INSECT RESISTANCE MANAGEMENT AND REFUGE REQUIREMENTS FOR Bt CORN

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ABSTRACT

Widespread farmer adoption of Bt corn hybrids and new Bt traits for caterpillar pests in addition to corn rootworm have increased the number of acres where target insect pests are exposed to Bt active ingredients each growing season. The purpose of Insect Resistance Management (IRM) is to maintain the effectiveness of Bt crops as an insect pest management tool by preventing or delaying development of insect resistance to Bt traits. The IRM plan is implemented by planting refuge corn acres on each farm where a Bt corn hybrid is planted. Refuge corn acres do not contain the Bt insect trait used in the Bt planting. A refuge provides a corn crop habitat that allows target pest insects to feed, mate and reproduce without being exposed to the Bt trait. Mating between Bt-susceptible insects from the refuge and potential resistant insect ensures that susceptibility to the Bt toxin is passed on to the next generation. Without a refuge, target insect populations that are exposed to Bt corn each growing season over multiple generations will eventually become resistant to Bt.

Planting a refuge is required by law through the U.S. Environmental Protection Agency (EPA) as a condition of Bt corn hybrid registration and market availability. The refuge must be planted to 20% of the corn acreage on each farm where a Bt hybrid is planted, and there are specific configuration and distance requirements. If planting a "stacked" Bt corn hybrid that contains one Bt trait for caterpillar pests (e.g., corn borers, western bean cutworm) and another Bt trait for corn rootworms, then the 20% refuge requirement must be met for both types of pests at the same time.

This overview and update presentation will address common questions such as: What is IRM? What happens if I don't plant a refuge? Who checks for IRM compliance? How do I implement the refuge for two types of pests (corn borers and corn rootworms) at the same time when planting stacked Bt hybrids? Where are Bt traits expressed in the corn plant? What if the Bt corn hybrid is not controlling the targeted insect? Presently, there are no changes for the 2009 growing season to the mandated 20% refuge and configuration and distance requirements. Some seed company registrants have applied to the U.S. EPA for approval to market Bt corn hybrids with different planting arrangement and reduced refuge percentage. This presentation will give a brief overview of the proposed Bt IRM changes presented to U.S. EPA by seed company registrants. Until EPA rules on any such change, the current Bt IRM refuge requirements stand and should be implemented in 2009.

References

Cullen, E., R. Proost, and D. Volenberg. 2007. Insect resistance management and refuge requirements for Bt corn. UWEX Pub. A3857, Univ. of Wisconsin-Extension, Madison, WI.

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