

IPM NEWSLETTER

Update for Field Crops and Their Pests

No. 13

June 8, 2007

Past newsletters and other information can be found at UTCrops.com

Bookmarks: [Cotton update](#) [Fungicides on corn](#) [Several insect issues](#) [Corn and soybean updates](#) [Weed control](#)
[Wheat storage](#) [Area report](#) [Farm management](#) [Moth traps](#)

In-field Soybean Scout Schools

| County | Date and Time | Location | Contact* |
|------------|------------------|--|-------------------------------|
| Weakley | June 19, 9:00 am | Hall Shop, 1785 Bob Miles Road (From Hwy 89, 7 miles west of Sharon) | Jeff Lannom 731-364-3164 |
| Gibson | June 19, 1:30 pm | Ag Museum, Milan Research & Education Center | Philip Shelby 731-855-7656 |
| Lauderdale | June 20, 9:00 am | Parker Shop, Durhamville-Orysa Rd. (5 miles south from Hwy 19, or 1.5 miles north from Hwy 87) | Jerry Parker 731-635-9551 |
| Dyer | June 20, 1:30 pm | Mt. Tirzah Baptist Church, Tatumville Road (north from Hwy 104, 6 miles east of Hwy 412) | Tim Campbell 731-286-7821 |

* Contact you local County Extension Agent, or see <http://www.utextension.utk.edu/fieldCrops/upcomingevents.html> for additional details including maps to some locations.

Cotton Progress Report (Chris Main, Extension Cotton and Small Grains Specialist)

The Tennessee agricultural statistics agency reports that 99% of the cotton crop was planted as of June 4th this is about 1% ahead of 2006 and about 5% ahead of the five-year average of 94%. Cotton condition is rated as fair to good with most of the early crop beginning to square.

Plant Growth Regulators (PGR's) are an excellent tool to manage excessive vegetative growth and promote crop earliness. I would caution against aggressive use of PGR's until we begin to get more frequent rainfall. Remember that PGR's are a plant management tool, not yield enhancers. While many opinions exist about PGR use, cotton treated with excessive rates of PGR's while under early-season or management stress can be set behind for the entire growing season. Please do not make 'automatic' PGR applications just because that is what you have done in the past. Make sure that plants are showing signs of excessive growth. I prefer to use height to node ratios for determining the need for PGR's. The table below is a guide to determine plant vigor at different growth stages. Examine the height to node ratio (HNR) by dividing the plant height by the number of main stem nodes to get an average internode length. As the season progresses also examine the uppermost five nodes (active growth area) on a plant for excessive internode length. Remember that PGR's will not shrink plants. Examining the five uppermost nodes will give the best indication of current growth since the lower nodes have stopped expanding.

Height to node ratios for cotton PGR decisions. (Jost et al. 2005)

| Growth Stage | Normal | Stressed HNR (inches/node) | Vegetative |
|-----------------------------|----------|-------------------------------|------------|
| Seedling | 0.5-0.75 | - | - |
| Early Squaring | 0.75-1.2 | 0.7 | >1.3 |
| Large Square - First Flower | 1.2-1.7 | <1.2 | >1.9 |
| Early Bloom | 1.7-2.0 | <1.6 | >2.5 |
| Early Bloom + 2 weeks | 2.0-2.2 | <1.8 | >2.5 |

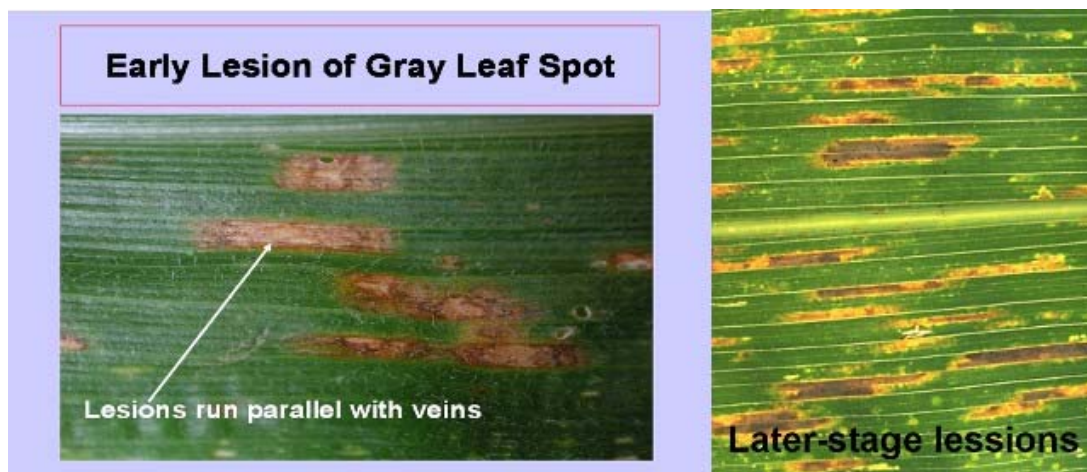
Jost, P., S. M. Brown, S. Culpepper, G. Harris, B Kermerait, P. Roberts, D. Shurley, and J. Williams. 2005. 2005 Georgia Cotton production guide p 37-39.

