

COTTON VARIETY AND BIOTECH UPDATE
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Since Eli Whitney invented the cotton gin and textile mills became mechanized, there have been some watershed inventions in cotton production. In the 20th century, the development of the spindle cotton picker, moduling system, and advances in gin technology have certainly changed the way that we grow and process raw cotton. Weed control and the development of herbicides have had a tremendous impact on profitability, labor, and tillage. Synthetic insecticides and boll weevil eradication have significantly altered cotton production systems by making our yield less determinate on insect pressures, and more determined by other production factors. Cotton biotechnology and the advent of transgenic varieties could also be considered one of those watershed events.

With the introduction of BXN cotton, followed shortly by Bollgard (BG) cotton in the mid- to late-90s, transgenic acreage rose steadily and appears to have leveled off at a little more than 75% of the entire US crop.

However, if we consider the acreage planted in each state or production region, the acceptance and adoption of transgenics can be much higher. In 2003, each state in the southeast and mid-south production regions planted 91% or more of their acres to a transgenic variety of some sort. Nationwide, the numbers range from a low of 42% in California to a high of 100% in Florida.

In the late 90s, the majority of transgenic varieties planted were BXN, BG, or Roundup Ready (RR). Since 1997, the trend has been an increase in RR cotton, whether as a single-gene, or stacked-gene variety. In 2003, single-gene RR varieties accounted for 27% of the total US acreage, while BG/RR stacked varieties accounted for 46% of the total US crop. Stacked varieties are the portion of transgenics that have increasingly been adopted almost every year since 1997.

Each year, USDA-AMS publishes statistics on the seven most popular varieties planted in the US. While the acreage devoted to the seven most popular varieties has not changed drastically since 1997, the makeup of those varieties has. Every year since 1999 at least six of the top seven most popular varieties beltwide has been transgenic in some form or fashion. As an undergraduate agronomy student, I was taught that the number one consideration in choosing a cotton variety was yield. There is now statistical evidence to dispute that, indicating that growers now first choose a transgenic trait, and then consider other factors when choosing a variety. The availability of transgenic traits is arguably the driving force in cotton variety development, availability, and popularity.

I would like to highlight this morning some of the newer biotech options in variety selection. This is information gleaned from industry sources and I encourage you to attend the New Developments From Industry section of the conference as well as the technical sessions on Thursday and Friday for more detailed information concerning transgenic options that are now, or soon will be available for cotton farmers.

In the area of weed management options, BXN and RR cotton has been around for some time and continues to be available. Most farmers have become familiar with these technologies.

New for 2004 is the commercial introduction of Liberty Link (LL) cotton from Bayer CropSciences. LL cotton is tolerant to over-the-top applications of the broad spectrum herbicide glufosinate which will be sold under the trade name of IGNITE. The IGNITE label will allow for over-the-top applications to LL cotton from emergence to early bloom with a 70 day pre-harvest interval restriction. Suggested labeled rates are from 32-40 ounces per acre with a limit of 80 total ounces per season. IGNITE can be tankmixed with other herbicides so long as the application timing and target species is consistent with the tankmix partner's label. All LL varieties in 2004 will be available from FiberMax and they indicate that supplies of these varieties are likely to be short in the upcoming year.

Looking farther down the road, Roundup Flex cotton is expected to be tested on a large scale in 2005 with a commercial release in 2006. Roundup Flex cotton varieties will be tolerant to over-the-top applications of glyphosate. The window of application has not yet been established, but will be much wider than the current 5-leaf restriction on RR cotton. Several papers in the weed science conference will address weed management systems and specifics in both LL and Roundup Flex cotton systems.

For insect management technologies, BG cotton has been available for several years and is familiar to most producers. 2003 saw the first commercial introduction of Bollgard II (BG2) varieties. BG2 combines two *Bt* genes and exhibits activity

against a wide range of caterpillar pests including cotton bollworm. Early reports of the field performance of BG2 has been mostly positive across the belt. These varieties will be stacked with the RR trait and will be available from Deltapine, Stoneville, and FiberMax in 2004.

