Information Bulletin 405 **February 2004**

Annual Report 2003

Summary

of the

NORTH MISSISSIPPI RESEARCH AND EXTENSION CENTER

Experiment Station
Vance H. Watson, Director

Mississippi Agricultural & Forestry Experiment Station
J. Charles Lee, President • Mississippi State University • Vance H. Watson, Vice President

NOTICE TO USER

This Mississippi Agricultural and Forestry Experiment Station Information Bulletin is a summary of research conducted at the branch stations of the North Mississippi Research and Extension Center. These include the North Mississippi Branch Experiment Station in Holly Springs, Northeast Mississippi Branch Experiment Station in Pontotoc, and Prairie Research Unit in Prairie. It is intended for the use of colleagues, cooperators, and sponsors. The interpretation of data presented herein may change after additional experimentation. Information included herein is not to be construed either as a recommendation for use or as an endorsement of a specific product or variety by Mississippi State University or the Mississippi Agricultural and Forestry Experiment Station.

This report contains data generated as part of the Mississippi Agricultural and Forestry Experiment Station research program. Cooperating personnel are listed on page 3. It also contains summary reports of Extension projects under the direction of Extension professionals and conducted throughout the Northeast Mississippi Extension District.

Trade names of commercial products used in this report are included only for clarity and understanding. Any experimental pesticides were used in accordance with EPA Experimental Use Regulations [40CFR 172.3 (Section 5) of FIFRA].

The 2003 Annual Report, with full-length research reports, is available on CD upon request and at the North Mississippi Research and Extension Center Web site:

MSUcares.com/nmrec

ANNUAL REPORT 2003 SUMMARY
OF THE
NORTH MISSISSIPPI RESEARCH AND EXTENSION CENTER

Joe Street, Interim Head

Including Reports from:

North Mississippi Branch Experiment Station
Holly Springs

Northeast Mississippi Branch Experiment Station
Verona

Pontotoc Ridge-Flatwoods Branch Experiment Station
Pontotoc

Extension Activities
Northeast District

Prairie Research Unit
Prairie

Horticulture Research & Education Unit
Verona

ANNUAL REPORT 2003

Extension reports, along with abstracts of research reports, are presented in this summary document. Complete research reports, with Materials and Methods, Results and Discussion, and Tables and Figures, are available on CD (upon request), and at the NMREC web site: MSUcares.com/nmrec

NORTH MISSISSIPPI RESEARCH & EXTENSION CENTER

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2003 OVERVIEW
NORTH MISISSIPPI RESEARCH AND EXTENSION CENTER
Joe E. Street, Interim Head

What a difference a year makes. At this time last year, prices were low and the outlook was not good. One year later, prices for most farm commodities are good and the 2003 production year was a record setting year. Farm production was 5.65 billion dollars which was 31 percent higher than 2002. Cotton, corn, soybeans, and sweet potatoes all had record yields even though excessive rains hampered corn production in this area. When conditions are good for the producer, they are also good for research and the North Mississippi Research and Extension Center (NMREC) faculty and staff experienced another productive year. The primary emphasis has been to provide quality research and extension programs for our clientele. In addition to research on experiment station facilities, much of our research is done on producer farms and we appreciate the support and cooperation.

In November 2003, Dr. Reuben Moore assumed the duties as Associate Director of the Mississippi Agricultural and Forestry Experiment Station. Reuben provided exceptional leadership of the NMREC and he will be missed. He is in a good position to use his talents to benefit the entire state of Mississippi. He is to be commended for his outstanding leadership in moving NMREC forward during times of dwindling budgets. We wish him well in his new assignment.

Dr. John Kushla joined the staff in December as Assistant Extension/Research Professor of forestry. Dr. Kushla holds a joint appointment with MSU Extension Service and the Forest and Wildlife Research Center. John is a talented scientist and I encourage you to get to know him and take advantage of his expertise.

I am honored to serve as the Interim Head of NMREC. As a brief introduction, I am a weed scientist by training and have worked for the past 24 years in rice research and extension at the Delta Research and Extension Center in Stoneville, MS. I am a native of Tippah County and I look forward to facilitating research and extension programs in north Mississippi. My door is always open and I welcome your comments.

In this report are summaries of research and extension projects. The information should prove valuable to you and will reveal the importance of continued support of research and extension. This is only a brief overview of the activities of 2003. If more information is desired on any subject, feel free to contact the author of the report or go to our website, at www.msucares.com/nmrec

The North Mississippi Research and Extension Center is here to support you and we value your comments and suggestions. NMREC has outstanding scientists who strive to provide timely and useful information to clientele. You have a stake in our research and extension efforts and the quality of life that our efforts support. Even during times of dwindling resources, it is our desire to continue to improve our services and provide the quality of research and extension efforts that you deserve.

TABLE OF CONTENTS

TABLE OF PERSONNEL

NAME	TITLE	COMMODITY	LOCATION
Dr. Joe E. Street	Interim Head, NMREC	Administration	Verona
EXTENSION DISTRICT PROGRAM LEADERS			
Linda Mitchell	MSU-ES District Program Interim Director	Family/Youth/Adm.	Verona
Dickie Rhea	MSU-ES District Program Director	Agriculture	Verona
SCIENTISTS, PROJECT LEADERS, SPECIALISTS			
Dr. Normie Buehring	Research Professor, Supt.	Agronomy - Soybeans Cotton, Weed Control	Verona
Dr. Kent Cushman	Associate Research Professor	Vegetable crops Medicinal Herbs	Verona
Dr. Rick Evans	Research/Extension Prof.	Beef Cattle	Prairie
Mike Howell	Area Livestock Agent	Livestock	Verona
Dr. Joe Johnson	Research Professor	Cotton	Holly Springs
Dr. Lelia Kelly	Asst. Extension Professor	Horticulture	Verona
Dr. John Kushla	Extension/Research Prof.	Forestry	Verona
Donald Pogue	Assistant Supt./Dairyman	Dairy	Holly Springs
Dr. Mark Shankle	Asst. Research Professor	Agronomy	Pontotoc
Dr. Crofton Sloan	Asst. Research Professor	Ornamentals	Verona
Dr. Mike Williams	MSU-ES Specialist	Entomology	MSU
SUPPORT STAFF			
Loyd Berry	Facilities Coordinator	MAFES	Pontotoc
Tim Best	Research Associate	Beef Cattle, Agronomy	Prairie
Tracy Brown	Facilities Manager	MAFES	Verona
Judy Butler	Secretary	MAFES	Verona
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Barbara Curry	Executive Secretary	MSU-ES Adm.	Verona
Robert Dobbs	Research Associate II	Agronomy crops	Verona
Tim Foster	Research Technician	Agronomy crops	Verona
Trevor Garrett	Research Associate	Agronomy crops	Pontotoc
Rodney Glover	Farm Laborer	MAFES	Holly Springs
Ted Gordon	Risk Mgmt. Specialist	MAFES/ MSU-ES	Verona
Nancy Green	Secretary	MAFES	Holly Springs
Susan Harkness	Research Associate	Hort - Ornamentals	Verona
Mark Harrison	Research Associate I	Agronomy crops	Verona
Jerry Haulcomb	Research Technician	Agronomy crops	Verona
Ann Hinds	Administrative Secretary	Administration	Verona
Thomas Horgan	Research Associate	MAFES-MSU-ES Hort - Vegetables	Verona

NAME	TITLE	COMMODITY	LOCATION
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Charles McGregor	Farm Laborer	MAFES	Pontotoc
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Daryl Nicholson	Maintenance Technician	Agronomy crops	Verona
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Joyce Pace	Secretary	MAFES	Prairie
Terry Patterson	Swine Program Asst./Manager	Swine	Pontotoc
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Sam Tackitt	Farm Supervisor	MAFES	Pontotoc
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Susan Travis	Secretary	MSU-ES	Verona
Jimmy Whaley	Farm Laborer	MAFES	Holly Springs

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Associate Director MAFES – Reuben Moore
Executive Director Extension – Joe McGilberry
Dean of Veterinary Medicine – John Thomson

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Peter Ryan
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Tom Althen
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Angelica Chapa
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David Ingram
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Delta Research and Extension Center
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Charles Ed Snipes
Steve Nichols

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Bobby Cullum
Matt Romkens
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AGRONOMIC CROPS
Bill Burdine, Jay Phelps, Dennis Reginelli, Charlie Stokes
Area Agronomy Agents

Spring rains in 2003 reduced the number of corn acres planted and harvested for grain in Northeast Mississippi. In some cases producers were forced to abandon fields and plant other crops. In most cases producers were forced to keep what was planted and ended the season with reduced yields. Although rains hurt many producers in portion of Northeast Mississippi, some producers were still able to make record crop yields. State cash receipts for all crops and livestock were $3,623,772,000.

On farm demonstrations evaluating hybrid selection, row spacing, skip-row production, growth regulator use and rates, seed treatments, and herbicide were conducted with producers in several counties. One seed treatment demonstration indicated a 21- bushel per acre yield advantage by applying a seed treatment over the untreated check, resulting in an increased profit of $42 per acre by using a seed treatment. One demonstration on seeding rates showed a decreased seed cost of $10 per acre without reducing yields. One cotton variety trial showed a difference of $135 per acre in yield between varieties. One soybean variety trial showed yield difference of 15 bushels per acre between varieties.

Producers participated in area type field days and production meetings to address corn, cotton and soybean management. “Turn-row” talk meetings were held during the growing season at equipment barns, restaurants, and fields to update producers on products that were available for the current growing season and what might be available in the upcoming growing season. These meetings were informal, and proved beneficial to the producers. Producers at one meeting reported savings of $12 per acre from information gathered. Attendees at the Northeast Cotton College reported over $375, 000 total benefit from the information covered at the “college”.

Economics work this past year centered around the new farm bill and the Ag Market Network. Network conference calls were offered to producers monthly through many county extension offices, and gave timely marketing information in row crops, aided in the marketing education of agricultural producers, and helped producers develop a market plan to generate cash flow to meet expenses. These were cooperative efforts between the Mississippi Farm Bureau Federation, MSU Extension Service, and Rosenthal Collins Group L.L.C. Other workshops just on the farm bill have help producers make tough decisions about farming their lands. Attendees at these events valued the planning help up to $50,000.

The high cost of legal disposal alternatives usually lead to agricultural pesticides remaining on the farm, and often, eventual leaks or spills. Extension efforts to respond to these environmental concerns and hazards from agricultural pesticides have led many communities to hold Waste Pesticide Collection Days. This past year, over 45,000 pounds of old chemicals were collected and disposed of in an approved manner.

SWEET POTATOES

The 2003 crop year began with a 3-week delay in planting due to wet field conditions. Once fields dried, the remainder of the season progressed extremely well. Air temperatures were moderate throughout the growing season and never exceeded 98° F. Timely rainfall events occurred throughout the growing season and prevented plants from becoming drought stressed. Several fields received rainfall during the growing season in excess of 35 to 40 inches.

Insect pressures never reached anticipated levels. Lower than average pest populations allowed for a higher quality crop in 2003. Reduced pesticide applications also reduced input expenses.

Sweet potato producers saw many Extension programs throughout the 2003 season. These included a series of Insect Scouting breakfasts that allowed growers and Extension personnel to gather together to discuss pest problems being observed and what was providing good control,. Other efforts included a MAFES/Extension Field Day to look at field production techniques, numerous planning and production meetings, Private Pesticide Applicator Training, May/June Beetle trapping program, soil fertility/yield correlation research, aerial imagery research, farm visits and individual consultations

A new program in 2003 was 'Scouting Schools'. Extension professionals provided hands-on training to show producers and scouts proper scouting techniques and insect identification charts and recommended control measures. Scouting kits and were provided to each attendee.

Contact:

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ENTOMOLOGY
Michael R. Williams, District Entomologist

Crop/arthropod situation for NE Mississippi: `Different' pests continue to crop up in the NE Mississippi area probably because of the changes in farming practices. Entomological interest centered around corn in early 2003. Dr. Don Parker teamed with area personnel to build a Southwestern Cornborer and other pest reporting system for corn. It raised the awareness of all corn farmers in the area and helped to increase IPM activities in corn in all of Mississippi. Stink bugs, clouded plant bugs, spider mites and bollworms were the major problems in NE cotton fields, but pressure from these pests was light. Fall armyworms again appeared much earlier than usual in grass crops and a number of pastures and hay fields required insecticide applications to halt the pest. In general, the year was fairly light for arthropods.

Cotton: Boll weevil captures were the fewest ever in NE Mississippi. There continues to be a few trap captures in the area, but we are seeing more and more areas report `NO WEEVIL' captures and no spray activity for their management. The hill counties currently grow approximately 400,000 acres of cotton. Arthropod losses in 2003 were again light. All arthropods reduced yields by 4.72%. The stink bug complex reported the most loss at 1.35% and bollworm/budworm complex were second, reducing yields of NE Mississippi cotton by 1.3%. *Lygus* (plant bugs) were also contributors to losses at 1.2%. Only about 1/2 of the acres were treated with any insecticide in 2003 and about 65% of the acres were planted to the Bt transgenic varieties. Foliar applications of insecticide were low with an overall cost of $20 per acre in Northeast Mississippi. The total cost of arthropod management, including - at planting insecticides, Bt use fees, eradication costs, scouting, and foliar insecticides was $69.06 per acre. Yields were higher again in 2003 with many farms reporting in excess of 2 bales per acre. The excellent fall weather provided the generally late crop with time to compensate and an excellent harvest. A complete listing of all Cotton Insect Losses is available at http://www.msstate.edu/Entomology/Cotton.html.

A joint project with the Mississippi Boll Weevil Management Corporation enabled the placement of pheromone traps in 4 locations in the state, including NE Mississippi. Traps were placed in late May, checked and maintained weekly through September. Nineteen counties were included in the program which trapped bollworm, budworm and beet armyworm moths and boll weevils. More than twice as many bollworm moths were captured as budworms demonstrating to farmers the effectiveness of budworm management. This information was shared weekly through the Crop Insect Situation newsletter. Complete results of trap captures may be seen on the MSBWMC web site: http://www.bollweevil.ext.msstate.edu/webpage_trapln.htm

Soybeans: Grasshoppers and saltmarsh caterpillars were again active in a number of counties in NE Mississippi. Other Lepidoptera were present in varying numbers, but only a few reached population numbers requiring sprays. Dectes stem borers were also seen in fields as were three cornered alfalfa hoppers, stink bugs and other minor pests.

Corn: Heavy rains and inclement weather prevented timely planting of the 2003 corn crop. The early-planted crop emerged in a ragged manner and was troublesome to farmers. Late planted corn emerged quickly and in many cases caught the early corn. Southwestern cornborers continue to be heavy hitters in a large number of fields in the NE area. Trapping and intensified cultural management and timing of insecticide applications helped to reduce the effect of these pests, but they still caused yield loss and required pesticide expenditure. Forty counties across the state were trapped for SWCB in 2003. State areas with potential for damage from SWCB were plotted, and advanced warning was provided to farmers in those areas weekly in the Crop Insect Situation newsletter and by electronic mail. Moth captures peaked during the first week in July. More moths and more damage from SWCB occurred in the south delta in 2003. Primarily because of the emphasis on trapping and timely sprays, SWCB numbers were held well below 2002 numbers. Trap captures never exceeded 50 moths per trap in NE Mississippi. We will continue the educational efforts and trapping programs to combat SWCB in 2004. There will also probably be an increase in *Bt* corn in the area as a result of this pest.

Sweetpotatoes: Losses to insects in sweetpotatoes are almost always recognized after it's too late to do anything. Pests of this crop include – the grub complex (white grubs, whitefringed beetles, cucumber beetles, and others), the black flea beetle, and wireworms below ground, and the Lepidoptera – mostly armyworm complex above ground. In 2003 insect damage from all the pests listed above was fairly light. Sugarcane beetles were not very prevalent in fields, but Wireworms and whitefringed beetle continued to be problems in NE Mississippi. As in previous years,

the later in the season harvest is delayed the greater the damage from insects, especially from wireworms, white grubs and whitefringed beetles.

Other entomological activities in NE Mississippi: Interest in butterflies and butterfly gardens continues to develop in NE Mississippi. Numerous Garden Clubs and other similar organizations are developing butterfly gardens throughout the area. Schools are also getting into the act by building outside science and environmental study laboratories, which include butterfly plants. Homeowner gardens and Master Gardener Projects also received attention during 2003.

4-H Activities: There were 6 Junior Linnaean teams and 6 Senior Linnaean teams from the 28 county area in 4-H Linnaean Game competition. Tate and Webster Junior Linnaean teams were winners in their respective areas and Lee's Senior Team was first place in the Senior Linnaean Games at 4-H Club Congress. Tate County Juniors had 2nd place Linnaean Teams with the Juniors at the Mid South Fair Regional Championships and the Senior Champions were from Covington County, Mississippi, while the Lee County Senior team placed second. There were 30 Insect collections from the 28 county area displayed in various fairs and competitions. More than 75 young people from the area participated in 4-H entomological activities including Entomology Camp in 2003. The June camp was held on Wood College Campus, near Mathiston. There were 62 campers from 8 states at the 4-day camp. Two television news crews (channels 9 and 4) visited the camp and we were featured on the afternoon news over the entire area. The second camp was conducted at Leroy Percy State Park, near Hollandale. There were 45 campers, which included 2 area high school biology teachers in camp. Campers in 2003 included young people from as far away as Wyoming, West Virginia, Arizona, Ohio as well as Arkansas, Louisiana, Tennessee and Mississippi.

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ANIMAL SCIENCES
Mike Howell, Lisa Stewart, Area Livestock Agents

Monthly Newsletter: The Northeast Livestock Link is a monthly newsletter designed for County Directors, 4-H Youth Agents and producers to stay informed on current issues involving the beef cattle industry. In addition the newsletter carries discussion about management practices and marketing options that encourages readers to "think outside the box". The newsletter is distributed to all Northeast District County Extension offices, producers actively involved in the Integrated Resources Management Program, past participants of the MSU Artificial Insemination Shortcourse and current participants in the Northeast Mississippi Master Cattlemen's program.

Beef Breeders Directory: The Beef Breeders Directory was established in 2002 to assist Mississippi Beef producers with an on-line listing of registered bulls and heifers, commercial heifers and embryos for sale, ands is rapidly becoming one of the primary information sources for locating cattle to buy or sell in Mississippi. This listing assists buyers with a quick and easy way to locate Mississippi farms that have the specific animals they are in search of, along with phone numbers and locations of farms. This listing is also a valuable free service to producers that have bulls, heifers or embryos for sale. Currently the Directory has information on 14 different breeds available from 26 counties with the state. Producers can access the on-line listing by logging on to the www.msucares.com web site. (Click on Livestock> Beef Production> Mississippi Beef Cattle Breeders Directory) The listing is set up by breeds or by counties, and producers can print off a Directory form to complete and mail if they want to list cattle for sale on their farm. The beef Breeders Directory has also been linked to the Mississippi Beef Cattle Improvement (BCIA) web site.

North Mississippi Beef Agribition : The 2003 Beef Agribition was a big success for Mississippi cattlemen. The attendance was the best ever since its beginning in 1998, with over 800 producers from Mississippi, Alabama, Arkansas and Louisiana coming for the Friday and Saturday event**.** The Agribition got under way Friday night with a presentation on alternative marketing and alliance marketing. 80 producers gathered around the sale area to enjoy a hamburger supper and listen to the presentation, before getting a preview of the cattle in the pens that sold on Saturday.
45 registered Brangus, 51 registered Angus, 28 all-breeds bulls and 71 commercial replacement heifers were offered in the sales. Area producers are discovering the benefits of the Agribition as a source to market premium quality registered and commercial breeding stock as well as a good resource to buy farm fresh cattle. The Trade Show held in conjunction with the Agribition continues to be a popular attraction, and attendees can visit with industry representatives, exam their product line, and monitor the sale proceedings at the same time.

The Friday night program for the **2004 Agribition** will be a seminar on forage production practices in Mississippi. Dr. Richard Watson, Forage Specialist with the MSU-ES and Dr. Jane Parish, MSU-ES Beef Specialist will lead the discussion on the new Fescue varieties available, along with management guidelines for these forages. They will also offer suggestions on limiting the number of days hay is fed and replacing the hay with forages we can grow here for more cool season grazing. Also this year, to support the growing Horse Industry in Mississippi, the 2004 Agribition will sponsor the first annual all breeds Horse Sale as part of this year's events.

"Producer's Choice" Beef Herd – Holly Springs Research Station: As reported last year in this annual report, the newly established beef herd at the Holly Springs Station was developed to give small herd owners a prototype herd to compare their herd with in terms of performance, production and financial records, herd health and profitability.

Currently the process of replacing the original cowherd with their A. I. Sired heifers is underway. The first A. I. sired heifers were artificially inseminated in December, 2002 and this will be the first generation of females to make-up the "Producers Choice" foundation herd. During the next three to four years, only the heifers with the highest ratios for weaning, yearling and carcass will be retained in the herd or made available through the MAFES production sale. All other females and steers will be sent to the feedlots for finishing.

Production and financial records on the first wave of A. I. sired calves will be available later this year for producers to evaluate and compare with their herd.