DD60 Accumulation (TASS and NWS data)

| Location | 4/20-6/6 | 4/27-6/6 | 5/4-6/6 | 5/11- 6/6 | 5/18-6/6 | 5/25-6/6 |
|--------------|----------|----------|---------|-----------|----------|----------|
| Brownsville | 530 | 482 | 430 | 359 | 257 | 212 |
| Dyersburg | 575 | 526 | 470 | 290 | 290 | 231 |
| Fayetteville | 584 | 537 | 474 | 307 | 307 | 238 |
| Memphis | 700 | 660 | 564 | 353 | 353 | 268 |
| Milan | 516 | 469 | 417 | 245 | 245 | 203 |

Tips for Corn Producers Using Foliar Fungicides (Mevin Newman, Professor, Plant Pathology)

Many corn producers are considering spraying their corn with a fungicide to control diseases. This interest has been spurred by higher corn prices, increase in gray leaf spot disease and favorable research at the Research and Education Center at Milan. Of course, not every corn field should be sprayed. If there is no disease or very little disease, the response will not be very great. On the other hand, if the disease potential is high, more increase can be expected compared to untreated corn. The more disease causing-factors that are present, the more likely a fungicide will increase yields.



The following are some important factors to consider:

1. Susceptibility of Hybrid to gray leaf spot (none are totally resistant to all leaf diseases).
2. Continuous corn increases disease potential.

3. Tillage practices (no-till) that leave corn residues on the surface of the ground will increase disease potential. However, conventional tillage may also promote foliar disease, especially if fields are not rotated with other crops.
4. Later plantings tend to have more disease.
5. Irrigation will provide essential moisture for diseases to develop.
6. Dry weather before and after tassel will reduce disease development.
7. Periods of rainy weather throughout the growing season will increase the likelihood and severity of disease.
8. Severe gray leaf spot will weaken the stalks and may result in increased lodging.

Which fungicides should producers use? The strobilurin fungicides have given the best yield increases in research plots. Headline (pyraclostrobin), Quadris (azoxystrobin) and Quilt (azoxystrobin + propiconazole) have been tested and have given significant disease control and higher yields. Stratego (trifloxystrobin + propiconazole) is cleared for corn disease control, but we have not yet put it in our tests.

When is the most effective time to spray a fungicide? For several years, research has demonstrated that corn should be sprayed just at the tasseling stage. If sprayed before tassel or later, when corn is in full silk, disease control and yield tend to drop off. If silks have turned brown, very little increase in yield may result.

How should the fungicide be applied? Most corn is too tall at tassel to be sprayed with a high cycle sprayer, so many will use aerial application. However, some ground sprayers are big enough and may cause very little damage.

How much water should be applied? For best disease control aerial applicators should use at least 5 gallons of water per acre with a fungicide adjuvant or COC. Ground applicators should use 15-20 gallons of water per acre with a fungicide adjuvant or COC. Nozzles that give smaller droplets in the range of 300 microns will give better coverage.

Insect Issues (Scott Stewart, IPM Specialist)

Thrips problems are still continuing in smaller cotton, but the phone has been a little quieter this week. Spider mites are still a worry, and I have seen moderated to heavy infestations in parts of Carroll County. Lack of rain is the #1 complaint, but we are getting some help with rain right now.

