VARIETY BY SEEDING RATE BY PGR IN COTTON

Cotton varieties today have a broad range of fruiting characteristics and vegetative growth as compared to many varieties from the past. Current varieties may begin fruiting earlier (at lower nodes), may set a larger crop due to earlier fruiting, and have the ability to extend the fruiting period via indeterminant fruiting patterns. A greater range of indeterminancy and efforts to eradicate the boll weevil have allowed many of these shifts in fruiting pattern to be realized as production tools by cotton producers. As with past varieties, the range of growth habit and indeterminacy allows for customized seeding rates and plant growth regulator (PGR) applications to be used as management tools for the cotton crop. PGR management decisions depend on local climate, production systems, and the specific variety planted. Consequently, management systems ranging from less aggressive PGR applications in more determinate varieties to lower seeding rates in less determinate products may be used as tools to optimize growth management and/or yield potential when growing a particular variety. In 2012, the Monsanto Learning Center at Scott, MS evaluated the interaction of cotton variety, seeding rate, and PGR use on cotton lint yield.

Study Guidelines

A demonstration trial was conducted at the Monsanto Learning Center at Scott, MS to evaluate the effects of cotton variety, seeding rate, as well as PGR rates and timing on lint yield. Three Deltapine® cotton varieties were planted at seeding rates of 14,000; 27,000; 41,000; and 55,000 seeds/acre (Table 1). These seeding rates represented 1, 2, 3, and 4 seeds/foot. Two PGR regimes were implemented: passive and aggressive (Table 1). In general, the passive treatment starts later, and lower rates of PGR are applied throughout the season as compared to the aggressive treatment.

Table 1. Description of the variables evaluated.

Cotton Varieties	DP 1321 B2RF DP 1212 B2RF DP 1252 B2RF
Planting Population (seeds/ acre)	14,000 27,000 41,000 55,000
PGR Regime	Passive: 10.4 oz/acre on June 22 14.2 oz/acre on July 6 12 ounces/ acre July 23 36.6 oz/acre seasonal total Aggressive: 12 oz/acre on June 22 16 oz/acre on June 28 20 oz/acre on July 6 48 oz/acre seasonal total

All varieties were Genuity® Bollgard II® with Roundup Ready® Flex (B2RF) cotton. The plots were planted on May 1 and harvested on October 1, 2012. Conventional tillage and other standard agronomic practices for the region were implemented. Irrigation and insecticides were applied to the plots as needed.

Results

Results from the 2012 demonstration trial had trends similar to previous trials from the Monsanto Learning Center at Scott, MS. All cotton management demonstrations and management decisions should be carefully considered in the context of the year that they were conducted, but in general several observations can be made from the 2012 trial which include:

- Across all products and PGRs at seeding rates of 27,000 seeds/ acre and above, yields were similar (Figure 1). This reinforces the need for very specific management decisions to optimize the crop. This also points out the fact that populations can be reduced too much and in some cases, there is no need to increase populations beyond the level that ensures a good stand in the range of 30,000-35,000 plants/acre established in the field.

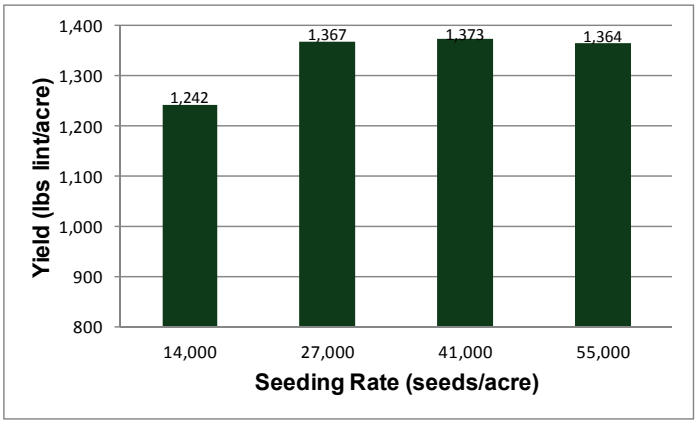

Figure 1. Average cotton yield by population.

