



# 2013 DEMONSTRATION REPORT

## Monsanto Learning Center at Monmouth, IL

### Effect of Corn Rootworm Control and Nitrogen Rate on Corn Yield

#### Background

- Nitrogen is one of the highest input costs for growers. Availability of Nitrogen and water are the two most important factors in determining potential corn yield.
- The damage caused by corn rootworm (CRW) larvae can severely impact the ability of a corn plant to capture water and nitrogen.
- With this in mind, a demonstration trial was conducted at the Monsanto Learning Center in Monmouth, IL to illustrate the value of CRW protection in high-pressure environments.

#### Materials and Methods

- Conventional tillage: Fall chisel plow. Corn on corn rotation.
- UAN applied and incorporated in the spring. The seed bed established using a soil finisher
- Roundup Ready® Corn 2, Roundup Ready® Corn 2+ Soil Applied Insecticide (SAI), Genuity® VT Triple PRO® RIB Complete® corn blend, and Genuity® SmartStax® RIB Complete® corn blend were planted with 105 and 111 day RM respectively.
- Planting was on May 13, 2013 at 38,000 seeds per acre in thirty inch rows.
- Three primary treatments

- 32% UAN applied at 60 lbs per acre
- 32% UAN applied at 120 lbs per acre
- 32% UAN applied at 240 lbs per acre

- Corn was harvested September 25, 2013.

#### Nitrogen Rate x Corn Rootworm Control

- Using multiple modes of CRW protection (Genuity® SmartStax® RIB Complete® corn blend) had shown the best protection against CRW feeding and an increase in yield at all Nitrogen rates in this trial.
- Genuity® SmartStax® RIB Complete® corn blend had shown a 75% increase in Nitrogen Use Efficiency compared to the refuge.
- Bt products exhibited improved Nitrogen and water uptake, which leads to better grain yield, compared with the non-Bt counterparts.

#### NIS Root Score

- Products with CRW protection had shown greater root mass for optimal nitrogen uptake resulting in higher yield.
- Using a single MOA to protect against CRW offered some yield advantage and reduced CRW feeding when compared to a refuge corn product.