Natural Refuge Option Approved for Bollgard II. The EPA has approved the use of “natural refuges” for Bollgard II cotton. What does this mean?

- A non-Bt refuge is no longer required for Bollgard II cotton fields. This does not apply to the original Bollgard technology, nor does this currently apply to WideStrike cotton. A structured, non-Bt refuge is still required for Bollgard and WideStrike fields.
- Non-Bt refuges for Bollgard II fields can now be treated for bollworm, tobacco budworm and other caterpillar pests as desired by producers with any currently labeled insecticide.

Spraying for Plant Bugs in Cotton. Some early planted fields are beginning to square. The need for making plant bug applications in squaring cotton should be based on two main factors: 1) plant bug population density and 2) square retention levels. Continuing research indicates something that is not very shocking. Treatments sprayed on a schedule are often wasted because they miss their target. This is especially true in prebloom cotton because plant bug infestations tend to be relatively sporadic. In large-plot replicated tests on prebloom cotton last year, only 1 of 8 locations ever exceeded a minimum

threshold of 8 plant bugs per 100 sweeps (or less than 80% square retention). In all cases, yields were not increased by making insecticide applications when plant bug populations were below threshold. Recommended insecticides for plant bugs are listed below. *Treatment is recommended when plant bug populations are 8+ bugs per 100 sweeps during the first two weeks of squaring. You can and should use a more aggressive threshold if square retention drops quickly, particularly if it approaches 80% or less.* You will note that UT discourages the use of acephate, dimethoate, Bidrin and other OP insecticides prior to bloom. The use of Vydate is also discouraged, although some Vydate will be used as part of a nematode suppression program. This is an attempt to manage resistance to these compounds. *Reminder:* the new Bidrin label does not allow the application of this product between first square and first bloom.

| Plant Bug Insecticide Recommendations in Pre-blooming Cotton | Lb Active Ingredient per Acre | Amount of Product per Acre | Acres Treated per Gal or Lb of Dry Product |
|---|--------------------------------------|-----------------------------------|---|
| acetamiprid (Intruder 70WSP) | 0.048 | 1.1 oz | 14.5 |
| flonicamid (Carbine 50WG) | 0.081 - 0.089 | 2.6 - 2.8 oz | 6.2 - 5.7 |
| imidacloprid 4.44 (Trimax Pro) | 0.047 | 1.35 oz | 94.8 |
| imidacloprid 4.0 (Trimax, Couraze Max) | 0.047 | 1.5 oz | 85.3 |
| thiamethoxam (Centric 40WG) | 0.0375 - 0.05 | 1.5 - 2 oz | 10.7 - 8 |

Corn Borers in Corn. The first-generation moth flight of southwestern corn borers (SWCB) is late enough that some corn is already near tasseling. Because these moths are attracted to larger corn, and because plants at this stage are sensitive to infestation, *there may be some benefit to including an insecticide for corn borers when applying a fungicide at early tasseling. This only applies to non-Bt corn.* This benefit is dependent upon whether SWCB are present in significant numbers (> 20-25% infested plants). Moth trapping and scouting are the only methods to accurately predict corn borer infestations. The first generation is generally sporadic and smaller than the second generation -- some areas may have many moths, others relatively few.

Using SWCB moth traps can help guide treatment decisions. For example, moth traps at our experiment station have not caught more than 1 moth per trap per week. The take home message is there are few moths, and spraying corn borers will not pay. However, I've also had reports this week of moth catches ranging from 30-200 moths in Benton, Lake, Obion, Weakley, and Carroll Counties (thanks to Kevin Knop). This represents a fair sized first generation flight in these northern counties. There are already treatment-level infestations in some early-planted fields in part of Haywood County (an area that caught >100 moths last week). I would be concerned about early-planted, non-Bt corn fields near traps with high moth catches during the previous 7-14 days. In this scenario, there is a decent chance that an insecticide application will increase yields if the application is made in a timely fashion. If a field will not be tasseling for a couple of weeks, waiting to put out an insecticide with the fungicide will be too late to control the current generation of SWCB. Also, by the time the second SWCB generation occurs (typically in mid July), much of our corn will be past the early tasseling stage that is optimal for fungicide applications. So, tank-mixing insecticide with the fungicide is less unlikely to pay unless you are dealing with late-planted corn. It would be nice if the best timing for a fungicide application always coincided with the best time to put out insecticide, but that is wishful thinking. Every farm should have 1 or 2 SWCB moth traps.

