

# Agronomy Notes

October  
2005

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## 2005 Cotton Short Course

The 2005 Cotton Short Course will be held November 29-30, 2005 at Mississippi State University, Bost Extension Center. Pre-registration is \$60 (**deadline is November 22nd**) and on-site registration is \$80 (begins at 8:30 a.m. on the 29th).

There will be a social/dinner on the 29th at the MAFES Conference Center (Bull Barn) starting at 6:00 p.m.

**Pre-registration is available on line at [http://msucares.com/crops/cotton/short\\_course.html](http://msucares.com/crops/cotton/short_course.html).**

Please contact Emily Rose (662) 325-2701 for additional information.

## Corn/Wheat By Dr. Erick Larson

**Corn Residue Management** - After harvest, producers face management decisions as they begin preparing fields for next year's crop. Following a corn crop, the primary factor producers consider is managing the heavy corn stalk residue for subsequent field preparation and planting. As fuel (and fertilizer) prices soar, many growers are reconsidering their need to perform costly fall tillage practices. Growers have traditionally manipulated corn stalks using stalk shredding and/or multiple disking operations to destroy crop residue. Some producers are also considering burning. However, one of the primary advantages of utilizing corn in crop rotation systems is improving soil properties, by adding more organic matter. Increasing soil organic matter content improves soil tilth and structure, which reduces soil crusting and erosion, and increases soil-water infiltration and soil water and nutrient holding capacity – also reducing the need for deep-tillage. Reduced tillage or no-till systems improve this positive impact even more, because tillage accelerates organic decay. This is particularly true in the South, because our warm, wet climate encourages microbial activity and rapid organic decomposition, much more than drier, colder regions. Furthermore, equipment manufacturers now produce planters (or attachments for existing planters) and other implements specifically designed for use in heavy corn residue. Thus, growers nationwide and in Mississippi are rapidly eliminating tillage operations from their crop production systems. I would encourage hesitant producers to try minimal tillage on a few acres – let mother nature decompose

those stalks over the winter, rather than burning diesel.

**Addressing Fertility Problems** - Fall is a good time to begin addressing many fertility problems. Applying and incorporating lime during the fall is necessary to allow pH neutralization before the cropping season begins. Of course, soil testing is the foundation of a sound fertility program. Soil testing recommendations eliminate guesswork, allowing growers to address limitations with the right of fertilizer before problems arise. Thus, your fertilizer expenses are reduced and the crop grows off better! However, I believe more frequent or even annual soil testing is required when rotating crops, compared to continuous cropping, because crop nutrient needs may differ substantially. Phosphorus deficiency often occurs following cotton or soybeans, because corn requires double the amount needed for cotton or soybeans. Potassium deficiency often occurs following a high-yielding soybean crop, since 70 bu/a. soybeans remove about 100 pounds of potassium from the soil. However, delay application of potassium on low CEC or sandy soils until spring because of leaching problems.

**Fall Weed Control** - Many perennial weeds, including Johnsongrass and Bermudagrass, are very susceptible to herbicide application at this time of year, because they are storing energy in their rhizomes in preparation for winter. A translocated herbicide, such as gly-

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phosphate, will be drawn into the rhizomes and have a higher likelihood of killing these reproductive organs. Apply herbicides when weeds are actively growing and at least two weeks before the normal first frost date. Tillage or stalk shredding should be avoided for several weeks prior to or after herbicide application.

## WHEAT

**Wheat Short List** - A list of the wheat varieties which have had superior yields over the past several years is now available on the MSUcares website (listed in Frequently Asked Questions as "What are some good wheat varieties?") or at your county extension office. Plant characteristics, maturity, straw strength, disease resistance and other helpful information are noted for each variety.

**Keys to High Yields** - Drainage and fertility are two extremely important factors governing wheat yields which should be addressed in the fall. Wheat is grown during the rainy season, potentially exposing it to saturated conditions at any time. Optimal water drainage is critical to Mississippi wheat production because extended waterlogging may reduce stands, hamper vegetative growth, encourage pathogen development and reduce nutrient availability. Thus, field selection and soil physical improvements capable of improving drainage, such as multiple surveyed water furrows and clean ditches, can enhance wheat yield tremendously. Soil tillage hardpans may also substantially limit yield potential by inhibiting internal drainage. Thus, disruption of soil hardpans with moderate to deep tillage equipment (chisel plow, subsoiler, paraplow, etc...) is encouraged, if needed. Wheat yield potential is extremely dependent upon nutrient availability because it is a very shallow rooted crop grown during the wet season, making it nearly impossible to mine nutrients from the soil profile. Thus, growers also need to supply enough phosphorus and potassium to meet crop uptake and apply lime to correct soil pH before planting, if needed, or yields will suffer tremendously. Diammonium phosphate (DAP 18-46-0) is an excellent fall fertilizer source, particularly for late-planted wheat, because it supplies both nitrogen and phosphorus, which will promote vigorous growth and advance maturity - essentially serving as a "starter fertilizer."

