33. Insect Resistant Cotton (2)

The fall armyworm, soybean looper and the beet armyworm are destructive migratory pests of many crops in the southeastern US. Damage caused by fall armyworms on cotton is from their feeding on the fruit. Once loopers begin feeding on the outer canopy, they can completely defoliate the plant in 36 to 48 hours. Young beet armyworm larvae feed together and gradually disperse as they grow. They skelotonize leaves.

Transgenic Bt cotton has been commercially available in the United States since 1996. Bt cotton has demonstrated remarkable control of some lepidopteran pests, particularly the tobacco budworm and the pink bollworm. Since its release into commercial markets, Bt cotton seldom, if ever, has required supplemental insecticide control for these two pests. Control of the bollworm has been less dependable. Common lepidopteran pests such as fall armyworms, beet armyworms and soybean loopers are even more tolerant than bollworms. Supplemental foliar insecticide applications have been used in many Bt cotton fields to control economically damaging populations of fall armyworms, beet armyworms, soybean loopers and especially bollworms.

Approximately 36% of current Bt cotton acreage is treated for bollworms (1.9 million acres) with 527,700 pounds of chemical active ingredients. Approximately 65000 bales valued at $19 million were lost to bollworms on Bt cotton acreage in 2000. For beet armyworm/fall armyworm/soybean looper control, approximately 21% of current Bt cotton acreage is treated with 458,955 pounds of chemical active ingredients. Approximately 12,000 bales valued at $3.6 million were lost to loopers/armyworms on Bt cotton acreage in 2000.

Unacceptable control of bollworms and other lepidopteran pests such as beet armyworms, fall armyworms and soybean loopers, prompted the development of a new genetically modified cotton that contains two separate crystalline proteins. The addition of a second Bt protein provides satisfactory control of beet armyworms, fall armyworms, and soybean loopers. Efficacy is improved against bollworms. The dual-toxin cultivars may not require supplemental insecticide applications for these pests.

Bt cotton I will likely be phased out and completely replaced with Bt cotton II; a process that will take several years. It is estimated that Bt cotton II will be adopted on the same acreage that is currently planted with Bt cotton I at an increased cost of $2/A. The major impact of Bt cotton II would be an elimination of current losses and spraying costs due to bollworms/loopers/armyworms on Bt cotton acreage.

**Estimated Impacts of Insect Resistant Transgenic Cotton (2)**

- Change in Production: 37 million lbs/yr increase in production
- Change in Pesticide Use: 1.0 million lbs/yr decrease in insecticides
- Change in Net Revenue: $46 million/yr increase in net revenue

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