



2013 DEMONSTRATION REPORT

Monsanto Learning Center at Monmouth, IL

Higher Yielding Corn Strategies

Background

Corn grain yield is the final result of several factors that influence the development and performance of the plant throughout a growing season. Yield has steadily increased in the past 150 years (Figure 1) due to advancements in breeding, cultural practices, and biotechnology. In order to meet grain demands in a world with steadily decreasing farmable land, the behavior of yield-influencing factors must be understood.

Multi-year and multi-location university research has indicated that there are 7 categorical management factors that influence corn yield. These factors are weather, nitrogen, product selection (including biotech traits), previous crop, plant population, tillage practices, and growth regulators (e.g. 'plant performance' or greening effect of strobilurin fungicides). Nutrient availability is also an important factor in plant growth. The MESZ (12-40-0-10S-1Zn) product, which provides a single source to promote balanced crop nutrition via fused granules containing 4 essential nutrients, plus 0-0-60 (potash) was used in this study to display the effects of nutrients at low and high management rates.

Understanding the interactions of these factors is critical to maximize corn yield potential. Differentiating these factors

into a standard system versus high management system in an omission plot layout can help gain insight on how each factor contributes to final yield. A replicated corn demonstration trial was conducted at the Monsanto Learning Center at Monmouth, IL to investigate the interaction and management levels of several factors that can impact corn yield.

Study Guidelines

Roundup Ready® Corn 2 (105 RM), Genuity® SmartStax® RIB Complete® corn blend (105 RM), and Genuity® VT Triple PRO® RIB Complete® corn blend (112 RM) were planted on 5/14/2013 using various combinations of plant populations, nutrients levels, and Headline® fungicide applied at R1 growth stage (Table 1). Treatments were applied to a corn-soybean rotation field with strip tillage done in the fall.

Plot size was 10 feet x 100 feet (0.023 acre) with a 30-inch single row. There were 4 rows per treatment. Weeds were managed with PRE application of Harness® Xtra 5.6L herbicide at 2.5 qt/acre on 5/2/2013 and POST application of Roundup PowerMAX® herbicide at 22 fl oz/acre + ammonium sulfate (AMS) at 17 lbs/100 gal on 6/19/2013. Plots were harvested on 9/7/2013 and yield was adjusted to 15% moisture content.



Figure 1. Historical U.S. Corn Grain Yields 1866 to Date



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Table 1. Seeding rates, fertilizer levels and Headline® fungicide rate used for 2013 demonstration trial.

Seeding Rate* (seeds/acre)	MESZ + 0-0-60** (lbs/acre)	Headline® Fungicide*** (fl oz/acre)
35K*	50	9
42K	100	

*K = 1,000
 **MicroEssentials® SZ™ (12% N- 40% P- 0% K- 10% S- 1% Zn) + 0-0-60 (N-P-K) placed in till zone in the fall
 ***applied on 7/22/2013 at the R1 stage

Results

When averaged across corn products, Headline® fungicide application, and plant populations, the 100 lbs of added nutrients (MESZ + Potash) outyielded the 50 lbs MESZ + Potash treatment. Highest yield of 270 bu/acre was obtained in 42,000 seeds/acre plant population compared to 259 bu/acre for the 35,000 seeds/acre population (Figure 2).

Across corn products, yield of the 42,000 seeds/acre plant population was slightly higher compared to the lower population (35,000 seeds/acre) with the addition of 100 lbs of nutrients (Figure 3).

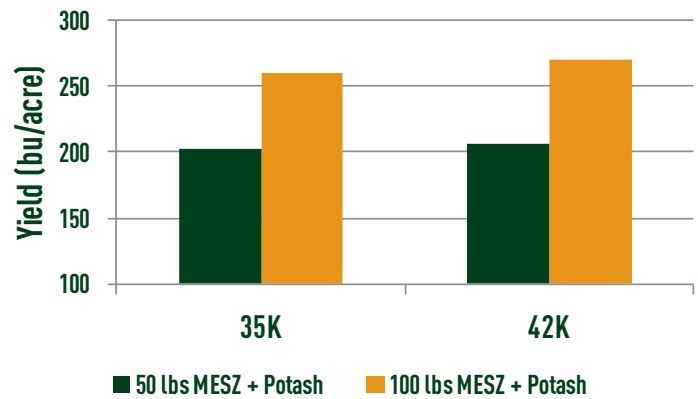


Figure 2. Effect of nutrient addition and plant population on average yield of three corn products in 2013.