**Don't Plant Wheat Early** - Resist the urge to plant wheat early. Planting too early unnecessarily exposes wheat to potential development, fertility, weed and numerous pest problems which ultimately reduce yield

potential. Thus, growers accustomed to gaining developmental advantages from planting summer crops early, such as corn and soybeans, may run into severe problems by using the same strategy with winter wheat. The adverse effects from excessive fall growth include spring freeze damage, development of Barley yellow dwarf and other pest problems, more weed competition, poor nutrient use, and increased lodging.

**Optimum Planting Dates** - The suggested wheat planting dates (within 10-14 days of the average first frost date in the fall) should provide warm enough temperatures and long enough days for seedling emergence and tillage to begin before dormancy occurs. This normally corresponds to:

**North and Central Mississippi:** October 15- November 10

**Delta Region:** October 20-November 15

**South Mississippi:** November 1-November 25

**Coastal Region:** November 15 -December 10

**Seeding Rates** - Wheat growers should strive to establish 1.0 to 1.3 million plants per acre or 23 to 30 plants per square foot. Assuming 85% successful emergence planting with a grain drill, you will need a seeding rate of 1.2 to 1.5 million seeds per acre. Using the number of seeds per pound listed on the seed tag, you can then calculate how many pounds of seed per acre are needed. For example, 1.35 million seeds per acre divided by 13,500 seeds per pound is 100 pounds of seed per acre. This seeding rate is equivalent to 18 seeds per foot with a seven-inch drill spacing. Growers broadcasting and incorporating seed should use higher seeding rates (40-45 seeds/ft.<sup>2</sup>), because emergence success will likely be modest (60-70% of planted seed). Growers broadcasting small grain seed on the soil surface should generally utilize very high seeding rates (50-60 seeds/ft.<sup>2</sup>), because emergence and seedling survival is normally low (around 50% of planted seed).

**No-Till Production**—Growers can successfully establish and produce small grains in no-till systems, but need to closely manage factors capable of limiting planting performance and stand establishment, such as residual crop debris. The presence of substantial plant residue in no-till systems, may restrict drill penetration, seed placement, and furrow closure. Thus, growers should closely check drill performance in the

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field, reduce drill ground speed, and increase seeding rate by 10-15%, compared to drill rates in conventionally prepared seedbeds, to compensate for difficult planting conditions. Large amounts of loose, tough stalk residue often accumulate in planter equipment framework, drastically restricting performance. Drill performance in standing stalks may be improved by

drilling at an angle slightly different from the direction of the existing crop row. This redistributes the residue concentration zone continuously along the drill's frame, minimizing residue accumulation. Applying a burndown herbicide prior to planting will generally improve seeding establishment.

## Forage

By Dr. Richard Watson

**Clover vs Nitrogen Fertilizer?** - The rising price of nitrogen-based fertilizer is one of the greatest challenges to forage production in Mississippi. With the long-term outlook for gas prices staying high, it is likely that nitrogen (N) fertilizer will also continue to become more expensive. The Mississippi forage crop is almost exclusively a grass crop, with bermudagrass, bahiagrass, and tall fescue dominating the 3-4 million acres of pasture and hay land in the state. This is no surprise given the high yield, and persistence of these species in the Mississippi environment. Grasses, in general, are also more tolerant of poor fertility and high grazing pressure than non-grass forage crops (e.g. legumes). However, grasses still require all the plant nutrients essential for growth, including N. In fact many grass species are very responsive to N fertilizer and can have linear responses to N rates up to 400lb N/acre/year, where other nutrients and moisture are not limiting. However, knowing the importance of N to plant growth does not change the fact that it is becoming very expensive to apply to our forage crops. We can certainly improve the situation by using best management practices, such as applying small amounts often (between 30-50 units N/A at monthly intervals) rather than large single applications that can lead to wastage and poor use efficiency of the N. The other option is to look at other 'cheaper' alternatives to inorganic N fertilizers. These other options include N-rich byproducts from other animal industries (e.g. chicken litter), and utilizing leguminous forage crops such as clover to fix atmospheric N.