The 2002/2003 calf crop was the first year the herd had calves from a controlled breeding season, the heifer calves from this group have been A.I. bred and will take their place in the mature cow herd next year. The steer calves from the 2002/2003 calf crop are currently being fed out in a feedlot in Kansas. The 2005 Annual report will provide the performance and carcass information from these steers. The projected harvest date for these calves is April 2004. Cattlemen's Association groups as well as other producer groups are always welcome to call and set up a time to visit the herd and review this approach to making greater profits from small herds.

Another exciting project with the "PC" herd that is just getting under way is the development of a year-round grazing plan. As feed cost continue to rise, small herd owners will need to develop a better management plan for containing feed cost. It is the intent of this year-round grazing study to help answer questions for small herds owners on how to economically implement this on their farms.

Artificial Insemination Shortcourse: The 2003 Artificial Insemination Shortcourse held at the Prairie Research Station was well attended. Twenty one producers from three states were exposed to the latest information in Artificial Insemination and Synchronization techniques. In addition the producers were given information on herd health, working facilities and corral designs, understanding EPD's, nutrition and proper feeding and whole herd management and bio-security for the farm.

This shortcourse is one of the few of its kind held in the entire southeast and because each participant requires a great deal of one on one teaching, the class size is limited to 25 or 26 each year. Producers interested in learning how to become a successful Artificial Insemination technician began calling 4 to 6 months prior to the October shortcourse to ensure they could enroll in the class.

The 2003 class at the Prairie Station enjoyed being the first group to use the state of the art working facilities which is completely protected from inclement weather.

Beef Quality Assurance Program: The Beef Quality assurance program was created 10 years ago by the National Cattlemen's Beef Association. BQA brings beef producers together with one central goal; to produce safe, wholesome beef for consumers.

The BQA program in Mississippi mirrors the National effort with live presentations before a producer audience using three 10 X 16 displays. The displays include photos, diagrams, three dimensional mock-ups and taxidermy specimens. The topics covered in the three 15 minute presentations include; Proper Management to Enhance Beef Quality, Targeted Breeding for Quality Beef and Responsible Culling to Improve Productivity and Efficiency in the herd.
The Mississippi Beef Quality Assurance program consist of several beef Industry partners including the Mississippi Beef Council, Mississippi Department of Agriculture and Commerce, Mississippi Farm Bureau Federation, Mississippi Veterinarian Medical Association, Mississippi State University Extension Service and the Mississippi State University College of Veterinary Medicine.

The 2003 MBQA programs in North Mississippi were held at Pontotoc and at the Prairie Experiment Station. At the conclusion of each MBQA program producers were offered the opportunity to submit their application to become BQA certified.

Master Cattlemen's Program

The Master Cattlemen's program was started in May of 2003. Producers from the North Mississippi area were invited to enroll in the year long program. This program was created to offer producers a more in-depth study of the production practices involved in beef cattle production. Thirteen producers have attended the monthly, 3 hour meeting to improve their knowledge in the production areas they feel deficient and to share their knowledge in the areas of production that have been successful with. The informal round-table discussions have been well accepted by the attending producers and from the first meeting to the present every producer attending has expressed their desire to continue with this format. In addition to the improved knowledge base obtained by these producers, alliance marketing and group purchasing will be other benefits these producers expect to obtain from being involved in this program.

Youth Activities

Youth activities continue to grow in the livestock areas. 4-h and FFA youth members compete in judging contests and in livestock shows and Horse shows, hoping to advance to the state level shows. In 2003, 208 youth exhibited 110 animals, and 98 junior 4-H members competed in the district livestock judging contest held in Verona. Statewide, 1196 youth exhibited 1842 animals at the 2003 Dixie National Junior Roundup. During the summer, 191 youth exhibited 311 horses in the District 4-H Horse Show, and 74 youth competed in the Horse non-riding events. At the State 4-H Horse Show, 494 4-H members from 66 counties showed 649 horses.

This year, a Backyard Horse Camp wass also offered to youth who had an interest in the horse industry. Fifty-eight youth attended the two-day camp, which helped educate them about safety and maintenance of horses. The camp was co-sponsored by several Extension staff members, a local veterinarian, farrier, horse artist, feed suppliers, Mississippi Homemaker Volunteers and 4-H volunteers. The youth learned about the following items at the camp:
General care and daily maintenance of owning a horse,
Proper foot care and conditioning of the hoof
Patterned classes were demonstrated
How to detect the leads in a horse's movement
Confirmation and structure of the horse was discussed and what to look for in judging horses. Proper tack and fitting correctly on each horse
Horse knowledge for horse bowl contest
Cloverleaf and Visual Presentations
Photography
Horse Art

The campers were also introduced to many aspects of the horse industry. The non-riding events were introduced and many of the participants have participated in the non-riding and riding events in 4-H since this event.

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EXTENSION LIVESTOCK ACTIVITIES
Angelica M. Chapa, Extension Dairy Specialist

North Mississippi Branch Experiment Station Dairy and Beef Field Day: A "Dairy and Beef Field Day" was held on September 18 at the North Mississippi Branch Experiment Station in Holly Springs. The field day was an opportunity for dairy producers and beef producers in North Mississippi to view the ongoing research at the dairy unit and discuss management strategies regarding the 40-head commercial beef cow/calf herd. Presentations during the morning session featured a broad range of information that was timely and basic to producers of both types of cattle. Dr. Wayne Groce, MSU College of Veterinary Medicine professor, spoke to producers of the benefits of a good herd health program and the importance of biosecurity on their operations. He also discussed his experiences with livestock disease outbreaks overseas and the implications for the U.S. livestock industry.

The management and economics of baleage was discussed by Dr. Mike McCormick, resident coordinator of the LSU AgCenter's Southeast Research Station in Franklinton, LA. Dr. McCormick has been involved with baleage research for several years and outlined different management strategies for producing good quality baleage including forage type and storage options. In addition to management of baleage he also discussed the economics of baleage production in comparison with hay production and gave producers information to decide if the economic returns of baleage would fit into their production situations. Since many producers are unsure of their cost of production, financial management, through participation in the integrated resource management program, was discussed by Webb Flowers, coordinator MSU Department of Animal and Dairy Sciences. He reviewed the financial information that producers would need to calculate income and expenses for their operations.

For many producers in Mississippi, improving the reproductive efficiency of their herd is an important goal. Tim Dickerson, graduate student MSU Department of Animal and Dairy Sciences, spoke to producers about management techniques for improving reproductive efficiency in their herds. Topics covered in this presentation included: basics of reproductive management, bull management, estrous synchronization, A I and semen handling, and record-keeping.

The afternoon tour or the station included a demonstration of cooling capacity of the tunnel ventilation barn at the dairy unit and discussion by Dr. Terry Smith and Dr. Angelica Chapa (Department of Animal and Dairy Sciences, MSU) of the results of the past several years of research in the facility. Current studies in the tunnel ventilation barn address milk production, udder health, intake, and air quality. Mike Howell, area extension livestock/forage agent, updated producers on the management strategies used for the commercial beef cow/calf herd. This herd was established as a prototype profitability herd for the benefit of smaller-sized producers. The afternoon tour ended with a presentation by Donald Pogue, assistant superintendent of the North Mississippi Branch Experiment Station, about management of the Marshall ryegrass, which was developed at the station.

WILEY L. BEAN SWINE DEMONSTRATION UNIT
Mark Crenshaw, Associate Specialist

The Wiley L. Bean Swine Demonstration Unit is located at the Pontotoc Branch Experiment Station on highway 15 approximately seven miles south of Pontotoc. This swine demonstration unit was established to serve as an educational resource to swine producers in Mississippi. The demonstration unit consists of approximately 30 sows housed primarily in natural ventilated mono-slope roofed facilities. At the swine demonstration unit, visitors can tour a working swine operation while receiving information about many swine production management, equipment and housing options.

Genetic Program: Since 1995, a primary focus of educational programming at the swine demonstration unit has been a genetic improvement program. The genetic improvement program was developed to provide area producers with a source of replacement gilts and recommendations for a breeding program that will enhance the productivity and carcass quality of the offspring. Producers also have the opportunity to receive training and assistance with artificial insemination (A.I.) techniques at the swine demonstration unit or on their individual farm.

The swine demonstration unit serves local swine producers as a multiplier herd for open replacement gilts. Following a breeding program as outlined by the Mississippi State University Extension Service, local producers have two options for replacement gilt purchases.

Option A – For Producers desiring to produce and select replacement gilts from their own herd.

1. Purchase F-1 gilts (hamp x land) from the swine demonstration unit.
   - These gilts will be a nucleus herd designed to produce a source of potential replacement gilts within the producers operation.
2. Mate the F-1 gilts to a maternal line york boar.
   - Producers have the option of mating these gilts to their own maternal york boar or by A.I. using fresh semen from maternal line yorkshire boars collected and extended by the staff at the swine demonstration unit.
3. Replacement gilts (york x hamp/land) from the above mating are then mated to a terminal line boar (duroc).
   - Producers must supply their own terminal boar for this mating either through natural service or A.I.
4. All offspring from this mating are terminal pigs and are sent to market.

Option B – For Producers that do not want to producer their own replacement gilts.

1. Purchase all their replacement gilts (york x hamp/land) from the swine demonstration unit.
2. Mate all gilts to a terminal line boar (duroc).
   - Producers must supply their own terminal boar for this mating either through natural service or A.I.
3. All offspring from this mating are terminal pigs and are sent to market.

Agent Training (swine artificial insemination) – Many swine producers utilize A.I. as a means to improve reproductive efficiency and herd genetics. Agents in the field need a working knowledge of swine A.I. techniques and how producers can best utilize A.I. in their swine-breeding program. In September, the swine demonstration unit hosted an agent-training workshop. Participants received hands on training related to A.I. of swine. Specific topics at this workshop included: boar collection, extending and storage of boar semen and insemination of sows.

Market Situation – Cash hog prices in 2003 have generally been below break even for most swine operations. The number of pigs marketed in 2003 often exceeded packer demand, putting downward pressure on cash hog prices. Although the U.S. breeding herd has fewer sows currently in production, the number of Canadian pigs crossing the border into the U.S. will continue to offset the number of U.S. pigs produced. Without an increase in domestic demand or export demand for Pork, the market outlook for 2004 doesn't appear much better than 2003 especially since feed cost is increasing.

In 2003, Mississippi produced approximately 486,000 pigs down about 2% from 2002 but relative steady production over the past four years. Opportunity may exist in some regions of the State to market pigs through alternative market outlets however producers need to take advantage of all management techniques to improve economic efficiency. The swine demonstration unit can assist producers with management decisions.

Environmental issues: Changes in environmental regulations have placed pressure on previously established swine operations to comply with new standards for permit renewal. Many swine operations utilize some type of a lagoon system for waste disposal. Normal lagoon management requires agitation and pumping of the solids once buildup occurs. While there are many products on the market today, that claim to eliminate solid buildup, the effectiveness of these products is still undetermined.

The swine demonstration unit selected a lagoon additive, which claims to reduce solid buildup, and began using the product according to company directions. The MS Pork Producers Association provided funding for this demonstration. Prestage Farms assisted by providing equipment designed to measure sludge buildup. Lagoon sludge was modified by use of this product however final measurements on the lagoon sludge level have not been determined. This demonstration has terminated. Sludge modified by the use of the lagoon additive did not meet expectations for revitalizing the lagoon treatment capacity of the manure. Plans are to agitate and pump the lagoons or demonstrate another technology directed toward revitalizing mature lagoons.

Composting: Mortality disposal is another environmental concern for swine producers. Composting appears to be the most favorable long-term solution. Incineration may be the best short-term solution for large production units but permits for this method have met resistance with the regulatory agency (Department of Environmental Quality) and the Public. Small family farms must determine an approved method other than burial for disposal of mortality that is cost effective. Composting of mortality on family farms appears to be the most acceptable and cost effective long-term method for mortality disposal. Information concerning on farm composting for small-scale production units can be obtained from the swine demonstration unit. A composting project on a larger scale is being demonstrated on a Contract Grower farm in North MS. A management guideline for composting swine mortality publication is available through the Mississippi State University Extension Service.

Other Program Activities 2003: Staff and resources at the swine demonstration unit support other programs throughout the state. These include:

- School Tours for K - 3 students (261 Students)
- Judging Clinics (Northeast District 4-H Judging Workshop at Pontotoc, MSU Livestock Judging Team)
- 4-H/FFA Judging Contest (Swine Judging Contest in Jackson at the State Fair, Northeast District Judging contest at Verona, Marshall County Livestock Judging contest.)
- Swine Shows (Dixie National Junior Roundup, Dixie National Barrow Show, MS State Fair, Northeast MS Fair)
- MSU Livestock Management Class (conducted Baby Pig Management Lab)
- Super Bulldog Weekend (assisted MS Pork Producers Association with Pork Promotion)
- MS Pork Producers Association Annual Meeting Report
- Individual Producer Visits (73 Adults)
- Furnished pigs to support Pizza Farm activities (April and September)
- Furnished pigs to support MSU/ADS Teaching programs.

Educational efforts at the Wiley L. Bean Swine Demonstration Unit will continue to provide assistance to area swine producers and the swine industry. By providing individuals with accurate information regarding swine production and the swine industry, an informed decision can be made by these individuals regarding the development and management of a swine enterprise.

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FORESTRY

Tim A. Traugott, Extension Professor , John D. Kushla, Asst Extension/Research Professor
Dedric B. Brown, Area Forestry Agent

Timber is the number one agricultural crop in the district, generating over $10 million from these counties. Extension personnel, working with local forestry associations, forestry consultants, local advisory groups, and other agencies provided education for timber owners. Short courses, workshops, field days, conservation events, group meetings, and newsletters delivered information to over 48 thousand timber and landowners within the district. Extension personnel presented over 50 educational programs for landowners, with the value of the information being estimated at over $6 million, ranging from $110 to $50,000 per participant ($5-270 per acre).

Several activities were targeted to underserved clientele. These field days and workshops provided practical management information and introduced landowners to local resource people. Personal contacts also impacted producers, as one timber owner received 30% more for their timber by marketing through the help of extension personnel.

Tree planting activities were also held in most counties. Extension worked closely with personnel from the Natural Resources Conservation Service, the Mississippi Forestry Commission, local Master Gardner chapters, and the local County Forestry Associations (CFA). Thousands of free trees were given to Mississippi youth and families with information on their importance to the economy and environment. For instance, over 20,000 trees were distributed to youth and adults in Chickasaw and Oktibbeha Counties. Hardwood trees were planted for shade, erosion control, wildlife food and shelter. The pines were planted for wildlife cover and timber, potentially growing to a value exceeding $150 per tree.

Special recognition goes to the Marshall CFA for the 2003 Outstanding CFA Award from the Mississippi Forestry Association.

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[**note:** Beginning December 1, 2003, Dr. John D. Kushla was hired as the Northeast District Forestry Specialist. John brings considerable training and experience to the Mississippi State University Extension Service. John has forestry degrees from Penn State, the University of Florida, and Oregon State University, and he has work experience with the forest industry and government. Over the years he has worked as project leader in forest soil survey, directing a pine and hardwood nursery, implementing an agency geographic information system, and conducting applied silvicultural research. John is currently living in Tupelo with his lovely wife and two adorable daughters.]

HORTICULTURE
Jeff Wilson, Area Horticulture Agent

Status of Industry: The Green Industry of Mississippi, also known as the Nursery and Landscape Industry, is comprised of many different types of businesses related to environmental horticulture. The green industry includes thousands of small family businesses that grow, sell (wholesale and retail), install, and maintain plants for residential and commercial landscapes. Mississippi has 568 landscape maintenance/contractor firms, 859 retail businesses, 169 licensed arborists, 163 pest management firms, and over 350 certified nurseries. Established annual sales (based on 1999 figures) were $48.1 million for the Nursery/Greenhouse Production Sector, $183.88 million for the Landscape/Horticulture Services Sector, and $318 million for the Horticulture retail Sales Sector. Based on 2003 figures, the farm value for Fruits and Vegetables was in excess of $100 million. Sweet Potato crops, mostly in Calhoun and Pontotoc Counties, accounted for over $58 million, up from $22 million in 2002..

The "Green Industry" of Northeast Mississippi is active and growing. Approximately 20% of the states green industry businesses are in Northeast Mississippi. The state's second largest wholesale nursery is located in Tippah County (Tim Needham, County Director). Revenues from this county in horticulture exceeded $1 million. The Extension Service in Northeast Mississippi recognized and addressed this expanding industry by devoting thousands of hours to horticulture programming and activities for consumers, youth and industry clientele. Extension Agents assisted several new horticulture businesses in developing on land that had been used in conventional type farming systems. These included a sod farm, a greenhouse production, and a field production ornamental tree farm. Other agents provided invaluable technical assistance and expertise to businesses that helped them to have continued success.

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MISSISSIPPI MASTER GARDENER ANNUAL REPORT
Lelia Scott Kelly, Assistant Extension Professor
State Master Gardener Programs

The Master Gardener Volunteer Program is an educational program that enhances public knowledge in consumer horticulture. Through trained and supervised volunteers, it provides educational assistance to citizens concerning lawns, fruits, vegetables, trees, and ornamentals.

Under the guidance and support of Extension agents, participants in the program complete a training program, pass an examination, and volunteer a minimum of 40 hours within one year of training to become a certified Master Gardener. To remain active Master Gardeners must contribute 32 hours of volunteer service each year after becoming certified.

The Master Gardener Volunteer program allows Extension to extend education to an ever-increasing gardening audience and meet the public demand for information. Statewide, there are approximately 1200 active Master Gardeners in 40 counties.

Agents conducted 88 Master Gardener Classes and 40 advanced training opportunities for Master Gardeners in 2003

The introduction of a new computer recording keeping system for use by the county offices to track and record service and other information of Master Gardeners has enabled Extension to accurately assess the contributions of these volunteers. Counties, using the new recordkeeping spreadsheet program, reported that Master Gardeners donated over 38,000 hours of service in 2003. Equivalent to 18.3 full-time employees, this volunteer service provided a benefit of $627,000.00 to the state of Mississippi.

Along with their Extension agent and specialist colleagues, Master Gardeners (MG's) are committed to providing high-quality educational programs in horticulture and the environment in Mississippi communities and neighborhoods. MG's conducted 263 public horticultural programs for 5750 people in 2003. These public presentations represent a significant outreach, and deliver Extension information to the public, garden clubs, civic clubs, and other community organizations.

Master Gardeners also established or maintained 611 demonstration gardens at schools, parks, libraries, courthouses, city halls and other public grounds. In each project, MG's use the most recent researched-based, environmentally sound horticultural techniques and plant materials.

Master Gardeners contribute in many other ways. Master Gardeners wrote 87 newspaper articles, conducted 41 horticulture therapy projects, wrote 62 gardening fact sheets, and devoted 1700 hours to manning information booths at fairs and exhibits. These volunteers also handled 233 home garden visits.

Preparing youth for the future through the use of gardens as classrooms is of special interest to Master Gardeners, who devote many hours to programs and projects involving youth. MG's provided coordination and expertise to 666 youth programs that involved gardening. Through these programs and projects 16,642 youth were exposed to the wonders of gardening and their environment.

Master Gardeners have provided leadership and support to the 4-H Junior Master Gardener (4-H JMG) Program statewide. Master Gardener volunteers have conducted trainings for teachers and leaders in the management of the program. MG's have sought and received local funding for the 4-H JMG program and have acted as leaders of the program in numerous schools in the state. The Mississippi State Board of Master Gardeners hosted the first annual 4-H JMG awards at their State Conference in Vicksburg in May of 2003.

Twelve of the 23 counties in the Northeast District have approximately 150 active Master Gardeners. These volunteers contribute significantly to the deliver of programs and activities in this district. For example, the Master Gardeners of Oktibbeha conducted a workshop at the Annual Conference of the Mississippi Homemaker Volunteers.

In addition, the 73 Master Gardener volunteers of the North Mississippi Extension Horticulture Center (NMEHC) serve this district. This group is associated with and supported by the North Mississippi Research and Extension Center (NMREC). The NMEHC Master Gardeners donated 3,557 hours of service in 2003. These hours are equivalent to a monetary donation of $58,833 in service to the Extension Service. While conducting this service the group collectively drove 21,626 miles and made 9,643 contacts with clientele. They conducted 34 gardening programs/classes, wrote or contributed to 42 newspaper articles, wrote 21 garden fact sheets and answered 475 home horticulture questions through the toll free Home HortLine. They also assisted with 40 garden clinics/fairs/flower shows. They devoted 639 hours to youth garden programs. Through these programs they made contact with 8,530 youth from this district.

The two toll-free consumer horticulture phone lines manned by Master Gardeners at the Harrison County Extension Office and North Mississippi Extension Horticulture Center at the NMREC in Verona continue to greatly expanded Extension's reach to clientele. In 2003 the Forrest County Extension office began providing this service. Master Gardeners at these three sites have handled over 1570 calls in 2003 from consumers without having to consult an agent, who is then free to devote more time to other clientele or activities. Extension computer services are in the process of designing a computer program to record data received through these calls. This program would compile questions answered by subject, location and other information into a searchable database for future reference.

