LOUISIANA CROPS NEWSLETTER

Cotton, Corn, Soybeans, Sorghum

Volume 2, Issue 2

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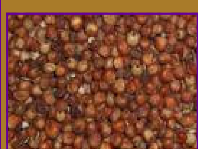

Issue Contributors (alphabetically)

John Kruse

Charles Overstreet

Cotton Nutrient Uptake and Removal

John S. Kruse, Ph.D., Extension Specialist

How much nitrogen, phosphorus and potassium should a grower apply to optimize cotton lint yield? It is a fair question, and the answer is - it depends. What should be a straight-forward answer becomes difficult because of the differences in soils, and whether a field is irrigated or not. Research conducted at the Northeast Research Station and Macon Ridge Research Station over a three year period demonstrated that heavier clay ground yields higher than silt loam soil for the same rate of nitrogen (Table 1). It is interesting to note that in the years these tests were conducted, the dryland cotton out-yielded the irrigated cotton, suggesting that for cotton, timely rains can more than make up for irrigation. It is also worth noting that on the clay ground yields increased by about 620 pounds of seed-cotton per acre as nitrogen rates were increased from 50 to 125 pounds per acre. On the contrary, on the silt loam yields only increased by about 172 pounds of seed-cotton per acre when N rates were increased from 50 to 100 pounds of N per acre, and did not go up with higher N rates. This suggests the soil already had adequate nitrogen available stored in the soil, and only needed a supplemental amount to maximize yields. It may also suggest that nitrogen on the irrigated ground was lost, perhaps through denitrification, and so required more to maximize yields.

Table 1. Effect of nitrogen rates on cotton yield (1987-89)

	Silt Loam	Clay (irrigated)	Clay (non-irrigated)
N Rate (lbs./acre)	--Yield, lbs. seed cotton per acre (alluvial soils)--		
50	2979	3121	3240
75	3108	3495	3626
100	3151	3401	3648
125	3013	3477	3860
150	3065	3648	3694

Information provided by the Potash and Phosphate Institute (now IPNI) indicates that cotton will take up 80 pounds of nitrogen, 24 pounds of P_2O_5, and 70 pounds of K_20 per bale. Cotton Physiology Today (volume 2, number 3) puts those figures a little lower at 62 pounds of N, 22 pounds of P_2O_5 and 61 pounds of K_2O.

A critical factor when considering how much N, P_2O_5 and K_2O to apply is how much is left as residue from the previous crop. That same report from Cotton Physiology today showed that 35 to 40 pounds of N, 13 to 20 pounds of P_2O_5, and 5 pounds of K_2O were removed from the field as seed cotton, leaving 22 to 27 pounds of N, 2 to 9 pounds of P_2O_5, and 56 pounds of K_20 in the field as residue. Cotton following corn should have even higher rates of these nutrients available from decomposing corn residues. The Agronomy Journal (volume 68, number 5) reported on Acala cotton that yielded 1412 to 1560 pounds of lint per acre took up 214 pounds of N per acre, but only removed 102 pounds of N per acre in seed cotton. Similarly, 96 pounds of phosphate were taken up but only 45 pounds were removed, and 195 pounds of potash were taken up, but only 53 pounds were removed.

Nichols reported (1996) that the average nitrogen recommendation across the cotton belt by Extension Services for upland cotton was 56 pounds of N per bale. This emphasizes the importance of knowing how much cotton a field can reasonably be expected to yield. A recent (2010) trial conducted by Cotton Specialists across Texas, the Mid-South and Southeast demonstrated that too much nitrogen had a detrimental effect on lint yields (Figure 1). These soils ranged in texture from silt loam to clay loam.