Recommended Corn Borer Insecticides ([Link to suggested rates](#)):

1. Intrepid 4-6 oz/acre is my first choice on corn once it begins tasseling. This product tends to provide better residual control and rainfastness.
2. Mid-rate pyrethroid insecticides such as Asana XL, Baythroid XL, Capture, Mustang Max, Prolex, and Warrior will provide decent control if applications are properly timed. However, I prefer this class of chemistry in pre-tassel (whorl-stage) corn.
3. Other labeled insecticides include Tracer, Furadan and Sevin

Of course, high-volume ground applications are preferred, but aerial applications can be somewhat effective. Do not expect better than 70-80% control in the best of cases. The key to control is treating before most larvae begin tunneling into stalks. Larvae will begin tunneling into stalks about 7-10 days after eggs hatch.

Granulated Cutworm Eggs Found in Cotton. In recent years, we occasionally find “worm” eggs on small cotton. The same is occurring this year. Often times these turn out to be the eggs of the granulated cutworm (rather than bollworm or tobacco budworm). Granulated cutworm eggs are slightly larger and slightly less spherical (more flattened) than bollworm eggs. Often you will see several eggs on one leaf or plant. Unlike bollworms and budworms, the small larvae have a dark head capsule and are covered with fine hairs, but you will need good eyes or a hand lens. Granulated cutworms cause little injury to cotton, although they might scuff-up the terminals of non-Bt cotton.

Grape Colaspis in Soybean. I’ve now seen several fields with some mysterious stand loss (left) that could be confused with “damping off” or some other seedling disease. Surviving plants may be wilting and lack vigor. The culprit has been grape colaspis larvae which feed underground on roots.



They are cream colored, C-shaped grubs that are about ¼-inch long when full sized. The larvae and pupae (pictured below), as well as emerging adults (above), can sometimes be found when the soil is dug up around the plants. However, if you are late in looking, they may already be gone. We first observed this problem in tests of insecticidal seed treatments, where Cruiser was doing a good job of preventing stand loss. Unfortunately, there is nothing that can be done to cure the problem in fields that are already planted because foliar insecticides are ineffective.



Grape Colaspis Larva



Grape Colaspis Pupa

Corn and Soybean Updates (Angela Thompson, Extension Corn and Soybean Specialist)

Crop Progress. With the rain received last weekend and scattered rain this week, crops got a temporary break from the drought. However, warm temperatures and windy conditions have pretty much dried fields out again. Where moisture fell, late soybeans are trying to emerge to a stand. In most counties, leaves on non-irrigated corn have been rolling at least part of the day for several days and we need a good soaking rain statewide soon. This week a small number of acres are starting to tassel. More than one third of our acres are probably 2-3 weeks away from tasseling. Corn in areas that were moisture limited since planting is more erratic in size than we normally see for this time of year which leads to concerns about uniformity of tasseling later on.

We are about 80% planted for soybeans. Planting has halted to allow wheat harvest and because we have no moisture. In beans that are up, septoria Brown Spot is being found in fields around the state. With dry weather, disease remains on lower leaves, generally doesn't spread and a fungicide spray is not needed to manage this disease. (About the only positive side to a dry summer is less foliar disease pressure in corn and soybeans!!)

Yield Potential and Spraying Fungicides on Corn. Folks growing dryland corn have tough decisions to make about whether to invest in a fungicide application this year. The decision to apply a fungicide is based on several factors outlined by Melvin Newman. However, the yield potential of the field is a critical consideration. In areas that have been fortunate to catch showers regularly, corn yield may not be hurt badly yet by the dry weather since most of our corn is not yet ready to tassel. For others, drought conditions early and into V9-12 can cause corn plants to set fewer rows of kernels on the immature ear. Continuing dry weather into pollination means corn will likely not pollinate normally and late season drought means ears will not fill out completely. A fungicide won't resurrect drought stressed corn. The yield reduction estimates below are based on the growth stage being exposed to at least 4 days of wilting due to drought.

