

9. Field Performance of Ciba Seeds Maximizer *Bt* Hybrid Corn

Jeff Stein¹, Laura Privalle¹, Patricia Fearing¹, Dean Christensen², James White²,
and Moez Meghji²

Ciba Seeds has received United States and Canadian regulatory approval to market transgenic *Bt* Maize known under the trade name Maximizer hybrid corn with Knock-Out built-in corn borer control. This field corn produces a truncated form of the insecticidal CryIA(b) protein that occurs naturally in *Bacillus thuringiensis*. The principal control target for *Bt* Maize is the European corn borer (ECB; *Ostrinia nubilalis*). This widespread pest reduces yield by disrupting normal plant physiology and causing physical damage to the stalk and ear, resulting in annual economic losses of nearly \$1 billion in the United States. It is difficult to control ECB by either conventional or microbial *Bt*-based pesticides since application must occur before the larvae bore into the stalk. Expression of the insect control protein within the plant enables to overcome this problem and provides an unprecedented level of ECB control, while eliminating the health and environmental risks associated with other pest control methods.

Nineteen genetically different *Bt* corn hybrids or inbreds derived from the initial transformation event have been field-tested. Sites throughout the corn-growing regions of the continental United States and Hawaii were chosen to compare the performance of the hybrids under diverse environmental conditions and under exposure to a broad group of pathogens and pests indigenous to the various geographic regions. At each site, the transgenic varieties and their genetically equivalent non-transgenic counterparts were monitored throughout the growing season by plant breeders and agronomists. In addition to regular inspections for disease and insect pests, qualitative comparisons for a large number of morphological and agronomic traits were made between the transgenic and non-transgenic germplasm lines. The parameters chosen for this comparison cover a broad range of characteristics that encompass the entire life cycle of the corn plant: stand establishment; early plant vigor; leaf orientation; leaf color; plant height; root strength (lodging); silk date; silk color; ear height; ear shape; ear tipfill; intactness; dry ear weight; tassel color; tassel size; yield; reaction to insecticides; reaction to fungicides; and susceptibility to bacterial and fungal pathogens. Results from these trials indicate that corn plants producing CryIA(b) protein are highly effective in controlling ECB, even though only minute quantities of the protein are produced. Except for tolerance to ECB, the performance of the *Bt* corn is indistinguishable from that of non-transformed isogenic counterparts. This was true for all hybrids and the breeding germplasm lines evaluated across all geographic regions.

¹ Ciba Agricultural Biotechnology, Research Triangle Park, NC, USA.

² Ciba Seeds, Applied Technology Research, Bloomington, IL, USA.

