Cotton Planting and Stand Establishment

KEY POINTS

- Producing a quality cotton crop begins prior to planting the first seed in the ground.
- Careful evaluation of seed quality, planting conditions, planter performance, and planting rate can help establish a vigorous and uniform stand.
- Warm soil temperatures, adequate soil moisture, and good seed-to-soil contact are essential for fast emergence of cotton seed.

Cotton Product Selection

Cotton variety selection is an opportunity for growers to choose a cotton product with high yield potential, trait packages for management efficiency, nematode resistance, and differing maturities for harvest efficiency and growing environment. It is important to consider the stability and quality characteristics of a cotton product.

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

Seed Quality

Each lot of cotton seed is tested for a number of quality parameters. A warm germination test is conducted to determine viability. 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. A cool germination test simulates less than ideal conditions (soil temperature of 64.4 °F) to estimate seedling vigor. Results should have a minimum germination of 60%. To obtain warm and cool germination data for cotton varieties, growers may contact their seed dealer or the seed company.

Storage. Cotton seed should be handled carefully and stored in cool, dry environments. Storing in warm, humid environments can decrease germination.

Soil Conditions and Weather

Soil temperature should be a minimum of 65 °F within the germination zone. A simple soil temperature probe can help determine soil temperature at planting depth (Figure 1). Planting depth may vary from 0.5 to 1.5 inches depending on soil type and water availability. Soil temperatures should be above 65 °F, preferably closer to 85 °F, and moist prior to planting. Germination may be sporadic if cotton seed is planted into soil temperatures of less than 58 °F. Therefore, it is best to plant cotton according to soil temperature as opposed to calendar date. Rainfall 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, 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.

Figure 1. Check soil temperature at planting depth prior to planting.
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Planting during extended warm air temperatures can help increase germination. Cool air temperatures during the first five days after planting can delay germination, which may lead to reduced stands, increased risk of seedling diseases, and potential yield loss. 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 can delay planting date. In no-till production, it is especially important to obtain a good stand on the first try for crop success. Seed should be planted shallow, 0.25 to 0.5 inches deep, making sure the seed furrow is closed. Replanting cotton in no-till systems can complicate weed control and result in an uneven stand.

Soil warmth may also depend on soil characteristics: texture, color, moisture, and ground cover. Soils that are sandy or drain well can warm up faster than heavy, water-logged soils. 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. A rotary hoe may be used to carefully loosen the soil surface. Hill dropping, or planting two to three seeds together, may also help seeds emerge if soil crusting is a problem.

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.

Check the down pressure of the closing wheel. Good seed to-soil contact is essential for quick and even emergence. If soils are dry, increase down pressure to help bring water to the seed. If soils are wet, decrease down pressure to avoid soil compaction around the seed. If there is a vacuum metering system, clean it and check all seals. Calibrate the planter according to owners manual instructions. 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

Cotton seed size can vary by variety and conditions it was produced in. It is recommended to determine final plant population by 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.

Seedling Vigor

Seedling vigor is the size, health, and growth rate of a seedling and is a result of genetic background, growing conditions, and management practices. Increasing seedling rate and applying good crop management practices can help increase germination when considering planting into unfavorable conditions. Waiting to for conditions improve can help avoid decreased seedling vigor.

Sources:

Performance may vary from location to location and from year to year, as local growing, soil and weather conditions may vary. Growers should evaluate data from multiple locations and years whenever possible and should consider the impacts of these conditions on the grower’s fields. ALWAYS READ AND FOLLOW PESTICIDE LABEL DIRECTIONS. 130113013723 032718MEC

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