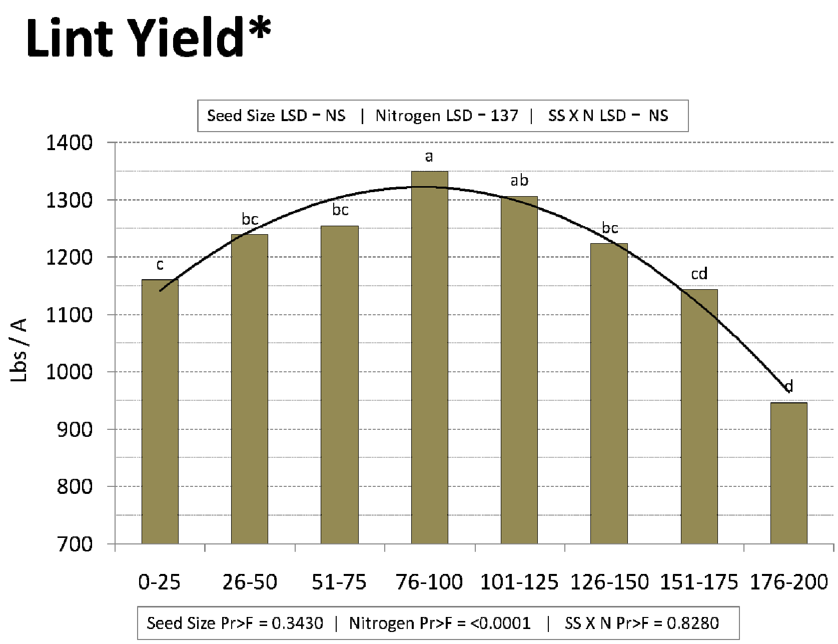

Figure 1. Lint yield results averaged across 16 locations on grower fields. The X axis represents nitrogen ranges in pounds per acre of available nitrogen, which included applied N as well as soil residual N (Main et al., 2010).

*Average of 16 locations

Are There Errors in the Louisiana Crops Newsletter?
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Crop Rotation against the Southern root-knot and Reniform Nematodes

Charles Overstreet, Ph.D., Extension Nematologist

As producers begin to make plans on which crops to use this year, nematode management should be an important consideration. Many of the fields across the state have problems with Southern root-knot, reniform nematodes or combinations of these two pests. Making the wrong choice can have serious implications at harvest time.

The Southern root-knot nematode is typically found in the coarse-textured soils in our state. These are the sandy areas of fields or coarse silt loams. This is the nematode that produces galls or knots on the root system and can be readily identified in the field on stunted plants. The common species of root-knot that we have in Louisiana attacks a number of our major crops including cotton, soybean, corn and sweet potato. Sugarcane and wheat are considered fair hosts but still support population increases. Crops which are not damaged include peanut and milo.

The reniform nematode is found in a wide range of soil types including both the coarse-textured and fine-textured soils. It is not uncommon to see very populations in fields across fields which have wide ranges of soils from sands to clays. Reniform does not produce any distinctive feature that makes it easy to recognize. Although the egg masses of this nematode are visible without any magnification, they appear as tiny bumps along the root surface. Reniform has a wide host range like root-knot and attacks cotton, soybean, and sweet potato. Crops that are very resistant or immune to this nematode include sugarcane, corn, peanut, milo, wheat and rice.

The greatest damage from either of these two nematodes occurs when a susceptible crop is planted where very high populations of these nematodes are present in the soil. The greatest potential for damage occurs when a susceptible crop is grown two or more years in the same field. This can either be the same crop such as cotton after cotton against the reniform nematode or even cotton and then soybean which is also susceptible. Rice appears to be a really good rotation crop for our state. We have had very little problems with either nematode in fields where rice is used as a rotation crop.

Early plant death of soybean by the Southern root-knot nematode after sugarcane.

Crop rotation has proven to be an especially useful tool against the reniform nematode. This nematode can build up to extremely high populations on susceptible crops and cause considerable damage. Corn has been a favorite rotation crop in many fields where this nematode has historically been a problem. Although one year in a rotation crop that is a poor host for the nematode can be very useful, two years is considered better. Sometimes the population of reniform nematode has reached such high populations in a field that even one year in a nonhost crop is not sufficient. Damage can still occur if a susceptible crop is planted.

