Cotton Planting and Stand Establishment

- Producing the best cotton crop begins prior to planting the first seed in the ground.
- Thorough assessment of cotton variety selection, seed quality, planting conditions, planter performance, and seeding depth can help establish a uniform cotton stand.
- Warm soil temperatures, adequate soil moisture, and good seed-to-soil contact are essential for fast emergence of cotton seed.

Cotton Variety Selection

Selection of cotton varieties is an opportunity for growers to choose the best product for their individual needs. Qualities to consider include trait packages for management efficiency, fiber quality, storm resistance, and yield potential on irrigated or dryland fields. It is also important to consider the relative maturity of each variety to align maturity with the growing environment. Full-season varieties perform best in growing environments with long growing seasons. If planting later than planned, short or mid-season varieties may provide growers with another opportunity to make a good cotton crop. It is also important to consider pest pressure in late-planted cotton situations. Insect pressure, like whiteflies, may be higher leading to selecting a smooth-leaf variety over a hairy-leaf variety. Planting different varieties with varying maturities can help with timing harvest. If the same cotton variety is planted, multiple planting dates may also allow cotton to mature at different times, making harvest coordination easier.

Seed treatments are also important to consider when selecting cotton products. A seed treatment may help protect seedlings by providing disease and insect protection, and improved early-season vigor. Planting in wet or cool soil conditions may be more prone to seedling diseases, making additional disease prevention efforts valuable.

Seed Quality

Each lot of cottonseed is tested for a number of quality parameters, including warm germination and cool germination. To determine viability, a warm germination test is conducted; seeds are placed in moist conditions with alternating temperatures of 86°F for 8 hours and 68°F for 16 hours, to simulate ideal growing conditions. The percentage of seeds that germinate should be at least 80% of total seed tested. For germination testing under less than ideal conditions, or to check seed vigor, growers may contact their seed supplier or send seed samples to a university or private lab for cool germination testing. Results of this test will provide an estimation of the percent of germination when soils are cooler (at 64.4°F). The cool germination test results should have a minimum germination of 60%. To obtain standard and cool germination data for cotton varieties, growers may contact their seed dealer. Seed companies may also provide germination results from standard, cool, and state germination tests.

Seed quality may also be impacted by how the seed is stored. Cotton seed should be handled carefully and stored in cool, dry environments. Storing in warm, humid environments can decrease germination.

Soil Conditions and Weather

For optimum cotton germination, soil temperature should be a minimum of 65°F within the germination zone. Use of a simple soil temperature probe can help determine soil temperature at the planting depth (Figure 1). Planting depth may vary from 0.5 to 1.5 inches depending on soil type, and water availability. Germination may be sporadic if cotton seed is planted into soil temperatures of less than 58°F. It is best to plant cotton according to soil temperature as opposed to calendar date.

In addition to warm soil temperatures, planting during extended warm air temperatures will also help increase germination. If air temperatures are cool during the first five days after planting, there is a potential increase for germination delays, which may lead to reduced stands, potential yield loss, and an increased risk of seedling diseases. Rainfall levels of 1 inch or more can drop soil temperatures as much as 5°F. Imbibition, or the uptake of water through the seed coat, occurs within 24 to 48 hours after planting into moist conditions. Hydration of the seed is critical for germination; however, if the seed is exposed to cooler temperatures from sources like irrigation or rain, imbibitional chilling injury can occur. Imbibitional chilling injury can damage the sensitive tip of the taproot or in severe cases cause loss of seed viability. Therefore, soil temperatures should be above 65°F, preferably closer to 85°F, and moist prior to planting. Also, avoid planting when air temperatures are forecasted to be below 50°F for anytime during the first five days after the planting date.

Soil Preparation

Tillage systems can have an effect on how quickly soils warm up in the spring. Soils that have been conservation-tilled, like no-till and strip-till, typically do not warm up as fast as conventional-tilled soils. Increased crop residue in tillage systems can delay planting date. For no-till production, seed should be planted shallow, 0.25 to 0.5 inches deep, making sure the seed furrow is closed. Also, in no-till systems it is especially important to obtain a good stand on the first try for crop success. Replanting cotton in no-till systems can complicate weed control and result in an uneven stand.

Soil warmth may also depend on soil texture, color, moisture, and ground cover. Soils that are sandy or drain well will warm up faster than heavy,
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water-logged soils. In addition, darker soils, and soils that have been bedded up prior to planting tend to warm up faster.

Soil crusting may prevent germinating seedlings from emerging. This is more common in compacted soils with low organic matter. If soil crusting occurs, a rotary hoe may be used to carefully loosen the soil surface. Planting 2 to 3 seeds together, or hill dropping, may also help seeds emerge if soil crusting is a common problem (Figure 2).

Planter Preparation

Planter maintenance is important to increase planter accuracy, reduce time at planting, and increase planter longevity. The following parts should be checked, cleaned, and repaired or replaced if worn: drive trains, sprocket bearings, opener blades, shaft bearings, sprocket teeth, and double disc openers.

Also be sure to check the down pressure of the closing wheel. Good seed-to-soil contact is essential for quick and even emergence. If soils are dry, down pressure should be increased to help bring water to the seed. If soils are wet, down pressure should be decreased to avoid soil compaction around the newly planted seed. If there is a vacuum metering system, clean it and check all seals. To calibrate the planter, follow instruction in the owners manual. Finally, follow appropriate planting speeds to maintain uniform planting.

Planter depth should be set in the field once the soil texture and moisture depth is determined. Planting too shallow will result in poor seed-to-soil contact and planting too deep can cause stand skips and delayed emergence. To determine actual planting depth and spacing, dig up the cotton seed behind the planter after planting 50 to 100 feet of row.

Seeding Rate

Seeding rate can also impact cotton stand establishment. Cotton seed size may vary due to growing conditions and variety, and it is recommended that the final plant population should be determined on the number of seed per foot of row, and not by pounds of seed per acre. Ideal planting rate may be affected by soil type, water availability, tillage system, and yield expectation.

Figure 2. Two seeds planted together to increase germination.

Sources

1 Cotton production in Mississippi. Mississippi Agricultural and Forestry Experiment Station. August 21, 2014. MSUcares.com

For additional agronomic information, please contact your local seed representative. Individual results may vary, and performance may vary from location to location and from year to year. Individual results may vary, and performance may vary from location to location and from year to year. This result may not be an indicator of results you may obtain as local growing, soil and weather conditions may vary. Growers should evaluate data from multiple locations and years whenever possible.

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