences, conducted the tests on the MSU South Farm in 1998 and 1999. He worked with MAFES agronomist Brian Baldwin on this project.

“We chose to study kenaf because of the forage mass it produces. The nutrient crop is very good, it is pretty high in protein and the energy appears to be fairly available,” Rude said.

Kenaf appeared to be an acquired taste for cattle, similar to people learning to drink coffee.

“Once they got adapted to eating kenaf, they ate it well, and once they liked it, they actually preferred it to the other forages available,” Rude said.

There was a lot of rain the first year of the study, allowing the kenaf to grow quicker than the cattle grazed it down. The second year had drought-like conditions. During the first year, 72 steers grazed the three test plots for 56 days. In the second year, 45 steers grazed the three plots for 84 days.

Researchers looked for cattle weight gain during both trial years, and at the forage’s digestibility the first year.

“Average daily gain during the first trial for steers grazing pearl millet was faster than those

grazing dallisgrass or kenaf," Rude said. "Results of the second year's grazing study showed the greatest daily gain on kenaf, followed by pearl millet and then dallisgrass."

Rude speculated that kenaf did not perform as well the first year because of less-than-ideal plot management and rain that caused it to grow quickly and become woody. The second year, researchers managed each of the forage plots for optimum performance, and cattle grazed on the kenaf while it was more leafy.

Another unusual result that surfaced involved digestibility. When calculated the first year, steers consuming millet appeared to digest and use nutrients more efficiently than those that fed on kenaf or dallisgrass, yet those feeding on kenaf had the best weight gain.

"The kenaf had a lower digestibility, but the cattle gained quicker, probably because the digestibility study grinds up both the stalk and the leaves, while the cattle just graze the leaf and probably don't eat the stalks," Rude said. "Energy is probably readily available in the leaf. We'd like to pursue this in other studies."

In the study, all three forages were fertilized annually, but kenaf was the most expensive and had to be reestablished each year. Pearl millet is another annual, but the seed is less expensive than kenaf seed. However, researchers found that kenaf can graze eight animals per acre, and pearl millet can graze six to seven, but traditional summer forages like dallisgrass and bermudagrass can graze just two per acre.

"Kenaf can carry more animals per acre, and they will gain weight faster. That offsets the additional cost of the forage," Rude said. "In our study, it was cost beneficial to use kenaf. With more research, we can isolate management practices we need to follow to be more consistent and precise."

Rude said kenaf is not the answer to grazing issues in Mississippi, but it has promise. He suggested that small farms and those with diversified enterprises may benefit most from raising kenaf as either a fiber or a forage, depending on market prices.

Researchers Investigate Emerging Fungal Threat To Corn

By Charmain Tan Courcelle

A collaboration between MAFES and the U.S. Department of Agriculture's Agricultural Research Service (ARS) may yield clues to the lifestyle of a tricky fungal pathogen that infects corn every year.

Fusarium verticillioides (synonym *F. moniliforme*) is a common field fungus that infects many plants, including corn, cereal grains and beans. *Fusarium* infection can affect plant growth and yield, leading to significant economic losses to farmers. Evidence of this fungus has been found in 80 to 90 percent of all corn tested in the United States, but despite this prevalence, part of the challenge facing researchers is that infected corn plants do not always show outward signs of disease, making *F. verticillioides* difficult to track.

"*F. verticillioides* is hard to work with because you can't look at a plant and tell that it is

infected," said Gary Windham, ARS research plant pathologist. "A corn ear can look healthy on the outside but harbor the fungus on the inside."

Still more troubling is the ability of *F. verticillioides* to produce mycotoxins called fumonisins, which have no effect on the host plant but have serious consequences for farm animals that eat fumonisin-contaminated feed. Fumonisins have been associated with severe illness in farm animals, including leukoencephalomalacia in horses and pulmonary edema syndrome in pigs. Some studies have also linked this toxin with an increased risk of human esophageal cancer.

Because *F. verticillioides* is prevalent in all corn-producing areas, scientists predict that fumonisins may outpace aflatoxins — another common fungal toxin family — as a food contaminant.

Current methods of testing corn for fumonisin contamination have relied on costly and time-consuming analytical methods. Because some *F. verticillioides* mating populations have been shown to be prolific fumonisin producers, researchers have put much effort on distinguishing among them in corn. However, this method only provides a partial hint of a strain's potential for toxin formation.

"This species of fungus is found in corn every year, but the toxins it produces are not seen every year," said Rich Baird, MAFES plant pathologist. "For producers to really know what they're dealing with, they need to know whether a *Fusarium* strain is a fumonisin producer or nonproducer.

"We would like to find a way to determine whether certain isolates of *F. verticillioides* are responsible for producing particular levels of toxin and to find out what growth conditions promote fumonisin production."