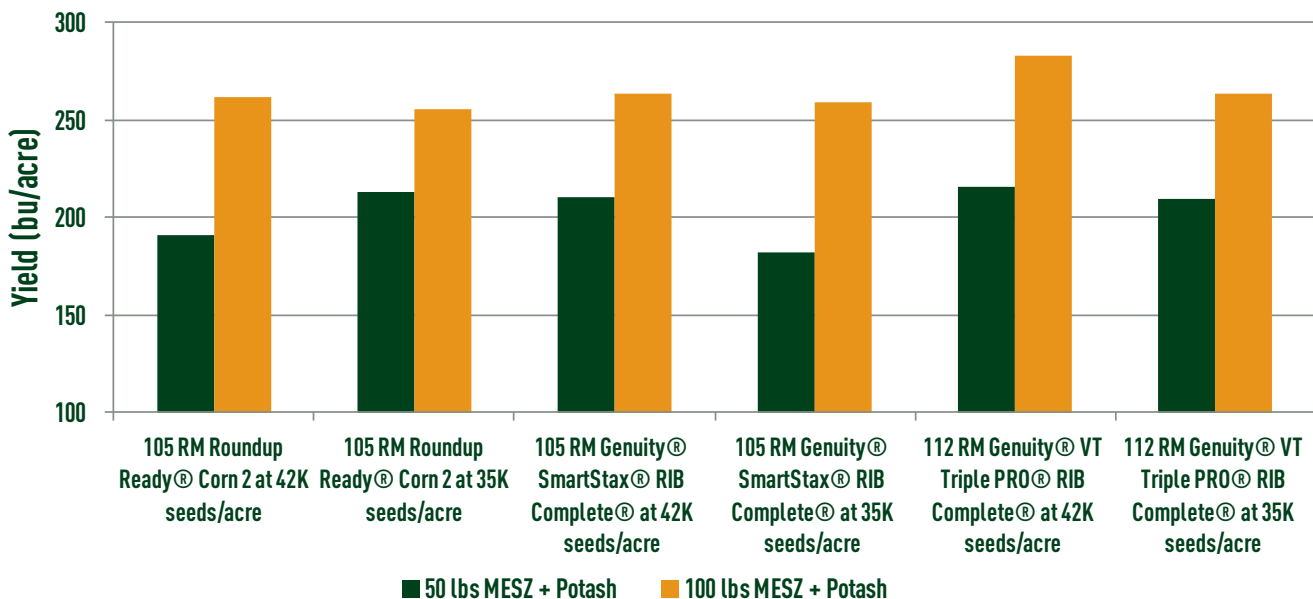


Figure 3. Effect of nutrient addition, plant population, and corn trait package on yield of three corn products in 2013.



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The effect of Headline® fungicide application at R1 stage on yield across different planting populations and corn products was slightly higher (Figure 4); however, this was not consistent as the untreated check yielded the same or higher than the treated plot in some cases (data not shown).

Key Messages

- Regardless of the trait, fertilizer, plant population, and fungicide application none of the corn products produced 300 bu/acre due to:
 - Very wet conditions shortly after planting causing poor stand establishment and disadvantaged roots.
 - High temperatures and drought conditions during pollination late in the season, which may have caused kernel abortion.
- Ideally, a combination of fertilizers, genetics, traits, strobilurin fungicides and other crop protection products, good growing conditions, and strategically placed plant population can all help achieve higher yield².

Sources and Legal

¹ USDA-NASS. Historical corn yield data 1866-2013, <http://quickstats.nass.usda.gov> (verified 11/20/13). ² Below, F.E. et al. 2011. A report of crop physiology laboratory omission plot studies in 2011. University of Illinois, <http://cropphysiology.crops.illinois.edu> (verified 11/20/13). MicroEssentials SZ Product Portfolio. <http://www.microessentials.com> (verified 12/3/2013).

The information discussed in this report is from a single site, two replications 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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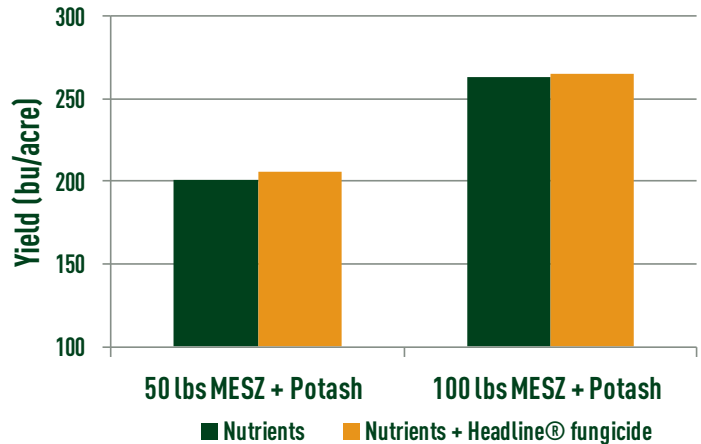


Figure 4. Effect of Headline® fungicide and nutrient applications on average yield of three corn products in 2013.

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.

Roundup Technology® includes Monsanto's glyphosate-based herbicide technologies. 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.

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