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DOUBLE-CROP COTTON FOLLOWING WHEAT SPECIAL ISSUE

This special issue of the Louisiana Cotton Bulletin provides tips and recommendations for producing double-crop cotton. Double-cropping cotton presents two major challenges – getting a stand and management of late-planted cotton. This newsletter addresses many of the factors around those two challenges.

Managing the Wheat Stubble—Sandy Stewart, Ph.D. and Rob Ferguson

The first major hurdle to cross in a double-crop cotton and wheat system is to get a stand. Basically, there are two options; plant into the wheat stubble or remove it by burning. If at all possible, planting into the wheat stubble is the preferred method. The benefits of leaving the residue in terms of building organic matter, water infiltration, and ground mulch should not be underestimated.

Wheat straw that has been chopped and distributed evenly facilitates getting a stand.

Stubble Height and Burning

Trials conducted in 2007 by the LSU AgCenter indicated no yield differences among double-crop cotton planted into wheat straw cut at 6 inches, 12 inches, or burning off the straw. The 12 inch stubble treatments did, however, result in shorter plants throughout the season. The best information we have at this point leads us to recommend cutting the wheat stubble at 6 inches. As with most aspects of the double-crop system research is ongoing to refine recommendations.

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Inside this issue:

Upcoming Dates:

Cotton Inc. EFS Conference, Memphis-June 10-11

Northeast Research Station Field Day, St. Joseph—June 24

LA Farm Bureau Annual Meeting, New Orleans—June 25-29

Dean Lee Field Day, Alexandria—Aug. 21

Managing the Wheat Stubble (cont'd from Page 1)

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Burning the wheat straw is an option that some growers will choose to exercise. Burning removes the straw and cleans the beds, but could come at a price of losing moisture. Additionally, the benefits of the mulch are lost. For some producers, planters and existing field conditions may necessitate burning. However, producers are encouraged to plant into the wheat straw if possible.

A higher row will help conserve moisture when planting into wheat stubble.

Chopping and Spreading the Wheat Straw

An important step is to chop and spread the wheat straw behind the combine as evenly as possible. Problems can be encountered in planting if a lot more straw is piled on top of some rows than others. An even distribution of chopped wheat straw is most important and facilitates being able to set a planter to obtain a stand across the entire field.

Flat Planting

Some producers will try to plant cotton following wheat in fields that do not already have raised beds. The track record on this is a poor one. Without excellent internal drainage in the field, flat planted cotton is difficult, if not impossible, to plant and maintain a productive stand. One option is to burn the straw and pull up beds, but the loss of time, diesel costs and moisture makes this an unattractive option. Flat planting following a wheat crop is much more conducive to soybeans than cotton.

Planter Set-up-Sandy Stewart, Ph.D. and Rob Ferguson

Trash Wipers and Conserving Moisture

Trash wipers on the front of the planter are critical. Some cleaning of straw from the top of the row is needed to be able to place the seed in a trench and cover it adequately. The concern then is how deep and aggressive to set the trash wipers. There is no 'one size fits all' recipe for this. The overall thing to keep in mind is that soil moisture must be conserved as much as possible; therefore, only run trash wipers as deep as needed to clean the bed, while disturbing the soil as little as possible. Moisture is needed to obtain a stand quickly. With ample soil moisture, more aggressive trash wiping is possible. Conversely, if soil moisture is marginal, little or no disturbance of the top of the bed is best.

Because moisture conservation is so important, no-till coulters have not been found to be beneficial. In fact, coulters usually do more harm than good because they will mix dry soil into the seedbed and dry it even more. Most producers with experience in double-crop cotton have removed the coulters from their planters.

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Planter Set-up (cont'd from Page 2)

Trash wipers need to clean residue, but disturb the soil as little as possible to conserve moisture.

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Down Pressure and Seeding Depth

The seedbed is likely to be firm, so accomplishing an adequate seed depth while still being able to close the furrow is a challenge. Once again, there is not one recipe that will fit all situations. Growers will need to spend some time finding the right combination of 1) no-till down pressure springs, 2) seed depth setting, and 3) tension on the press wheel(s). Planting into the existing straw may seem an insurmountable challenge at first, but some time spent adjusting the three items above usually will work. The goal is good soil-seed contact and covering of the furrow.