Baird is working with assistance from MAFES entomologist Peter Ma on developing the tools he will need to achieve these goals.

In one study, Baird is trying to distinguish among individual members of the fumonisin family using matrix-assisted laser desorption/ionization mass spectroscopy (MALDI-MS). MALDI-MS is a technique that allows identification of an individual protein from a mixture based on the molecular weight of its components.

"The most exciting thing about this technology is that it will allow us to detect fumonisins at concentrations 100 to 1,000 times less than what can now be found using current methods," Baird said.

Another fumonisin detection system that Baird is working on is based on the polymerase chain reaction (PCR). He has designed sets of "DNA primers" for this assay that may allow him to detect enzymes involved in fumonisin production.

For now, he is evaluating whether these primer sets will allow him to distinguish between toxin-producing and nonproducing isolates. However, Baird said he hopes that with some fine-tuning, the primers will eventually be able to discriminate among low, medium and high fumonisin-producing fungal isolates.

"Ultimately, we'd like to have primers that are specific enough to tell us the likelihood of a

particular fungal isolate producing fumonisins," Baird said.

Developing such primers should also make it easier for Baird and Windham to learn more about the entry route of *F. verticillioides* into corn and to identify the conditions that promote fumonisin production.

"Corn is naturally infected with this fungus at infection rates as high as 60 to 70 percent," Windham said. "If we want to find out more about this fungus (under experimental conditions), we need to have a technique to separate the wild-type (or naturally occurring) strains from the strain we've used to inoculate corn ears so we can determine the effect of different inoculation routes or conditions on fungal growth and toxin production."

The team would also like to use the PCR technique to screen for corn varieties that may have resistance to fumonisins.

"We're trying to find corn lines that limit the amount of toxin produced by these *Fusarium* strains," Windham said. "The fungus itself doesn't do much damage, it's the fumonisins that are a problem. What we're after is a quick way to screen plants for fumonisin production; this will save time in breeding resistant corn.

While the research will take several years, the scientists are hopeful that the work will lead to better methods of fumonisin control.

Optimal Performance in Broilers Tied to Threonine Needs

By Charmain Tan Courcelle

A nutritional study suggests that meeting the dietary threonine needs of broilers may optimize growth performance and health in these birds, while helping with the poultry producer's bottom line.

Michael Kidd, MAFES poultry nutritionist, has completed a study to determine the minimum dietary requirements that provide optimal growth, feed conversion and carcass traits in finishing broilers.

Poultry feed accounts for about 70 percent of input costs over an entire integrated broiler operation. So developing diets that minimize costs and maximize broiler growth performance is essential for economic profitability.

Common dietary formulations used by the poultry industry contain corn, soybean meal, poultry meal, poultry fat, limestone, phosphate supplements, salt and vitamins, and mineral premixes. Because the nutritional value of proteins in a broiler diet is not always sufficient for optimal production, commercial diets also include supplements of amino acids — the building blocks of proteins —that are essential for poultry.

In an effort to formulate least-cost diets, many U.S. poultry operations have reduced the concentration of dietary crude protein in broiler feeds to minimize the cost of this expensive nutrient. But this practice may actually result in reduced profit margins if the amount of the amino acid threonine is inadequate, Kidd said.

“The efficiency of growth and breast muscle development in broilers can be limited under situations of threonine deficiency, resulting in reduced breast meat yields and economic losses,” he said.

Total sulfur amino acids (methionine and cystine), lysine and threonine — in that order — are the most limiting amino acids required for broiler growth. Kidd said previous research focused on determining the requirements for total sulfur amino acids and lysine, but not for threonine. To determine the threonine needs of finishing broilers, he evaluated the growth of broilers fed threonine-deficient diets from six to eight weeks of age.

“Very little is known about threonine needs as broilers get older,” Kidd said. “But mature broilers consume more feed than younger birds, so determining the minimum threonine requirements for the later stages of broiler growth is critical for diet cost considerations.”

Kidd worked with three poultry integrators, two located in Mississippi, on this study. The team compared broiler performance on a control diet containing 0.71 percent total dietary threonine with an experimental diet that was threonine deficient (0.45 percent threonine) or the same experimental diet supplemented with increments of L-threonine, a purified source of the amino acid.

Altogether, 4,096 male broilers were included in the study, which was conducted under conditions that mimic poultry industry facilities. Birds received the same diets for their first 42 days and then received control or experimental diets from 42 to 56 days of age. Kidd used body weight gain and feed conversion traits as growth response indicators. Live body weight, processed weight, breast meat, leg, wing and fat pad weights of the broilers were used to determine carcass characteristics.

