AGRONOMIC Spotlight

Technology Development by MONSANTO

Benefits of Genuity™ VT Triple PRO™ Technology in Silage Corn

Silage corn product selection is based on yield and quality characteristics. However, it also starts with identifying products that are adapted to the area based on maturity, standability, drought tolerance, and disease and insect resistance. Genuity™ VT Triple PRO™ corn technology represents the next generation of *B.t.* products that protects against a broader variety of insect pests, providing the potential for increases in silage corn yield and quality.

Broad Spectrum Insect Protection

Genuity VT Triple PRO technology in corn provides a dual mode of action to protect against above ground insects including corn earworms, fall armyworms and corn borers (Figure 1). Corn earworm larvae primarily feed on the tips of developing corn ears, but also feed on corn silks, which can lead to pollination problems. Corn earworms have been reported to enable increased levels of mycotoxins that can cause feed quality problems in silage. Fall armyworm larvae can damage the ears as well, but feed primarily in the corn leaf whorl which can result in yield reductions (Figure 2). Larvae of sugarcane and southwestern corn borers can lead to plant lodging by boring into the corn stalks. Additional losses caused by these insects may occur due to ears dropping from shank feeding and pathways for diseases to enter or be carried into the corn plant.

More Silage Yield Potential

Genuity VT Triple PRO corn products are generally healthier because of the protection provided against biotic stress factors. Healthier corn plants have the potential to be higher yielding and more profitable to the silage producer. Testing conducted in California resulted in an average silage corn yield increase of 3.6 tons per acre by including Genuity VT Triple PRO trait technology with a corn product (Table 1). This equated to an average revenue increase of $72.00 per acre due to more silage yield to the producer.

Figure 2. Corn earworm damage to tip of corn ear (left). Fall armyworm damage to leaves of young corn (right).

Higher Quality Silage Potential

Small differences in corn silage fiber and digestibility can result in large differences in predicted animal performance. A model to predict animal performance was developed at The University of Wisconsin to evaluate corn silage products based on yield, starch content and digestibility. Starch from the grain along with the digestible component of the fiber (NDFd) accounts for

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Figure 1. From left to right — corn earworm, fall armyworm, sugarcane borer, and southwestern corn borer.

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Table 1. Silage corn yield and quality performance as influenced by Genuity VT Triple PRO trait technology in testing conducted under corn earworm pressures.

Corn Performance Measurement	Trait Technology (corn product used with the same base genetics)	
	RR2	VT3P
Silage Yield (Tons/acre @70% moisture)	31.7	35.3
Fiber Digestibility (% NDFd, 30 hrs.)	52.3	52.9
% Starch	26.9	27.6
Milk/Ton (lbs/ton)	3046	3067
Milk/Acre (lbs/acre)	28,900	32,500

Source: Average of 30 locations with head-to-head comparisons conducted in California during 2009 (Monsanto Company).
RR2 = Roundup Ready® Corn 2
VT3P = Genuity™ VT Triple PRO™

the majority of the energy in corn silage. Using the model, the estimated intake of energy from corn silage is converted to milk per ton. Milk per acre is then calculated using the estimated values of milk per ton and dry matter yield per acre. This model can be used to compare different corn products based on their estimated relative feeding quality of silage produced.

In the California testing under confirmed corn earworm pressures, the corn product with Genuity VT Triple PRO technology had slightly higher starch content and fiber digestibility (Table 1). The increase of 0.7% starch content with Genuity VT Triple PRO was equivalent to almost 500 pounds more starch per acre in this testing. This also equated to higher quality silage expressed in pounds of milk per ton of silage. Milk per acre of silage corn reflects both the quality and quantity of silage expressed in pounds of milk. Genuity VT Triple PRO technology resulted in an average estimated increase of 3,600 pounds of milk per acre produced by the silage corn product used in the testing.

Reduced Potential for Mycotoxins

Minimizing insect damage to corn stalks and kernels can help reduce the plants vulnerability to mycotoxin production by diseases such as *Fusarium* and numerous ear rots. Mycotoxins are frequently a problem in corn silage that includes not just grain but a high percentage of stalks and stover. Animal health problems have been identified with mycotoxins in corn silage, and this is becoming an increasing concern to producers. Since *B.t.* corn products provide protection against insects, there is the potential to reduce or eliminate molds and mycotoxins by maintaining stalk, cob, and kernel integrity and preventing pathways for detrimental mold spores to enter or be carried into the plant tissue.

Fumonisins are prevalent mycotoxins produced by fungi and can be toxic to both humans and animals. Fumonisin levels in silage corn can be indicative of insect feeding. Testing in California showed more insect feeding and higher fumonisin levels in a corn product that did not have Genuity VT Triple PRO trait technology (Figure 3). Protection against a broader spectrum of insect pests provides more potential to reduce mycotoxin levels in silage corn.

Silage corn products with Genuity VT Triple PRO trait technology provides broader spectrum protection against common insect pests to help deliver a higher quality silage with more yield potential.

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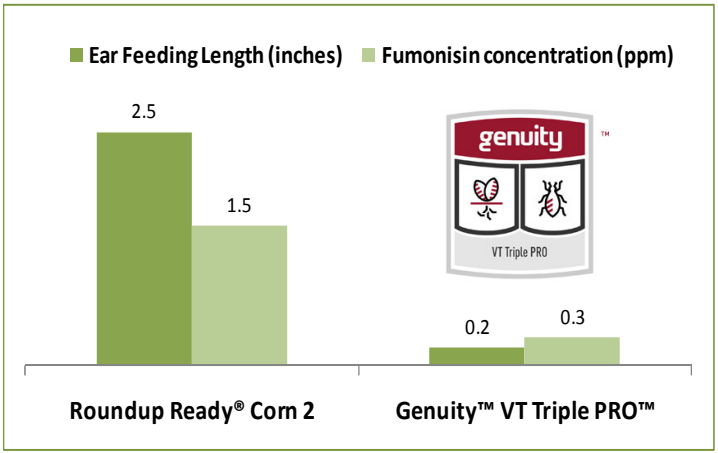

Figure 3. Average length of ear feeding and fumonisin concentration in silage corn as influence by trait technology (average of 23 locations with corn earworm pressure using the same corn base genetics— Monsanto testing conducted in California).

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Sources:
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G. Munkvold and R. Hellmich. Genetically modified, insect resistant corn: Implications for disease management. APSnet Feature, Oct. 15 thru Nov. 30, 1999. http://www.apsnet.org

Before opening a bag of seed, be sure to read, understand and accept the stewardship requirements, **including applicable refuge requirements for insect resistance management,** for the biotechnology traits expressed in the seed as set forth in the Monsanto Technology Agreement that you sign. By opening and using a bag of seed, you are reaffirming your obligation to comply with the most recent stewardship requirements.