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LSU AgCenter Cotton Extension

Louisiana Cotton Bulletin

Seeding Rate Calculations and Considerations—Sandy Stewart, Ph.D.

It has been said that the most expensive day in a cotton crop is the day it is planted. Seed costs, technology fees, and seed treatments all combine to make cotton seed an expensive commodity. Because of this cost and the precision of today's vacuum planters, there has been a steady decline in seeding rates. At one time, you could find recommendations for seeding rates given in pounds/acre; now, it is in terms of seed/ row foot.

"...a final plant population of between 2.5 and 3.5 plants/ row foot appears to be a good compromise..."

A safe statement is to say that we have probably shaved seeding rates about as far as they can reasonably be cut. Because we are usually planting the minimum amount of seed, it takes very little in the form of adverse conditions or poor seed quality to reduce stands below an optimal level.

Optimum Plant Populations

Research conducted in Louisiana has shown that with today's varieties cotton can produce equal yields across a wide range in plant populations. So, deciding on what the "perfect" population should be is not an exact science and depends partly on the growing season. However, a final plant population of between 2.5 and 3.5 plants/row foot appears to be a good compromise between an acceptable stand in most environments and seed cost. This equates to roughly 34,000 to 48,000 plants/

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Soil Temperature and Cotton Germination—Sandy Stewart, Ph.D.

Soil temperature is one of the main factors to consider when planting cotton, especially in April. Planting forecasts routinely consider the 5-day forecast for temperature, expected accumulation of DD60s, rainfall, and potentially drying winds. The missing ingredient is usually soil temperature because it can vary from field to field based on soil texture, color, surface residue, bed preparation, and moisture. Soil temperature should be a minimum of 65°F when planting cotton. The

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Inside this issue:

Upcoming Dates:

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

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

Dean Lee Field Day, Alexandria—Aug. 21

Seeding Rate and Calculations (cont'd from Page 1)

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acre on 38-inch rows.

Actual Emergence vs. Seeding Rate

When measuring the actual emergence of an exactly known amount of seed, I have usually been surprised to find it almost always less than 85% ad usually closer to 75%. That is to say that the actual germination and emergence rate in most fields will range between 70 and 85%. Cotton has a small seed and weak seedling which must be accounted for when choosing a seeding rate.

The table on page 3 shows what the required seeding rate has to be to achieve a given range of final plant populations. For example, note that if we assume 75% emergence, which is typical, then 3.33 seed/row foot must be planted in order to achieve a final stand of 2.5 plants/row foot.

Under adverse conditions, one can assume a lower rate of emergence. This may include dry conditions, cooler soil temperatures, or rain soon after planting to name a few. Alternatively, as conditions improve the actual emergence rate will probably improve. The key is to be realistic about the conditions into which cotton is planted and adjust the seeding rate based on the table above.

Hill-Drop vs. Drill Seeding

Many Louisiana producers choose to hill-drop cotton. There are many known benefits to hill-dropping, the most obvious being the increased pushing power of seedlings to emerge through crusted soils as opposed to drill seeding. A common question is whether a hill-dropped plant population is any better or any worse compared with a population drilled down the row. Research in Louisiana has

Hill-dropped cotton emerging through a soil crust.

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Soil Temperature (cont'd from page 1)

following rules of thumb should be remembered:

1. Finer textured soils will warm slower than coarse textured soils due to lower water holding capacity. Soil moisture has a high heat capacity and can act as a thermal buffer to daytime heating.
2. Well-drained soils typically warm faster than poorly drained soils.
3. Raised beds warm faster than flat ground because of greater internal drainage, more surface area exposed to the sun and more aeration. The higher the bed, the faster it will warm.
4. Dark colored soils warm faster than lighter colored soils because they retain heat from sunlight better.
5. Surface residue will tend to retain soil moisture and shade the soil surface resulting in slower warming.

Seeding Rate and Calculations(cont'd from Page 2)

	Plants/acre		Required Seeding Rate/foot Based on Emergence			
Plants/row foot	38-inch rows	40-inch rows	70%	75%	80%	85%
1.00	13,756	13,068	1.43	1.33	1.25	1.18
1.50	20,634	19,602	2.14	2.00	1.88	1.76
2.00	27,512	26,136	2.86	2.67	2.50	2.35
2.50	34,390	32,670	3.57	3.33	3.13	2.94
3.00	41,268	39,204	4.29	4.00	3.75	3.53
3.50	48,146	45,738	5.00	4.67	4.38	4.12
4.00	55,024	52,272	5.71	5.33	5.00	4.71
4.50	61,902	58,806	6.43	6.00	5.63	5.29
5.00	68,780	65,340	7.14	6.67	6.25	5.88

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shown no differences between hill-drop and drill seeding. The key is the overall population and data have shown the two methods to perform equally at equal populations once a stand is established. Once again, there are some benefits to hill dropping, especially in soils that tend to crust.

The following table converts hill dropping at various hill spacing to seeds/row foot. This information can be applied to the required seeding rates table to determine the optimum hill-dropped configuration.

	Seed/hill		
Hill Spacing	2 seed	3 seed	4 seed
6 inches	4.00	6.00	8.00
8 inches	3.00	4.50	6.00
10 inches	2.40	3.60	4.80
12 inches	2.00	3.00	4.00
14 inches	1.71	2.57	3.43
16 inches	1.50	2.25	3.00
18 inches	1.33	2.00	2.67

Seeding Rates Have a Season-Long Effect

Paying close attention to seeding rates is one of the more important things a producer can do when planting cotton. The seeding rate affects the final plant population which has a direct impact on maturity and overall plant height.

Lower plant populations can often yield similarly to higher plant populations because lower populations will produce more second position, third position, and vegetative bolls. However, these outer position bolls will take more time to set and mature and on the plant. Therefore, there is a delay in maturity. Research in Louisiana has shown that peak bloom, or maturity, is delayed about 7 days for 2.0 plants/row foot compared with 4.0 plants per row foot. This will vary some from year to year, but there is no doubt that reducing the population will also result in some delay in maturity.

Due in part to the increased fruit load per plant, final plant height is also decreased in lower compared to higher plant populations. This can have important implications for plant growth regulator management. In trials with DP 555 BG/RR, less mepiquat was generally needed to manage plant size in lower populations compared to populations. Reductions in overall mepiquat needed were sometimes small and vary with the growing season, but lower populations generally require less intensive mepiquat management.

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