Based on his results, Kidd said the minimum total dietary threonine requirement for a finishing broiler is 0.66 to 0.67 percent depending on the carcass trait of interest. For example, 0.66 percent dietary threonine provided good breast and wing weight, while 0.67 percent threonine gave good live body weight, processed weight and leg weight.

Kidd noted that his studies were conducted on male broilers and that females have a lower threonine requirement due to less whole-body protein and more whole-body fat.

“Most poultry companies feed on a straight-run basis with males and females together, so threonine requirements might be a little lower in this setting,” he said.

As part of his analysis, Kidd developed a mathematical model of maximum profitability to predict the economic importance of including threonine at or near its minimum requirement. The model took into account typical input costs of an integrated broiler company, such as feed costs, hatchery cost per chick, chick cost per kilogram of live bird, total production cost per kilogram of live bird and processing cost per live bird.

“Using this model, we found that the dietary threonine concentration required for optimum profitability coincided with the concentrations required for optimum broiler performance and carcass traits,” Kidd said. “Our results suggest broiler diets have to be optimized for nutrient levels for maximum profitability.”

But Kidd said his results should only be used as a guideline, rather than as a set requirement.

“The nutritionist at a poultry company has to decide how much nutrients are needed to optimize a production function, whether it’s calorie conversion or breast meat production,” Kidd explained. “Also, it depends on the ingredients used in a diet formulation. If a company has ingredients low in threonine, it may need to supplement (L-threonine) at certain times to achieve optimum performance.”

And threonine may be needed for more than just optimal growth and profit, Kidd said. A proper balance between threonine and other amino acids could also increase broiler performance in hot environments and boost broiler immunity to diseases.

Nonconventional Uses Explored as Nutrient Management Solution

By Charmain Tan Courcelle

Traditionally, poultry litter has been spread as a fertilizer on pastures located in the 34 poultry-producing counties in Mississippi.

But a combination of long-term land application of poultry litter and decreases in pastureland has made this valuable byproduct too much of a good thing. The nutrient storage capacity of the soil in these south Mississippi counties has been pushed close to its limits, raising concerns of potential environmental problems from nutrient runoff into water sources.

Now, researchers involved in a collaboration between MAFES and the Southwest Mississippi Resource Conservation and Development Council, Inc. (RC&D) are investigating new uses for poultry litter that will ensure continued environmentally sound use of this material. The work could also expand the market for poultry litter.

Trees grow on cake

One application being explored is use of poultry litter as a fertilizer in forests. Alex Friend, Mississippi State University forestry scientist and a member of the MAFES-RC&D project, has been studying the growth response of pine trees to poultry litter and the environmental quality issues associated with litter use in forests. His initial results from a noncommercial-scale study suggest raw poultry litter provides a good growth response in pine trees, but it has a minimal impact on water quality.

“Mississippi is heavily forested with pine trees growing in nutrient-deficient soils,” Friend said. “We saw poultry litter use in forests as an opportunity to solve poultry litter disposal questions and solve nutrient deficiency in trees at the same time.”

At the Coastal Plain Branch Experiment Station in Newton, Friend led a team that tested the effectiveness of stockpiled cake — the top layer of raw poultry litter that has been cleaned out of a chicken house and stored — as a one-time fertilizer in a thinned stand of 10-year-old pines.

In March 2000, they applied raw poultry litter at three application rates — 0, 2.5 and 10 tons of litter per acre — to the stand and then assessed growth by measuring tree diameter monthly.

“We were very surprised to see a growth response in trees within the space of six months,” Friend said. “This is very unusual in forests because trees have so much mass and are buffered to changes. We think this shows litter has much potential for forestry use.”

But another consideration that Friend had to make in his studies before reaching any conclusions was whether forests can “contain” the nutrients found in poultry litter. To answer this question, Friend’s team placed PVC tubes 50 centimeters (20 inches) into the ground and collected soil water samples from just below the main tree root mat.

“Part of the paradigm we were testing was that existing trees in the stand would act as nutrient pumps to suck nutrients out of soil and prevent nutrient movement into water and the environment,” Friend said. “We took lysimeter, or soil water, samples to give us an idea of what leaches through most of the tree roots and used it as an indication of what might make it to surface water.”

As part of this study, his team collected soil water samples every month for more than a year.

“Within a month, we saw evidence of elevated nutrient availability in soil,” Friend said. “But the significant thing with this part of the study was that application rates of 0 and 2.5 tons of litter per acre were usually indistinguishable in terms of nutrient leakiness into soil water. So this suggests a good growth response in forests can be obtained without adding so much poultry litter that nutrients run off.”

Friend said he hopes to conduct a larger scale study that will look into more detail at the actual impact of poultry litter application in forests on a watershed.

While Friend has seen encouraging results with litter, he cautions that not everyone in the state may want to use poultry litter on forestland.