The Mississippi Master Gardener program enhances the ability of Extension to meet local educational needs. These volunteers provide leadership and support to horticultural educational efforts throughout the state. Their dedication has allowed Extension to multiply its efforts and continue to expand and reach new audiences in Mississippi.

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THE 4-H JUNIOR MASTER GARDENER PROGRAM
Lelia Scott Kelly, Assistant Extension Professor
State Master Gardener Programs

The 4-H Junior Master Gardener (JMG) program, introduced in Mississippi in 2000, is a youth development program. Its purpose is to teach horticulture and environmental science, community service, leadership, teamwork, and other life skills through "hands-on" gardening activities. It has grown to now include over 2339 registered youth in 26 counties. The effectiveness of this program to reach a diverse clientele is supported by the demographics of the youth involved. Enrollment in the program is divided equally between sexes, with 58% of the members being white, 41% are black and less than 1% are Latino or Asian American.

In the Northeast district, 218 youth were added to the 4-H JMG rolls. This accounts for 19% of the total number of new enrollees statewide. All of these youth are located in Lee County. 4-H JMG teacher/leader packets were distributed to all teachers participating in the Pizza Farm youth program. The 4-H JMG Scarecrow Trail was a new event initiated by the North Mississippi Horticulture Center Master Gardeners and supported by the NMREC. This event, which opened in conjunction with the Garden Expo, remained open for the public through the middle of October. This event was to promote the 4-H JMG program, bring youth and adults into the Magnolia Botanical Gardens and raise public awareness of the educational facilities and gardens associated with the NMREC. Approximately 2000 youth and adults toured the gardens and walked the trail. The Tupelo Bureau of Tourism, local businessmen and industries sponsored this event.

This substantial growth in statewide enrollment is due, in part, to the early attention to the development of an innovative, yet systematic program development and delivery system that actively engaged a diverse group of agencies, organizations and people. Extension agents, horticulture industry leaders, Mississippi Department of Education officials, professional and service organization leaders, and local school and community leaders were

involved in all phases of the program development and delivery system. Establishing the involvement of these groups early made them stakeholders in the program. It became their program also and they, therefore, had a sincere desire to promote and support their program. Its success was their success too.

Extension professionals, including 4-H agents, area horticulture agents and the state 4-H JMG coordinator conducted approximately 30 volunteer leader/agent trainings and 275 programs for youth using the 4-H JMG curricula. Master Gardeners, who devote many hours to programs and projects involving youth, provided coordination and expertise to 666 youth programs that involved gardening. Through these programs and projects 16,642 youth were exposed to the wonders of gardening and their environment. A large percentage of these youth programs used the 4-H JMG educational material. In addition, Master Gardeners have provided leadership and support to the 4-H JMG Program statewide by assisting with trainings for teachers and leaders in the management of the program. Master Gardeners have sought and received local funding for the 4-H JMG program and have acted as leaders of the program in numerous schools in the state. The Mississippi State Board of Master Gardeners hosted the first annual 4-H JMG awards at their State Conference in Vicksburg in May of 2003.

Research studies conducted by various universities including Mississippi State University Extension Service, Purdue University and Texas A and M University indicate that when youth are involved in school gardening activities, their interest in science, teamwork skills, community service, interest in eating fruits and vegetables, personal responsibility, enthusiasm of learning, and attitudes on nutrition all increase. The results of a study conducted by Mississippi State University Extension Service indicated that 27% of the parents surveyed said their child plays or works more in the garden or home landscape since participating in the program. One-quarter of the parents surveyed in this same study said they have increased their spending on gardening or landscape materials by an average of $257 as a result of their child's participation in the program. The potential economic impact of this expenditure on the green industry of Mississippi is substantial. Two schools in Mississippi (Ackerman Elementary and Water Valley Elementary) were selected to be national pilot schools for the newest JMG curriculum project, "Wildlife Gardener." This new curriculum book will be available for sale early in 2004.

The Mississippi Nursery and Landscape Association (MNLA) recognized the importance and potential positive impact of this program on Mississippi's youth and choose in 2001 to partner with the MSU-ES in supporting this program. The MNLA is the major sponsor of the program and has made a commitment to fund the statewide 4-H JMG awards that were implemented in 2003. These awards were established to reward and encourage the continued involvement of agents, leaders, sponsors and youth. Awards were given in five categories in May of 2003. With the continued support of the MNLA these awards will be given each year.

Other initiatives developed to sustain and promote participation in the program were the continued expansion of the 4-H JMG website to include award information and other resource material. As the state program has grown and changed, a need to update five of the existing Extension publications about the program was identified. This has been accomplished.

Press and media coverage of the program has resulted in national recognition of Mississippi 4-H JMG. Quotes, articles and pictures about the Mississippi program have appeared on television broadcasts, in various newspapers throughout Mississippi and in the newsletter of the National Junior Master Gardener Program. The international headquarters at Texas A & M has recognized the success of the Mississippi program by placing the Mississippi state coordinator on the national board of directors and recommending this state's program implementation and methodology as a model of success to other states interested in initiating the program.

To support the program, internal grants and external grant monies have been sought and obtained. Since the introduction of the program in the fall of 2000, $28,308.00 total grant monies and donations have been secured to support the program statewide. In 2003, financial aid and in-kind donations were valued at $8,108,00. Efforts are ongoing to obtain external grant monies at the local, state and national level to ensure the future success of the program as demand continues to increase for trainings, supplies and curriculum to support the program statewide.

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ENTERPRISE & COMMUNITY RESOURCE DEVELOPMENT
Shelaine Wise, Area Enterprise & Community Resource Development Agent

High Value Agriculture for Small Farms – Small farmers are being squeezed out of most commodity production, and many of them are looking for specialty enterprises that fit their farms. An alternative agriculture enterprise workshop was held offering insight on enterprises that could make money for farmers with limited acreages. The topics included how a farm has entertainment value, tomatoes from field to market, how to turn a fishpond into a source of profit, and pumpkin patches as a form of entertainment.

Of the 42 attendees, 100% responded that the topics were of economic benefit. Of the eighteen responding, the average value of what the information could be worth to the landowner was $542. Six responded the information was priceless.

Farmers' Markets Development – A healthy diet of fresh fruits and vegetables is being promoted by all health organizations. Consumers are looking for fresh, locally grown sources. This situation creates economic opportunities for growers and as a result farmers' markets are being organized in many communities.

At the request of Northeast District County Directors and Area Chamber of Commerce Directors, a statewide survey of farmers' markets was held. Information from the survey was used to co-author with Dr. Al Myles, a publication titled "Understanding the Economic Benefits of Farmers' Markets in Community Development". This publication was used to promote the development of farmers' markets in Itawamba, Prentiss, and Union counties. Two educational programs "Growing For Market" and "Selling at the Farmers' Market" were presented at one district-wide and two county programs.

A survey of nine Union county farmers' market growers indicated a successful market with five growers selling more than one thousand dollars of produce. Eight growers rated the Extension program "Selling at the Farmers' Market" as being excellent in the usefulness of their operation.

E – Commerce – The Internet is changing the way the world conducts business. Reports indicate that over 605 million people are online worldwide with anticipated growth reaching nearly 1.3 billion by 2005. Many rural businesses have not received educational information to assist them in gaining knowledge of e-commerce. A workshop was held in Verona highlighting the benefits of electronic start-up issues such as building a web store and making a web store run, web site design, and how to market a web site. As a result of the e-commerce workshop, thirty-two rural small business owners have increased their viability and profitability levels by entering and growing in the e-commerce market channel.

Pizza Farm – Today's children have fewer opportunities to see animals and crops growing on farms, and so are less aware of the sources of many products. The lack of knowledge about agriculture is on the increase and, therefore, the general public does not realize the importance of agriculture. The awareness of the value of agriculture and the respect for the farmers are key issues to address.

Through a team effort between Mississippi State University Extension Service and Mississippi Agricultural and Forestry Experiment Station, Pizza Farm was re-established in Verona, a central location for the Northeast District. MSU-ES agents and Master Gardener volunteers were enlisted to educate third graders on the importance of farmers and the role of agriculture to produce their all time favorite food – pizza.

Through information obtained at Pizza Farm, students are now more aware of the importance of agriculture to their food supply. In the future, these students will remember the concepts taught at Pizza Farm and apply them in making good sound judgments concerning agriculture, which will lead to a greater appreciation and support of agriculture.

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WILDLIFE
Jason Blaylock, Area Wildlife Agent

Wildlife/Fisheries - The Wildlife and Fisheries Extension program provides the link between the information developed by research and the clientele who will use the information to successfully manage different wildlife and fisheries resources. The Wildlife and Fisheries program consist of 4 different areas: Wildlife, Fisheries, Natural Resource-based Enterprises, and the 4-H Field and Steam Program. Over 6,500 contacts were made in 2003 through the utilization of newsletters, short courses, and field days. These consisted of programs on topics such as Farm Pond Management, Whitetail Deer Management, Wild Turkey Management, Small Game Management, Wildlife Habitat Management, and Dove Field Management.

In the area of **Natural Resource-Based Enterprises** there were several different educational events held, while Mississippi State University hosted the "First National Symposium Sustainable Natural Resource-Based Enterprises for Private Landowners". This symposium was conducted by specialist from all over the country, and was attended by landowners from across the state. Extension personnel worked very closely with Farm Bureau, Ducks Unlimited, U.S. Fish and Wildlife Service, Mississippi Department of Wildlife Fisheries and Parks, Mississippi Wildlife Federation, Delta Wildlife, Mississippi Forestry Commission, Natural Resources Conservation Service, and the National Wild Turkey Federation.

Mississippi 4-H Field and Stream

Mississippi 4-H Field and Stream is a joint venture between the Mississippi State University Extension Service, Department of Wildlife and Fisheries, and 4-H, and is coordinated by MSU Extension Service professionals and volunteers. 4-H Field and Stream strives to enable young people aged 8-18 years, their parents, and adult volunteers to become responsible, self-directed, and productive members of society.

Mississippi 4-H Field and Stream consists of several program areas, including shooting sports, wildlife habitat evaluation, school enrichment modules, Catch-A-Dream, youth sport-fishing, and hunting skills. The 70-acre Lifeskills Center is the home base for the 4-H Field and Stream Program and is located in West Point, Mississippi. There are over 12,000 young people and over 500 adult volunteers who are in some way part of the 4-H Field and Stream Program. There were over 1,500 youth and adult volunteers who participated in the 4-H Shooting Sports Program alone this past year4-H Field and Stream is perhaps the largest single program area in Mississippi 4-H. Annually, the program reaches thousands of youth and adults through the shooting sports, wildlife conservation, and other outdoor activities. The key to the program's success lies in its mission: to teach important life skills – responsibility, self-discipline, and cooperation, and others – to youth throughout Mississippi. As an essential byproduct, participants in 4-H Field and Stream learn about the shooting sports, wildlife and aquatic ecology, natural resources management, and hunting skills and ethics.

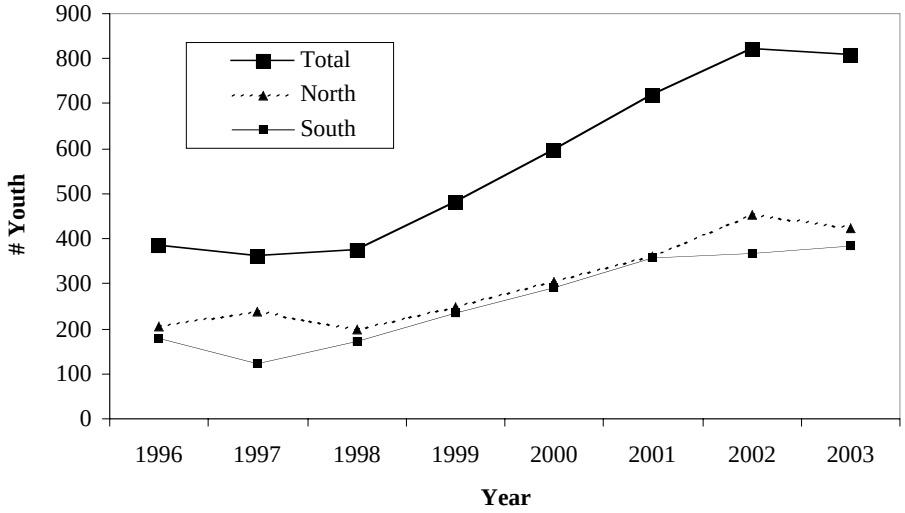
2003 Event Participation

- 51 counties overall
- North = 423 youth
- South = 384 youth
- State Invitational = 144 youth

2003 Club Participation

- 1351 youth in Shooting Sports
- 117 in WHEP
- 78% of counties reported that participation in 4-H Field and Stream would increase over the next 5 years; 39% predicted a "substantial increase."

4-H Shooting Sports/WHEP Participation
1996-2003



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4-H YOUTH DEVELOPMENT
Linda Mitchell, District Director, Family and Youth

4-H is Mississippi State University Extension System's dynamic, educational program for today's young people. The program combines the cooperative efforts of Mississippi's youth, volunteer leaders, Mississippi State University and Alcorn State University, federal-state-local governments, and the U.S. Department of Agriculture. The mission of the Mississippi State University Extension System in conducting 4-H programs is to assist youth in developing knowledge, skills, and attitudes that will enable them to become self-directing, productive, and contributing members of society.

The 4-H Vision is to become a state leader in developing youth to become productive citizens and catalysts for positive change to meet the needs of a diverse and changing society.

The 4 "H"'s represent these four important areas of youth development:
Head – clearer thinking and decision making which is useful throughout life.
Heart – greater loyalty, strong personal values, positive self-concept and concern for others.
Hands – larger service, workforce preparedness, useful skills, science and technology literacy.
Health – better living and healthy lifestyles.
Youth are also encouraged to look beyond themselves to find ways to help those around them.

Mississippi 4-H Statistics
212,569 contacts were made through 2260 4-H Clubs, school enrichment programs and community, district and state events.

4,226 youth were members of 372 4-H community-based clubs.
14,565 youth were involved in Plants and Animals projects
19,577 youth were involved in Healthy Lifestyles projects and activities
27,708 youth participated in Environmental Education projects
37,415 youth participated in Leadership and Citizenship Development
10,731 youth were involved in Child/Youth Families at Risk programs

Volunteers in 4-H
Volunteers are essential to the successful delivery of 4-H programs to youth. In 2003 there were 1129 adult volunteer leaders who worked directly and indirectly with the youth in our district.

The average 4-H adult volunteer donates 220 hours per year in preparing for club meetings and teaching youth. Each volunteer drives an average 300 to 400 miles for 4-H in a personally-owned vehicle and spends $40 to $60 annually on teaching materials. Estimated value of the total time volunteers devote to the 4-H plus their out-of-pocket expenses state-wide is about $6,000,000.

The 4-H Value Set
We believe that *youth development* is the focus of everything we do.
We believe that *partnerships* are essential to successful youth development.
We believe that *volunteerism* is fundamental.
We believe in the strength attained from *diversity* across the entire range of 4-H experiences.

The **Congressional Award Program** is about challenge. The award offers young people the opportunity to set a personal goal and achieve it in four areas; personal development, volunteer public service, physical fitness and expedition/exploration. Along the way, they learn about themselves and about qualities like responsibility, citizenship and the ability to plan and organize. There are six levels of Award-Bronze, Silver and Gold Certificates and Bronze, Silver and Gold Medals.

In the spring of 2003, 11 youth received their Bronze Medals and 5 received their Silver Medals in Washington. We had 2 youth receive their Gold Medals in June at the ceremony held at the Capitol in Washington, D.C. The 2003 State Ceremony was held at the Capitol in Jackson. We were pleased to have 32 youth receive their Bronze Medals and 22 youth receive their Silver Medals.

The Certificate of Merit award is presented by Bell South to 4-H Clubs who have met high standards the previous year. Recognized for 2001 were the *Triple C 4-H Club* in Lowndes County and the *People Pleasers 4-H Club* in Tippah County.

Community Pride grants are provided by the Chevron-Texaco company for 4-H to clubs to conduct a Community Pride project in their community. Clubs must develop a plan and a budget, prepare the grant proposal, and submit it through a screening process. Worth proposals are funded, and exceptional projects receive special recognition. In our district last year, 18 clubs received funding for their projects. Of these, six projects received special recognition:

Prentiss County –Thrasher School (Governor's Award)
Pontotoc County –Cream of the Crop 4-H Clubs (Lt. Governor's Award)
Alcorn County –Wenasoga Lucky Clovers (Congressional District 1 Award)
Alcorn County -Kossuth Junior High Beta Club
Alcorn County -Kossuth Junior High SGA
Alcorn County – Go Go Goers
Webster County – Eupora Biology Club

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FAMILY AND CONSUMER EDUCATION
Ms. Linda Mitchell, Interim District Director, Family and Youth

MSU Extension Service's Family and Consumer Education program addresses critical issues for individuals and families. Although modern families may take different forms than in the past, it is society's basic institution and is still the dominant influence in a person's life.

Today's families and individuals need help in coping with rapidly changing trends in society. Parents are torn between work and family obligations; they are concerned about financial security, education for their children, and care for elderly parents. With these situations in mind, our efforts focus on individuals and families throughout the life cycle, helping them manage and improve their lives, their environments, and their communities. The underlying goal is to help all Mississippians become healthy, financially secure, and responsible members of society.

Extension Family and Consumer Education information was distributed to over 455,900 individuals in Northeast Mississippi. This was accomplished through group teaching opportunities, exhibit days, short-courses, personal visits and consultations, and mailings. New technologies such as internet communications, workshop-by mail and fax mailings were also utilized to communicate with clientele.

Nutrition programs focusing on the Food Guide Pyramid and dietary guidelines, food safety, nutritional needs of young children, menu planning, reading food labels, eating healthy snacks and cost-effective food purchasing reached some 83,700 clientele. Many of these were from limited-resource families.

Extension also took a lead role in teaching the required food safety course "ServSafe" to local restaurant personnel, school, food service personnel, and other food preparation employees. Food-borne illnesses can cost up to $250 in treatment, not to mention the liability for commercial establishments. Prevention, in this case, has economically benefited many Mississippians

Financial management training to help families manage resources by learning to budget their money, plan for retirement, and make sound decisions on savings, credit use, insurance, investments and estate planning reached another 32,500. One housing authority reported a 90% decrease in late rent payment and housekeeping complaints due to the trainings.

Leadership development programs including the Mississippi Homemaker Volunteers, and others which build skills in communication, decision making and problem solving reached more than 29,600 in the 21 county area.

Health education programming providing instruction in basic health needs and self-care skills such as injury prevention and early detection of concerns such as Breast cancer reached over 52,100 in our area. These activities included Health Fairs in several counties, attracting a large number of Senior Citizens for Blood Pressure, Cholesterol and other free services and information.

In one case, Extension Health Agents were conducting a tasting event for diabetics when they discovered a lack of knowledge and understanding of diabetes. Extension Agents teamed with MS Department of Health and the North MS Medical Center Diabetes Center to implement a four-week Diabetes Seminar in Benton, Itawamba, and Marshall counties. Dining With Diabetes and Diabetic Care sessions provided 64 participants with information that challenged them to take charge and gain better control of their diabetes.

The six-month follow-up evaluations show that:

1. Sixty-four Diabetics, or family members who care for them, now have a better understanding of diabetes, its complications, and health consequences as a result of Extension organizing the seminars in Itawamba, Benton, and Marshall counties.
2. Three Diabetic Support Groups have been an outgrowth of the seminars.
3. Twenty-seven diabetics are managing their meal plans, food selections, and serving sizes better, and are eating less fats and sugars.
4. Eighteen participants are involved in some form of exercise and have lost weight ranging from 3 to 20 pounds.
5. Thirteen diabetics have lower blood pressure readings as a result of better eating habits and regular exercise.

Through the efforts of MSU's Extension Service, all Mississippians will have access to information that will help make their communities the best places for their families to live, work and play.

Parenting training for young families and **Child Caregivers** training reached another 123,200 people, and helped parents and providers of child care understand and develop skills related to child development. Participants have valued the information received at over $100 per person, for a value at over $8,000,000. In addition, Child caregivers saved over $30,000 by attending local trainings rather than having to travel over 100 miles to attend required trainings.

In our changing society, the face of America's family is ever-evolving. Child and Development Extension professionals face constant challenge in program delivery. Research supports the fact that literacy levels in our state are still lower than average (Annie Casey Foundation report) and that Mississippi children continue "at risk" on my levels.

In the upper portion of the Northeast district in the 2003 calendar year, over 150,000 contacts were made with child caregiver trainings, through newsletters, educational fairs, parent education and other activities and events. A financial impact of approximately $250,000.00 was realized due to Extension trainings because of savings on travel, workshop cost (either free or low cost), and other related expenses. Thanks to a generous partnership with the MS Public Broadcasting Network (they donated, we distributed and educated), families in the upper portion of the Northeast District received over 3,000 children's reading books for a financial impact of over $21,000.00. However, the lasting and even more valuable impact concerns the (1) promotion of literacy which brings jobs to our state and (2) family bonding with has lasting positive effects.

Other services to families included parenting classes; a working woman's newsletter (which was sent out to over 2,500 individuals per month throughout the year); participation by the agent in several state committees and local partnerships; and cooperative efforts with other Extension professionals to best serve clientele.