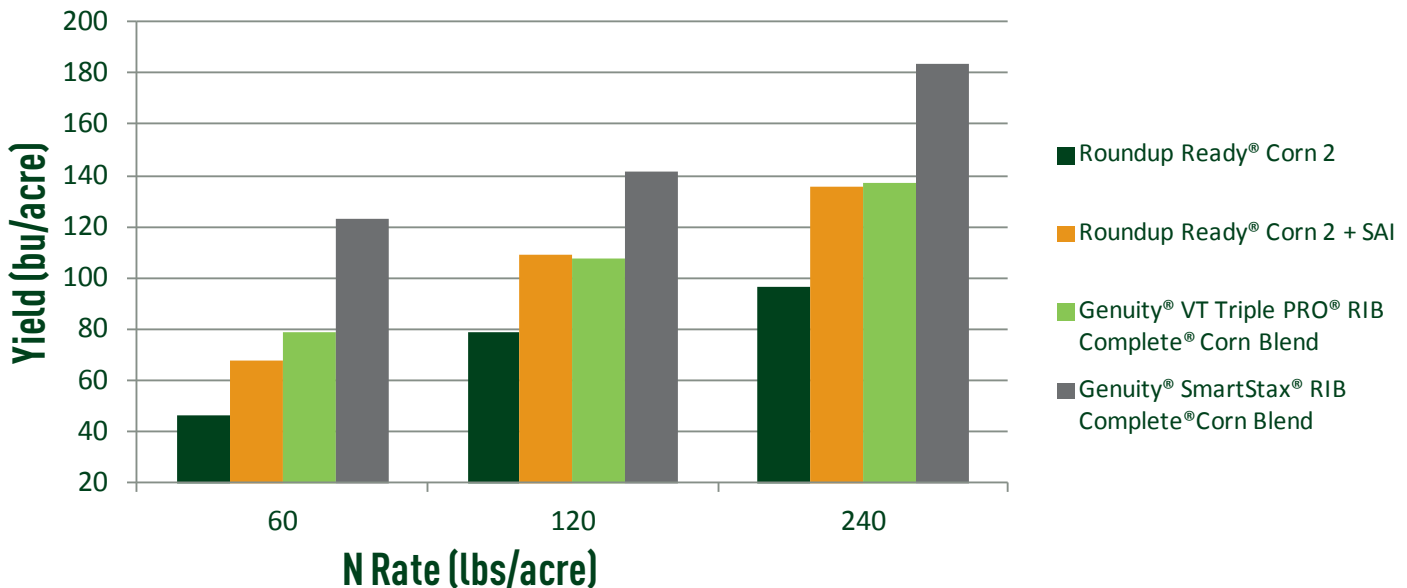


Figure 1. Nitrogen Rate x Corn Rootworm Control



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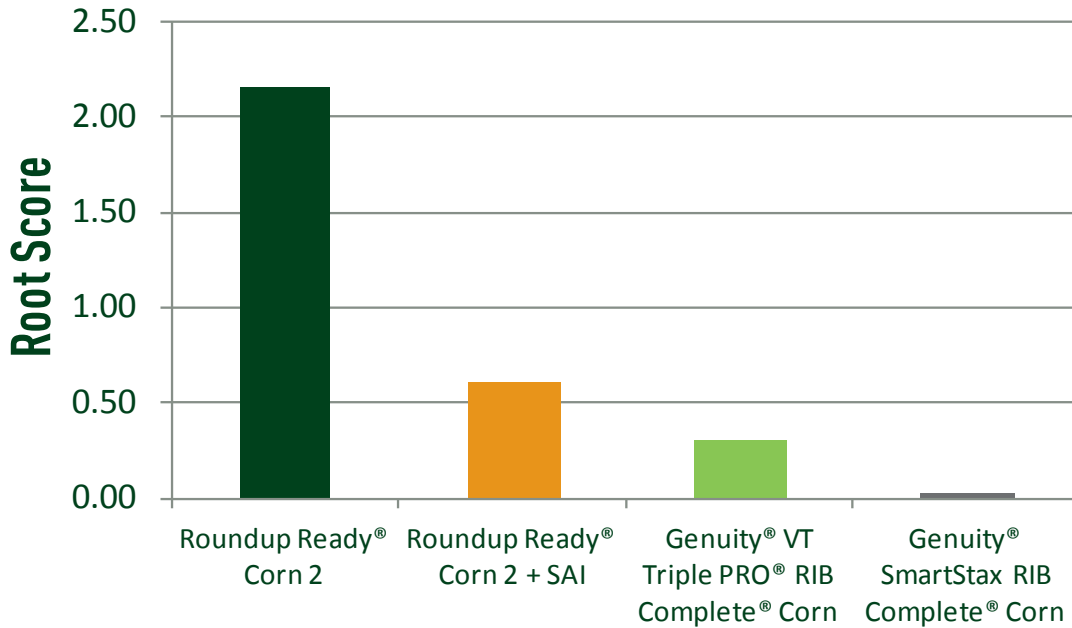


Figure 2. NIS Root Score.

#### Key Messages

- Protecting root systems from CRW damage results in improved water uptake and more efficient utilization of nitrogen, leading to higher yields.
- In a high-pressure CRW environment, the Genuity® SmartStax® RIB Complete® corn blend trait package had the lowest root node injury rating – well under the economic threshold value of .25, as well as the highest yield compared to all other treatments.
- Utilizing CRW best management practices such as crop rotation and adult beetle scouting, in conjunction with the multiple MOA Genuity® SmartStax® RIB Complete® corn blend package, not only optimizes productivity, but can increase the durability of Bt traits.

#### Source and Legals

<sup>1</sup> Below, F. E, et al. 2013. South Dakota Corn Grower' Annual Meeting. The quest for 300 bushel corn. Sioux Falls, SD.

<sup>2</sup> Jason, W, et al. Transgenic corn rootworm protection increases grain yield and nitrogen use of maize. Crop Science, 2013; 53 (2): 585

The information discussed in this report is from a single site, non-replicated demonstration. This informational piece is designed to report the results of this demonstration and is not intended to infer any confirmed trends. Please use this information accordingly.

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B.t. products may not yet be registered in all states. Check with your Monsanto representative for the registration status in your state.

**IMPORTANT IRM INFORMATION:** Genuity® RIB Complete® corn blend products do not require the planting of a structured refuge except in the Cotton-Growing Area where corn earworm is a significant pest. Genuity® SmartStax® RIB Complete® and Genuity® VT Triple PRO® RIB Complete® corn are blended seed corn products. See the IRM/Grower Guide for additional information. Always read and follow IRM requirements.

Individual results may vary, and performance may vary from location to location and from year to year. This result may not be an indicator of results you may obtain as local growing, soil and weather conditions may vary. Growers should evaluate data from multiple locations and years whenever possible.

**ALWAYS READ AND FOLLOW PESTICIDE LABEL DIRECTIONS.** Roundup Ready® crops contain genes that confer tolerance to glyphosate, the active ingredient in Roundup® brand agricultural herbicides. Roundup® brand agricultural herbicides will kill crops that are not tolerant to glyphosate. Genuity®, RIB Complete®, Roundup Ready 2 Technology and Design®, Roundup Ready®, Roundup®, SmartStax® and VT Triple PRO® are trademarks of Monsanto Technology LLC. Leaf Design® is a registered trademark of Monsanto Company. LibertyLink and the Water Droplet Design® is a registered trademark of Bayer. Herculex® is a registered trademark of Dow AgroSciences LLC. Respect the Refuge and Corn Design® and Respect the Refuge® are registered trademarks of National Corn Growers Association. All other trademarks are the property of their respective owners. ©2013 Monsanto Company.11052013KY



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/Stewardship 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.





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Figure 3. Roundup Ready® Corn 2



Figure 4. Roundup Ready® Corn 2



Figure 5. Genuity® VT Triple PRO® RIB Complete® Corn Blend



Figure 6. Genuity® SmartStax® RIB Complete® Corn Blend