The rough nature of the beds will most likely require that planters be run slightly slower to minimize bouncing and leaving seed on top of the ground. It is unavoidable that some seed will bounce out on top of the ground. So, increasing seeding rates by 10% in double-crop cotton should be a standard practice.

Finding the best combination of down pressure and seeding depth may require some experimentation with planter adjust-

Variety Selection for Double-Crop Cotton-Sandy Stewart, Ph.D.

Double-crop cotton is essentially late-planted cotton. Past experience with late planting dates suggests that over a number of years, earlier maturing varieties will out-perform full-season varieties when planted in later May and early June.

Research conducted by the LSU AgCenter in 2007, however, did not clearly indicate that maturity should be the deciding factor when choosing a variety for double-crop cotton. Varieties with good performance history in normal planting were the same varieties that performed well in limited double-cropping trials. Roundup Ready Flex varieties will greatly facilitate weed control. Double-crop cotton develops quickly; therefore, the ability to apply glyphosate over-the-top past the fifth true leaf is of value. Additionally, double-crop cotton does not always reach full canopy, which can lead to late-season grass pressure. Therefore, the ability to use glyphosate over the top an be sloppy with directed applications will help in

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Variety Selection For Double-Crop Cotton (cont'd from p.3)

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weed management. Bollgard II and Widestrike varieties can also reduce the risk of late-season caterpillar pests.

The best advice is to focus on planting a variety that is adapted to the area and has a history of being productive. Choosing a poor performing variety just because it is early is not the answer. The varieties Stoneville ST 4554B2RF, Phytogen PHY 485 WRF, and Deltapine DP 117 B2RF have all performed well in double-crop trials and have growth patterns that can make them well-suited for the system. Each has its attributes and other varieties may also be good choices based on yield history in the area or on a particular farm. In particular, DP 117 B2RF should not be placed on droughty soils or without irrigation.

Insect Management Issues- Ralph Bagwell, Ph.D.

Problems with insect pests have been a great concern in double-crop cotton. The concern arises from cotton being planted late, thus maturing late, and being planted into a crop known as a host for thrips, plant bugs and stink bugs. Observations, however, from the past few years indicate that insect pests may be less of a concern.

Insect pests' densities have generally been lower in double-crop cotton than in cotton planted during the normal planting window. The reason for this occurrence is not known but it is likely associated with the delayed planting date. Delayed planting either provides a temporal escape by either not being available when pests commonly search for hosts or are not available when large populations move.

This does not mean that insect pests are not a problem, treatable populations of most insect pests have been found in double-crop cotton. Thus, scouting and treatments are still needed in double-crop cotton.

The following paragraphs discuss observations of insect pest populations in cotton behind wheat.

Thrips: Populations of thrips have been much lighter in double crop cotton than in cotton planted during the conventional window. Thrips move from wheat to alternate hosts when wheat starts to dry down. At the time wheat is cut, very few thrips remain in the wheat field. The less expensive seed treatment options, such as acephate, usually provide adequate protection from thrips in cotton behind wheat.

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Insect Management Issues (cont'd from Page 4)

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Aphids: Fewer problems with aphids have been experienced in double-crop cotton. While this may not be true for cotton planted no-till into a wheat cover crop, cotton planted behind wheat may be planted so late that aphids do not have time to build to high densities before the aphid fungus eliminates aphid populations.

Plant Bugs: Initially, plant bugs were anticipated to be a more severe problem in double-crop cotton. Our experiences, however, have been that plant bug populations are lower in cotton planted behind wheat. The prevailing thought for this is that cotton planted behind wheat may not be recognized as a host during the early and mid season when plant bugs are actively searching for hosts.

Stink Bugs: Stink bug populations recently have been to low to detect if planting double-crop cotton will have an impact on stink bug population densities.