| Stage of Development | Percent Yield Reduction | Water Requirement |
|----------------------|-------------------------|-------------------|
| Vegetative | Up to 10% | 0.1" per day |
| Tassel Emergence | Up to 25% | 0.25" per day |
| Silking; Pollen shed | 40-50% | 0.33" per day |
| Blister | 30-40% | <0.1" per day |

Borrowed in part from Walking Your Fields; Pioneer newsletter June 7/07

Mid Season Irrigation and Nitrogen Fertilizer. Corn should be irrigated on time with adequate amounts of water needed for specific growth stages in order to maximize yield. Water use is highest at tasseling/pollination into the milk stage. To be effective in a dry year, irrigation must be maintained until physiological maturity or 'black layer' formation (**about 55-65 days after silking**).

I have had questions about making pre-tassel or in some cases at-tassel nitrogen applications to boost irrigated crop yield. Corn utilizes about 25% of its total N from silking through the dent stage. At-tassel applications will probably work (can't find much data here). There is more information about nitrogen applied about 2 weeks before tassel emergence. In theory, pre-tassel nitrogen is put out early enough to allow nitrogen to change to the desired form in soil solution for plant uptake, and for adequate amounts to be assimilated by the plant before tassel emergence. Most producers used 30-50 lbs N applied aerially as ammonium nitrate or granular urea (urea should be watered in within 4 days if no rain occurs).

Baling Corn for Hay. I have received a few calls this week about baling corn for hay. Some growers in central TN did this last year as the result of a rain shortage there. In areas that have missed most rains, the corn outlook isn't too promising. These areas are also suffering from a hay shortage and this increases interest in baling corn for feed.

Some things to consider:

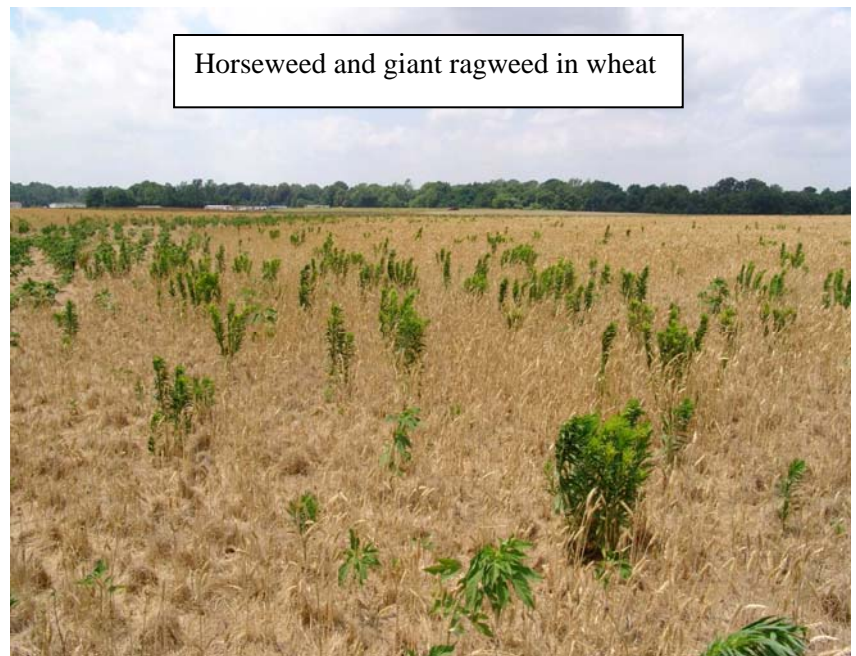
- Get a nitrate test done before cutting or grazing the corn field. Where 100+ lbs of N were applied, this is cheap insurance since we are dealing with high N rates and a drought stressed crop that may result in undesirable nitrate levels.
- Check herbicide labels for grazing/cutting restrictions. Products like Atrazine, Steadfast, and Callisto have a waiting period of 60, 30 and 45 days, respectively before utilizing for forage or hay. Roundup WeatherMax is 50 days.

Soybean Stands and Dry Weather. Wheat harvest has begun in some areas, and double crop beans will hopefully be planted in the next few weeks. (In some areas, we are still trying to finish planting our 'full season' beans.) Questions concerning whether to plant now or wait for a rain have been coming pretty regularly this week. Soybeans should stay pretty stable in dry soil for a week or more. After 2 weeks of hot, dry conditions, seed deterioration due to environment and pests may start to affect germination. Growers with fields that have pretty much missed rains all spring may want to wait until they get adequate rain in that area to plant seed. In areas that usually catch some rain when a front passes through, it may be a good gamble to plant in anticipation of rain.