**Legumes as a Source of Nitrogen for Grass-Based Pastures.** - The major questions relating to the use of legumes as a nitrogen source for our pasture and hay crops are "What clover should I use?" and "How much nitrogen?" and "I going to get from it?". The answer to these questions is the same, and one that all scientists like to use- "It depends."

**Effects of Yield and Clover Content on N Fixation.** - From an N fixation standpoint, the species of clover you use is often secondary to the amount you have in the pasture, the general soil fertility levels, and the management of the clover. While there are species differences in the ability of different legumes to fix N, the level of N fixation is generally related to yield, which in turn is related to other growth-related factors (e.g. soil fertility, moisture, and grazing pressure/frequency). Therefore, the more clover you have in a pasture, and the more productive that clover is, the more N will be fixed. Where the soil pH and other nutrients are not limiting, pure crops of many clover species can fix between 200 and 400lbs N/acre/year. However, on average, most common annual and perennial clover species used for forage will fix between 50-200 lbs N/acre/year where the stand is at least 30% clover. Obviously there is quite a big difference between 50 and 200 lbs, which indicates that there are a number of factors at work here that will ultimately determine the N fixation rate. In general, if you have a high population of healthy clover plants it is likely that you are at the high end of the N-fixation range (i.e. 150-200 lb N/acre/year). The question then becomes, "How do I know if I have a good clover content?" In a grazed pasture, clover content should be somewhere between 30% and 50% of the total dry matter (DM) present (during the growth season of the clover), and should not be below 20% if you are to gain the full benefit of having clover present. Any more than 50% and the clover can cause nutritional disorders, such as bloat, and may, in fact, lower animal performance despite the associated increase in crude protein and digestibility. On the other hand, less than 20% clover is generally not enough to significantly improve animal performance and allow adequate N fixation.

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So how do you know what your clover content is? The first step in assessing clover content is to look at the ground cover to estimate how much of it is occupied by clover, grass, weeds, and bare ground. The best time to do this assessment is during the spring when the clovers are actively growing but are yet to flower (Mid March- end of April). Randomly pick several sites in your pasture and visually estimate how much of the area is covered by clover. Once you know the approximate ground cover you can have a fair idea as to the clover content of your pasture or hay field. However, it is important to remember that ground cover is not necessarily the same as dry matter yield, i.e. a 50% ground cover may not mean that the clover is 50% of the dry matter produced in that pasture. Many clovers have a lower dry matter percent and total annual yield than grasses so you may need to adjust your yield estimates accordingly. High yielding annual clovers, such as Arrowleaf and Crimson, can often achieve spring yields comparable to well-fertilized cool season grasses (3000-5000 lb DM/acre from February through May) but may only produce 50-70% of the total annual yield. Perennials, such as red clover and Ladino white clover, may also have similar spring yields to cool-season grass but this productivity usually falls as the stand thins over subsequent years. Depending on management, red clover might need to be reseeded every 2-3 years and ladino white clover every 3-4 years if clover content is to be kept above 20% of the pasture. Small-leafed, stoloniferous, "Dutch" white clover, which regularly volunteers in many Mississippi pastures, will generally last much longer than this (indefinitely in many cases) but the annual yield of this clover is generally much lower than the Ladinos or other medium-leafed white clover varieties. This tradeoff between yield and persistence is common in many clover species. However, great progress has been made recently with the development of white clover varieties that have a high yield potential and improved persistence in grazed pastures. Dr. Joe Bouton released two of these white clovers, Durana and Patriot, from the University of Georgia Agricultural Experiment Station in 2002. These clovers have since shown to be excellent performers in the Southeast USA, including Mississippi. A red clover line, selected under the same breeding strategy, will be tested in Mississippi this coming year.