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MISCELLANEOUS PROJECTS

NORTH MISSISIPPI GARDEN EXPO

R.C. Sloan, S.S. Harkness, L.S. Kelly

Mississippi State University has an opportunity to reach a non-traditional agricultural audience, the home gardener. These new clients are the driving force behind the fastest growing segment of agriculture today, The Green Industry. They are involved in the entire range of gardening which includes ornamentals, vegetables, and turf. They are by far the largest client group that MSU agriculture could hope to reach. MSU-ES county agents report that the majority of the calls that they receive are related to garden and landscape questions. This event is an attempt to bring together Mississippi gardeners that have questions and interests with the MSU professionals that have comprehensive expertise in the many subjects that are related to gardening. Approximately 750 people attended the 2003 Expo on Saturday, September 20, 2003.

MAGNOLIA BOTANICAL GARDENS

R.C. Sloan, S.S. Harkness, and L.S. Kelly

The objective of the Magnolia Botanical Gardens (MBG) is to establish an outdoor educational center integrating research, demonstration, and educational programs to promote landscape development and enhancement in communities in Mississippi. Home, street, and city landscaping projects result in not only an improved quality of life for citizens, but also economic benefits such as increased property values of individual houses and integrity of neighborhoods. MBG will serve as an outdoor classroom to evaluate and demonstrate environmentally friendly landscape practices and plant material selection for both the landscape professional and the homeowner. MBG will also serve as an outdoor classroom for children and adults to develop an appreciation for and expertise in sustainable landscape practices. Affiliated horticulture groups such as the Mississippi Master Gardeners, Northeast Mississippi Rose Society, North Mississippi Native Plant Society, and the Old South Iris Society have indicated a willingness to contribute to horticultural demonstration and educational programs at MBG. The Gardens will be open to the public and should develop into an outdoor destination for both gardeners and non-gardeners alike. This will contribute to the diversity of cultural enrichment opportunities available to citizens in Northeast Mississippi.

FOUNDATION SWEETPOTATO SEED PROGRAM

Loyd W. Berry, Mark W. Shankle, and Jeff L. Main

The foundation sweetpotato seed stock program for the state of Mississippi is maintained at the Pontotoc Experiment Station. The goal of the program is to maintain high quality seed stock that is genetically pure, disease, and insect free for Mississippi's sweetpotato producers. A total of 2,505 bushels of sweetpotato seed was produced on 13 acres in 2002. All the seed was sold in the spring of 2003. A total of 2400 bushels of sweetpotatoes seed was produced on 11 acres in 2003. It is expected to all will be sold in the spring of 2004.

IMPROVING MONITORING TECHNIQUES AND CONTROL DECISIONS FOR THE SOUTHWESTERN CORN BORER

Michael R. Williams and C. Don Parker

The southwestern corn borer (SWCB) has become a major pest of corn in Mississippi during the past 5 years. Although the literature indicates this insect was a major pest of corn in the 1960's, their population densities dissipated as corn acreage decreased during the 70's and 80's. During the mid-1990's, corn acreage in Mississippi began to increase and likewise the densities and distribution of the SWCB increased. The goals of this project were to improve the information relating to densities of SWCB and associated economic losses at different phenological stages of crop development, to improve monitoring techniques, and to create a mechanism by which producers are provided updated decision-making information regarding SWCB in corn.

MAFES RESEARCH PROJECTS

CORN & CANOLA

BT/RR CORN HYBRID EVALUATION

N.W. Buehring, M.P. Harrison, and R.R. Dobbs

This study was conducted to evaluate the yield response of BT [toxic to Southwestern corn borers (*Diatraea grandiosella*)], Roundup Ready (RR), and stacked (BT/RR) corn hybrids compared to conventional hybrids. Early season growing conditions were poor in May due to excessive rainfall. Late season growing conditions, especially during the grain fill period were good and resulted in good yields. No corn lodging was observed at the time of harvest. Corn yields ranged from 129 to 152 bu/ac. There were no yield differences among the RR, BT, RR/BT, and conventional hybrids evaluated in this study. Pioneer 31B13 (BT hybrid) had the highest bushel test weight of 56.2 lb/bu. This was higher than DK6410 and DK68-70 which had test weight of 53.9 and 54.7, respectively. All other hybrids had test weights equal to Pioneer 31B13.

NO-TILLAGE CORN HYBRIDS FOR MARKET DEVELOPMENT

M.W. Shankle, T.F. Garrett, and J.L. Main

A field study was established to evaluate yield for several corn hybrids in a no-tillage environment. This study will help provide corn producers knowledge for their corn hybrid selections. There were 22 corn hybrids planted on a Henry silt loam on March 24. Insect pressure was minimal and environmental growing conditions were good for corn production in 2003. Average yield for the trial was 180 bu/ac. Pioneer 31G98, Dekalb 69-70, and Pioneer 31B13 yielded over 200 bu/ac. All hybrids yielded more than 160 bu/ac, except Pioneer 32R25 and Pioneer 34B24, which yielded 157.1 and 150.4 bu/ac, respectively.

CORN AND SOYBEAN RESPONSE TO ROTATION AND TILLAGE ON A PRAIRIE CLAY SOIL

N.W. Buehring, M.P. Harrison, and R.R. Dobbs

A corn and soybean response to a corn-soybean rotation and selected tillage systems study initiated in the fall of 1999 on a Prairie clay soil (Catalpa silty clay loam) was continued in 2003. Early season excessive rainfall stunted corn and soybean growth. Favorable conditions, however, occurred during the rest of the growing season. Both corn and soybean showed a positive response to rotation. Terral TV 2140RR corn (116 day maturity), averaged over tillage/rotation system, produced 131 bu/ac. No-till corn rotated after no-till winter cover crop (Paradana Balansa clover, self reseeding)/no-till soybean; no-till corn rotated after a fall coulter-chisel-harrow (FCH), a one-pass operation reduced tillage (stale seedbed) system with soybean; and no-till corn rotated after no-till soybeans had higher yield than continuous no-till corn. However, there was no difference between no-till corn after no-till soybean and no-till corn after FCH soybeans.

RESIDUAL FALL PARATILL EFFECT ON CORN YIELD

R.R. Dobbs, N.W. Buehring, and M.P. Harrison

The purpose of this study was to determine whether deep under-row tillage (paratill) applied in the fall of 2000 (cropped with corn in 2001) had any residual effect on corn yield in 2002 and 2003. In 2002, the environmental growing conditions were very favorable for corn with above normal rainfall in May and July, resulting in excellent yields. In 2003, saturated soil conditions from excessive rainfall, resulted in stunted plant growth and reduced yields.

However, the results from both years indicate no yield or test weight improvement from annual fall paratilling. Yield was 174.9 bu/ac for the bed-roller only treatment and 175.5 bu/ac for the annual fall paratill followed by (Fb) bed-roller treatment in 2002. In 2003, the bed roller only treatment yielded 120.1 bu/ac and the fall paratill Fb bed-roller yielded 119.0 bu/ac. Test weights were 58.03 for the bed-roller only treatment and 58.13 for the paratill Fb bed-roller treatment in 2002. In 2003, test weights were identical for both treatments at 56.32 lb/bu. These results indicate that deep under-row tillage effects may last for at least two years.

COMPARISONS TO HERBICIDE SYSTEM IN NO-TILLAGE CORN FOR BROADLEAF SIGNALGRASS CONTROL

M.W. Shankle, T.F. Garrett, and J.L. Main

A no-tillage corn trial was established to compare broadleaf signalgrass *Brachiaria platyphylla* control systems in a no-tillage environment. Weed control systems included preemergence (PRE) and postemergence (POST) herbicides applied alone, sequentially, and as tank-mix partners at different timings. At 60 days after planting all herbicide systems controlled broadleaf signalgrass at least 99%, except for treatments that only received a PRE application. Broadleaf signalgrass control was greater with systems that included a POST treatment compared to the PRE alone system. Grain yield ranged from 70.8 to 145.2 bu/ac for all herbicide treatments. Untreated checks were included with Dekalb 6971 RR/YG and Pioneer 31B13 YG, which yielded 79.6 and 64.3 bu/ac, respectively. Grain yield was 142.5 bu/ac for a single application of 21.4 oz/ac Roundup WEATHERMAX and the addition of a residual herbicide or sequential Roundup WEATHERMAX treatment did not improve yield.

EVALUATION OF MESOTRIONE FOR WEED CONTROL IN NO-TILLAGE CORN

M.W. Shankle, J.L. Main and T.F. Garrett

This research evaluated Callisto (mesotrione) for broadleaf signalgrass *Brachiaria platyphylla* control and yield in no-tillage corn. Corn yields ranged from 96 to 116 bu/ac for all herbicide treatments, which was greater than 85 bu/ac for the untreated check. The highest yielding treatment was 3 oz/ac Callisto at 56 DAP, but was not significantly different compared to all other herbicide treatments. At harvest all treatments containing Callisto controlled broadleaf signalgrass at least 80%, except for the PRE treatment of 1.8 qt/ac Bicep II Magnum plus 0.6 qt/ac Aatrex followed by (fb) 3 oz/ac Callisto. Weed control and yield did not improve with the addition of a preemergence herbicide or with a higher rate than 3 oz/ac Callisto alone.

CORN YIELD RESPONSE TO N RATES IN COMBINATION WITH HYDRAHUME

R.R. Dobbs, N.W. Buehring, and M.P. Harrison

Improving fertilizer efficiency in row crop production is a major consideration. HydraHume is a humus derived 12% organic acid product designed to improve nutrient uptake. The purpose of this study was to evaluate the effect of HydraHume in combination with reduced soil applied N rates on corn yield and mid-rib leaf nitrate nitrogen (NO_3-N) and potassium (K) concentrations. Abnormally wet conditions delayed the nitrogen and HydraHume applications about 2 weeks, which reduced yield potential. Grain yields ranged from 104 bu/ac to 118 bu/ac. HydraHume and nitrogen rates produced no significant effects on yield. Leaf tissue analysis showed reduced nitrate and K levels following the initial (2 weeks after sidedress) sample date of 6/10/03. However, HydraHume and nitrogen combinations had no effect on leaf tissue nitrate nitrogen or K levels.

CORN RESPONSE TO FOLIAR CORON APPLICATIONS WITH REDUCED N RATES

M.P. Harrison, N.W. Buehring, and R.R. Dobbs

A study was conducted on a Leeper silty clay loam soil in 2003 to evaluate the effect foliar applications of CoRoN® [(25-0-0) contains 2.5 lb N/gallon of a controlled release nitrogen (CRN) liquid fertilizer available in varying formulations for foliar application], in combination with soil applied N rates on corn grain yield. Early season growing conditions were very unfavorable due to excessive rainfall in May. However, mid to late season conditions

improved and resulted in good yields. Foliar applications of CoRoN had no effect on corn yield and there was no foliar application by N rate interaction. Averaged over foliar applications, yields increased from 150 to 173 bu/ac as soil N rates increased from 119 to 170 lb N/acre. The 170 lb N/acre rate had the highest yield at 173 bu/ac and was higher than both 119 and 145 lb N/ac application rates.

EVALUATION OF WINTER CANOLA CULTIVARS FOR NORTH MISSISSIPPI

J.R. Johnson and J.R. Saunders

Thirty-four winter canola cultivars were evaluated in the fall of 2002 and spring 2003 for stand germination, winter survival, bloom date, maturity, and grain yield at the North Mississippi Branch Station. The overall mean of the test was 1844 lb/acre. Grain yields ranged from 1273 lb/ac to 2451 lb/acre. Ten cultivars had yields of 2000 lb/ac or higher. Five cultivars had yields less than 1500 lb/acre. For this study a majority of the cultivars had yields ranging from 1500 to 2000 lb/acre.

PERFORMANCE OF SPRING CANOLA VARIETIES AT THE NORTH MISSISSIPPI BRANCH STATION

J.R. Johnson and J.R. Saunders

Twenty-four spring canola varieties and breeding lines were evaluated in the fall of 2002 and spring 2003 for stand germination, winter survival, bloom date, maturity, and grain yield at the North Mississippi Branch Station. The overall yield mean of the test was 1624 lb/acre. Grain yields ranged from 1033 lb/ac to 2140 lb/acre. One variety, UGA G00092, had yields higher than 2000 lb/acre. Eight varieties had yields less than 1500 lb/acre. Fifteen of the spring canola varieties had yields ranging from 1500 to 2000 lb/acre.

SOYBEAN - VARIETIES

ROUNDUP AND CONVENTIONAL SOYBEAN VARIETY TRIALS

N.W. Buehring, M.P. Harrison, R.R. Dobbs, Bernie White, and Fawad Shah

One hundred twenty-eight Roundup Ready and 23 conventional varieties were evaluated on a Leeper silty clay soil in 2003. The Roundup Ready varieties were evaluated in separate maturity group (MG) studies (Early MG IV, late MG IV, Early MG V, and Late MG V). The conventional varieties evaluated in separate studies were MG IV, Early MG V, and late MG V. Excessive rainfall (254% of normal) in May delayed early season growth. However, rainfall of 183% and 210% of normal in June and August, respectively, resulted in good yields. The overall mean yields for Roundup Ready early MG IV, late MG IV, Early MG V, and Late MG V were 46.2, 51.5, 43.1, and 41.1, respectively. The overall mean yields for the conventional MG IV, early MG V, and late MG V were 49.7, 53.8, and 56.3 bu/ac, respectively. Except for late MG V, the highest yield conventional and Roundup Ready varieties produced more than 60 bu/ac. The lowest yielding varieties across all studies ranged from 30 to 40 bu/ac. When compared to the lowest yielding varieties in each study, selecting the most productive variety has the potential to almost double the soybean yield.

SOYBEAN MATURITY GROUP III TRIAL

N.W. Buehring, M.P. Harrison, R.R. Dobbs

Eight Roundup Ready maturity group III varieties were evaluated on a Marietta silt loam soil in 2003. The environmental growing conditions for maturity group III soybeans were very unfavorable during the early growing season with excessive rainfall through May. All varieties matured in late August. The yields ranged from 30 to 49 bu/ac with a study mean yield of 38 bu/ac. AG3702 yield of 44.1 bu/ac was similar to the highest yield variety AG3902 of 49.4 bu/ac. AG3702, DPX3932RR, Armor 39-E9 showed no difference in yield. DK3961RR,

DK3968RR, DPX3932RR, and Armor 39-E9 also showed no yield difference. The lowest yielding variety was DPX3940RR with 29.7 bu/ac and was similar to Deltapine DPX3861RR and DPX3940RR. The preliminary data indicate that maturity group III varieties have potential for North Mississippi. Variety selection is highly important for maximum yield potential.

ROUNDUP READY SOYBEAN VARIETIES RESPONSE TO EARLY PLANTING

N.W. Buehring, R.R. Dobbs, and M.P. Harrison

A field study was conducted on a Leeper silty clay loam soil at Verona, Mississippi to determine maturity group (MG) IV and V productive soybean variety response to selected early planting dates (4/15/03, 4/30/03, and 5/29/03). Early season growing conditions were unfavorable due to excessive rainfall for May (253% of normal) and cool temperatures. The study site also was under floodwater for about 8 hours in May and August. The data indicated a variety by planting date interaction for yield and plant height at maturity. Yields ranged from 21 to 40 bu/ac. The MG IV varieties (DK4868RR, DG 4950RR, and AG4603) planted 4/30/03 had higher yield than planted 4/15/03. DK4868RR was the only variety which produced higher yield 4/30/03 than either planted on 4/15/03 or 5/29/03. The MG V varieties Deltapine DP5644RR, DP5915RR, and Pioneer 95B53 showed no yield differences between planting dates. All varieties were shorter in height planted 4/15/03 than planted 4/30/03 or 5/29/03 with no differences between 4/30/03 and 5/29/03 planting. All varieties except AG4603 and DP5915RR planted 4/15/03 matured 3 weeks earlier than planted 5/29/03 and about one week earlier than planted 4/30/03. DP5915RR planted 4/15/03 matured about 2 and 3 weeks earlier than planted 4/30/03 and 5/29/03, respectively. AG 4603 planted 4/15/03 matured 2 and 4 weeks earlier than planted 4/30/03 and 5/29/03, respectively.

EFFECT OF PLANTING DATE ON GROUP III NO-TILLAGE SOYBEAN

M.W. Shankle, T.F. Garrett, and J.L. Main

Five glyphosate tolerant maturity group III soybean varieties were evaluated to determine the effect on yield of three planting dates in a no-tillage environment. Mean yield was 33.3, 27.5, and 25.9 bu/ac for April 2, April 16, and April 30 planting dates, respectively. Yields ranged from 21.4 to 38.6 bu/ac across all planting dates. On the April 2 planting date Asgrow 3702 yielded 38.6 bu/ac, which was greater than 29.5 and 31.1 bu/ac for Deltapine X3861 and Deltapine 3940, respectively. Yields were not different among varieties for the April 16 planting date. On the April 30 planting date Armor 39-E9 yielded 29.6 bu/ac, which was greater than 21.4 and 23.0 bu/ac for Asgrow 3702 and Asgrow 3902, respectively.

DELTA AND PINE LAND SOYBEAN VARIETY EVALUATION

J.R. Saunders, J.R. Johnson and J.D. Roberts

Four soybean maturity groups were planted using conventional tillage practices to determine yield differences. Seed was furnished by Delta and Pine Land Seed Company, all entries both public and experimental varieties were Roundup Ready. The different groups were: Late Group III, Early Group IV, Late Group IV, and Group V. The Late Group III and Early Group IV's were planted on April 15. The Late Group IV and Group V's were planted on May 12. The overall yields from late Group IV's were higher than the Early Group III, Early Group IV and Group V.

GLYPHOSATE TOLERANT GROUP IV NO-TILLAGE SOYBEAN VARIETY

T.F. Garrett, M.W. Shankle, and J.L. Main

Twenty-three glyphosate tolerant maturity group IV soybean varieties were evaluated for yield potential in a no-tillage environment. Mean yield for the trial was 52.3 bu/ac. Deltapine 4331 yielded 73.6 bu/ac, which was greater than all other varieties evaluated. All varieties yielded greater than 45 bu/ac except for Deltapine 99-4902 (experimental), Delta Grow 4860, Asgrow 4603, Deltapine 498, and Asgrow 4502, which yielded 44.9, 43.0, 42.5, 41.2, and 39.4 bu/ac, respectively.

GLYPHOSATE TOLERANT GROUP V NO-TILLAGE SOYBEAN VARIETY

T.F. Garrett, M.W. Shankle, and J.L. Main

Twenty-three glyphosate tolerant maturity group V soybean varieties were evaluated for yield potential in a no-tillage environment. Yields ranged from 57.8 to 73.7 bu/ac. Mean yield for the trial of 64.3 bu/ac. Varieties with yields of 68 bu/ac or greater were Deltapine 98-06954 (experimental), Deltapine C99-71420 (experimental), and Deltapine 5915. Varieties yielding less than 60 bu/ac were Deltapine 5806, Delta King 5366, Armor 56-J6, and Pioneer 95B96, which yielded 59.4, 58.7, 58.7, and 57.8 bu/ac, respectively.

EVALUATION ON CONVENTIONAL SOYBEAN VARIETY

T.F. Garrett, M.W. Shankle, and J.L. Main

Six conventional soybean varieties were established to determine yield differences in a no-tillage environment. Yields ranged from 45.6 to 55.3 bu/ac with a mean yield for the trial of 49.4 bu/ac. Yield was at least 50 bu/ac with Deltapine 5110-S, Deltapine X97134-35, and Deltapine X5520S, which was greater than Deltapine 4748S, Pioneer 9594, and Deltapine 5989.

SOYBEAN – PRODUCTION STUDIES

SOYBEAN RESPONSE TO SELECTED ROW SPACING AND LOW SEEDING RATES

N.W. Buehring, M.A. Blaine, M.P. Harrison, and R.R. Dobbs

A study was conducted in 2002 and 2003 to evaluate an indeterminant (DK4868RR) and determinant (Pioneer 95B53) soybean variety's canopy closure, plant branching, yield, and stem diameter response to narrow row (9.5 and 19 inch spacing) and seed rates (55,000, 110,000, and 165,000 seed/ac). The 2002 growing season was favorable for good yield. The early season growing conditions in 2003 were unfavorable due to excessive rainfall; however, conditions were favorable in July and August. This study site in 2003 had flood water about one ft deep on it May and August. The determinant variety Pioneer 95B53 had more branches per plant than the indeterminant variety DK4868RR. Row spacing had no effect on late season canopy closure, branches per plant, stem diameter, and plant height at maturity. Both years, the 55,000 seed/ac seed rate for both varieties had larger stems, shorter plant height at maturity, more branches, and lower yield than 110,000 or 165,000 seed/ac which had similar yield. Both determinant and indeterminant varieties indicated seeding rates of 110,000 seed/ac in 19-inch rows with good precision planting technology is adequate for maximum yield and late season canopy closure. Additional research is necessary to determine whether all varieties show similar results.