Boll Worms, Armyworms and Other Caterpillar Pests: As with stink bugs, recent populations of these caterpillar pests have been too low to detect any differences between cotton planted behind wheat and planted during the conventional window. Thoughts on how these insect pests impact double-crop cotton are speculative. Experiences, however, have been that double-crop cotton matures by a similar calendar date as cotton planted during the normal planting period. Thus, wheat cotton may be exposed to insect pests for a shorter period of time than normal planted cotton. This also indicates that insect control technology should not drive variety selection decisions.

Finally, these statements are based on previous experiences. Although insect pest problems have been lighter in double-crop cotton for the previous three years, this does not guaranteed that they will be this year. Therefore, cotton planted behind wheat should be continuously monitored for the presence of damaging insect pests.

Plant Growth and PGR Management- Sandy Stewart, Ph.D.

Cotton plants grown in a double-crop scenario following wheat tend to be shorter and more compact than normal planted cotton. By compact, we mean overall plant height is less, but also the fruit distribution on the plant appears to be more concentrated in the bottom and middle portions of the plant. This is probably due to high early retention in the bottom third of the plant. There are two major implications of this observed fruiting pattern.

Management of rank growth through the use of mepiquat usually does not need to be as aggressive as with earlier planted cotton. With good boll retention on the first five nodes, the fruit load on the plant will serve as the best regulator of rank growth. In past years, much of the focus of PGR management has been on match-head square applications. The approach to PGRs in double-crop cotton should be less aggressive at this time to avoid unnecessary restrictions on plant height. In most situations, initial applications should be timed to first bloom.

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Plant Growth and PGRs (cont'd from Page 5)

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The second implication is that plants will be slow to reach full canopy. In some fields, full canopy closure may not occur. Lack of canopy closure can increase weed pressure, particularly in mid- or late-season. Overly aggressive PGR applications can slow canopy closure in double-crop cotton, and lead to more weed germination.

Irrigation and Fertility-Sandy Stewart, Ph.D.

The ability to irrigate double-crop cotton is very important, particularly on droughty soils such as those found on the Macon Ridge. Obtaining a stand quickly is one of the keys to success, and irrigation can help that if dry conditions dictate that cotton has to be "watered up." Moreover, early retention is usually high, resulting in a more compact fruit distribution and bloom period. Maintaining good moisture through the bloom period then becomes more important.

This is not to say that double-crop cotton cannot be grown without irrigation. On some soils it can. However, drought-prone soils such as those found on the Macon Ridge dictate the need for irrigation. In any case, irrigation is definitely an advantage for a crop that develops as rapidly as double-cropped cotton.

Fertilizers recommendations for double-cropped cotton are not well-refined at this time. However, due to removal by the wheat crop and a generally high C:N ratio, it is logical to increase fertilizer N rates by 10-20% over what would normally be applied.

Weed Management Issues-Daniel Stephenson, Ph.D. and Sandy Stewart, Ph.D.

Weed management in double-cropped cotton is not vastly different from conventionally planted cotton. Some differences, however, should be noted when designing a weed control program.

The presence of wheat straw provides a mulch to prevent some weed seed from germinating. However, a residual herbicide, such as metolachlor (Dual Magnum, Sequence, others) is still needed. Residual herbicides must reach the soil surface and be activated to provide control. This can be a concern in the presence of wheat straw. Metolachlor can be intercepted by, but will not be bound to wheat straw. A rain will wash it off to the soil surface. Therefore, some metolachlor will not be immediately activated after an application. This underscores the need to apply full labeled rates of metolachlor or any residual herbicide.

If wheat stubble is burned, reduced weed control should be expected from residual herbicides due to the burned wheat straw (a.k.a. charcoal) binding the herbicide. Fortunately, this effect will be diminished during the growing season with rainfall. Following burning, use glyphosate for weed control then follow with residual herbicide application after the charcoal effect is reduced.

Double-crop cotton is slow to canopy, so mid- and late-season weed pressure, especially from annual grasses such as broadleaf signalgrass and browntop millet should require close attention. Additionally, residual herbicides at layby are likely to provide an

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Weed Management (cont'd from Page 6)

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advantage for season-long control as well as good herbicide resistance management. The Roundup Ready Flex system is an advantage in double-cropped cotton because of the ability to make over-the-top applications at virtually any point in the system in order to remove escaped weeds.