“Trees, and especially pine trees, are evolved to grow under low-nutrient conditions,” Friend explained. “Results with poultry litter can be both good and bad, depending on soil conditions.”

Friend also noted that his studies were based on using a single application of poultry litter in the lifetime of a tree stand. He said more work would be required to address the sustainability of this practice on a single piece of land. Still, Friend said he thought a significant acreage of Mississippi land could benefit.

“Poultry litter could be quite effective as fertilizer for landowners who have a mixed holding of poultry and forestland, or who live in proximity to poultry operations, and are looking to improve tree growth in nutrient-deficient forests,” he said.

Research data for this project are still being collected. Friend said he expects final results and recommendations for use to be available to landowners early next year.

How does your garden grow?

Poultry litter is also being assessed as a fertilizer in horticulture.

“There are several good reasons to look at using poultry litter outside of land application to pastures. For one thing, the nutrient level of poultry litter — and especially the nitrogen level — is high, making it very useful in gardening,” said Richard Harkess, MAFES horticulturist.

Harkess is interested in using poultry litter as a fertilizer for potted plants grown in commercial nurseries and in home gardens. He and his team are assessing the benefits of adding heat-processed, pelleted poultry litter as part of a potting mix and determining the best application rates for litter.

“When we first started this project, we were hoping to use poultry litter as a soil amendment because that would mean using larger quantities of litter,” Harkess said. “But we found out early on that poultry litter has too much nutrients to be used as an amendment, so we’re now looking at using poultry litter as a supplementary fertilizer.”

In a greenhouse on the MSU campus, Harkess is comparing the growth of blue salvias, petunias and ornamental peppers planted with and without poultry litter added as a fertilizer.

“We chose these plants because they are very popular among consumers as potted plant varieties and bedding plants,” he said. “The pepper plants will also give us a hint at how vegetables will do with poultry litter as a fertilizer, even though we’re growing them as ornamentals for these experiments.”

Harkess said the performance of the plants will demonstrate poultry litter’s value as a fertilizer and indicate whether there are toxicity issues in potted plants related to litter use.

As part of the study, Harkess is also collecting leachate samples, which will be used to determine the nutritional status of the test plants under fertilized and unfertilized conditions.

“The pH and electrical conductivity readings from leachate samples will tell us the general health of the potting media and nutrient availability to plants. These measurements are frequently used by greenhouse growers to give a quick idea of where plants are nutritionally at any given time,” Harkess explained.

At the time this article was written, Harkess was two weeks into his studies. He said he hoped the test plants treated with processed poultry litter would grow better than untreated plants, but so far they are not performing well.

However, the greenhouse experiments are still in their early stages, and Harkess is waiting for all the results to come in before completing his analyses. He will also look at using raw versus processed poultry litter to see if that affects the health of potted plants.

In the meantime, Harkess is also studying poultry litter use in landscape flower beds.

“Mississippi soils stay warm year-round, which causes the organic material in soil to break down a lot faster,” he said. “We want to know if adding poultry litter to soil will add an organic component that can be used by plants.”

Similar to the greenhouse studies, these tests will examine plant growth as a measure of

how well poultry litter performs as a landscaping fertilizer. Some growth indicators that Harkess will use for the plants, which are now growing in contained field plots, include flowering earliness and the rate at which the plants fill out their plots.

If the field tests show poultry litter is suitable for landscape use, it could “go a long way in helping the poultry industry use a significant amount of byproduct from their facilities,” Harkess said. In addition, it would provide the homeowner interested in using organic fertilizers a new product to try.

EDITOR’S NOTE: Cliff Bice contributed to this story.

Perspective -- Changing Population Demographics Require Greater Acceptance of Technology

By Douglas Marshall

With misguided zeal, food irradiation opponents are using the USDA’s recent plan to back irradiation as a platform to launch a campaign of fear against a well-researched technology.

Critics of this technology have instead focused on supporting the ineffective approach of looking for *Salmonella* contamination on meat products by sampling food processing plants once a day to keep our food safe. Most scientific authorities do not support this needle-in-a-haystack approach because it would require the inspection of every ounce of meat and poultry product coming out of US plants. That’s a staggering 72 million pounds of beef and 90 million pounds of ready-to-cook chicken meat every day.

Between 10 and 80 million people suffer from food-borne disease in the United States every year. Of those, as many as 5,000 will die. Each of us has a 20 to 30 percent chance of getting a food-borne disease each year. Or for every 10 people, two to three will suffer from vomiting, diarrhea, fever and severe abdominal pain annually from contaminated food. Food-borne disease is second only to the common cold as a cause of illness in the US In more than 95 percent of cases, the cause of food-borne illness is of biological origin. And there is every indication the organisms that cause food-borne disease are evolving into super bugs with increased capacity to cause sickness.

