DIVISION OF AGRICULTURE
RESEARCH & EXTENSION
University of Arkansas System

Agriculture and Natural Resources

FSA2163

Double-Cropped Cotton and Wheat

Tom Barber
Associate Professor -
Cotton Agronomist

Gus Lorenz
Associate Department
Head - Entomologist

Ken Smith
Professor -
Weed Scientist

Arkansas wheat producers have recently increased acreage due to higher market prices and value of wheat production. Similarly, increases in market prices for cotton have spurred producers' interest in considering double-cropping cotton after wheat harvest. In the past, late-planted cotton was never a good option because of late-season insect pressure from caterpillar pests and, most notably, the cotton boll weevil. Recent success in eradication of the boll weevil, coupled with Bt worm protection technologies in current cotton cultivars, allows for increased profit potential with cotton following wheat.

Location is the key to success when double-cropping cotton and wheat. The length of the production season can vary greatly from Northeast to Southeast Arkansas. On average, there is a week to ten days more of growing season in Chicot County (Lake Village) versus Clay County (Rector). With this in mind, in an average year, cotton should not be planted following wheat north of the I-40 corridor, or more specifically, no farther north than Marianna, Arkansas. Regardless of where the cotton is planted, fall weather will decide the fate of the crop and the overall yield potential.

This fact sheet covers the things to consider when planting cotton following wheat.

Figure 1. Wheat planted after cotton harvest.

Planting Dates

Planting an early-maturing variety of wheat with plans to harvest by the end of May is crucial to ensure that cotton can be planted on time. Table 1 includes the latest possible planting and cutout dates for cotton based on COTMAN averages of the last 5 and 30 years. Based on this information, cotton should not be planted after the first week of June in Central and Southeast Arkansas because, on average, there will not be enough heat units available in the fall to mature the crop out if planted past these dates. The optimum cotton planting dates in Arkansas are from April 20 to May 20 most years.

Table 1. Planting dates and last effective bloom dates (cutout dates) based on COTMAN and probability of accumulating 850 heat units past cutout.

Location	5-Year Planting Date	Cutout Date	30-Year Planting Date	Cutout Date
Northeast	May 29	Aug 17	May 16	Aug 4
Central	June 2	Aug 20	May 22	Aug 10
Southeast	June 3	Aug 22	May 24	Aug 12

Arkansas Is Our Campus

Visit our web site at:
https://www.uaex.uada.edu

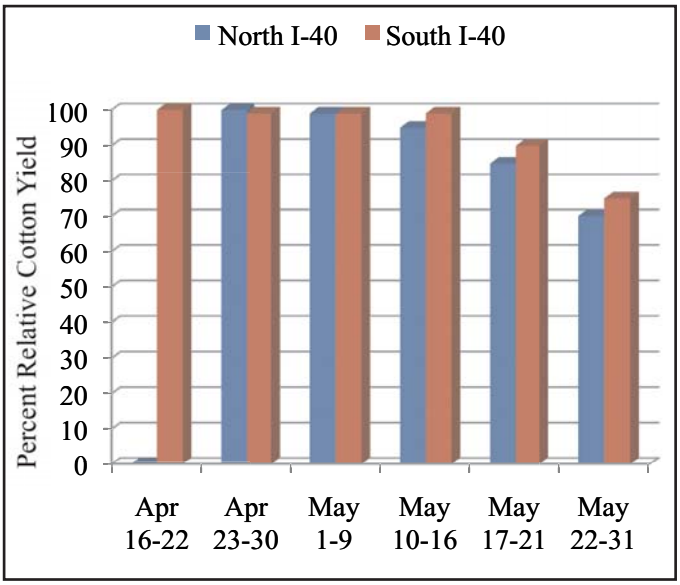

Figure 2. Percent relative cotton yield based on planting dates in verification fields north and south of I-40.

Arkansas producers should expect at least a 2 percent loss of yield potential every day cotton is planted past May 20. Figure 2 shows the percent of yield potential across planting dates from cotton fields in over 20 years of the verification program. Fields planted past May 16 resulted in decreased yield potential. If cotton is planted the first week of June, this suggests that the maximum yield potential is reduced 25 to 30 percent. Therefore, if field averages are normally 1,200 lbs lint/A, producers should budget production costs based on 850 lbs lint/A maximum yield.

Variety Selection

Only varieties that mature early and are determinant in growth characteristics should be planted following wheat due to the compressed growing season. Planting an early-maturing variety containing Roundup Ready Flex or Liberty Link weed control technologies and stacked with Bollgard II or WideStrike insect management traits is recommended. Table 2 contains variety performance data from 2009 following wheat at Marianna. Earlier maturing varieties such as FM 1740B2F, DP 0912 B2RF, ST 4554 B2RF and PHY 375 WRF performed better than later maturing varieties such as ST 5458B2RF. UA 48 conventional is one of the earliest varieties available to Arkansas producers in 2011 and should perform well when planted late; however, because there is no Bt technologies for caterpillar protection, production costs may be higher to protect this variety from late-season worm pests.