**Table 1. Value of N fixed by legume crops at different values of manufactured N fertilizer (ammonium nitrate).**

	Cost of Ammonium Nitrate (33.5-0-0)				
	\$225/t	\$250/t	\$275/t	\$300/t	\$325/t
N fixation rate (lb/A/y)	\$0.34/lb N	\$0.37/lb N	\$0.41/lb N	\$0.45/lb N	\$0.49/lb N
25	\$8.50	\$9.25	\$10.25	\$11.25	\$12.25
50	\$17.00	\$18.50	\$20.50	\$22.50	\$24.50
100	\$34.00	\$37.00	\$41.00	\$45.00	\$49.00
150	\$51.00	\$55.50	\$61.50	\$67.50	\$73.50
200	\$68.00	\$74.00	\$82.00	\$90.00	\$98.00

**Effects of soil fertility on N fixation.** When considering the effects of soil fertility on N-fixation it is important to realize that it is not the clover per se that fixes the nitrogen, it is the *rhizobium* bacteria that live in nodules on the clover roots that perform this valuable task. The organic nitrogen fixed by the bacteria is then released, to be used by grasses and other companion species, when these nodules slough off the root. These bacteria are very sensitive to changes in soil pH, and as pH level falls from 6.5, which is optimum, the population and N-fixation capacity of the bacteria will fall accordingly. Therefore is important to get a soil test to determine the pH and the lime application rates (if any is required) to elevate your pH into the optimum range (i.e. 6 - 7.5).

While N fertilization may not be needed on pastures and hay fields containing significant amounts of clover, phosphorus (P) and potassium (K) are still very important fertilizer inputs. Phosphorus levels in plants are generally much lower than N and K levels (there is about 3-4 lbs of N for every lb of P) but the predominant soil types in Mississippi are often naturally low in P so may require several yearly applications to lift them into the moderate to high range (80-150 lbs of extractable P/acre) required for optimum clover growth. Plants require similar amounts of K and N so there needs to be between 250-300 lbs of extractable K/acre to support good clover production. Many Mississippi soils have moderate to high K levels so may not need any additional applications. Clover crops also require many other important micro and macro nutrients so it is important to get a soil test every 2-3 years on grazed pastures and every year on hay fields.

**Management of Clover Crops to Promote Nitrogen Fixation.**

**Seed inoculation.** As mentioned earlier, legume crops (e.g. clovers) require a certain type of bacteria

to fix N for them. Therefore, seed must be inoculated with the bacteria prior to sowing. In some cases, where clover has been planted previously, there may be an existing 'natural' population of rhizobia bacteria already in the ground. However, *rhizobium* bacteria are generally specific to a certain species of legume so the natural populations may not be suitable for the type of clover you wish to plant. It is safer to inoculate your seed with the correct strain. Many clover varieties already come coated with the bacteria so require no additional treatment. This coating is usually in a clay base so it can add a significant amount of weight to the seed (often around 30%). Therefore, when seeding coated seed at the recommended rates, you may end up with 30% less actual seed being planted. In order to get the same seed population you can add an additional 30% seed weight per acre, however, it has been shown that there can be very little difference in establishment between coated and uncoated seed at the same seeding rate (lbs/acre). If you have pur-

chased 'raw' (uncoated) seed you can generally purchase the correct inoculant with the seed.

**Grazing management.** To get the best productivity, and N fixation, out of your clover crop, it is important not to overgraze the crop. Most legumes are generally not as tolerant of overgrazing as grasses. In addition, grazing animals may preferentially graze legumes giving the companion grasses a competitive advantage. Therefore, in an overgrazed pasture, legume establishment, persistence, and overall productivity may be negatively impacted. It is best to rotationally graze clover pastures so that the pregrazing height is no more than 8-10 inches and you are leaving at least 3-4 inches of post grazing residue.

For more information on legumes for pasture and hay crops, contact your local office of the Mississippi State University Extension Service.

## Weed Control

### By Dr. John Byrd

#### Maverick Section 18 Granted, but Too Late.

Some time back I wrote that a section 18 label had been requested for Maverick (sulfosulfuron) herbicide to use in bermudagrass and bahiagrass to control johnsongrass, yellow and purple nutsedge and other sedges. That request went to EPA the end of January. It took EPA until this week to grant the request. I guess I shouldn't complain; after all, last year EPA neither granted nor denied the request. EPA also concluded, in their infinite wisdom, the occurrence of purple and yellow nutsedge and other sedges in pastures is not an emergency. Therefore, Maverick can only be used to treat johnsongrass. How can someone sitting behind a desk in Washington determine sedges are not an emergency problem in forage systems in Mississippi? They obviously didn't receive the phone calls and emails I received most of May and June. I've had far more calls about sedge control in pastures and hayfields than about johnsongrass control.