Asian Soybean Rust Update and Sampling Results. There was a new find of soybean rust on kudzu in St. Mary's parish in Louisiana. At this time rust seems to be spreading slowly. The USDA public website (www.sbrusa.net) will continue to post updates as they occur. Last weeks samples submitted to Knoxville for PCR testing, were all negative for the state.

Weed Control (Larry Steckel, Extension Weed Specialist)

The wheat crop that folks have taken to yield is a mix of some pleasantly surprising yields (50 to 60 bu/A) and some poor (5 to 20 bu/A) yields. Green patches of glyphosate resistant horseweed (marestail) and/or giant ragweed are evident in many of these fields being harvested. These two weeds are hard to control before soybean planting when they are undisturbed let alone when they have been cut off by a grain table. There are no complete control options to control either of these weeds after wheat harvest. One recommendation that can provide about 70 to 80% control of glyphosate resistant horseweed is 40 to 48 ozs/A of



Gramoxone Inteon plus 4oz/A of Sencor. If Sencor is not available then 4 oz/A of Canopy can make a good substitution. Include a non-ionic surfactant at 2 pts/100 gallons of mix, or crop oil concentrate at 1 gallon/100 gallons of spray mix. The Gramoxone Inteon plus Sencor tank-mix will also provide pretty fair control of giant ragweed. Ignite at 29 oz/A + 4 oz/A Sencor can also provide comparable

control to the Gramoxone Inteon/Sencor tank-mix. Use at least 15 gallons/Acre of water when using any of these tank-mixes for best results.

Area Report for Northwest Tennessee (Gene Miles, Area Crop Specialist, Week of June 4th)

The area remains dry even though some timely showers are benefiting some locations. Cotton growth stages for fields being monitored through Dyer and Lauderdale Extension Service IPM programs range from cotyledon to 7th node. Thrips counts in susceptible cotton fields being monitored through these programs range from 0 to 2.0 thrips per plant this week. Cotton fields susceptible to thrips damage should be checked at least once weekly. A minimum of one plant per acre or a minimum of 10 plants in fields less than 10 acres should be checked to determine thrips per plant. Early planted cotton (April 21) in the Delta area is in the 9th node and averaging 98 percent square retention.

Once cotton reaches the 5th node, observation for pin head squares should be made. Once the square is observed, the first week of squaring has been reached. It is important to note this growth stage since economic thresholds for plant bugs change as cotton matures. Square retention counts should be started as soon as possible after cotton begins to square. Square retention can be determined by counting the 1st position square only on the top 5 nodes of the plant. This should be done till 20 positions are checked in one location. Check 5 positions in the field which will give you 100 1st positions checked. Subtract the 1st square positions missing from 100 to obtain percent square retention.

- Corn - Rootless corn syndrome has been noted in the area. This is basically caused by dry weather which prevents base roots from forming. Corn has begun to tassel this week.
- Soybeans - Dry weather has stopped planting.
- Wheat - Initial yields of surviving wheat fields from Dyer County are averaging 55 bushels per acre with test weights averaging 58 and above.

Wheat Harvesting (Russ Patrick, IPM Specialist)

Although some wheat is being harvested, it is hoped that the bins were prepared earlier to receive the grain (such as spraying down the walls and flooring with Tempo SC-Ultra at 16mm/gal rate). Treat around the perimeter of the bin up to at least 10 feet away from the storage area. Protecting wheat from insects is much more difficult than corn because it is being harvested during the warmer periods of the year giving insects a start with ideal living conditions. Storcide II can be used to treat the grain as it is being binned. This gives extra protection from insects at the beginning of the storage time.

Farm Management Update (Chuck Danehower, Area Specialist – Farm Management)

Some areas of Tennessee received welcome rainfall over the weekend and this week. However it was not a general rain. Many areas are still dry and are quite a bit behind in moisture. With the wheat coming off and dry soil conditions, there has to be some concern about planting double crop soybeans. With November Soybeans trading in the mid \$8 bushel range, planting double crop soybeans appears profitable. But, if soil conditions make getting a good stand questionable, then you need to know your breakeven yield before planting.