Encouragingly, the high incidence of food-borne illness and death in this country could be averted. Most bacteria and other microorganisms that cause food-borne illness, such as *Salmonella* and *E. coli* O157:H7, are destroyed by irradiation. Similar to milk pasteurization, which uses energy from heat, food irradiation uses energy but in this case from x-rays, gamma rays or high-energy electrons to destroy harmful bacteria, viruses and parasites.

Microorganisms are very much a part of our world and environment. They are present everywhere, even in places that look clean. Indeed, many food animals (cattle, pigs, chickens) can harbor a variety of pathogens without being ill from infection and without the farmer knowing which animals are infected and which animals are not. The only way to ensure that food is safe is to control microbial spread by using good manufacturing practices, along with preventive measures such as irradiation. Irradiation cannot magically

improve the quality of a food if it has already undergone deterioration prior to processing. For this reason, the USDA requires plants that use irradiation to meet the same standards of sanitation as all other meat and poultry processing establishments.

Despite what irradiation opponents would encourage consumers to believe, both the practice and products of food irradiation are safe for the consumer and the environment.

Irradiation has been used as a sterilization method in hospitals and clinics for more than 30 years without mishap. Many credible organizations, such as the USDA, US Food and Drug Administration, Centers for Disease Control, American Medical Association, World Health Organization and United Nations Food and Agriculture Organization, recommend food irradiation.

Over the past 50 years, numerous animal feeding trials have clearly demonstrated that irradiated foods are safe for consumption. Food irradiation is approved for use on more than 40 food products in 37 countries. Many military and space rations are irradiated. For patients with weakened immune systems, food irradiation is a lifesaver; it destroys food-borne microbes that can cause life-threatening illnesses in immunocompromised individuals. Irradiated foods are not radioactive. The technology proposed is similar to what is currently used in microwave oven technology, which most consumers use on a regular basis.

Irradiation is the only technology we have available now that can ensure the safety of a food, while still retaining the desirable characteristics found in raw food. Irradiated foods may even be more nutritious than foods treated with other types of sanitation and preservation methods because irradiation is a “cold pasteurization technique” — a process that does not significantly raise the temperature of food — which minimizes nutrient loss. Irradiation also has the advantage of extending the shelf life of food, even perishable food.

Often, the groups that profess to be protecting public interest have demonized food irradiation with images of atomic bomb mushroom clouds. However, the fact is that food irradiation has a long history of documented safety. More importantly, food irradiation will go a long way toward doing what these opponents say they advocate — ensuring the well-being of consumers by making their food supply safer.

Irradiation is not a magic bullet that removes the need for proper production, processing, storage, handling and cooking of foods. However, when irradiation is combined with good manufacturing practices, it assures that food reaches the consumer with a reduced risk of food-borne contamination.

So why all the fuss from irradiation opponents? Could it be that they have everything to gain financially from consumer rejection of irradiation? Many so-called consumer advocacy groups require constant media attention to generate interest in their cause, which, in turn, generates the donations they live on. Without the outrageous claims, these advocacy groups would lose media attention, resulting in lost income.

No credible scientific organization has voiced opposition to food irradiation. Careful research conducted in this country and elsewhere in the world has overwhelmingly shown irradiated foods to be safe for consumption.

Over the last century, new food safety issues have come to the fore as we’ve moved away

from our agrarian roots toward a highly evolved, industrialized society. Ours is an aging society with a larger number of individuals who are at a higher risk for food-borne disease. Also increasing and at high risk for food-borne illness are the numbers of immunocompromised individuals, including people with cancer, those undergoing chemotherapy and patients with acquired immune deficiency syndrome (AIDS). Together with the elderly and the very young, these high-risk groups are now estimated at 25 percent of our population and rising.

Societal change is also reflected by a shift in where we eat, how we eat and what we eat. Our predilection for convenience foods and meals has placed us at a greater risk for food-borne disease than any other factors combined. Foods prepared by food service establishments, such as restaurants, delis and cafeterias, are more likely to cause food-borne disease than similar foods that are manufactured and processed.

The challenges presented by our changing world and the changing microbial environment we live in demand that every available effective technology be used to keep our food supply safe. That means looking beyond personal agendas, and it means embracing tried and proven technologies like food irradiation.

Editor's Note: Douglas Marshall is a professor of food science and technology. He is internationally recognized as an expert on microbial food safety and public health and serves as a consultant to a number of national and international agencies, including the US National Institutes of Health, US Food and Drug Administration, US Department of Agriculture, United Nations Food and Agriculture Organization, and the World Health Organization.