Fortunately, the section 18 does not expire until October 2006, which basically means, EPA has granted Mississippi forage producers permission to use Maverick in the 2006 growing season. The use rate of Maverick is 1.33 oz product per acre with 0.25% (by vol-

ume) nonionic surfactant. Two applications per year can be made at least 40 days apart, as long as the total rate used per acre per growing season does not exceed 2.66 oz per acre. Treated fields may not be grazed or harvested for hay within 14 days after an application. Maverick cannot be applied by air and treated sites can only be planted in wheat if a rotational crop is desired. Lastly, no more than 10,000 acres can be treated with Maverick.

Sulfosulfuron has been used for some time on highway rights of way for johnsongrass control. It is probably the most effective herbicide against johnsongrass currently on the market. In research plots, three seasons of johnsongrass control have been observed from a single Maverick treatment. Unfortunately, there is no activity on other grasses or broad-leaf weeds, except the sedges. Maverick has activity on a variety of sedge species. Forage producers with a johnsongrass problem will be excited about this new herbicide.

# Rice

## By Dr. Nathan Buehring

This has been a memorable season that still seems to be never ending. Needless to say, another hurricane has come and left a lot more rice down. As of September 24, we had harvested about 65% of the rice crop. Most of the acres that are left to harvest are in the northern portion of Delta. Of the remaining 35% left to harvest, approximately 75% of it is lodged over. Combines were beginning to get back in the field the Wednesday following Hurricane Rita, even though the conditions were less than ideal.

With all of the down rice, we have put out a lot of Sodium Chlorate this year. This has helped dry down the rice, but it has hurt the milling yields for some producers. Since we will be applying more Sodium Chlorate due to having more down rice, I want to stress **“DO NOT GET AHEAD OF YOUR COMBINE CAPACITY”**. I have had many calls on very low milling yields as a result of not getting the rice harvested within 7 days after the Sodium Chlorate application. Ideally, I would like see the rice harvested within 5 days, but the absolute latest would be 7 days. If it looks like the weather may hold you up on harvesting, do not spray any more acres. I would rather error on the side of not spraying enough than too much.

With down rice, do not expect Sodium Chlorate to dry down all of the straw material. It will only dry down straw that it comes in contact with. Even though you are only drying a portion of straw, it will increase the combining efficiency to a certain extent. If you are going to use Sodium Chlorate, I would apply 4 to 5 lb/A using 10 GPA to get the best coverage as possible.

According to the latest USDA Ag Report, Mississippi will harvest 263,000 acres of rice, which is up 20,000 acres from the August 15<sup>th</sup> report. The latest yield projection for Mississippi is 6500 lbs/A (144 bu/A), which is approximately the 5-year average. Yields this year have been less than spectacular, especially with high input cost. While talking to producers over the past couple of weeks, the most popular statement I heard was that “the yields are good, but not great”.

Yield reports have ranged anywhere from 130 to 180 bu/A. The hurricanes have probably cost us about 5 to 10 bu/A. But I think the hot weather at the end of July and first of August hurt us more than anything because I have seen too many blank kernels.

The weather for this growing season was not exceptional by any means for growing rice. At Stoneville, there were 27 days that temperatures were  $\geq 95\text{EF}$ . When comparing to last year, there were only 8 days which were above  $\geq 95\text{EF}$ . The average high from May 1 to September 1 was 89.8EF (2.4 degrees higher than last year) and the average low during this time was 69.1EF (0.5 higher than last year). The cool and dry weather observed at the end of April was not a big help either.

I pulled up to a producer's field the other day while they were harvesting and thought maybe they had the combine set wrong because I saw a bunch of kernels on the ground. After I got out of the truck and looked, it was nothing but blank kernels.

We are currently still trying to finish harvesting our RITE program fields. Yields so far have also been less than stellar, ranging from 140 to 160 bu/A. Of the five fields I had this year, only two of them have been cut standing up.

