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SmartStax: Multi-trait Corn Offered by Dow and Monsanto

By Aaron Gassmann and Erin Hodgson, Department of Entomology

Beginning in 2009, Dow AgroSciences and Monsanto have entered into an agreement to offer SmartStax, which combines the Bt traits found in Herculex XTRA and VT Triple Pro. This product will include several Bt traits, with multiple toxins providing control of some key pests and with a broader overall spectrum of pest control. Additionally, there will be a reduction in the refuge requirement with the product. Growers should carefully consider how the pest-control benefits of this product balance against seed costs when deciding what to plant in 2011.

How does SmartStax differ from other products?

SmartStax combines the Bt traits found in VT Triple Pro and Herculex XTRA. VT Triple Pro contains Cry3Bb1 which targets corn rootworm species along with Cry1A.105 and Cry2Ab2 for control of Lepidoptera including European corn borer and corn earworm. Herculex XTRA contains Cry34/35Ab1 for control of corn rootworm and Cry1F for control of Lepidoptera including European corn borer and western bean cutworm. Additionally, SmartStax has tolerance of the herbicides glyphosate and glufosinate.

Implications for pest control

Historically, the primary corn pests of concern in Iowa are the European corn borer and corn rootworm. Both of these pests are controlled effectively in most cases by either VT Triple Pro or Herculex XTRA. SmartStax should provide control that is as good as or better than the parent products. Secondary pests of corn in Iowa currently controlled by Bt corn include corn earworm, western bean cutworm, black cutworm and armyworms. High adaption of Bt corn over the last decade is likely responsible for the drastic reduction in European corn borer populations, making it less of a problem in corn. Conversely, some secondary pests may become more problematic over the coming years; for example, the western bean cutworm has only recently expanded its range to include Iowa. Smartstax offers some advantages for control of secondary pests compared with either VT Triple Pro or Herculex XTRA.

Changes in refuge requirement

SmartStax requires a smaller refuge than either Herculex XTRA or VT Triple Pro. In Iowa, a five percent block refuge is required for all pests targeted by Smartstax. This includes below ground pests (western and northern corn rootworm) and above ground pests such as European corn borer and corn earworm. The refuge must be within or adjacent to the SmartStax field and cannot contain any Bt traits for pest control.

Things to consider

Advantages of SmartStax include a reduced refuge requirement and broader control of secondary pests. While the use of multiple traits should increase the durability of SmartStax, this benefit may be counterbalanced by the reduced refuge requirement, which should decrease durability. The extent to which SmartStax will increase profits on the farm depends on pest pressure, pest

management strategies and seed costs. For example, corn rootworm can be effectively controlled by crop rotation. In such cases, a stacked event such as SmartStax or a single-trait rootworm event such as VT Triple Pro should confer little additional benefit of increasing yield by reducing pest injury.

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