Producers Attend MAFES Field Days

Dairy Field Day

By Angelica Chapa

Approximately 275 people attended the Mississippi Statewide Dairy Field Day on May 24 at Jimmy Tucker & Sons Dairy in Holmesville.

Dr. Jim Watson, state veterinarian with the Mississippi Department of Animal Health, spoke to producers about protecting livestock from foreign animal diseases. Because feet and leg problems are always a concern to producers, Dr. Herris Maxwell of Columbia Animal Hospital demonstrated care and prevention of hoof sole ulcers using cows from the Tucker herd.

Other highlights of the tour included presentations by MSU animal and dairy scientists Jim Tomlinson, Terry Smith and Sam Sneed on strategies for feeding dairy cattle during hot weather. In addition, Gary Hay, Louisiana State University extension dairy specialist, spoke about managing to avoid somatic cell count problems during the summer.

Information about wastewater use and potential new EPA regulations was provided by MSU Extension Service agricultural and bioengineering specialist Jim Thomas and Tucker & Sons Dairy co-owner Bill Tucker. Also speaking at the event was MSU-ES forage

specialist Malcolm Broome, who exhibited several varieties of corn silage and forage soybeans and presented information on variety selection.

In addition to tour stops, educational and sponsor exhibits were on display with university and industry representatives available to field questions. The featured presentation during lunch was Dr. John McCormack, a veterinarian and author from Athens, Ga.

The Statewide Dairy Field Day was a cooperative effort of faculty on the MSU campus, area and county extension agents. MAFES, MSU-ES and the Mississippi Farm Bureau Federation were sponsors for the event.

Hay Day

This year's Hay Day, held June 23, brought more than 100 people to the Brown Loam Branch Experiment Station in Raymond. About 90 livestock and hay producers attended workshops covering topics related to proper hay storage, hay quality, and grazing and haying. In-field equipment demonstrations of the latest models of hay mowers, hay rakes, hay tedders and hay balers were provided by several area equipment dealers.

Cotton Field Day

Ideal weather conditions greeted the more than 230 people attending the 2001 Cotton Field Day held Aug. 15 at the Delta Research and Extension Center in Stoneville. The event brought about 125 producers to the station to learn more about DREC research aimed at maximizing cotton yields and profits, while minimizing input costs.

The 10 stops on the field tour included presentations on reducing tillage in monoculture cotton and cotton-corn rotation systems, management of nitrogen and potassium in cotton-corn rotations and use of flame cultivation in cotton. Also discussed at length were disease control and pest and weed management solutions. Another highlight of the field tour was a presentation of the Cotton Improvement Program, which has the goals of developing and improving cotton varieties for Mississippi and the Midsouth, developing cotton germplasm for research and development purposes, and providing information to enhance breeding efforts. In addition, DREC researchers presented results of evaluations of insect resistance in conventional and transgenic cotton varieties.

Exhibits at the field day included a range of variable-rate, pesticide-application equipment; a poster and computer session highlighting the use of global positioning systems and geographical information systems technologies in weather forecasting; a mobile training facility for the Mississippi Space Commerce Initiative; and a cotton nematode education station.

Rice and Soybean Field Day

For the second year, the Rice and Soybean Field Day was held back-to-back with the Cotton Field Day. Approximately 220 people attended the Aug. 16 event at the Delta Research and Extension Center.

Producers and industry representatives toured rice and soybean research plots devoted to

improving weed and disease control methods. Attendees also saw results of soybean variety trials and rice breeding line evaluations. Other topics included rice fertility and the effect of planting date variation on growth and management of different soybean maturity groups. In addition to the field tour, producers also had the opportunity to test-drive DeltaSoy, an interactive web site containing soybean variety trial information.

The Mississippi Rice Promotion Board and the Mississippi Soybean Promotion Board sponsored Rice and Soybean Field Day.

In Brief

DuPont Gift Benefits MSU Weed Control Research

Mississippi State researchers working on rice weed control received a boost from a DuPont donation.

MSU was presented with DuPont's KF081 rice herbicide technology on June 28. Scientists with the Mississippi Agricultural and Forestry Experiment Station will use the technology as a basis for future commercial development.

Research conducted at DuPont has shown that the herbicide works on broadleaf weeds and sedges found in rice fields.

Nancy Cox, MAFES associate director, said further studies by MAFES scientists could lead to other uses for the technology.

"DuPont is making these compounds available to us along with other research information," Cox said. "We will use our expertise in weed and chemical sciences to expand on these studies and find alternate uses for this herbicide; for example, weed control in nonrice crops."

Cox said the gift from DuPont represents an ongoing partnership between MSU and the company. In the past, DuPont has provided funding for MAFES research in the area of crop protection.

MSU will hold patent rights and regulate licensing agreements on any commercial product stemming from the donated herbicide technology.