If crop rotation is not a good option this year, be prepared to use other management options to deal with nematode problems. A few soybean varieties have some resistance available against the Southern root-knot. We don't have any soybean varieties to use against reniform. Nematicides are available in most crops. Be sure to use the correct nematicide to deal with the severity of the problem you have in your fields. Seed treatment nematicides may be all that you need when nematode populations are low or the damage potential in a field is low because of soil conditions. Fumigants may be required on higher value crops when nematode populations are very high or the damage potential is great in a field (deep sands, low fertility, etc.).

Damage to cotton from the Southern root-knot nematode when planted after corn.

Damage caused by the Southern root-knot nematode when cotton was planted after cotton.

Starter Fertilizer Considerations

John S. Kruse, Ph.D., Extension Specialist

Many producers have noted a distinct response to an application of starter fertilizer in corn. The primary reason for this response is that young seedlings with immature root systems need available phosphorus (P) for rapid root development. Insufficient P levels slow the growth of the root system and delay overall growth. Often, once the root system advances enough to effectively mine the soil for P, the crop "catches up," so the application may not always result in a higher yield compared to no-starter applied. On the other hand, the low cost and ease of application combined with the added assurance that nutrients will be readily available during the critical initial growth stage of the corn crop makes a starter application worth considering.

There are many different forms of starter fertilizer, but in liquid systems the fundamental building block is ammonium polyphosphate (APP), often referred to as either 10-34-0 or 11-37-0. A fertilizer blender may add some UAN (32-0-0) solution and even some potassium hydroxide to provide a little potash. Others often include a micronutrient package that may include zinc. More materials blended into the mix generally results in a more expensive application. Rates vary, but many producers apply 3 to 5 gallons of APP in furrow at planting with good results. One word of caution – APP has a fairly high salt index, so if the soil is sandy and has low organic matter, use a lower rate so as not to burn the seed.

Application techniques vary, but an ideal application is to knife-in the starter fertilizer in a 2x2 or 4x4 placement, with a band of fertilizer knifed in 2 to 4 inches out and 2 to 4 inches below the seed. This method allows the seedling roots to find the band of fertilizer rapidly and exploit the nutrient-rich zone around it. In-furrow placement is acceptable providing you have never observed fertilizer injury on the seed. The least desirable placement is on the surface above the band because P is very immobile and does not wash down into the soil the way nitrogen will. This results in the seedling roots needing to grow up toward the surface to find the P fertilizer. The lease efficient way to apply P fertilizer is broadcast in the fall. The broadcast placement allows P to be available to all the weeds growing in between the rows, and the fall timing often results in P fertilizer immobilization from calcium (in high pH soils) or aluminum and iron (in low pH soils).

Starter fertilizer provides a strategically placed band of P near the seed where it allows for more rapid root growth and seedling establishment. Most starter fertilizers use APP as the fundamental building block, but 'straight' 10-34-0 or 11-37-0 is very saturated and tends to crystallize easily in the tank. To avoid this, blend with some amount of water – the more water the more stable the solution.

Figure 1. A young corn plant exhibiting purpling at the base from a temporary P deficiency. This plant will likely grow out of this condition as the soil warms. A starter fertilizer application is added assurance of P availability, but may not result in a measurable yield increase compared to no-starter fertilizer applied.

Upcoming Calendar Events for 2011

Feb 1-28

Vote on national sorghum referendum at local FSA offices. Producers that growing sorghum since national checkoff began in 2008 are eligible to vote.

May 2

Ag Magic

Parker Coliseum

All day event

June 28

Northeast Research Station Pest Management and Crop Production Field Day

More detailed information will be provided later in spring.

June 30

Rice Research Station field Day

8-12:00

July 7-10

Louisiana Farm Bureau Federation Annual Meeting, New Orleans Marriott, New Orleans, LA

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