If there are plans for planting wheat for grain following cotton harvest, be mindful of the rotation interval for residual herbicides such as diuron (Direx or Karmex) and prometryn (Caporal or Cotton-Pro). Consult herbicide labels for specific rotation intervals if this situation is a possibility.

Despite the wheat straw mulch, reducing early weed competition is still important in cotton following wheat.

Planning for Double-Crop Cotton in 2009-Sandy Stewart, Ph.D.

2009 is a long way off, but it if a producer has any plans for growing double-cropping cotton in the future, some consideration needs to be given to planning ahead far in advance. The beginning of a good double-crop cotton system begins in the fall of the preceding year.

Planting wheat on beds in the fall is by far the preferred practice for double-cropping cotton. A high bed provides internal drainage in the field and helps conserve soil moisture when it comes time to plant cotton. In 2008, some producers will choose to plant double-cropped cotton flat. Without good drainage in the field, this can be troublesome. Re-working beds following wheat harvest is time consuming, dries the soil out, and can usually makes getting a stand of cotton dependent on the next rain. Planning ahead before planting wheat in the fall is the first step in producing double-crop cotton the following summer.

Double-Crop Systems as Best Management Practices-Don Boquet, Ph.D., and Ken Paxton, Ph.D.

Many Louisiana farmers use conservation tillage and year-long cropping practices with winter cover or grain crops to increase surface residue to reduce erosion and help improve surface water quality. Such practices are considered best management practices (BMPs) for surface water quality protection. Winter cover crops and grain crops are good for water quality but are also good for soil quality and in the long term will be economic and beneficial. Combining year-long cropping practices with no-till is the most efficient way to build organic matter in southern soils and combined with residue from winter crops provides a system with un-

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Double-Cropped Cotton as BMP (cont'd from Page 7)

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paralleled benefits for soil and water quality. No-till and crop residue also conserve soil water, which can improve yields of the following summer crops.

The year-round system of double-cropping wheat and soybean has been a common practice throughout the mid-South for 30 years. Acreage in doublecropping varies and is reliant on the perceived profitability and increased risk for the summer crop. Cotton has received increased interest as a doublecrop in recent years because current varieties with embedded traits may be more adapted to this practice. In the case of cotton, however, the production risks of doublecropping are not as well documented as for soybean. Risks have always been perceived to be greater because cotton is a much higher input crop that is highly reliant on early planting dates and long growing season to maximize yield.

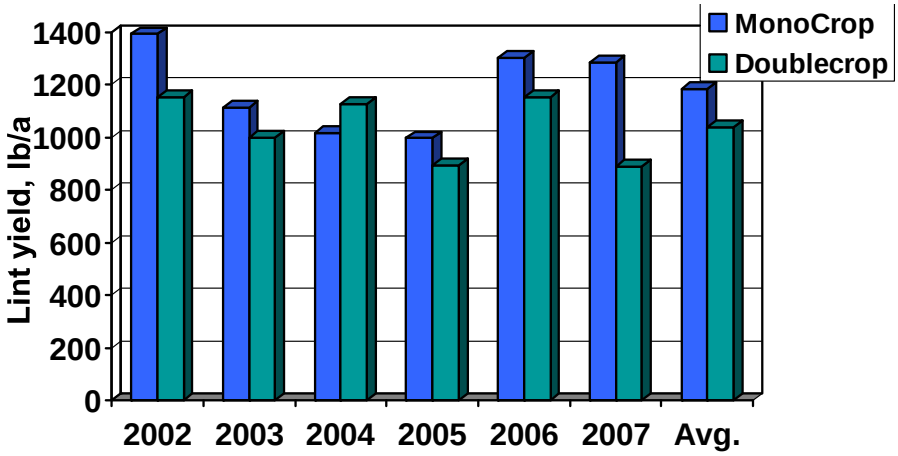

Figure 1. Irrigated monocrop and doublecrop cotton yields on no till Gigger sl. M*onocrop with winter fallow. Doublecrop follows winter wheat.*