CORN AND SOYBEAN RESPONSE TO ROTATION AND TILLAGE ON A PRAIRIE CLAY SOIL

N.W. Buehring, M.P. Harrison, and R.R. Dobbs

A corn and soybean response to a corn-soybean rotation and selected tillage systems study initiated in the fall of 1999 on a Prairie clay soil (Catalpa silty clay loam) was continued in 2003. Early season excessive rainfall stunted corn and soybean growth. Favorable conditions, however, occurred during the rest of the growing season. Both corn and soybean showed a positive response to rotation. Terral TV 2140RR corn (116 day maturity), averaged over tillage/rotation system, produced 131 bu/ac. No-till corn rotated after no-till winter cover crop (Paradana Balansa clover, self reseeding)/no-till soybean; no-till corn rotated after a fall coulter-chisel-harrow (FCH), a one-pass operation reduced tillage (stale seedbed) system with soybean; and no-till corn rotated after no-till soybeans had higher yield than continuous no-till corn. However, there was no difference between no-till corn after no-till soybean and no-till corn after FCH soybeans.

SOYBEAN YIELD RESPONSE TO RESIDUAL FALL PARATILL TILLAGE ON A LEEPER SILTY CLAY LOAM SOIL

N.W. Buehring, M.P. Harrison, and R.R. Dobbs

A study was conducted in 2002 and 2003 to evaluate soybean yield response to the residual effect of a fall under-the-row deep tillage (paratill-bed-roller) stale seedbed system on a Leeper silty clay loam soil. The study was conducted on an area that received a fall paratill-bed-roller application in the fall of 2000 and cropped with soybean in 2001. The bed-roller system applied in the fall of 2001 and 2002 was compared to a paratill-bed-roller applied in the fall of 2001 and 2002. Growing conditions were favorable both years with above average yield. Yield data indicated a mean yield of 41.8 bu/ac in 2003 and 50.2 bu/ac in 2002. Both years, there was no yield and plant height at maturity difference between tillage systems. Two-year results indicated deep under-row tillage is not necessary for at least two years after under-the-row deep tillage.

COTTON - VARIETIES

NO-TILLAGE COTTON VARIETY EVALUATION

M.W. Shankle, T.F. Garrett, and J.L. Main

A study was conducted at the Pontotoc Ridge-Flatwoods Branch Experiment Station in 2003 to evaluate cotton lint yield of genetically enhanced varieties in a no-tillage environment. The first concept of this study was to evaluate first generation (BG/RR) and second generation (BGII/RR) "stacked trait" technology to the original single trait (RR) variety. The varieties tested include SG215 BG/RR and DP424 BGII/RR and SG521 RR derived from SG 125; and DP458 BG/RR and DP468 BGII/RR and DP5415 RR derived from DP 5415. In addition, other genetically enhanced varieties were included for comparison. The first and second generation stacked trait to single trait technology comparison indicates that second generation stacked trait technology is equal to or greater than the first generation stacked and single trait varieties. Lint yield for these varieties follow the order of SG521 RR (1358 lb/ac) = DP458 BGII/RR (1323 lb/ac) = SG215 BG/RR (1230 lb/ac) and DP468 BGII/RR (1398 lb/ac) > DP5415 RR (1249 lb/ac) = DP458 BG/RR (1217 lb/ac). A comparison of all varieties illustrates that PM1218 BG/RR lint yield is greater than all second generation stack trait varieties except DP468 BGII/RR. In addition, DP555 BG/RR and DP451 BG/RR yielded more than 1400 lb/ac and were not different than PM1218 BG/RR.

EARLY AND MID-SEASON COTTON VARIETY TRIALS

N.W. Buehring, T.P. Wallace, R.R. Dobbs, and M.P. Harrison

Wet soil conditions in early May delayed planting until the end of May. First blooms were noted about July 30. Good rainfall and warm temperatures resulted in a good fruit load by September 1. Yields were above average. In the early maturity study, seed cotton yields ranged from 2725 to 3989 lb/ac with an overall mean yield of 3260. The mid-season varieties seed cotton yields ranged from 3036 to 4567 lb/ac with an overall mean yield of 3792 lb/ac. The percent first pick ranged from 92 to 97% for the early maturity study; and 88 to 97% for the late maturity study. Lint yields in early maturity variety ranged from 1072 lb/ac for PM1199BR to 1589 lb/ac for FM 966 LL. FM 966 LL, OAX-303, FM 958 LL, and OAX-300 BR had yields from 1470 lb/ac to 1589 lb/ac with no difference between varieties. Lint yield for mid maturity varieties ranged from 1199 lb/ac for DP 449 BG/RR to 1833 lb/ac for ST5599BR. ST 5599BR and ST 5242BR had yields of 1833 and 1758 lb lint/ac and were not different. Variety selection has the potential to increase lint yield by as much as 500 lb/ac.

COTTON VARIETY RESPONSE TO REDUCED SEEDING RATES

N.W. Buehring, M.P. Harrison, and R.R. Dobbs

A study was initiated in 2003 to evaluate yield response of three productive varieties to seeding rates ranging from 13,000 to 65,000 seed/ac. Due to wet soil condition, planting date had to be delayed until 5/28/03. The 2003 seed

cotton yield results indicated that 3 seed/ft of row (39,000 seed/ac) in 38-inch row was sufficient for maximum yield for ST4892BR, ST5599BR, and DP555BR. Seeding rates less than 3 seed/ft of row for all varieties decreased yields. Boll weight increased as seeding rate decreased to 13,000 seed/ac. ST5599BR had higher boll weight than both ST4892BR and DP555BR. ST4892BR and DP555BR showed no difference in boll weight. Maturity was delayed by 6 days when seeding rate was decreased to 13,000 seed/ac.

COTTON – PRODUCTION STUDIES

COTTON YIELD RESPONSE TO TILLAGE SYSTEMS ON A LEEPER SILTY CLAY LOAM SOIL

N.W. Buehring, M.P. Harrison, and R.R. Dobbs

A tillage study was initiated in 2003 to further evaluate reduced tillage systems for cotton production. The objective was to evaluate no-till in comparison to reduced tillage systems of one or two pass operations for land preparation on soils with 0.5% or less slope. The no-till system was compared to treatments that were planted no-till on beds which had been formed in January or April (Prepmaster®) of 2003. The no-till treatment in 2003 was planted on the beds which had been formed the fall of 2001 with a paratill-bed roller system. The cotton was planted no-till in the spring of 2003. These beds were almost flat with only one to two inch height at planting. The no-till treatment had lower plant population, less early season growth, lower seed cotton and lint yield, and was shorter in height at maturity. The bed-roller, under-row-deep-tillage (paratill) + bed-roller, applied in January 2003 and the Prepmaster® (bed-renovator) treatment (applied in April 2003) showed no difference in yield and all were higher than the no-till system. This study will be continued in 2004 to determine long range effects.

RESIDUAL DEEP TILLAGE EFFECT ON COTTON YIELD

N.W. Buehring, R.R. Dobbs, and M.P. Harrison

A study was initiated in the fall of 2001 after cotton had been grown on a site that received a fall paratill-bed application in 2000. The objective was to evaluate the residual effects of a fall under-row deep tillage (paratill) bed-roller system on cotton yield on a Leeper fine sandy loam soil. The cotton growing season environmental conditions in 2002 and 2003 were favorable with above average yield. The 2002 results indicated an overall mean seed cotton yield of 2577 lb/ac, 1005 lb/ac of lint, and a lint percent turnout of 39% . In 2003, the overall mean yield was 2972 lb/ac of seed cotton, 1343 lb/ac of lint, and a lint percent turnout of 45.2. The fall bed-roller, applied two consecutive years after the paratill bed-roller, had yield equal to the fall paratill bed-roller system applied every year. These results indicate that deep under-the-row tillage may not be necessary for at least two years.

WEED MANAGEMENT SYSTEMS FOR RR/BT COTTON

M.P. Harrison, N.W. Buehring, and R.R. Dobbs

A study was conducted during the 2003 growing season evaluating weed management systems for Roundup Ready/BT (RR/BT) cotton. The study was conducted on a Leeper silty clay loam soil where weed infestations of pitted morningglory (*Impomea lacunosa*) was light to moderate, broadleaf signalgrass (*Brachiaria platyphylla*) and crabgrass (*Digitaria sanguinalis*) were very light, and sicklepod (*Senna obtusifolia*) infestation was high. The preliminary results indicated that the residual burndown application of Caparol (prometryn) did not result in increased weed control at planting. These one-year preliminary results indicated cotton growers have four weed management options for sicklepod morningglory control in RR/BT cotton without negative consequences. Option 1: the grower has the option to use 3 applications of Roundup (glyphosate) starting with a post-emergence over-top (POT) application at 1 leaf cotton followed by (Fb) repeated POT application at 4 leaf cotton and a post-directed broadcast (PD) layby application at 10 leaf cotton. Option 2: use an appropriate preemergence (PRE) herbicide [Cotoran (flumeturon), Dual Magnum (metolachlor)] and skip the 1 leaf POT application Fb Roundup/Touchdown IQ (glyphosate) POT 4 leaf and a PD layby application at 10 leaf cotton. Option 3: use Staple (pyrithiobac) + Roundup applied POT at 4 leaf cotton Fb Roundup PD at 10 leaf cotton. Option 4: use Roundup/Touchdown POT at 1 leaf

cotton Fb Envoke (trifloxysulfuron) POT at 4 leaf cotton Fb a 10 leaf PD layby application of Touchdown/Roundup Suprend (trifloxysulfuron + pnometyn) + Touchdown. Delaying the first herbicide POT application of either Roundup/Touchdown or Dual Mangum + Roundup/Touchdown until 4 leaf cotton Fb Touchdown PD at 10 leaf cotton and Touchdown POT delayed until 4 leaf cotton Fb Envoke POT at 7 leaf Fb Touchdown PD at 10 leaf cotton reduced mid season morningglory control at yield. The POT Envoke application at 7 leaf cotton demonstrated potential crop injury and yield loss.

COMPARING YIELDS USING PREEMERGENCE HERBICIDE IN ROUNDUP READY COTTON

J.R. Johnson and J.R. Saunders

Roundup Ready technology in cotton provides an opportunity for producers to control grasses and weeds with post emergence (POT) herbicide applications thereby omitting any preplant incorporated (PPI) or preemergence (PRE) herbicide application. A study was conducted at Holly Springs to evaluate Cotoran, Cotoran and Dual, and Staple sprayed on Roundup Ready cotton as a preemergence (PRE). There was no visible cotton injury in plots with PRE herbicide treatments by the time plants started initiating true leaves. Weeds and grasses had rapid emergence in the plots without a PRE and in many cases were as tall or taller than the cotton at three weeks after emergence when Roundup was applied postemergence (POT). Pigweeds were present in the plots where Cotoran and Dual were used as a PRE. Yields ranged from 1686 lbs seed cotton/ac with no PRE herbicide to 1788 lb seed cotton/ac with Cotoran as a PRE.

PREVIOUS YEAR'S CROP AND PLANT RESIDUE EFFECTS ON CURRENT YEAR'S CROP YIELD

J.R. Johnson and J.R. Saunders

Previous year plant residue can be a blessing and/or a curse. Residue can be a blessing when one considers adding organic matter to the surface or soil, to reduce erosion, or providing a mulch cover to reduce soil moisture evaporation and increase water-holding capacity. Residue can be a curse when one considers management techniques in dealing with the residue for planting and pest control. Yet, crop residue is an important commodity when meeting conservation compliance on highly erodible land. Crop residue on the soil may become even more of an asset when new conservation initiatives are implemented and producers are paid for the level of conservation carried out on their farm. In our study we measured residue from corn and cotton production with fall tillage, and spring tillage and no-tillage systems. In general we found surface residue dropped below 30% on the surface as soon as tillage was performed on the field regardless of the type of crop grown in the previous year or if the tillage was in the fall or spring. The no-till system had residue levels above the 30% level throughout the growing season in both the cotton and corn stubble. However, the cotton grown no-till in the corn stubble had a significantly higher level of residue than the all other systems when evaluated in July. Yield ranged from 860 lbs lint/ac where cotton was grown after corn with fall tillage to 799 lbs lint/ac for cotton grown after cotton with spring tillage.

TILLAGE AND COVER CROP EFFECTS ON COTTON MATURITY

J.R. Johnson and J.R. Saunders

There are several things that can delay cotton maturity including variety selection, pesticide program, nitrogen rates, and tillage. Maturity delays from tillage are not noticeable every year. However, in some summers delays in maturity between tilled and no-tilled cotton is noticeable. Cover crops can cause additional delays in maturity in no-tilled cotton in some instances. In our study heavy rain and low temperatures occurred the first three weeks after planting. High temperatures for the month of May failed to exceed 90 degrees. Cloudy overcast days also decreased the DD 60's in May. Accumulative DD 60's were running about 300 below average at the first of June. Total DD 60's fell to 400 below the average during the first 15 days of June. There was high plant-to-plant variation in squaring in all plots. High variation in squaring resulted in a high variation in time and position of boll set on the main stem. This high variation in boll set lead to considerable differences in boll maturity in all plots. Earliness as measured by the percent first pick showed no differences between tillage and cover crop treatments in our study. Percent first pick ranged from 66% for the no-till after a wheat cover crop to 83% for the conventional tilled after a wheat cover crop. Yields ranged from 986 lbs lint for conventional tilled with native cover to 1094 for the no-till with a crimson clover cover crop.

TILLAGE SYSTEM FOR COTTON

J.R. Johnson and J.R. Saunders

In comparing cotton tillage systems for plant emergence and survival the conventional system had an emergence rate of 93% compared to 87% for the no-till and the conventional system had a survival rate of 74% compared to 69% in the no-tillage system. Plant height at six weeks after planting was 22 inches for the conventional system compared to 16 inches for the no-till system. There was no difference in plant height between the tillage systems at two, six, and ten weeks after planting. There was no difference between the two systems for canopy closure at two, six, and ten weeks after planting. The no-tillage system had two percent more bolls than the conventional system. The no-tillage system had a final yield 15 percent less than the conventional system in 2003.

COVER CROPS FOR NO-TILL COTTON PRODUCTION

J.R. Johnson and J.R. Saunders

Cover crops are a vital tool in conservation tillage. Legume cover crops serve as a source of nitrogen. In other cases, cover crops can serve as nitrogen scavengers removing nitrogen from the soil in order to minimize pollution of runoff to streams, lakes and other bodies of water. In our study we evaluated crimson clover, vetch, wheat, and native vegetation for cover crops in no-till cotton production. Plant stands, seedling vigor and early growth of the cotton plants were not noticeably different in any of the cover crops. However, as the season progressed it was evident by cutout and plant color the cotton grown after the legume crops was slower to mature. The vetch and crimson clover caused a delay in maturity of 7 to 10 days past the wheat and native vegetation. Yields ranged form 2549 lb seed cotton/ac to 2409 lb seed cotton/ac in this study. Yields were the highest for the vetch cover crops.

EVALUATION OF THREE RATES OF TEMIK AND SEED TREATMENTS FOR THRIPS CONTROL ON COTTON 2003

D. Bao, J.T. Reed. and C.S. Jackson

Cruiser (thiamethoxam) and Gaucho (imidacloprid) seed treatments and three rates of Temik (aldicarb) applied in-furrow were evaluated for control of thrips in seedling cotton. Tests were conducted at the Plant Science Research Center, Mississippi State, MS. All treatments except Gaucho significantly reduced adult tobacco thrips numbers below that of the untreated check through 18 DAP (Days After Planting). By 26 DAP, only the Cruiser and the two lower rates of Temik reduced adult tobacco thrips numbers below that of the untreated check. Immature thrips were controlled in all treatments through 26 DAP, but no difference in numbers of immature thrips existed between treated plots and the untreated check by 31 DAP. At 18 and 26 DAP all treatments showed significantly reduced damage ratings compared to the untreated check. Yield did not differ between treatments in this trial.

COTTON – FERTILITY & NUTRIENT MANAGEMENT

COTTON RESPONSE TO POTASH AND HYDRAHUME

N.W. Buehring, R.R. Dobbs, and M.P. Harrison

HydraHume is a product containing 12% humus derived organic acids. The potential benefit of HydraHume is improved uptake efficiency of applied fertilizers. Therefore, a cotton study was conducted in 2003 evaluating the influence of preplant incorporated applications of potash (K_2O) rates (25, 50, 75, and 100 lb/ac) in combination with HydraHume rates (0, 1 and 2 gpa) on cotton petiole N and K levels and yield. The potash rates were based on a soil test recommendation rate of 100 lb/ac. All N was applied sidedress as UAN solution (32% N) at pinhead square. The environmental growing season had above normal rainfall for May, June, August, and September. HydraHume and potash rate treatments had no visual effect on cotton growth or maturity. Cotton lint yield ranged from 894 lb/ac for 25 lb/ac of potash + 2 gpa HydraHume to 1041 lb/ac for 75 lb/ac of potash + HydraHume at 1 gpa. Compared to the checks (no HydraHume plus 25 lb potash/ac), neither HydraHume nor potash increased yield or percent lint.

BROILER LITTER AS A NITROGEN SOURCE FOR COTTON

J.R. Johnson, J.R. Saunders, and Haile Tewolde

The value of chicken broiler litter as a fertilizer, especially as a nitrogen source for cotton, has increased in importance over the past several years. Several ongoing studies are underway evaluating chicken litter as a nitrogen source for cotton within MAFES and USDA-ARS research programs in Mississippi. Several producers within the state and region of north Mississippi have been applying chicken broiler litter for several years and reaping the benefits of N-P-K from the litter. In the first two years of the study we only evaluated nitrogen from the chicken broiler litter annually. The phosphorus and potassium values are to be determined at the end of three years, when the project is terminated. In the first year when there was no carryover of nitrogen from the broiler litter and the inorganic nitrogen rates fit a regression curve with 80 lbs of inorganic nitrogen having the maximum yields and 3 tons of broiler litter having the maximum yield. In 2003 broiler litter at 3 tons/ac produced yields significantly higher than the broiler litter rates of 4.5 tons/ac and the nitrogen rates of 30 lb/ac, 100 lb/ac, and 150 lb/ac.

CHICKEN LITTER AS A FERTILIZER IN CONVENTIONAL TILLAGE COTTON

M.W. Shankle, H. Tewolde, T.F. Garrett, and J.L. Main

This study evaluated chicken litter as a fertilizer N source in conventional tillage cotton at the Pontotoc Ridge-Flatwoods Experiment Station in Pontotoc County, Mississippi in 2003. Lint yield of 1350 lb/ac from 3.67 ton/ac of litter incorporated was greater than the untreated check yield of 1226 lb/ac. Incorporation has no effect on lint yield. Litter rates alone or plus sidedress N showed no differences and were equal to the commercial N rate of 90 lb N/ac.

CHICKEN LITTER AS A FERTILIZER IN NO-TILLAGE COTTON

M.W. Shankle, H. Tewolde, J.L. Main, and T.F. Garrett

This study evaluated chicken litter as a fertilizer N source in no-tillage at the Pontotoc Ridge-Flatwoods Branch Experiment Station in Pontotoc County, Mississippi. The chicken litter treatments lint yield was higher than the untreated check and equivalent to the standard UAN fertilizer (90 lb N/ac). The 2.45 ton litter/ac incorporated + 30 lb N/ac (UAN) sidedress and 3.67 ton litter/ac incorporated produced yield equal to the standard UAN 90 lb N/ac sidedress treatment. Litter lightly incorporated at planting increased yield by 100 lb/ac than unincorporated.

CHICKEN LITTER RATE EFFECTS IN NO-TILLAGE COTTON

M.W. Shankle, H. Tewolde, J.L. Main, and T.F. Garrett

A study was conducted in 2003 at the Pontotoc Ridge-Flatwoods Branch Experiment Station in Pontotoc County, Mississippi to evaluate poultry litter as a source of fertilizer in notillage cotton production. Lint yield with litter at 4.49 and 6.12 ton/ac was equal and higher than 1.22 ton/ac. Lint yield for all litter rates (alone or followed by UAN solution) and the standard UAN fertilizer treatment were equal to the highest rate of litter. Except for the 1.22 ton/ac litter rate.

COTTON – SEEDING RATES & ROW PATTERNS

COTTON ROW PATTERN GROWTH AND YIELD RESPONSE

N.W. Buehring, M.H. Willcutt, M.P. Harrison, R.R. Dobbs,
T.C. Needham, and J.B. Phelps

A study was initiated in 2002 on a Marietta silt loam soil (Verona, MS) and a Falaya silt loam soil (Falkner, MS) evaluating cotton response to different row pattern production systems. The row patterns used in the study were 15, 30, and 38-inch row solid cotton, 15-inch rows with a 2 x 1 skip row (2 rows of cotton with a 30-inch skip), 15-inch row 2 x 2 skip row (2 rows with a 45-inch skip), 30-inch rows with a 1 x 1 skip-row (cotton in 60-inch rows), 30-inch

rows with a 2 x 1 skip row (2 rows of cotton with a 60-inch skip), and 38-inch rows with a 2 x 1 skip row (2 rows of cotton with a 76-inch skip).