Updates

Delta Council Honors Two of MAFES' Own

A top MAFES administrator and a veteran MAFES researcher were among those honored for their accomplishments at the 66th annual meeting of the Delta Council.

Marty Fuller, MAFES associate director, was presented with the Delta Council's 2001 Aquaculture Achievement Award. MAFES entomologist Aubrey Harris received the Agricultural Researcher of the Year award for his research in insect management and

control in the Delta.

Fuller was recognized by the Stoneville-based organization for his contributions to Mississippi's farm-raised catfish industry and his efforts to bring about the orderly and timely release of a new and improved strain of catfish. Industry experts said the new catfish strain, NWAC-103, is expected to enhance catfish production and increase profits for the Mississippi catfish industry, which is primarily based in the Delta.

"We're proud of Dr. Fuller's and Dr. Harris' achievements," said Vance Watson, MAFES director. "These Delta Council awards acknowledge that MAFES projects do have a positive impact on the economy and quality of life for Mississippians. They also represent another example of the close partnership between MAFES and the Delta Council."

Delta Council is dedicated to the economic development of the Delta and part-Delta counties of Mississippi, and it promotes the region's economy through partnerships with agricultural, business, scientific and legislative leaders. Each year, the organization recognizes individuals who have made important contributions to the economy and well-being of the Delta.

MAFES Biochemist Receives National Grant for Plant Research

A grant from the National Science Foundation will help a MAFES scientist study plant response to heat stress.

Biochemist Dawn Luthe will receive almost $114,000 in NSF funds. She is part of a team that will examine how molecules called "heat-shock proteins" protect photosynthesis during heat stress in plants.

NSF is an independent US government agency that promotes science and engineering through the support of research and education programs in these fields. The organization supports almost 20,000 science and engineering projects every year following a competitive grant proposal process.

Environmental stress in plants has an impact on key processes, such as photosynthesis, and can affect the ability of plants and crops to grow, said John Boyle, head of MSU's biochemistry and molecular biology department.

"We have a good general appreciation of how heat shock works, but a more detailed molecular model of the stress response in plants is needed to help alleviate stress in crops," Boyle said. "Dr. Luthe's research will contribute to our basic understanding of heat stress and heat shock response, which may eventually lead to the generation of more stress-tolerant crops through the use of genetic engineering."

Luthe will collaborate with Scott Heckathorn and E.W. Hamilton, both of Syracuse University, on this project. She and her colleagues have received three years of NSF funding.

Professional Organization Honors Veteran MSU Engineer

By Bob Ratliff, MSU University Relations

A Mississippi State University agricultural engineer was named Fellow of the American Society of Agricultural Engineers (ASAE), an honor achieved by only about 2 percent of members of the organization.

David B. Smith received the honor on July 31 at the society's annual meeting in Sacramento, Calif. His selection recognizes more than 35 years of accomplishments in research and teaching.

Founded in 1907 and headquartered in St. Joseph, Mich., ASAE is the professional organization for engineering as it applies to agricultural, food and biological systems. Its 9,000 members are located in more than 90 nations.

"Dr. Smith is considered one of the nation's leading experts on chemical application in agriculture," said Jerry Gilbert, agricultural and biological engineering department head. "His research has resulted in reduced costs to producers and protection of the environment from unnecessary chemicals."

Two national engineering standards for reduction of drift from agricultural chemical applications are among Smith's major accomplishments.

Gilbert said Smith also has provided leadership in the establishment of a land surveying emphasis in MSU's agricultural engineering technology curriculum.

A Richland native, Smith received his bachelor's and master's degrees at Mississippi State and a doctorate at the University of Missouri.

He joined the MSU faculty in 1983, following more than a decade of service as a project leader with the US Department of Agriculture/Agricultural Research Service in Columbia, Mo. Smith also serves as a MAFES agricultural engineer. He is the tenth active ASAE fellow within MAFES.

MSU Researcher Selected for Powe Award

By Bob Ratliff, MSU University Relations

An assistant professor of animal and dairy science at Mississippi State University is one of this year's selections for a top Oak Ridge Associated Universities honor memorializing a late MSU administrator.

Scott T. Willard, who is a MAFES faculty member, is one of 25 young scientists receiving a $10,000 Ralph E. Powe Junior Faculty Enhancement Award. His research includes work with heat stress and the physiology of reproduction in dairy and beef cattle.

Established in 1946, Oak Ridge Associated Universities (ORAU) is a consortium of 85 doctoral-granting colleges and universities. ORAU works to advance science and education by establishing partnerships among the government, academia, and the private sector in key areas of science and technology.