In the near future, we will see the introduction of two new insect management technologies. First will be Widestrike from Dow AgroSciences. Widestrike contains two *Bt* genes and exhibits activity against a wide range of caterpillar species including cotton bollworm. In 2004, there will be limited testing and release of Widestrike from PhytoGen Seed Company. Dow has research and testing agreements with other seed companies as well.

Registration is expected in 2005 for VipCot from Syngenta Crop Protection. Syngenta has research and testing agreements with at least one major seed company and the VipCot technology has exhibited efficacy against caterpillar pests including cotton bollworm, but with the exception of European corn borer.

Biotechnology in cotton varieties has firmly established itself as being here to stay. In the future, I think we can expect additional traits to improve efficacy against caterpillars as well as non-lepidopteran insect pests that have become major pests in post-Boll Weevil Eradication and *Bt*-cotton production systems.

Other traits currently being researched, both privately and publicly, are fiber quality and yield traits, as well as “value added”, and agronomic traits. In the early 1990s, few would have predicted the adoption and breadth of transgenic traits and varieties and there is no reason to believe that cotton biotechnology won’t soon reach beyond crop protection in cotton production systems and begin to impact the cottons we grow with agronomic and “value added” traits.

I would like to quickly go through some of the new or recent variety introductions from some of the major seed companies. This is not meant to be an exhaustive list, but includes most of the major new introductions. Many of the varieties shown will be available in limited quantities in 2004.

From Deltapine, we will see the introduction of two new RR varieties to go along with the recent introduction of three new BG/RR varieties and two new BGII/RR varieties. Deltapine also has a couple of BG/RR varieties in the production pipeline that will be tested extensively this year.

Stoneville Pedigreed Seeds will be introducing three new RR varieties in 2004. Additionally, there will be the introduction of one new B2R variety. ST 5599BR will be widely available along with a couple of more additions to the stacked BG/RR lineup of varieties they have to offer.

FiberMax continues to bring new transgenic varieties to the market. Most notable is the introduction this year of LL cotton in four varieties that will be widely tested and available in limited quantities in 2004. FiberMax will also introduce RR versions of existing varieties.

PhytoGen will introduce four new RR varieties and one conventional variety with a commitment to new varieties and biotech in the acala and pima cotton regions of the belt.

Beltwide Cotton Genetics is a relatively new seed company to the industry. Beltwide Cotton Genetics will have a lineup of two conventional and three RR varieties in 2004.

As you can see, the biotechnology band continues to beat on. Grower acceptance has been high and there is a noticeable commitment to transgenic traits both from biotech and seed companies. We have learned from the first wave of transgenic cottons that they can be wonderful management tools in our production systems. None are silver bullets and in a biological system there is likely to never be a silver bullet. But the transgenics have certainly had an impact on cotton production and changed the way we control weeds, insects, and choose varieties. They add to the toolbox we have for producing cotton and it is imperative that we use these tools wisely by utilizing them where appropriate and protecting the technology with things like sound resistance management programs. Technologies such as LL and Roundup Flex cotton certainly add to the options weed control and the next generation of *Bt* cottons will provide further plant protection and likely change many of our current scouting methods, and threshold recommendations.

It should be remembered also by all cotton producers and the industry as a whole that a transgenic cotton variety is still a cotton variety with the characteristics of yield, fiber quality, earliness, plant stature, and all the rest. While the transgenic traits are very important, the old-fashioned rules of cotton variety selection are still important, and maybe more so today. The reason is that the seed is an investment and a delivery mechanism for a host of technologies, but it also contains the same genetic components now as it did 50 years ago that determine its suitability and adaptability to your farm and production system. The true potential of transgenic traits cannot be realized if the variety selection is not appropriate in the first place.