SEED SPACING FOR COTTON IN THE HILLS

J.R. Johnson, J.R. Saunders, Ted Wallace, Will McCarty, and John Beal

With the high price of planting seed, most producers are looking for ways to economize on cottonseed when it comes to planting without sacrificing yields. A study was conducted on a producers' field in Claiborne County 3 miles east of Port Gibson on upland loamy soil to evaluate planting populations. Cotton was planted on beds which had been hipped in the fall after corn harvest. Fertilizer was spread by a custom applicator according to soil test recommendation prior to any fieldwork. The beds were rolled to provide a smooth planting surface. Seeds were planted on 38 in rows at 2, 2.5, 3, 3.5, 4, 4.2, 4.5, 5, 5.5 and 6 seeds/ft of row the first week of May. Plots were planted with DP 555 BG/RR variety of cotton. The weather in April was warm and sunny and the soil temperatures were ideal for planting the last week of April. The plants were up to a good stand by the first week of May. May was cloudy, overcast with frequent rains. However, the plants grew rapidly and were squaring by the first week of June. All plants were blooming the first week of July. Yields ranged from 1176 lb lint/ac with 5 seeds/ft of row to 972 lb lint/ac with 1 seed/ft of row. The 5 and 6 seeds/ft of row yields were significantly higher than the other seeding rates.

PLANT CHARACTERISTICS OF ULTRA NARROW ROW COTTON

J.R. Johnson, and J.R. Saunders

Improvements in technology over the past several years have allowed producers to grow cotton in rows spaced narrower than traditional row spacing. Some of the technology includes more precise drill planters, more efficient harvesting equipment, and genetically modified seed with herbicide and insect resistance. Roundup Ready cotton, however, has played the greatest role in allowing growers to have success with Ultra Narrow Row (UNR) cotton. In our study,we found that when populations were increased within the row plant height increased, and the number of barren plants increased. When the plant population increased to more than three plants per square foot the percentage of barren plants increased to 30 percent. Boll size was also greatly affected by plant population. Boll size was larger with the low population and was smaller with the high population. The highest lint yield of 1249 lb/ac was for two seed per foot of row.

DAIRY

TUNNEL VENTILATION COOLING FOR LACTATING DAIRY COWS DURING HOT WEATHER: 2. COMPARISON TO COOLING WITH SHADE AND FANS

Terry R. Smith, Angelica Chapa, Donald Pogue, Thad Riley, Justin Williams, Jenna Crouch, Heather Wilson

The objective of this study was to characterize the ability of tunnel ventilation cooling to alleviate symptoms of heat stress in lactating dairy cows. Fans and evaporative "cooling" cells were used to cool the model, 20-cow tunnel ventilation facility, constructed at the Dairy Research Unit in Holly Springs, MS. The 10-week trial, which began June 2, 2003, compared two groups of 10 cows housed in the tunnel ventilation barn with two similar groups, housed in an adjacent "traditional" freestall barn, which was cooled by shade and fans alone. The effect of tunnel ventilation cooling was to decrease exposure to moderate heat stress conditions by 4.3 hours/d when compared to conditions in the traditional freestall barns. In response, cows housed in the tunnel barn had dramatically lower peak body temperatures (1.2 ^{O}F) and respiration rates (15.7 breaths/min) than cows housed in the "outside" freestall barn. This increment in cooling improved feed consumption within the tunnel barn an average of 4.0 lbs/hd/d over the 10-week study. In addition, over the 10-week trial, cows receiving the tunnel ventilation cooling averaged 5.9 lbs/hd/d greater milk production than cows cooled with shade and fans alone. These results demonstrate that tunnel ventilation cooling can be used to mitigate the effects of heat stress on lactating dairy cattle in the southeastern US.

BEEF

THE EFFECT OF 0%, 10% AND 20% LEVELS OF TASCO MEAL, DELIVERED IN A COMPLETE MINERAL MIXTURE, ON HORN FLY NUMBERS, BODY TEMPERATURE, RESPIRATION RATE, HAIR SCORE AND CALF IMMUNOGLOBULIN LEVELS IN CROSSBRED BEEF COWS

T.F. Best, J.E. Huston and R.R. Evans

Previous studies using the brown seaweed meal, TASCO, at the 10% level have reported reductions in body temperature of cows and calves and reduced respiration rates and horn fly numbers in cows. This is the second year of a study, initiated in 2002, that was undertaken to determine if increasing the level of TASCO to 20% would have any additional benefit to beef cattle in reducing body temperature or horn fly numbers. The 20% level was directly compared to the 0% and 10% levels as in previous studies. The results from both the 2002 and 2003 studies showed no difference ($P < .05$) between levels of TASCO for cow and calf body temperature, cow pregnancy rate, calf weaning weight, cow or calf hair score, respiration rate or horn fly numbers.

SURVEY OF THE TOTAL FECAL COLIFORMS, E. COLI AND FECAL STREPTOCOCCI IN WATER COLLECTED FROM SITES WITH AND WITHOUT BEEF CATTLE

R.R. Evans, T.F. Best, and, S.V. Diehl

Water samples were collected from four different sites at the Prairie Research Unit beginning in the late winter of 2002 and aliquots from these samples were filtered and the filtrate was plated onto selective media to allow bacteria to grow. Bacteria were evaluated using the Standard Methods published by the American Public Health Association, 18th edition, 1992. Results are reported as colonies per 100 ml as prescribed by the Standard Method. The sampling sites are described in the following: **Sampling site 1A (SS1A)**, which is a roadside ditch that constitutes a portion of the headwaters of the creek sampled in the next described collection point. The **SS1A** sampling point is prior to the creek entering the pasture area and is used to determine the preexisting bacterial load. **Sampling site 1 (SS1)** is from a flowing creek (one-quarter mile downstream from **SS1A)**, which collects the runoff water from approximately 275 acres, and this acreage has between 125 and 150 mature cows, plus calves, grazing at most times of the year. **Sampling site 2 (SS2)** collects water from a grassed pasture of approximately 125 acres that has a variable stocking rate of cattle, and **Sampling site 3 (SS3)** collects water from a wooded and grass covered pristine area of approximately 150 acres, that has no human or livestock involvement. Bacteria numbers vary between areas and within areas at different sampling times. Runoff events occurred on a regular basis in 2003 due to its above normal rainfall. Rainfall events with less than one-inch accumulation falling onto dry soils provided no runoff. It can be concluded from this survey thus far, that bacteria in runoff waters vary, even in pristine areas with no human or domestic animal contribution and that all bacteria from streams running through and beside areas, where cattle graze, may not be from cattle only. Bacteria spikes seen in water from the pristine area, that are above those from other collection sites, could possibly be attributed to migratory activity or population variations in birds, rodents, deer, coyotes and other wildlife. As seen in this survey, measuring <u>total</u> coliforms in watersheds probably may not be the best method for assessing farm animal contributions. DNA fingerprinting, to determine the percentage of each contributing species, must be used to separate total bacteria counts.

DETERMINATION OF BACTERIA AND NUTRIENTS IN RUNOFF FROM BEEF CATTLE GRAZING OPERATIONS: PRELIMINARY REPORT

R.R. Evans, T.F. Best, S.V. Diehl, M.S. Cox, and L. Oldham

In the summer of 2002, six bermed paddocks, measuring 300 ft X 600 ft and comprising a total of 4.1 ac, were constructed in an established pasture of mixed common bermudagrass and fungus-infected fescue. A 75-acre pasture was surveyed to establish the parameters for six paddocks and to establish paddocks with approximately the same slope. This insured that runoff water collected from each paddock would travel through each collection paddock at a similar rate. Berms were made by throwing up soil with a levee plow, packing this loose soil by running over it

several times with the tractor and then repeating this process until the berms were thoroughly packed and 18 inches high and 36 inches wide. In June of 2003 the paddocks were plowed and packed for the final time, and fences and an automatic watering system installed in each paddock. Levees are high and wide enough to exclude water from outside sources and this insures that data generated from runoff water was from that paddock only. A runoff weir, for sample collection, was constructed at the lowest point of the paddock and an automatic sampling device installed in this weir to sequentially sample water from runoff events. The effect of cattle stocking rate density; age (calves vs. cows) or type of cattle (steers, replacement heifers, cows); placement of feeding and resting areas; temperature, rainfall frequency and other weather factors on the number and type of bacteria found in runoff water from these paddocks are areas of interest in initial studies. Future studies may include nutrient content in runoff water after application of organic and inorganic fertilizers.

ROUND BALE FEEDING METHODS COMPARING UNPROTECTED BALES, FEEDING IN RINGS AND FEEDING HAY THROUGH A BALE PROCESSOR

Richard R. Evans and Timothy F. Best

Hay may be the most expensive feed producers use in the cattle business. Losses occur in production, storage and from feeding and its associated renovation costs. Quality decline begins before harvest if the forage is allowed to become too mature. Once forages go from the leafy, vegetative or growing stage into the seed or reproductive stage, readily available protein and energy diminishes drastically within a 10-14 day period. Even if harvested at peak quality, few producers are able to bale all of the forage they cut. Numerous studies have been conducted looking at losses during storage, with losses ranging from 3-5% with barn storage and up to 30-50% for unprotected ground storage. High rainfall amounts and poorly drained storage areas accelerate ground storage losses. Generally the longer hay is stored, the greater the deterioration. Also, hay that is stored outside has a higher animal refusal rate since it has a musty, unpleasant odor generally associated with rotting hay. Increased feeding losses are seen when hay is fed without a hay ring, independent of storage method, because cows sort through the hay, eat their fill and then use the remainder of the bale as very expensive bedding. Once cattle have rested in the hay, mashed it into the mud, urinated and defecated on it, a further 15-20% or greater feeding loss may occur. With a combined 50% storage and feeding loss, the original 1200 lb hay bale may provide only 600 lb of actual feed and actually cost twice as much as its original value. With or without hay rings, pasture renovation costs are incurred because the refusal pad that remains from each bale must be burned or spread out and then the muddy, trampled area around where each bale was fed must be renovated and replanted. If this area is not renovated the next spring, beneficial forages will not grow and there will be excessive weed growth.

In this project three round bale-feeding methods were evaluated; unprotected bales, bales fed in rings and round bales fed from a bale processor. Whole bales, fed with or without hay rings, had a muddy 30-foot circle with a refusal pad in the middle. For each bale feeding area, approximately 706.5 square feet of productive pasture was lost. Due to the extremely wet spring, we were unable to renovate these areas and calculate renovation times and costs and by early summer as anticipated, these feeding areas were nonproductive weed covered areas. In the pastures where the bale processor was used, there was no evidence that hay had been fed. What refusal remained was thin enough so that beneficial forage species were able to grow up through it and no renovation was necessary. There was some rutting where the hay trailers and tractors ran in all pastures and there was also minor rutting where the bale processor ran. The bale processor is likely to be too expensive for a 25-cow herd, but with 100 cows a producer could possibly make it cost effective. If 400 bales were fed in an annual haying season, with a 10% savings per bale, these 40 saved bales at $25 each, would constitute a savings of $1000 per year. With a $10,000 cost, the bale processor would pay for itself in 10 years. With moderate care and inside storage, this machine could last for 15-20 years. Of course the more bales fed, the quicker the payback. Pasture renovation costs must be collected to determine the processor's real value over a winter feeding period. Another unexpected benefit of the processor was that hay was spread out in a windrow and all animals in the herd were allowed equal access to feed. With whole bale feeding the older boss cows always eat before the more timid, younger animals that generally are the animals in greater need of higher nutrition. Also, cows tended to spread out more with the windrowed hay and did not use this windrow hay as bedding. The project will be repeated in 2004.

FORAGE

"HIGHLANDER" GAMAGRASS – AN ALTERNATIVE SILAGE CROP

J.R. Saunders, J.R. Johnson, and J.L. Douglas

Corn is the primary silage crop for dairy cows in Mississippi, however alternative crops can be produced in Mississippi and other states. At the North Mississippi Branch Experiment Station and the Coastal Plains Experiment Station a joint study with the Jamie L. Whitten Plant Material Center (PMC) was initiated in 2001. This study was undertaken to determine if: (1) Eastern gamagrass could be established as a perennial forage grass and sustained as a permanent source of silage (2) to compare dry matter yield and forage quality of Eastern gamagrass to corn silage. Many hybrid silage corn varieties have been developed and evaluated, however disadvantages exist when using corn for silage, such as annual establishment cost and soil loss on conventionally tilled sloping cropland. Eastern gamagrass, a native warm season perennial grass, may be a more sustainable silage production system that would reduce soil erosion and establishment costs. Results indicate that Eastern gamagrass can be easily established and harvested for silage using conventional silage equipment. Eastern gamagrass yielded 22,114 lb dm/ac compared to corn silage of 16,039 lb dm/ac for the Holly Springs location (Table 1). At the Newton location gamagrass yielded 55,000 lb of dry matter and the two corn varieties combined averaged 25,800 lb dm/ac (Table 3). The Newton location was able to make three harvests of gamagrass. Nutritive quality analyses for both locations are listed in Tables 2 and 4. From data generated in this study the PMC was able to release accession 9062680 gamagrass to the public as "Highlander" Eastern Gamagrass in 2003.

EFFECT OF LAND APPLIED POULTRY LITTER ON YIELD, N AND P CONTENT OF WARM SEASON GRASSES

J.R. Saunders, J.R. Johnson, and J.L. Douglas

Water quality impacts from land applied poultry litter are dependent on many variables: soil, rainfall, climate, plant species, shallow versus concentrated flow, application rate, waste characteristics, among others. In an attempt to limit adverse environmental effects, Mississippi began requiring that all poultry facilities, that generate dry litter or waste, to obtain an application permit. The NRCS is charged with supplying the technical support for these plans.Application rates and required acreage are based on soil type and the nutrient removal capacity of the plants receiving the land applied poultry litter. Nutrient removal capacity is determined by percent nutrients in the plant tissue and by the season total dry matter yield of each group. The objective of this study is to evaluate the nutrient removal and yield potential of 9 warm season grass species receiving poultry litter as the fertilizer source.

SWEETPOTATO – PRODUCTION STUDIES

REGIONAL SWEETPOTATO VARIETY TRIAL

J.L. Main, P.G. Thompson, and L.W. Berry

In this trial, advanced breeding lines from sweetpotato breeding programs in Mississippi, Louisiana, and North Carolina were evaluated. NC-Beauregard (B14) produced the highest yield of U.S. No. 1 and total marketable yield of all cultivars, but was not significantly different than LA 99-35.

ADVANCED BREEDING LINE EVALUATION

J. L. Main, P.G. Thompson, and L.W. Berry

Advanced breeding lines from the Mississippi sweetpotato breeding program were evaluated in field trials for yield. The orange fleshed MS-K39 line produced the greatest U.S. No.1 yield, while MS-L66 produced the greatest total

marketable yield, but neither entry was significantly higher than the next six highest entries. White fleshed MS-M118 produced the greatest U.S. No.1 and total marketable yield, but was not significantly higher than three other entries.

YIELDS OF THIRD YEAR SWEETPOTATO BREEDING LINES

J.L. Main, P.G. Thompson, and L.W. Berry

Thirteen sweetpotato breeding lines, in the third year of selection, were evaluated for yield potential. Beauregard was the highest ranking entry for U.S. No.1 yield, but not different than MS-O28. MS-O26 was the highest ranking entry for total marketable yield, but was not different from three other entries including Beauregard.

HUMIC ACID NUTRIENT TRIAL

M.W. Shankle, T.F. Garrett, and J.L. Main

In 2003, a study was established in Mississippi, Louisiana, North Carolina, and Alabama to evaluate the effect of HM9754A (humic acid plus nutrients) on sweetpotato yield. US No.1 yield in Mississippi ranged from 313 boxes/ac to 210 boxes/ac for HM9754A at 60 lb/ac and the standard soil fertility program, respectively. However, the addition of HM9754A did not improve yield of Mississippi grown sweetpotatoes when compared to the untreated check.

SWEETPOTATO – WEED AND INSECT CONTROL

EFFECT OF SANDEA HERBICIDE RATE, APPLICATION TIME, AND INSECTICIDE ON SWEETPOTATO AND WEED CONTROL

M.W. Shankle, T.F. Garrett, and J.L. Main

Effects of Sandea 75WG (halosulfuron-methyl) on sweetpotato injury, weed control, and yield were evaluated. At 3 weeks after treatment (WAT), plant injury was 13% with Sandea at 1 oz/ac compared to 6 and 9% for Sandea at 0.50 and 0.66 oz/ac, respectively. Yellow nutsedge control was at least 90% with Sandea at 0.5 oz/ac and control did not improve with higher rates of Sandea. Plant injury at 1 WAT was 15% across all rates of Sandea applied at 6 weeks after transplant (WAP) compared to more than 30% for 3 and 4 WAP applications. However, injury symptoms diminished to 6% for 4 WAP applications at 3 WAT. Yellow nutsedge control was 50% at 1 WAT for the 4 WAP applications, which was greater than control when Sandea was applied at 3 and 6 WAP. At 3 WAT, yellow nutsedge control was 92% for the 4 WAP application compared to 84% for the 3 WAP applications. There was no Sandea by organophosphate insecticide interaction with respect to sweetpotato plant injury. No. 1 grade sweetpotato yield ranged from 216 to 241 boxes/ac and was not significantly different regardless of rate, application time, or type of insecticide applied prior to transplant.

EFFECT OF SANDEA APPLICATION RATES AND TIMING ON SWEETPOTATO

M.W. Shankle, T.F. Garrett, and J.L. Main

Effects of Sandea 75WG (halosulfuron-methyl) on sweetpotato injury, weed control, and yield were evaluated in Pontotoc County, Mississippi in 2003. At 4 weeks after treatment (WAT), plant injury was less than 5% and yellow nutsedge control was at least 94% for the 14, 21, 28, and 35 days after transplant (DAP) application times, regardless of Sandea rate. The highest US No. 1 yield was 170 box/ac with Sandea applied at 28 DAP, which was greater than the 85 box/ac yield with Sandea applied at 49 DAP. Total marketable yield was 349 box/ac for the 14 DAP application time, which was greater than the 232 box/ac yield with Sandea applied at 49 DAP. US No. 1 yield accounted for more than 50% of total marketable yield when Sandea was applied at 28 and 42 DAP. There were no yield differences when compared among the different Sandea rates.

VALOR AND COMMAND TANK-MIX COMBINATIONS IN MISSISSIPPI DELTA SWEETPOTATO

M.W. Shankle, J.L. Main, and T.F. Garrett

A trial was conducted at the Alcorn State University Demonstration and Technology Transfer farm in Mound Bayou, Mississippi to evaluate the use of Valor 51WDG (flumioxazin) herbicide in sweetpotato. Treatments were applied on 5/29/03 using a CO_2 backpack sprayer. Pre-transplant treatments included; Valor at 0, 2, and 3 oz/ac, Valor at 0, 2, and 3 oz/ac plus 1.66 pt/ac Command 3ME (clomazone), Valor at 0, 2, and 3 oz/ac plus 2 pt/ac Command and Valor at 0, 2, and 3 oz/ac plus 2.66 pt/ac Command. Post-transplant treatments included Valor at 2 and 3 oz/ac and Valor at 2 and 3 oz/ac plus 1.66 pt/ac Command. Morningglory control was at least 90% at 3 WAT in all plots that received Valor. All plots that received Command had at least 80% grass control at 9 WAT. Plant injury was significantly higher for post-transplant applications of Valor with or without Command than the pre-transplant applications and had lower yields. Total marketable yield ranged from 14 to 403 boxes/ac for the untreated and Valor at 3 oz/ac + Command at 2.66 pts/ac applied pretransplant, respectively. This research illustrates that a 3 oz/ac rate of Valor in a tank mix with Command at 2.66 pts/ac applied pre-transplant provides an high rate of control for grasses and morningglory with minimum plant injury.

THE EFFECT OF VALOR RATE AND CULTIVATION TIMING ON MORNINGGLORY CONTROL IN SWEETPOTATO

M.W. Shankle, J.L. Main, T.F. Garret, R.S. Taylor

A study was conducted in 2003 at Pontotoc County, Mississippi on Ferguson Farms to determine the effect of Valor 51 WDG (flumioxazin) rate in combination with cultivation timing on entireleaf morningglory (*Ipomoea hederacea* var. *integriuscula)* control in sweetpotato. Treatments were Valor at 1, 2, and 3 oz/ac applied one week pretransplant with cultivations at 1, 2, 3, and 4 weeks after transplant. At 1 week after cultivation (WAC), morningglory control was 94, 92, and 87% at 1, 2, and 3 weeks after transplant (WAP), respectively. Cultivation 1 to 3 WAP improved morningglory control. The US No. 1 and total marketable grade yields with cultivation at 1, 2, and 3 WAP were greater than the 4 WAP and no cultivation treatments. At 1 and 2 WAC, Valor at 3 oz/ac controlled morningglory greater than the 1 and 2 oz/ac rates. US No. 1 and total marketable grade yields with Valor at 3 oz/ac was greater than Valor at 1 oz/ac, but not different than Valor at 2 oz/ac.