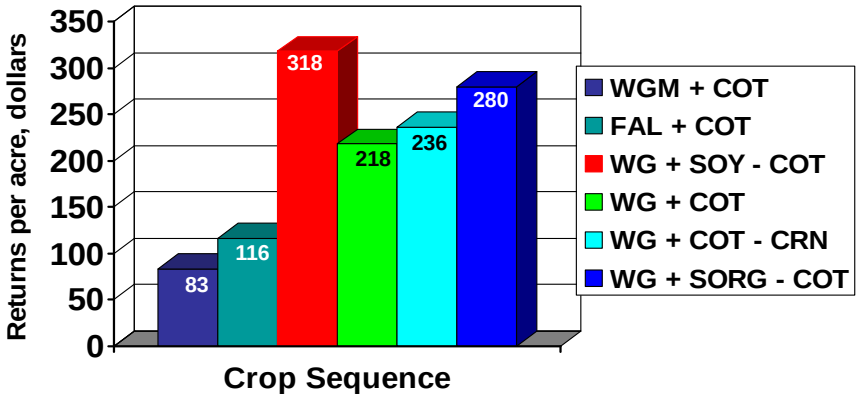

Figure 2. Annual net returns for selected cropping sequences in a cropping system BMP study – 2006-2007. *(WGM, wheat green manure; COT, cotton; FAL, winter fallow; WG, wheat grain; SOY, soybean; CRN, corn; SORG, grain sorghum)*

The LSU AgCenter has for many years conducted research on BMP cropping systems to evaluate the yield and economic benefits of production systems intended for soil and water quality improvement. One of these studies includes the evaluation of doublecropping wheat and cotton; and doublecropping wheat with cotton in various rotations with soybean, corn and grain sorghum. Continuous winter fallow/monocropping of each of the summer crops was included for comparison purposes.

In this ongoing study, total commodity yield of the doublecrop systems has been higher than monocrop systems because of the added yield of wheat grain that averaged 63 bu/acre. Cotton yields usually, but not always, sustained yield losses in double crop systems (Figure 1). Doublecrop cotton yield varied from a 3% yield increase to a 21% yield reduction compared with monocropping, losing an average 140 lb lint/

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Double-Cropped Cotton as a BMP (cont'd from Page 8)

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acre each year. This yield reduction is a significant economic penalty because it represents a loss directly from the net returns. However, it also represents a direct exchange of 140 lb lint per acre for 63 bu of wheat per acre.

The economics of the cropping systems relied greatly on the commodity prices received in a given year. In our studies, using enterprise budgets based on the yields and inputs for each system and annual prices, doublecropping was more profitable than monocropping (Figure 2). Across six years, doublecrop cotton/wheat produced annual net returns that ranged from $164.00 to $340.00 per acre from average yields of 63 bu wheat per acre and 1043 lb cotton lint per acre. The system of producing three crops in two years of corn-wheat-cotton, soybean-wheat-cotton, and sorghum-wheat-cotton averaged annual net returns that ranged from $261 to $320.00 per acre. In comparison, monocrop cotton averaged much lower net returns of $112.00 to $167.00 per acre from average yields of 1110 lb lint per acre.

Production risk is an important consideration for doublecrop cotton. Probably the greatest risk factor is the possibility of soil water deficient, especially at planting time. Irrigation capability eliminates this risk by ensuring a stand of cotton and rapid crop development. Other risks are related to the later-maturity of the cotton and include insects and tropical systems that bring extensive rain and high winds. Production risks for double crop cotton in the six years of the current study were found to be no greater than with monocrop cotton because these were irrigated studies. The three tropical storms that did arrive during the six years were in September and affected monocrop and doublecrop cotton equally.

The wheat-cotton doublecrop systems studied in the LSU AgCenter are highly productive and have potential to improve soil and water quality and therefore qualify as BMPs. These studies were conducted with no till, a viable economic practice because of the associated savings in fuel, equipment and labor costs Figure 3).

Figure 3. For best all around results, doublecrop cotton should be planted no till into wheat stubble to preserve the soil and water conservation benefits of the cropping system, which will maximize yield.

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