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# Cotton

## Dr. Tom Barber

This has been a very busy fall for cotton producers. The effects of Katrina and Rita have slowed harvest of all crops and in many ways complicated cotton harvest. Hurricane Katrina arrived at a time when many producers in Mississippi had not defoliated so they were spared extensive losses. However, in the South Delta where the cotton was further along in maturity, losses from 20 to 50% were sustained in many producers' fields. Katrina, of course, caused losses from blowing cotton off of the stalk; however, some losses were incurred from boll rot and hard lock where plants were lodged from heavy winds and bolls were in direct contact with the ground for extended periods of time in both the hills and the delta. Rita hit when about 70-80% of the delta crop was defoliated. The feeder bands or water bands from the hurricane caused tremendous cotton losses 35 to 50% in the counties along the Mississippi River particularly Coahoma, Bolivar, and Washington. It seems the cotton damage caused by Rita decreased the further east you move from the Mississippi River. However, there were scattered reports of tornadoes from the storm that caused damage to modules and gins where they touched down. Overall losses from both storms could total 40 to 60% (if not more) in select areas, especially when we determine and figure the module damage and loss. It goes without saying that yields will be a little off from our two record breaking years in a row. Every year is different and barring another tragedy we could still come out of this season with an average yield.

Even though the season is not over yet, it is already time to begin planning for next year. Variety selection is the most important decision you can make for next season. This was the first year that the newer varieties we plant in Mississippi, including the fuller season varieties, were subjected to hot, dry weather. The last two record breaking seasons provided excellent growing conditions for Mississippi cotton. Therefore, it is important to look at these varieties and how they performed over the wide range of growing conditions that we have experienced in the last few years. If we can identify a variety, or varieties, that have proven their performance over this wide range of environmental conditions, then we can reduce our risk by planting these proven performers over the majority of our acreage next season. Do not rely on one year data from variety trials; every year is different and by looking at

a three year average you can get a fairly good handle on the stability of a variety. Remember to spread your risk by not planting one variety over the majority of your acres. Plant varieties that differ in maturity in order to cover risks involved with natural disasters and other problems that Mother Nature may spring on us. In other words don't put all your eggs in one basket. Flex cotton will be available for commercial production next season. Roundup Ready Flex cotton allows the flexibility to apply glyphosate over the top of the cotton from emergence to 60% open, eliminating the 5 leaf window. It will only be available in Flex, Flex/BollGard II and Flex/Widestrike. There will not be a regular BollGard option with flex; if you want the worm protection you will have to plant BollGard II or WideStrike cotton. I will remind you that we will only have one year of data on these Flex and Flex/BollGard II varieties. Therefore, we do not have much information on how they will perform under a wide array of environmental conditions. It would not be a bad idea to try a couple of these on your farm, in limited acreage only.

With the costs of production increasing, there may be several management practices you can change to reduce some costs. Consider or re-visit a skip-row pattern which can decrease the per-land acre cost of production. Continue to reduce tillage practices, especially with fuel prices increasing. Try to implement a production practice consisting of less trips across the field, including one where you can combine pesticide, herbicide, and growth regulator applications. These three points are mentioned for your consideration; get as much information as possible.

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*This issue of Agronomy Notes was edited by Emily Dabney.*



October

**26, Organic Networking: Finding and sharing information, resources, people, and opportunities.** 9:00 a.m. to 3:30 p.m., Central Mississippi Research and Extension Center, 1320 Seven Springs Rd., Raymond, MS  
Contact: Bill Evans. 601-892-3731, *Free and open to public, lunch will be provided.* Topics covered include what is being grown, how to sell, where is the best production information, the Southern Organic Resource Guide, networking to become and stay certified, cooperatives, and other "stuff". Morning is presentations; after lunch group and general discussions.

Support from NCAT, IOIA, MAFES, MSUES, and ASUES makes this workshops possible. For clarity, the target audience is commercial farmers and allied industries, rather than homeowners and gardeners.



November

**3-4, Mississippi Entomological Association Insect Conference,** Mississippi State University, Bost Extension Center. For additional information contact Michael Williams (662) 325-2986.

**29-30, 2005 Cotton Short Course,** Mississippi State University, Bost Extension Center. Pre-registration and information available on line at [http://msucares.com/crops/cotton/short\\_course.html](http://msucares.com/crops/cotton/short_course.html). For additional information contact Emily Rose (662) 325-2701.



December

**2, Horticulture Club Christmas Open House,** Mississippi State University, Plant and Soil Sciences Greenhouse, behind Dorman Hall. For additional information contact Dr. Richard Harkess (662) 325-4556 or email [rharkess@pss.msstate.edu](mailto:rharkess@pss.msstate.edu).

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