Field Preparation

Fields should be selected that contain well-drained soils and have the capability of being irrigated. It is not recommended to plant cotton following wheat on fields that cannot be irrigated. The most important consideration is to achieve an even stand of cotton that emerges quickly after planting. Ideally fields should be bedded prior to wheat planting in the fall with the integrity of the beds maintained through wheat harvest and cotton planting.

Figure 3. Planting cotton after burning wheat stubble.

Table 2. Yields of seven cotton cultivars planted on June 8, 2009, following wheat harvest at Marianna, AR. Plots were harvested on November 9, 2009.

Variety	Lint Yield	Lint Percent	Mic	Strength	Staple	Uniformity
Fibermax FM 1740 B2RF	890	36.0	3.9	31.4	37	82.8
Deltapine DP 0912 B2RF	854*	37.7	3.9	28.6	35	81.4
Stoneville ST 4554 B2RF	819*	36.1	3.6	29.7	34	81.0
Phytogen PHY 375 WRF	798*	35.8	3.6	28.7	36	82.0
Dyna-Gro DG 2570 B2RF	754	36.1	4.3	30.0	35	82.0
Americot AM 1550 B2RF	659	34.9	3.3	29.2	35	81.8
Stoneville ST 5458 B2RF	622	35.1	3.7	32.8	37	81.0
LSD (P=.05)	93.4	.	.	.	.	.
CV	11.1	.	.	.	.	.
Grand Mean	771	35.9	3.76	30.06	35.57	81.71

* Not significantly different from the highest yielding variety in the trial.

Several options are available for planting cotton following wheat harvest. The two main ones include burning the wheat stubble or planting into the wheat stubble. Burning the stubble may be the most common and the easiest way to manage stubble. This is especially true under furrow-irrigated situations. It should be noted, however, that the benefits of wheat stubble, such as moisture conservation, increased water infiltration and increased organic material, can be lost when the stubble is burned. Also, burned smut or charcoal on the soil surface can tie up preemergence herbicides and allow weed escapes.

If planting cotton into stubble, wheat combines containing straw choppers should be used and set to evenly distribute the wheat straw during harvest. Cotton planters should be equipped with down pressure springs or air bladders and residue managers (trash wheels) to aid in even planting and seed-to-soil contact. Coulters in front of the double-disk openers may disturb the soil too much, resulting in an uneven seedbed, and thus may not be optimum for planting cotton into wheat stubble. Seed-firming wheels and cast iron closing wheels ensure adequate seed-to-soil contact and are recommended when planting in a no-till situation.

Figure 4. Emerged cotton planted in wheat stubble.

Planters should be operated at slower speeds to ensure planter accuracy, and producers should be ready to water quickly if soil moisture is not present after planting, as further delays in emergence can drastically reduce yields.

Seeding Rates

Cotton seeding rates should be increased 10 to 20 percent behind wheat, especially when planting into wheat stubble. Higher seeding rates are necessary to ensure an even stand and to maintain earliness. Higher plant populations will result in fewer second and third position fruit, thus increasing earliness and resulting in natural plant growth management.

Fertility

Soils should be sampled for adequate phosphorous, potassium and pH levels prior to wheat planting. Mixed fertilizers for both wheat and cotton crops can be applied in the fall. Nutrients should be applied based on soil test results and an estimated maximum cotton yield of 850 lbs lint/A. Nitrogen should be applied at approximately two-thirds of a normal season rate with a maximum of no more than 80 units/A. Total nitrogen should be applied prior to first square to prevent late-season growth and delays. Higher nitrogen rates will delay maturity and cause issues with growth management and defoliation later in the season.

Insect and Disease Management

Early-season thrips populations can delay cotton development and reduce yields; therefore, it is recommended that producers use an insecticide seed treatment on cotton seed when planting behind wheat. Seedling disease pressure in late May-early June is generally low due to drier conditions and higher soil and air temperatures. Thus a systemic fungicide seed treatment for seedling diseases, such as *rhizoctonia*, *pythium* and *fusarium*, is generally not necessary for late-planted cotton. A pyrethroid application is recommended within three days of planting to prevent stand loss from cutworms, which are more of a problem in high-residue situations. Planting cotton after wheat will generally expose cotton to higher populations of plant bugs, stink bugs and multiple caterpillar pests during the season; therefore, close scouting is crucial to maintaining earliness and maximizing yield potential. The grower and consultant should be prepared for high populations of these pests and to act quickly and shorten time intervals between applications if necessary. Dual gene varieties containing Bollgard II and/or WideStrike should be strongly considered to provide protection from late-season caterpillar pests; however, keep in mind, if large populations of caterpillar pests are present, supplemental foliar applications may be necessary to maintain yield potential.