Soybean prices remain volatile so rather than use this week's price, I would use a more conservative price such as \$7.25 bushel. Using the budget on the right, it takes about 10 bushels to cover variable costs and over 13 bushels to breakeven over variable & fixed costs (machinery depreciation & interest, labor). If the land is share rented at 1/3 then the breakeven is 15 bushels for variable cost & 20 bushels for variable and fixed. In the short run it is necessary to cover the variable costs and make 10 – 15 bushels per acre depending on the land cost. Note, I did not mention cash rent. At this point, it is essentially a fixed cost. I only look at this quick analysis, because if it continues to stay dry, some areas of Tennessee will have difficulty getting a good stand which will impact yield. Check your soil moisture before you plant. What makes this a tougher decision is that due to freeze damage we probably are not going to make the farm income we had anticipated on the wheat. I hope this helps to stimulate your thinking on what breakevens are needed to cover your crops. If we can assist you, contact your local UT Extension office.

| Double Crop Soybeans Budget | Per Acre |
|------------------------------|---------------|
| Seed & Treatment | \$33.99 |
| Weed Control | \$ 4.54 |
| Fungicide | \$10.50 |
| Insecticide | \$ 5.00 |
| Repairs | \$ 8.48 |
| Fuel @ \$2.35 gallon diesel | \$ 6.55 |
| Operating Capital | \$ 1.84 |
| Total Variable Costs | \$70.90 |
| Breakeven at \$7.25 | 9.77 bushels |
| Fixed Costs including Labor | \$26.10 |
| Total Fixed & Variable Costs | \$97.00 |
| Breakeven at \$7.25 | 13.38 bushels |

Tennessee Pheromone Moth Trapping Summary - Trapping efforts are funded in large part by the Tennessee Cotton Incorporated State Support Program.

Numbers of Moths per Week (Week 5, Ending 6-6-07)

| Trap Location | Tobacco Budworm | Corn Earworm (Bollworm) | Beet Armyworm | Southwestern Corn Borer |
|-------------------------|-----------------|-------------------------|---------------|-------------------------|
| Hardeman (Bolivar) | 0 | 0 | 0 | --- |
| Fayette (Whiteville) | 0 | 0 | 0 | --- |
| Fayette (Somerville) | 0 | 0 | --- | 0 |
| Shelby (Millington) | 25 | * | 0 | --- |
| Tipton (Covington) | 10 | 0 | 0 | --- |
| Tipton (North) | 7 | 0 | --- | 0 |
| Haywood (West) | 0 | 0 | 0 | --- |
| Haywood (Brownsville) | 0 | 0 | --- | --- |
| Madison (Exp. Stn.) | 0 | 3 | 0 | 0 |
| Madison (North) | 4 | 0 | --- | --- |
| Crockett (Alamo) | 0 | 0 | 0 | --- |
| Crockett (Maury City) | 0 | 0 | --- | --- |
| Dyer (Bogota) | 0 | 0 | 0 | --- |
| Dyer (Newbern) | 0 | * | --- | 0 |
| Lake (Ridgley) | 0 | 5 | 0 | --- |
| Gibson (Kenton) | 0 | 7 | --- | --- |
| Gibson (Milan Exp Stn.) | 5 | 0 | 0 | 18 |
| Carroll (West) | 0 | 0 | 0 | --- |
| Lauderdale (Goldust) | 0 | 1 | 0 | --- |

An asterisk (*) indicates trap was missing, knocked down or not run.

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DISCLAIMER STATEMENT

This publication contains pesticide recommendations that are subject to change at any time. The recommendations in this publication are provided only as a guide. It is always the pesticide applicator's responsibility, by law, to read and follow all current label directions for the specific pesticide being used. The label takes precedence over the recommendations found in this publication. Use of trade or brand names in this publication is for clarity and information; it does not imply approval of the product to the exclusion of others which may be of similar, suitable composition, nor does it guarantee or warrant the standard of the product. The author(s), The University of Tennessee, The Institute of Agriculture and the University of Tennessee Extension assume no liability resulting from the use of these recommendations.

Scott D. Stewart (editor)
Extension Cotton IPM Specialist