Continued on next page

Technology Development & Agronomy by MONSANTO

VARIETY BY SEEDING RATE BY PGR IN COTTON

- In 2012, the passively managed plots outyielded the aggressively managed plots by almost 200 lbs lint/acre (Figure 2). This can be attributed to a good crop with relatively high retention and fall weather that allowed a strong finish. With good conditions the plants continue to develop and successfully set fruit on more nodes. This ultimately allows for higher numbers of harvested fruiting forms and the associated higher yield. The aggressive PGR regime stops this development and reduces yield in some seasons. An early fall has the same impact by stopping bolls from developing to the harvestable stage before heat units decline in the fall.
- In all three varieties, the aggressively managed plots yielded as much or more at higher seeding rates than at lower seeding rates (Figure 3). This indicates that higher populations may require more aggressive PGR management as plants may have more vegetative growth to compete for light. This competition allows the plants to stay in the vegetative growth phase longer and delays fruiting. PGRs help rebalance the vegetative verses reproductive growth and, in many cases, this can help increase yields in higher populations. However, this is highly moderated in the interaction of environment by variety and only careful, timely scouting can measure the need for PGR intervention.
- The passively managed plots yielded as much or more at lower populations and generally had higher yields than the aggressively managed plots. DP1252 B2RF was an exception that can likely be accounted for in the relatively later fruiting start and the longer fruiting period the other varieties experienced this season as well as the good fall weather that helped finish a later crop. Typically, DP1252 B2RF begins to fruit relatively early for a full season variety. However, DP1252 B2RF has an extended fruiting window due to a different sink (or use of the plant's energy) compared to the larger seeded varieties in this study: DP 1321 B2RF and DP 1212 B2RF. In other words, the full maturity variety, DP1252 B2RF, may have experienced a shorter fruiting window this season, which likely reduced yield relative to the other varieties at lower populations.

SUMMARY

This 2012 data indicates that variety-specific cotton management decisions are important to optimize cotton yield. In 2012, a passive PGR regime appeared to offer the highest yield potential for the cotton products and populations evaluated. However, it should be noted that 2012 was a season without great potential for excess vegetative growth. This type of season is often characterized by relatively high whole plant fruit retention, moderate/timely rainfall during the season, and good weather to finish the crop. The 2012 data suggests the optimal seeding rates for the cotton products can be safely adjusted in various cropping systems without a yield penalty or causing great complications in growth management.

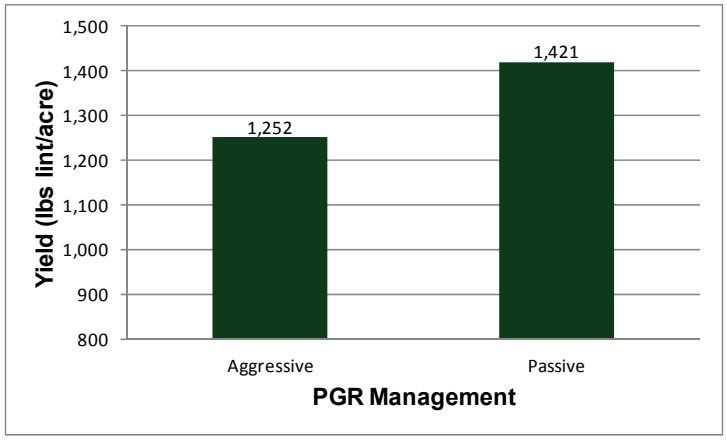

Figure 2. Average cotton yield by PGR management.

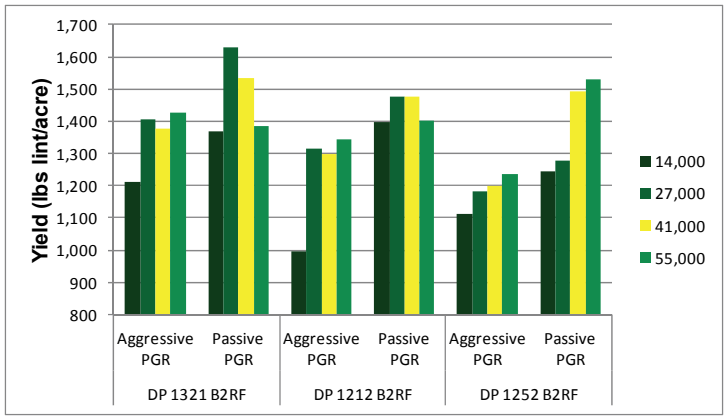

Figure 3. Average cotton yield by variety, population, and PGR management.

The information discussed in this report is from a single site, non-replicated, one-year demonstration. This informational piece is designed to report the results of this demonstration and is not intended to infer any confirmed trends. Please use this information accordingly.