Weed Management

Glyphosate-resistant Palmer pigweed and horseweed (Marestale) may be prevalent in many wheat fields prior to harvest. These two weeds must be controlled before the first cotton seed is planted. Burning wheat stubble will not completely control Palmer pigweed or Marestale; therefore, an application of Gramoxone or Ignite should be made to fields prior to planting. Residual herbicides should be used at planting regardless of the weed control technology utilized. Some herbicide may be lost to tie-up on the stubble, but inadequate coverage of the soil surface is more likely to be a problem. Obviously, a rainfall event or sprinkler irrigation immediately after planting and herbicide application will improve herbicide performance. Activity of residual herbicides may be reduced when sprayed in wheat stubble, thus higher labeled rates are recommended for all residuals. Cotton growing in wheat stubble may be slower to canopy, thus it is crucial that fields are scouted

Figure 5. Large glyphosate-resistant pigweed in wheat stubble.

regularly and post-directed sprays applied as necessary to manage glyphosate-resistant pigweeds and other weeds present. It is also important for producers to check plant-back restrictions for herbicides utilized for weed management in the wheat crop. Table 3 contains selected wheat herbicides and their respective plant-back restrictions to the following cotton crop.

Table 3. Cotton plant-back intervals to selected wheat herbicides.

Wheat Herbicide	Cotton Plant-Back Interval
Axial	4 months
Axiom	8 months
Beyond	Do not plant cotton
Express	45 days
Finesse	Do not plant cotton
Finesse Grass and Broadleaf	Do not plant cotton
Harmony Extra	14 days
Osprey	90 days
Peak	Do not plant cotton
PowerFlex	3 months
Sencor	8 months

Irrigation and Plant Growth Management

Timely irrigation is crucial to maintain earliness and yield potential. Irrigation initiation will probably be necessary earlier with later planted cotton due to typical dry weather patterns during June and July. There is a direct relationship with irrigation timing and plant growth regulator applications. If irrigation is initiated on time, plant growth regulators will most likely be needed; however, if irrigation is delayed, cotton will be stunted and take some time to recover before plant growth regulators are warranted. Generally, if late-planted cotton has ample moisture and high heat unit accumulation, rapid growth will occur. Many times cotton will delay fruiting until 7 or 8 nodes under these conditions. It is important to monitor fields for fruit retention on lower nodes and cotton internode length to time plant growth regulator applications. If cotton does not set squares on the 6th or 7th node and internodes are over 2.5 inches, a growth regulator application is warranted to retard the rapid growth and increase fruit set. If fruit set appears normal (beginning on nodes 5 or 6), then plan on growth regulators around first bloom or after irrigation. The goal is to gain as many fruiting nodes as possible prior to the last effective fruiting date.

Termination Timings

The probability that cotton following wheat will not cutout or reach NAWF = 5 (node above white flower) prior to the last effective bloom date is high. Therefore, it should be noted that heat unit accumulations toward insecticide and irrigation termination as well as defoliation applications should begin when the last effective bloom dates, determined by COTMAN and listed earlier in Table 1, are reached. This will ensure that cotton earliness is maintained and excess money will not be spent on upper bolls that will most likely not mature in average growing conditions.

References

Ferguson, R. E., A. M. Stewart, D. Y. Lanclos, B. M. Guillory and B. W. Woolham. Cotton Variety Performance in a Double-Cropped Planting Following Wheat. In Proceedings of the 2008 Beltwide Cotton Conference, Nashville, TN. January 8-11, 2008.

Griffin, T. W., L. T. Barber and B. McClelland. 2011. Estimating Yield Potential by Planting Date Utilizing Observed Data from the Arkansas Cotton Research Verification Program. In Proceedings of the 2011 Beltwide Cotton Conference, Atlanta, GA. January 4-7, 2011.

Robertson, W. C., and G. M. Lorenz. Considerations for Replanting and Latest Possible Planting Dates. Cotton Comments, www.uaex.uada.edu. April 2003.

Roberson, W. C., F. E. Groves and R. H. Hogan. Management of Late Planted Cotton. In Summaries of Arkansas Cotton Research, 2007. pp 67-69.

DR. TOM BARBER is associate professor - cotton agronomist, located in Little Rock. **DR. GUS LORENZ** is associate department head (Entomology Department) - entomologist, located in Lonoke. **DR. KEN SMITH** is professor - weed scientist, located at the Southeast Research and Extension Center, Monticello. All are employees of the University of Arkansas Division of Agriculture.

FSA2163-PD-4-11N

Pursuant to 7 CFR § 15.3, the University of Arkansas System Division of Agriculture offers all its Extension and Research programs and services (including employment) without regard to race, color, sex, national origin, religion, age, disability, marital or veteran status, genetic information, sexual preference, pregnancy or any other legally protected status, and is an equal opportunity institution.