Given annually, the Powe awards provide research seed money to young faculty members at ORAU member institutions. They honor Mississippi State's longtime research vice president who headed the organization's Council of Sponsoring Institutions. Powe died in 1996 following a lengthy illness.

The Powe award is an "indication of the promise of Dr. Willard's research career," said Robert A. Altenkirch, MSU's current research vice president.

An MSU faculty member since 1999, Willard holds master's and doctoral degrees from Texas A&M University. His bachelor's was completed at the University of Rhode Island.

Before coming to Mississippi State, he was a postdoctoral fellow at the Medical University of South Carolina.

National Biomedical Grant Boosts MSU Cartilage Cell Research

By Bob Ratliff, MSU University Relations

A 2001 Whitaker Foundation grant is aiding a Mississippi State University scientist's investigation of new strategies for treating arthritis and other cartilage tissue problems.

Biological engineer Steven Elder is receiving almost $210,000 from the Virginia-based organization for research into how mechanical stress affects the development of cartilage cells.

Whitaker is a private, nonprofit foundation dedicated to improving human health through the support of biomedical engineering. Each year, the organization funds approximately 80 national research projects following an extensive review process.

Cartilage tissue engineering is an important area of medical research because damaged cartilage does not heal well, said Jerry Gilbert, MSU's agricultural and biological engineering department head.

"The cartilage in hips and other joints degenerates because of injuries, diseases such as arthritis or just plain wear-and-tear," Gilbert said. "Dr. Elder's research will help in the search for cartilage replacements by providing a better understanding of how walking and other forms of mechanical stress influence the formation of cartilage."

The Mississippi Agricultural and Forestry Experiment Station also helps support Elder's research.

He is the second MSU biological engineer to receive Whitaker funding. Joel Bumgardner received the award in 1999 for his work with medical and dental implant materials.

Macoon Is New Research Agronomist

Bisoondat Macoon recently joined the staff of the Central Mississippi Research and Extension Center as an assistant research agronomist.

Before joining MAFES, Macoon was a postdoctoral fellow at the University of Florida, where he conducted research on utilization of dairy waste effluent in year-round cropping systems and best management practices for application of nitrogen from commercial sources and poultry litter. In both studies, he focused on nutrient uptake by crops and nutrient dynamics in soil and ground water.

At the Brown Loam Branch Experiment Station, Macoon will focus his research on forage production and utilization, grazing management, and nutrient recycling and environmental concerns in pasture-based livestock systems. He will also conduct research in row crop management.

Macoon holds a bachelor's degree in agriculture from the University of Guyana. He earned his master's and doctoral degrees in agronomy from the University of Florida, where he examined forage and animal responses in pasture-based production systems for lactating dairy cows.

Vann Is New Research Coordinator at Brown Loam

Rhonda Vann is a new research animal scientist and the research coordinator of the Brown Loam Branch. She will conduct research in beef physiology, animal health and nutrition.

Vann comes to MAFES following postdoctoral fellowships at Baylor College of Medicine and the University of Georgia, Tifton. At the latter institute, Vann studied the effects of genetic and environmental interactions on colostrum quality, passive transfer of immunity in beef cattle and the performance of beef calves through weaning. In addition, she has examined the relationship between age of heifers at puberty and age of calving.

Vann holds bachelor's and master's degrees in animal science from Texas A&M University. She received her doctorate in animal physiology from Mississippi State University.

Andrews Is New Food Scientist

Linda Andrews recently joined the faculty of the Coastal Research and Extension Center in Biloxi as an assistant research professor of food science and technology.

She has a bachelor's degree in medical technology from Florida State University and master's and doctoral degrees in food science from Louisiana State University. Andrews worked in private industry for five years in seafood quality control and product development and later as a seafood processing consultant. She has also conducted research in sugar processing.

Her current research will be focused in the areas of seafood quality control and seafood safety. One area she will investigate is the suitability of underutilized Gulf fish species for production of surimi, an artificial shellfish product. In addition, she will study pathogenic *Vibrio* species associated with Gulf oysters.

Calendar of Upcoming Events

Nov. 7, 2001	Mississippi Entomological Assoc. Insect Control Conference, MSU
Nov. 15, 2001	MSU-MAFES Annual Production Sale, Miss. Horse Park, Agricenter and Fairgrounds, Starkville
Dec. 3-4, 2001	Advanced Spatial Technologies Conference, MSU
Dec. 7, 2001	Horticulture Christmas Open House, MSU greenhouses
Feb. 21, 2002	Central Miss. R&E Center Advisory Meeting, Raymond
February 28, 2002	North Miss. R&E Center Advisory Meeting, Verona
April 9-11, 2002	School Days on the Farm, Miss. Horse Park, Agricenter and Fairgrounds, Starkville
May 23, 2002	Dairy Field Day, location to be announced

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