Mycogen Facts corn

NGBt1 CORN MAKES DOLLARS AND SENSE

The bite from the European corn borer (ECB) exceeds $1 billion annually. Research shows that for every first generation corn borer larvae in a plant, yields sink 5 to 6 percent. If there are two or three borers per stalk, losses multiply. When second generation borers persist, an additional 2 to 4 percent yield loss occurs. On fields that have 150 bushels per acre or more yield potential and show infestations of one to two corn borers per plant, profits decline by $15.00 to $30.00 per acre at a market price of $2.00 per bushel.

Compounding Problems

Corn borer infestation levels vary from year to year. So there's no reliable method for predicting the number of borers each season. Until the development of NatureGard® NGBt1 insect-protected hybrids by Mycogen Seeds, growers adopted a "wait-and-see" management strategy to decide if and when to spray based on the economic threshold of corn borer activity. But this often becomes a guessing game because much of the damage, especially from the first and second brood, is difficult to quantify and the spray window that could provide moderately effective control is quite narrow. Additionally, in most instances rescue treatments for ECB are less than 80 percent effective and the treatment must be applied before the larvae eat their way into the stalk.

Packaged Solution

For corn producers, controlling borers has been a crapshoot. Chemical treatments can be expensive, and it can be difficult to see a major bottom-line return on investment. Everything changed, however, when Bt (*Bacillus thuringiensis*) corn with resistance to ECB hit the market. Mycogen's NGBt1 gene, which helps the corn plant protect itself from both first and second brood ECB, is found in hybrids under the NatureGard line. The NGBt1 gene also is available in certain Silage-Specific™ corn hybrids as part of Mycogen's Totally Managed Feedstuffs® (TMF) silage corn line. No longer could this pest feast at will in lush green corn fields. Hybrids outfitted with this gene stop the ECB larva after it takes its first bite of the plant's leaves or pollen.

Mycogen researchers see this new technology offering many advantages. Compared to regular corn, NGBt1 hybrids appear healthier and show less lodging. When unprotected plants are invaded by borers, the holes they create allow stalk rot and ear rot to enter. But with the NGBt1 gene, diseases don't have an entry point to invade the stalks and infect the plants as easily.

Resistance Management

A potential exists for insects to develop resistance to chemicals or natural insecticides. As more and more producers switch acreage to Bt corn, adopting a management plan to counter resistance is a prudent move. The key is in maintaining a population of the insect that is susceptible to the Bt protein produced by the plant. So, researchers recommend planting a "refuge" of conventional corn. If or when a resistant moth should emerge, it's likely that it would mate with one of the far more numerous susceptible moths and produce susceptible offspring.

The refuge could be planted to any non-Bt corn hybrid. Planting systems for NGBt1 and conventional corn include alternate strips, split fields, separate locations and crop rotation. (See Mycogen's *Insect Resistance Management* fact sheet for more details.)

Additionally, numerous studies have demonstrated that corn borer moths are attracted to taller early-planted corn as the preferred place to lay their eggs. Since it's not advisable to plant all your corn acres to insect-protected hybrids, it just makes sense to plant your NatureGard NGBt1 hybrids first and let them be the target of the corn borer moths.

Measuring The Payoff

With more Bt hybrids being planted, growers want to know what kind of yield increase they need with Bt to gain back the extra cost paid for seed. Use the following table to calculate potential costs and benefits of Bt corn based on the number of corn borers per plant.

Potential costs and benefits of Bt corn based on number of corn borers per plant.

Yield	Corn Price	0	0.5	1	1.5	2
125 bu.	$ 2.00	-$ 10.00	-$ 3.75	$ 2.50	$ 8.75	$ 15.00
	2.50	-10.00	-2.19	5.63	13.44	21.25
150 bu.	2.00	-10.00	-2.50	5.00	12.50	20.00
	2.50	-10.00	-0.63	8.75	18.13	27.50
175 bu.	2.00	-10.00	-1.25	7.50	16.25	25.00
	2.50	-10.00	0.94	11.89	22.82	33.75

Assumptions: Bt seed corn costs $10* per acre more than non-Bt seed, each corn borer reduces yields by 5% and Bt corn provides 100% control of first generation ECB. M.E. Rice, Iowa State University, 1997.

If corn yields 150 bushels per acre at $2.00 per bushel with only a half borer per plant, there is not a heavy enough infestation to offset the cost of a Bt hybrid. However, with one borer per plant, there's a payoff of $5.00 per acre. The Bt corn is economically justified.

The key issues to be considered include the hybrid's yield, grain quality and stalk standability, as well as the economic return on investment.

Healthy Recommendations

Farmers need to realize that planting a NGBt1 hybrid does not guarantee higher yields when compared with conventional hybrids. Growers need to select hybrids based on yield potential and agronomic characteristics specific to their farm. To sort out hybrid performance, it's important to focus on high-yielding hybrids that are best suited to battling the ECB in a crop. When selecting a hybrid, the grower should examine the area of adaptation, anticipated yield goal, overall agronomic traits, historical estimate of corn borer related loss and seed premium cost.

Remember: Bt hybrids are like a prepaid insurance policy. Growers benefit from the extra investment if ECB attack their fields and if they select the best genetic package for their growing conditions and environment.

*Mycogen's NatureGard NGBt1 seed costs around $6 per acre more than non-Bt seed.

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