EFFECTS OF VALOR ON SWEETPOTATO 2003

M.W. Shankle, J.L. Main and T.F. Garrett

Effects of Valor 51WDG (flumioxazin) on sweetpotato injury and weed control were evaluated at the Ferguson Farm in Pontotoc County, Mississippi in 2003. Sweetpotato plant injury was not observed for any treatment of Valor + Command 3ME (clomazone) applied pretransplant (PRE). Plant injury with Valor at 1, 2, and 3 oz/ac plus Command at 2 pt/ac applied posttransplant (POST) was 18, 33, and 50% at 18 days after transplant (DAP). Crop injury increased to greater than 50% for Valor + Command + Induce applied POST. Broadleaf signalgrass was controlled at least 80% for all Valor + Command treatments applied at 18 DAP, but control with Dacthal W-75 (DCPA) was only 35%. Redroot pigweed control was 100% for all Valor + Command treatments at 18 and 25 DAP and was greater than control with Dacthal. Morningglory control was at least 80% for all Valor + Command treatments, but control with Dacthal was 66%. This research indicates that Valor applied PRE at 1 to 3 oz/ac in a tank mixture with Command will control pigweed and morningglory species in sweetpotato production without crop injury.

EFFECT OF HOLDING TIME ON CUTTING RESPONSE TO VALOR

M.W. Shankle, J.L. Main and T.F. Garrett

A study was established to determine the effects of Valor 51WDG herbicide on sweetpotato slips that are cut and then held for several days before transplanting. Sweetpotato slips were held for 0, 1, 2, 3, and 4 days. Plant injury was less than 10% across all treatments 1 week after initial transplanting. No injury was observed for slips held 0 days after cutting with any rates of Valor at 1 week after initial transplanting. Injury was highest to slips held for 4 days after cutting. There was no injury observed at the 2 or 3 week evaluation after initial transplant, regardless of Valor 51WDG rate.

EVALUATION OF SYSTEMIC INSECTICIDES FOR FLEA BEETLE MANAGEMENT

M.R. Williams, J.T. Reed, L. Adams, D. Bao

The trial was designed to evaluate soil application of systemic insecticides during transplanting of slips to help prevent infestations of sweet potato flea beetle. Sweet potato (*Ipomoea batatas*) slips were planted on 6/25/03, without pre-plant incorporated insecticide. Plots were 4 rows wide by 40 ft long, and slips were planted 1 ft apart. Insecticides were applied at planting in approximately 2 oz of water per plant and included Platinum 2FS (thiamethoxam), Admire 2F (imidacloprid), Poncho 2F (clothianidin), and Vydate 3.77L (oxamyl). Sweet potato foliage was sampled on a weekly basis throughout the summer, and potatoes were evaluated for insect damage at harvest. There were no sweet potatoes damaged by flea beetles. This is probably related to the very low numbers of flea beetles in foliage throughout the trial. The sampling for foliage pests was not begun soon enough to detect efficacy immediately following planting.

FOLIAR PESTICIDE EVALUATION FOR SWEET POTATO PESTS IN PONTOTOC COUNTY, MISSISSIPPI

J.T. Reed, M.R. Williams, C.S. Jackson, and D. Bao

The purpose of the test was to evaluate insecticides for control of lepidopteran pests. Since these pests did not develop in the plots, the plots were sprayed twice to determine the efficacy of insecticides on other pests, primarily flea beetles (*Chaetocnema sp.*). Sweet potato (*Ipomoea batatas*) slips were planted on 7/2/03, without PPI (pre-plant incorporated) insecticide. Plots were 4 rows wide by 40 ft long, and slips were planted 1 ft apart. Sweet potato foliage was sampled on a weekly basis throughout the summer, and potatoes were evaluated for insect damage at harvest. Treatments applied on 7/25/03 and 8/18/03 included Diamond 0.83 EC (novaluron), Provado 2F (imidacloprid), Capture 2EC (bifenthrin), Phaser 3 EC (endosulfan), Penncap M 4F (methyl parathion) SpinTor 2F (spinosad) Confirm 2F (tebufenozide) and Intrepid 2F (methoxyfenozide). Only the application of insecticide applied on 7/25/03 resulted in differences in numbers of flea beetles in samples from treatements five days post treatment. At that time Phaser and Capture reduced numbers below that of Provado, Spintor, Confirm and Intrepid. However the water-treated check did not differ from any treatment indicating that insect numbers were insufficiently uniform for confident analysis. Analysis of the data based on the percent change in numbers per plot between the 7/25/03 sample and the post-spray sample on 7/31/03 was inconclusive. It is evident that this pest is highly mobile and it is probable that 8-row or wider plots will be necessary for pesticide evaluations for this pest. Results of the second application indicated no efficacy from any compound. However, the flea beetle numbers were increasing dramatically at that time and movement of insects into the plots by the 4 DAT sample date probably overshadowed any efficacy.

EVALUATION OF SOIL-APPLIED PESTICIDES FOR SWEET POTATO PEST CONTROL IN PONTOTOC COUNTY, MISSISSIPPI

M.R. Williams, J.T. Reed, C.S. Jackson and D. Bao

This trial was planted to evaluate soil-applied insecticides applied PPI (pre-plant incorporated) and at lay-by (when vines begin to lap the middles). Because of wet conditions, the lay-by treatment could not be applied before the vines lapped the middles so only the PPI application was made in this trial. Sweet potato (*Ipomoea batatas*) slips were planted on 7/2/03. Plots were 6 rows wide by 40 ft long, and slips were planted 1 ft apart. Sweet potato foliage was sampled on a weekly basis throughout the summer, and potatoes were evaluated for insect damage at harvest. Insecticides were applied on 6/26/03 and included Lorsban 4E (chlorpyrifos), Admire 2F (imidacloprid), Force 3G (tefluthrin), Capture 2E (bifenthrin), Regent 4SC (fipronil) and Mocap 15G (ethoprop). Because a planned lay-by application of chemicals was not made in this trial, results are based on 20 replications for Lorsban, eight replications each for Admire, Capture and Mocap, and four each for Force and Regent. When analyzed in this manner only the damage by white grubs (*Phylophaga sp.*) resulted in significant differences between treatments, and the list of treatments from highest to lowest damage and associated percent damaged potatoes is: untreated (16.7%), Admire (14.3%), Capture (7.1%), Mocap (6.9%), Lorsban (6.4%), Force (5.1%) and Regent (3.4%). No differences between treatments were discernable from vacuum samples of insects in the foliage throughout the season.

EVALUATION OF A MOTORIZED VACUUM SAMPLER FOR INSECTS ON SWEET POTATO FOLIAGE

J.T. Reed and M.R. Williams

A sampler utilizing an Echo ES 230 leaf vacuum was designed to sample insects in sweet potato foliage. The device channels the exhaust air from a gas-powered leaf vacuum to blow across the foliage of a single row into the end of a 4 in pipe attached to the vacuum side of the leaf vacuum. A fine mesh screen inserted between the suction orifice and the fan collects the insects for viewing or counting. Efficacy of this device with a chain that was hung across the row so as to brush the vines to dislodge insects into the blower/vacuum stream, was compared to efficacy obtained without the chain and to a sweep-net and a vacuum without the blower assembly. Eight replicates in a randomized complete block design with 40 ft samples for the vacuum devices and 25 sweeps over a 40-ft distance were used to make the comparisons. Results indicate that the chain brushing the foliage slightly in front of the blown stream of air did not improve sampling. The blower/vacuum sampler was more efficient for sampling tortoise beetles than either the sweep-net or the hand-held vacuum, and it was more efficient in sampling flea beetles (primarily *Chaetocnema confinis)* than the sweep-net, but was only equal to the hand-held leaf vacuum for flea beetle collection. Although numbers of twelve spotted cucumber beetles (*Diabrotica undecimpunctata*) were few, the results indicate that the blower/vacuum was equal to the sweep-net, but the sweep-net was superior to the blower/vacuum with the chain attached and to the hand-held vacuum.

SWEET POTATO INSECT ESTABLISHMENT PLOTS, STONEVILLE, MISSISSIPPI

M.R. Williams, J.T. Reed, L. Adams, D. Bao

Plots of sweet potato (*Ipomoea batatas*) and brown top millet (*Panicum milaicelum*) were planted at the Jamie Whitten Center, USDA-ARS, Stoneville MS, in order to establish a population of white grubs (*Phyllophaga* species). Eight rows of millet and eight rows of sweet potato, replicated 4 times, were planted in rows approximately 500 ft long. Because several white grub species are attracted to grass, it was intended that *Phyllophaga* larvae would be established in the millet, and the following year sweet potato would be planted in the area where the millet had been with increased potential of testing soil-incorporated pesticides. At the end of the season, there was approximately one white grub per row-ft of millet. Twenty row-ft of border rows and center rows of each plot were dug with a commercial potato harvester 93 days after planting and potatoes were washed and examined for insect damage. Percent of potatoes damaged by white grub ranged from 10 to 13 percent with a trend toward more damage in rows bordering the millet than in rows in the center of the 8-row sweet potato plots. Identification of the grubs to species is pending, however, the possibility exists that the dominant species occurring in the millet is not a pest of sweet potato.

FOLIAR PESTICIDE EVALUATION FOR SWEET POTATO PESTS IN CALHOUN COUNTY, MISSISSSIPPI

J.T. Reed, M.R. Williams, C.S. Jackson, D. Bao

A test was designed to evaluate insecticides for control of lepidopteran pests. Caterpillars failed to establish, and the plots were sprayed twice to determine the efficacy of insecticides on other pests, primarily flea beetles (*Chaetocnema* species, *primarily C. confinis*). Sweet potato (*Ipomoea batatas*) slips were planted on 5/27/03, without soil-applied insecticide. Plots were 4 rows wide with 40-in spacing by 40 ft long, with 4 unsprayed rows as buffer between plots. Slips were planted 1 ft apart. Sweet potato foliage was sampled on a weekly basis throughout the summer, and potatoes were evaluated for insect damage at harvest. Treatments applied on 8/1/03 and 8/15/03 included Diamond 0.83 EC (novaluron), Capture 2EC (bifenthrin), Phaser 3 EC (endosulfan), Penncap M 4F (methyl parathion), SpinTor 2F (spinosad), Confirm 2F (tebufenozide), Intrepid 2F (methoxyfenozide) and Regent 4F (fipronil). Three compounds were efficacious for the control of flea beetle following two applications, Capture, Phaser, and Penncap M, and results indicate that Fipronil also has some efficacy. Capture and Phaser demonstrated significantly better control of flea beetles than Spintor, Confirm or Intrepid. Other compounds did not reduce populations of flea beetles below that of the untreated check. It should be noted that Diamond is an insect growth regulator and affects molting of immature insects. As such it would not be expected to reduce populations of adults. Other compounds (except Fipronil) were placed in the trial specifically for lepidoptera larvae that did not develop in the trial.

EVALUATION OF SOIL-APPLIED PESTICIDES FOR SWEET POTATO PEST CONTROL IN BOLIVAR COUNTY.

M.R. Williams, J.T. Reed, L. Adams, F. Chuckwuma, and D. Bao

This trial was initiated to evaluate different soil-applied insecticides and insecticide combinations applied PPI (pre-plant incorporated) and lay-by (just before vines lap) for control of soil-inhabiting insect pests of sweet potato (*Ipomoea batatas*). Sweet potato slips (variety: Beauregard) were planted on 5/29/03. Plots were 8 rows wide by 40 ft long, and slips were planted 1 ft apart. Sweet potato foliage was sampled on a weekly basis throughout the summer, and potatoes were evaluated for insect damage at harvest. Treatments applied at planting included Lorsban 4E (chlorpyrifos) PPI, Lorsban 4E PPI plus Force 3G (tefluthrin) lay-by, Lorsban 4E PPI plus Admire 2F (imidacloprid) lay-by, Lorsban 4E PPI plus Capture 2F (bifentrhin) lay-by, Admire 2F PPI, Force 3G (tefluthrin) PPI plus Force 3G lay-by, Capture 2E PPI, Capture 2E PPI plus Capture 2E lay-by, Mocap 15G (ethoprop) PPI, and Mocap 15G PPI plus Capture 2E lay-by. There were low populations of root-damaging insects, and no differences in damaged potatoes or in numbers of insects in foliage between treatments were evidenced in results of the trial.

VEGETABLES & CULINARY HERBS

ELONGATED AND OVAL TRIPLOID (SEEDLESS) WATERMELONS: SECOND YEAR RESULTS

Kent Cushman, Thomas Horgan, Richard Snyder, Peter Hudson, Christine Coker, and Mike Ely

Sixteen entries of triploid watermelons were grown during Spring 2003. Eight entries were elongated triploid types, some of which had been tested at this location during Spring 2002. The purpose of this study was to evaluate elongated triploid watermelon cultivars under northern Mississippi growing conditions. Cooperstown, an oval 'Tri-X 313' type that had performed well in previous trials at this site, was used as a standard. Transplants were started in the greenhouse on 21 March and transplanted to the field by hand 22 April. Melons were harvested July 1, 8, 15, and 23 from each plot and weighed individually. At least four melons from each plot were cut open and observed for severity of hollowheart, bacterial rind necrosis, and number of colored seeds. Opened melons were also tested for soluble solids concentration with a hand-held refractometer. 'Vertigo' produced the highest yield and one of the highest soluble solids concentrations, but it exhibited an unacceptably high level of hollowheart. Elongated entries that performed as well as 'Cooperstown' for total marketable yield (lb/acre), soluble solids concentration, and percent hollowheart, were 'Banner', SVR 0491-8282, 'Seedless Sangria', 'Revolution', 'Freedom', and SVR 0492-8187.

EVALUATION OF SELECTED SOUTHERNPEA CULTIVARS AND EXPERIMENTAL HYBRIDS

Kent E. Cushman and Thomas E. Horgan

The purpose of this trial was to evaluate new southernpea cultivars and breeding lines from Wax Seed Co. developed for machine harvest. Six entries of machine-harvestable southernpea cultivars and breeding lines were evaluated at the Horticulture Research and Education Unit in Verona, Miss. during the summer of 2003. Four entries were pinkeye peas ('Texas Pinkeye', 'Quickpick', 'Easy Pick', and TTPE 2002) and two entries were cream peas (GEC 2002 and CRM 2002). All entries were direct seeded on 10 June 2003. The experimental design was a randomized complete block with five replications. Plots were designed to be harvested by machine, but soil conditions allowed for only hand harvest. Therefore, the results reported here are not directly applicable to machine harvest. Pods that appeared mature for fresh market sales were harvested by hand on 4 Aug., 8 Aug., 12 Aug., and 15 Aug. for a total of 4 harvests. 'Easy Pick' produced the greatest yield of shelled pinkeye peas (2,590 lb/ac), but this yield was not significantly different from that of 'Quickpick' or 'Texas Pinkeye'. TTPE 2002 was the only pinkeye entry to yield significantly less than the other pinkeye entries. GEC 2002 produced a significantly greater yield of shelled cream peas (2,670 lb/ac) than that of CRM 2002. Yield of shelled peas of GEC 2002 was equal to that of 'Easy Pick', 'Quickpick', and 'Texas Pinkeye'. Percent shellout was greatest for 'Texas Pinkeye' and TTPE 2002, lowest for GEC 2002 and CRM 2002, and intermediate for 'Easy Pick' and 'Quickpick'. 'Texas Pinkeye' produced significantly greater early yield of shelled peas than any other entry. CRM 2002 produced the lowest early yield of shelled peas and all other entries were intermediate. In conclusion, pinkeye cultivars 'Easy Pick', 'Quickpick', and 'Texas Pinkeye'

performed equally well for yield of shelled and unshelled peas. TTPE performed poorly compared to these cultivars. 'Texas Pinkeye' exhibited significantly greater earliness and percent shellout. Based on this year's data alone, it can be concluded that 'Easy Pick' was acceptable for commercial production in Mississippi. However, further testing is needed. Weather conditions during this year's evaluation were wetter than normal, with timely rains during the summer months supplying adequate soil moisture for high yields. Of the cream pea entries, GEC 2002 performed far better than CRM 2002.

EVALUATION OF GRAPE TOMATO CULTIVARS FOR THE MISSISSIPPI MEDALLION PROGRAM

Kent Cushman, Thomas Horgan, Christine Coker, Mike Ely, William Evans, and Peter Hudson

Twelve entries of grape tomato cultivars were grown in northern Mississippi at the Horticulture Research and Education Unit in Verona for evaluation in the Mississippi Medallion Program. The experimental design was a randomized complete block with four replications. Each replication consisted of a single plant. Plants were started in the greenhouse from seed on 6 June and transplanted to raised beds on 9 July. Yield was calculated on a per plant basis. 'Fond Red Mini' produced the greatest total yield of marketable tomatoes (lb/plant), but its yield was not different from that of 'Jolly Elf', 'Navidad', or 'Mini Charm'. 'Jolly Elf' and 'Navidad' produced the largest tomato of these four cultivars, 'Fond Red Mini' produced tomatoes of an intermediate size, and 'Mini Charm' produced the smallest.

EVALUATION OF COLORED PEPPER CULTIVARS FOR THE MISSISSIPPI MEDALLION PROGRAM: FIRST YEAR RESULTS

Thomas Horgan, Kent Cushman, Christine Coker, Mike Ely, William Evans, and Peter Hudson

Twelve cultivars of colored sweet peppers were grown during the summer and fall of 2003 in northern Mississippi. The cultivars 'Bianca', 'Blushing Beauty', 'Diamond', 'Dove', 'Gypsy', 'Islander', 'Ivory', 'Lilac', 'Mavras', 'Perfection', 'Purple Beauty', and 'Tequila' were grown at the Horticulture Research & Education Unit in Verona for evaluation in the Mississippi Medallion program. Plants were started in the greenhouse from seed on 19 May and transplanted to raised beds on 10 July. The experimental design was a randomized complete block with four replications and four plants per plot. Peppers were harvested once per week from 26 Sept. through 7 Nov. 'Gypsy' produced the greatest number of marketable fruit, but average fruit weight (oz/pepper) was significantly lower than that of any other cultivar. 'Tequila' had the second highest marketable yield (no/plant), but its yield was not different from 'Islander', 'Perfection', 'Mavras', 'Ivory', 'Lilac', or 'Purple Beauty'. 'Ivory' had the greatest marketable yield (lb/plant) but it was not different from any other cultivar except 'Diamond', which produced the lowest marketable yields (lb/plant) of all cultivars trialed. 'Gypsy' and 'Perfection' produced the greatest early marketable yields (no/plant), but their early yields were not different from, 'Ivory', 'Tequila', 'Islander', and 'Lilac'. 'Ivory' and 'Perfection' produced the greatest early marketable yields (lb/plant), but their early yields were not different from 'Gypsy', 'Tequila', 'Islander', and 'Lilac'. 'Blushing Beauty' had the highest average fruit weight (oz/pepper) of all cultivars for total and early yield, but it did produced one of the least number (no/plant) of peppers and was a late maturing cultivar. Average fruit weight of 'Ivory' was also high, but its average weight was not different from that of 'Dove' or 'Bianca'. 'Lilac' and 'Diamond' produced the highest number of cull peppers. Based on these results the white to light yellow cultivars 'Ivory' and 'Perfection' appeared to combine the best qualities of total yield, early yield, and fruit size. For purple-colored cultivars, 'Tequila', 'Mavras', 'Lilac', and 'Purple Beauty' appeared to combine acceptable qualities of total yield, early yield, and fruit size. For cultivars that produce mature red fruit, 'Gypsy' and 'Islander' performed well. However, 'Gypsy' produces a thin-walled cubanelle type fruit that is not shaped like a traditional bell pepper. 'Blushing Beauty' was a nice looking red pepper that had the highest average weight but lower pepper numbers. This study will be repeated in 2004 before any final recommendations are made.

MISSISSIPPI MEDALLION DILL TRIAL: VERONA'S 2003 PRELIMINARY RESULTS

Muhammad Maqbool, Kent Cushman, William Evans, and Christine Coker

Seven cultivars of dill were grown at the Horticulture Research & Education Unit in Verona for evaluation in the statewide Mississippi Medallion program. The cultivars were 'Mammoth Long Island', from Jordan Seeds, 'Superdukat', 'Hercules', and 'Fernleaf' from Johnny's Selected Seeds, and 'Bouquet', 'Dwarf Fernleaf', and 'Dukat'

from Stokes Seeds Inc. Seeds were sown in 72-cell flats on 25 Apr. 2003 and seedlings were transplanted to raised beds on 24 June. The experimental design was a randomized complete block with three replications and twenty-one plants of each cultivar in each replication. Subjective ratings of appearance, uniformity, and apparent leaf/stem diseases were made on 28 Aug. and shoot heights were measured. Because of declines in plant growth in replication 1 (the presence of root disease appeared evident), data was recorded only from replications 2 and 3. 'Fernleaf', and 'Superdukat' were rated highest for appearance. 'Dwarf Fernleaf', 'Fernleaf', and 'Superdukat' were rated highest for uniformity of plant stand. 'Superdukat' appeared to exhibit the best survivability and 'Dukat" the least under the prevailing environmental conditions. One of these cultivars, 'Fernleaf', is an All America Selection winner. Average shoot height was ranked in the following order from tallest to shortest: 'Superdukat' > 'Mammoth Long Island' > 'Bouquet' > 'Hercules' > 'Dukat' > 'Fernleaf' > 'Dwarf Fernleaf'.

DOES PLANTING DATE AND IRRIGATION AFFECT YIELD OF THREE CULTIVARS OF LIMA BEAN? SECOND YEAR RESULTS

Thomas Horgan, Kent Cushman, and David Nagel

This study was initiated to determine conditions under which water and heat stress limit yield of lima bean. Three cultivars of lima bean (*Phaseolus lunatus* L.), 'Bridgeton', 'Nemagreen', and 'Thorogreen' were grown during the 2003 growing season at the Horticulture Research and Education Unit in Verona, Mississippi. Planting date significantly affected all measured parameters. The fourth planting date had higher bean yields than all other planting dates and pod weight was higher for the fourth and second planting dates. Cultivar was significant only for pod weight. 'Bridgeton' had a higher pod weight than 'Thorogreen', with 'Nemagreen' being intermediate. There were no differences between irrigated and non-irrigated treatments. Average temperature differences between irrigated and non-irrigated plots, at the same planting dates, were very small. The fourth planting date had the lowest average temperatures, averaging 10 ºF lower than the other planting dates. For the interaction between planting date and cultivar, the highest average pod retention occurred during the first planting date with the cultivars 'Bridgeton' and 'Thorogreen'. For the interaction between planting date and irrigation, the first planting date with no irrigation had a greater number of pods retained than all other treatments. In conclusion, time of planting had the greatest impact on yield, with irrigation having no affect and cultivar affecting only pod weight.

2003 REGIONAL SOUTHERNPEA COOPERATIVE TRIALS

Kent Cushman and Thomas Horgan

The Horticulture Research & Education Unit in Verona is one of several university sites throughout the southeastern U.S. that participates in the Regional Southernpea Cooperative Trials. These sites evaluate advanced experimental hybrids developed by regional breeding programs. Modern cultivars are mostly developed for machine harvest, and the plants of these cultivars grow upright with a heavy set of pods at the top of the plant. Much progress has been made in developing machine-harvestable pinkeye peas, but progress is now being made in developing cultivars of other types of southernpeas for machine harvest. The Cooperative trials allow vegetable projects such as Verona's to see and test the latest improvements in the development of southernpea cultivars.

ASPARAGUS CULTIVAR EVALUATION: THIRD-YEAR HARVEST

Thomas E. Horgan and Kent E. Cushman

Seven cultivars of asparagus: 'Jersey Gem', 'Jersey Giant', 'Jersey King', 'Jersey Knight', 'Jersey Prince', 'Mary Washington', and 'Purple Passion' were planted in a raised bed at the North Mississippi Research & Extension Center in Verona. 'Purple Passion' was obtained from three different sources, 'Jersey Giant' was obtained from two different sources, and each combination of cultivar and source was planted as a separate treatment. The experimental design was a randomized complete block with four replications. Three crowns were planted in each experimental unit (three crowns per plot) on 19 May 2000. Plants began to produce spears in 2001, with yields increasing yearly. A total of 28 harvests were made in 2003 from 26 March to 16 May. 'Jersey Giant' from Indiana Berry & Plant Co. (IBP) produced the greatest weight of total marketable spears, but its yield was not significantly different from that of 'Purple Passion' (IBP), 'Jersey Giant' from Daisy Farms (DF), and 'Jersey Gem'. 'Jersey Giant' (IBP) also produced the greatest weight of early marketable spears and a greater number of total marketable spears than any other entry. 'Jersey Giant' (IBP) also produced a greater number of early marketable spears than any other entry except 'Jersey King'. 'Purple

Passion' entries obtained from IBP and Nourse Farms (NF) produced the highest average spear weight. In conclusion, 'Jersey Giant' from IBP or DF has consistently performed well and can be recommended for use on a limited, trial basis in northern Mississippi. 'Purple Passion' from IBP has consistently performed well and can also be recommended for use as a specialty item on a limited, trial basis in northern Mississippi. 'Purple Passion' produces a large purple-colored spear, about 1.8 oz in weight that may be desirable as a specialty item.

TOLERANCE OF SELECTED TOMATO VARIETIES TO TOPICAL APPLICATION OF SANDEA

Alfred Rankins, Jr., Kent Cushman, and Mark Shankle

A study was conducted at the North Mississippi Research and Extension Center in Verona, Mississippi to evaluate the tolerance of four tomato varieties: 'Sunsation', 'Mountain Spring', 'Merced', and 'Celebrity' to topical applications of Sandea herbicide. Treatments evaluated included (1) 0.75 oz/ac Sandea 14 days after transplanting (DAP) followed by 0.75 oz/ac Sandea 28 DAP, (2) 0.50 oz/ac Sandea 14 DAP followed by 0.75 oz/ac Sandea 21 DAP followed by 0.75 oz/ac Sandea 28 DAP. Visual injury ratings based on green biomass reduction on a scale of 0 to 100, where 0 = no injury and 100 = death of all plants, and tomato plant heights were taken at 28, 35, and 42 DAP. Tomatoes were harvested on ten harvest dates (August 4, 8, 11, 13, 15, 18, 22, 25, and 27) and the number and weight of harvested fruit were recorded. Topical applications of Sandea did not significantly affect early and total grade 1 yield, early and total grade 2 yield, or total marketable yield, regardless of tomato variety. Overall, tomato yield was general higher with 'Sunsation' and 'Mountain Spring' due to increased instances of radial cracking in 'Merced' and 'Celebrity'. These data suggest that the varieties evaluated in this experiment are tolerant to topical applications of Sandea within the rates evaluated.

MEDICINAL HERBS

SHADE AFFECTS GROWTH AND PODOPHYLLOTOXIN CONTENT OF MAYAPPLE: SECOND YEAR RESULTS

Kent Cushman, Muhammad Maqbool, Ikhlas Khan, Hemant Lata, Ebru Bedir , and Rita Moraes

Four levels of sunlight exclusion (shade) were used: 0%, 30%, 55%, and 80% to determine the effect of shade on growth and lignan content of field-established plantings of American mayapple. The study was also conducted to determine whether mayapple is a shade requiring or shade tolerant species. Mayapple rhizomes were harvested from the wild and planted in raised beds in Winter 2001. Shoots emerged, grew, and senesced during Spring 2002 and Spring 2003. Only 2003 results are presented here. Shoot emergence, shoot longevity, leaf area, leaf dry mass, and shoot height data were collected. Leaf samples were also analyzed for lignan content: podophyllotoxin, _-peltatin, and _-peltatin. Shade treatments affected air and soil temperatures, with increasing levels of shade resulting in slight, but consistent, decreases in air and soil temperatures. Increasing levels of shade also resulted in significant increases in shoot longevity, plant leaf area, and shoot height. Shade affected podophyllotoxin, _-peltatin, and total lignan content, with increasing levels of shade resulting in decreasing content. Shade did not affect shoot emergence, total leaf area, total leaf dry mass, plant leaf dry mass, _-peltatin content, or podophyllotoxin yield. Our results indicate that the American mayapple is not a shade requiring plant. In full sun the plant does not persist as long as under shade, but lignan content is significantly greater than under shade.

MULCH TYPE, MULCH DEPTH, AND PLANTING DEPTH FOR FIELD-GROWN MAYAPPLE: SECOND YEAR RESULTS

Muhammad Maqbool, Kent Cushman, and Rita Moraes

This experiment was established on 1 Nov. 2001 at the Horticulture Research & Education Unit in Verona, Mississippi for the purpose of exploring weed control strategies, with little or no use of herbicides, during establishment and growth of American mayapple under field conditions. Treatments were combinations of mulch type (pine bark or wheat straw), mulch depths (3 or 6 in), and rhizome planting depth (0 or 2 in). The experimental design

was a randomized complete block with four blocks, using a 2x2x2 factorial arrangement of treatments. Bark mulch provided slightly better insulation from temperature fluctuations than straw mulch and rhizome segments planted 2 in deep experienced slightly less temperature variation than rhizome segments planted 0 in deep. Bark mulch in combination with 0 or 2 in planting depth and straw mulch in combination with 2 in planting depth were similar in that they produced equal numbers of shoots and equal leaf area and leaf dry weight. Mulch depth did not affect shoot emergence, leaf area, or leaf dry weight. Straw mulch in combination with 0 in planting depth produced fewer numbers of shoots and less leaf area and leaf dry weight. Treatment combinations of mulch type and mulch depth affected shoot height in the following order from tallest to shortest: bark mulch, 3 in mulch depth > straw mulch, 6 in mulch depth > straw mulch, 3 in mulch depth > bark mulch, 6 in mulch depth. Treatment combinations of mulch type and planting depth affected shoot height in the following order from tallest to shortest: straw mulch, 2 in planting depth > bark mulch, 0 in planting depth > bark mulch, 2 in planting depth > straw mulch, 0 in planting depth. Shoot height is not as important a measurement of plant growth as shoot emergence, leaf area, or leaf dry mass, but it is evident from these results that mulch type, mulch depth, and planting depth significantly influenced shoot height. Regardless of treatment, weed control was good to excellent. These results are similar to last year's results in that straw mulch in combination with 0 in planting depth was the only treatment combination that performed poorly.

VARIATION OF LIGNAN CONTENT IN AMERICAN MAYAPPLE LEAVES BY TIME OF HARVEST AND SHOOT TYPE: A PRELIMINARY REPORT

Muhammad Maqbool, Kent Cushman, Hemant Lata, and Rita Moraes

Leaves from a field-established planting of American mayapple (*Podophyllum peltatum* L.) were harvested five times during Spring 2003 to determine variation of lignan content over time. Harvests began Apr. 1 and were separated by 10-day intervals. The experiment was a randomized complete block design with a factorial arrangement of treatments and five blocks. Leaves were collected from sexual and asexual shoots within each block. Leaves were dried and analyzed by HPLC for lignan content. Harvest time significantly affected podophyllotoxin content and total lignans but not _-peltatin or _-peltatin contents. Shoot type was not significant and the interaction between harvest time and shoot type was also not significant. Podophyllotoxin content was highest when shoots were harvested on Apr. 1 and May 1, lowest on Apr. 11 and May 11, and intermediate on Apr. 21. Total lignan content was similar, with the highest contents on Apr. 1, Apr. 21, and May 1 and lowest on Apr. 11 and May 11. These results indicate that significant variation in lignan content occurred over time in leaves of American mayapple, with about 50 % variation in content from the lowest to the highest values. However, there was no obvious trend in the data due to time of harvest. The difference between the lowest and highest values was 10 $mg \cdot g^{-1}$ for total lignan content. Though a large relative difference, this is a small numerical difference. These results indicate that the source of this variation was not identified in this experiment, and that variation in lignan content over time is probably not directly linked to physiological age of mayapple leaves.

LIGNAN CONTENT AND LEAF BIOMASS OF MAYAPPLE UNDER DIFFERENT GROWING CONDITIONS

Kent Cushman, Muhammad Maqbool, Ebru Bedir, Ikhlas Khan, and Rita Moraes

Field plantings of the American mayapple, *Podophyllum peltatum* L., could provide a domestic source of podophyllotoxin, a compound used by the pharmaceutical industry, and provide an alternative source of income for growers of specialty crops. Two wild populations and one field-established planting of mayapple were used in this study, all of which were located in Mississippi. Wild populations were located at Holly Springs, an open, sunny site, and Natchez, a shady, wooded site. Harvesting rhizome segments from the wild and transplanting to the Verona location established the field planting. Leaves were separated from stems for the purpose of surveying leaf biomass yield and lignan content as affected by harvest time (early or late) and shoot type (sexual or asexual). Harvest time did not affect leaf area, leaf dry mass, or number of leaves. Shoot type did not affect leaf area, leaf dry mass, or number of leaves at two out of three locations: Holly Springs or Verona. However, shoot type at the Natchez location affected growth, with asexual shoots producing greater leaf area, leaf dry mass, and number of leaves than sexual shoots. Harvest time and shoot type did not affect podophyllotoxin, _-peltatin, or _-peltatin contents at the Natchez and Holly Springs locations. Total lignan content and podophyllotoxin yield were also not affected at these locations. There was a significant interaction between harvest time and shoot type at the Verona location, where podophyllotoxin content and total lignans were greater when sexual shoots were harvested early. In conclusion, it appears that leaf biomass production was not affected by early or late harvests. However, location appeared to affect leaf biomass production.

Holly Springs and Verona produced sexual and asexual plants with equal yields of leaf biomass. In contrast, Natchez produced significantly more leaf biomass from asexual plants than sexual shoots. Apparently, an environment of high light levels increased the overall vigor of mayapple colonies and increased the number of sexual shoots in the population. Lignan content and podophyllotoxin yield at the Holly Springs or Natchez locations were not affected by harvest time or shoot type. Results at the Verona location were different. Podophyllotoxin and total lignan contents of sexual shoots harvested early were about 27 % greater than sexual shoots harvested late or asexual shoots harvested early or late. Contents of _-peltatin and _-peltatin followed a similar pattern, though the trend was not as clear. Verona is the location of the transplanted, field-established population, but it is not known why lignan content and yield would be affected by harvest time and shoot type in a transplanted crop compared to the wild populations.

PROPAGULE TYPE AND PLANTING TIME AFFECT MAYAPPLE GROWTH: THIRD YEAR RESULTS

Kent Cushman and Muhammad Maqbool

Rhizome segments of the American mayapple (*Podophyllum peltatum* L.) were harvested from the wild and immediately transplanted to raised beds at the Horticulture Research & Education Unit in Verona, Miss. There were three planting times, Fall 2000, Spring 2001, or Summer 2001, and three propagule types: (1) two-node rhizome segments with a terminal node and its adjacent one-year-old node, referred to as Nt+N1, (2) one-node rhizome segments with a single node, other than Nt, of unknown age, referred to as Nx, or (3) one-node rhizome segments with a single terminal node, referred to as Nt. Mayapple shoots emerged from the ground from approximately 15 Mar. to 1 Apr. 2003 and grew for most of the month of April. Shoots declined throughout the month of May and completely senesced by 23 May. Shoot emergence, leaf area (cm^2/plot and cm^2/shoot), leaf dry mass (g/plot and g/shoot), and shoot height (cm) were recorded. Overall plant growth and performance can be ranked as follows. *Excellent:* Spring-planted Nt+N1. *Good:* Fall- and summer-planted Nt+N1; fall-, spring-, and summer-planted Nx; and spring-planted Nt. *Fair:* Fall-planted Nt. *Poor:* Summer-planted Nt. These results are similar to our previous reports (Cushman et al., 2002; Maqbool et al., 2003), and we can now recommend all three planting dates, but in the following order of preference: spring > fall > summer. We can also recommend two of the three propagule types, also in the following order of preference: Nt+N1 > Nx. The Nt propagules performed adequately when planted during fall or spring, but they did not perform well when planted during summer.

ORNAMENTALS

ANEMONE CULTIVAR EVALUATION

R.C. Sloan and S.S. Harkness

Five anemone cultivars were planted January 30, 2003 in field beds under a cold frame to evaluate the early spring flower stem production of this cool season crop. Overall growth and production of the 5 cultivars planted in this trial was poor. There were no differences in the number of stems produced by the cultivars. “Mona Lisa White” and “Mona Lisa Deep Red” produced longer stems compared to the other cultivars.

BRANCHING POLLEN FREE SUNFLOWER CULTIVAR EVALUATION

R.C. Sloan and S.S. Harkness

Field grown single stem sunflowers often have stem diameters greater than .5 in which are too large for use in floral arrangements. Stems of branching sunflowers often have a smaller stem diameter compared to single stem cultivars. Pollen free sunflowers are preferred by florists and consumers for flower arrangements because the blooms do not shed pollen which may stain table cloths and clothing. Sixteen pollen free, branching sunflower cultivars were evaluated in field production beds. The cultivars were planted on 6 separate planting dates from April to September. “Moulin Rouge”, “Claret”, and “Strawberry Blonde” were in the group that produced the most stems in the trial on all 6 of the planting dates

LISIANTHUS CULTIVAR EVALUATION

R.C. Sloan and S.S. Harkness

Three plantings of lisianthus cultivars were made in field beds under a cold frame. “Sapphire Blue” produced the most stems of the lisianthus cultivars planted on the first transplant date, February 19, 2003 and was included in the group of cultivars producing the most stems that were planted on March 12, 2003. A more comprehensive lisianthus cultivar evaluation examining a larger number of cultivars plus the effect of planting date is planned for the 2004 growing season.

POPPY CULTIVAR EVALUATION

R.C. Sloan and S.S. Harkness

One planting of poppy cultivars was made in field beds under a cold frame and a second planting was made in an unprotected field bed. “Champagne Bubbles Yellow” produced more stems than the other cultivars planted in the cold frame except for “Champagne Bubbles Orange”. There were no differences in the number of stems produced from the poppies planted at a later date in the field beds. The stems of “Iceland Wonderland Mix” were shorter than the other cultivars grown in the cold frame.

SINGLE STEM POLLEN FREE SUNFLOWER CULTIVAR EVALUATION

R.C. Sloan and S.S. Harkness

Pollen free sunflowers are preferred by florists and consumers for flower arrangements because the blooms do not shed pollen which can stain table cloths and clothing if they come in contact with the pollen. Thirteen pollen free, single stem sunflower cultivars were evaluated in field production beds. The cultivars were planted on 6 separate planting dates. “Sunny” was in the group of cultivars that required a longer growing time from seeding to harvest on 5 of the 6 planting dates. The group of sunflowers requiring the least amount of time to mature included “Brilliance” on all 6 planting dates, and “Sunsplash”, “Orange Mahogany”, and “Summertime” on 5 of 6 planting dates. “Orange Mahogany” and “Dorado Select” were in the group that produced the smallest diameter blooms on all planting dates and “Summertime was in this group on 5 of 6 planting dates. Secondary shoots that grew after the terminal shoot was harvested produced a second crop of smaller flower stems on 10 of the 13 cultivars in this trial.

SNAPDRAGON CULTIVAR EVALUATION

R.C. Sloan and S.S. Harkness

Snapdragon cultivars were planted on four different planting dates to evaluate their potential for fresh cut flower production in north Mississippi. Eleven cultivars of snapdragon, *Antirrhinum majus*, were transplanted to outdoor beds sheltered by a cold frame on January 28, 2003 and these 11 were planted again on February 11, 2003 with an additional 8 cultivars for a total of 19 cultivars on the second planting date in a cold frame. Seven cultivars were planted in a heated greenhouse on January 6, 2003 and 11 different cultivars were planted in the greenhouse on January 22, 2003. The snapdragon cultivars were evaluated for number of stems produced, stem length, and stem diameter which could serve as an indication of potential for use as fresh, cut flowers. ‘Monaco Violet’ and ‘Monaco Red’, planted on January 6, and ‘Overture Magenta’, planted January 22 were in the groups that produced the largest number of stems in the greenhouse trials, but the stem length of these cultivars was marginal for the florist market.

STATICE CULTIVAR EVALUATION

R.C. Sloan and S.S. Harkness

Eleven statice cultivars were planted in field beds sheltered by an unheated cold frame to evaluate the production of flower stems for florist cut flower utilization. “QIS Dark Blue”, “QIS Yellow”, “Fortress Purple”, “Excellent Yellow”, “QIS White”, and “QIS Swan Lake” were in the group of cultivars that produced the most stems during the trial. The stem production in this group ranged from 63.5 – 49.2 stems. However, all of these cultivars except “QIS Dark Blue” were in another group of 9 cultivars which were not significantly different in the production of stems in which the lowest producing cultivar yielded 39.0 stems during the trial.

EFFECT OF SPACING ON SUNFLOWER PRODUCTION

R.C. Sloan, S.S. Harkness, and K.L. Reel

Sunflowers are a potential cut fresh flower crop for Mississippi. Informal evaluations by local florists of sunflowers produced in trials at the Horticulture Research & Education Unit indicate that the quality of Mississippi sunflowers equaled or exceeded that of imported sunflowers. One requirement for florist's sunflowers is that the stem is not too large in diameter to fit into arrangements. Stem diameters of 1 in (2.5 cm) are too large for most florist arrangements. The purpose of this trial was to assess the effect of plant spacing on sunflower stem diameter, flower size, and plant size. "Superior Sunset" sunflower was planted on two dates.

There was a linear response of stem diameter due to plant spacing with the 3 in spacing producing smaller stems compared to the 6 in spacing, which was in-turn smaller than the 9 in spacing for the July planting date. Stem diameter of sunflowers planted in August was smaller for plants spaced 3 in apart compared to those spaced 9 in apart.

SWEET PEA CULTIVAR EVALUATION

R.C. Sloan and S.S. Harkness

Two plantings of 5 sweet pea cultivars were made; one in a heated greenhouse and the second in an unheated cold frame. In the greenhouse planting "Winter Flowering Rose Crimson" produced more stems than all other cultivars except "Winter Flowering Pink" while "Winter Flowering White" produced the fewest number of stems. There were no statistical differences between cultivars in the number of stems produced in the cold frame trial.

ZINNIA CULTIVAR EVALUATION

R.C. Sloan and S.S. Harkness

Three plantings of zinnia were planted to evaluate their potential for fresh cut flower production in north Mississippi. Fifteen cultivars of zinnia, *Zinnia elegans*, were transplanted to outdoor beds on three dates: May 19, June 20, and July 27 2003. The zinnia cultivars were evaluated for qualities which might serve as an indication of potential for use as fresh, cut flowers such as number of stems produced, stem length, stem diameter, and bloom diameter.

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