Monsanto Learning Center at Monmouth, IL

2015 Demonstration Reports

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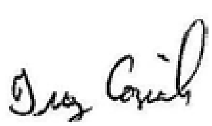
Thank you for visiting the Monsanto Learning Center at Monmouth, IL this past summer! Our goal here at the Learning Center is to help you keep up with ever-changing corn & soybean production technologies and provide you with up-to-date, relevant agronomic information that will benefit you and your operation. With that goal in mind, this booklet contains summaries from a number of our key trials and demonstrations around corn and soybean management systems from the past year.

For 2016, we will continue to strive to meet that goal with new trials and demonstrations around cover crops, nitrogen management, insect and weed resistance management, high yield systems approaches, and many other aspects of crop production research. We also plan to continue showcasing our current and future technologies, such as our newest Climate and data science tools as well as our Roundup Ready® Xtend Soybean Crop System, pending regulatory approvals. We hope you find the information within these pages, as well as the rest of our field trials and demonstrations to be valuable to you and your operation. Please contact us if you have any questions about these summaries, or any of the other projects here at the Monsanto Learning Center.

Additionally, you can download the electronic versions of the reports contained in this booklet by visiting the Monsanto Learning Center at Monmouth, IL website. The address is listed on the opposite page as well as a QR code that you can scan to be taken there directly. You can also follow us on Facebook and Twitter for seasonal agronomic and tour updates all year long.

Thank you once again, and we look forward to hosting you again in 2016!



Troy Coziahr, Manager
Monsanto Learning Center - Monmouth

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Cover Crop Systems

Background

There is an increasing interest in the utilization of cover crops in the Central Corn Belt.

Potential benefits of cover crops are: soil conservation, moisture conservation, weed suppression, improved organic matter, improved soil structure, help with 'fallow syndrome' in prevent-plant situations, improved nutrient cycling.

A similar cover crop systems demonstration was conducted in 2014 at the Monsanto Learning Center at Monmouth, IL. Results from 2014 showed higher yields in plots with a cover crop. Corn plant tissue test samples taken at tassel (VT) reported a slightly higher nutrient content in cover crop plots when compared to the untreated check. The results showed that immobile nutrients, such as phosphorus and zinc, appeared to be made more available in the cover crop plots. This increase may be due to increased nutrients in the decaying cover crop residue.

Study Guidelines

In the fall of 2014, a demonstration was established at the Monsanto Learning Center at Monmouth, IL. Four different cover crop plots were established, annual rye, radishes, commercial blend of multiple species, and cereal rye.

Cover crops were sprayed with Roundup PowerMAX® Herbicide at 32 fl oz/acre and 2,4-D at 24 fl oz/acre in the spring to kill any remaining cover crop/weed growth that survived the winter. A 112 RM Genuity® SmartStax® RIB Complete® corn blend was planted on June 2, 2015 with two replications. An untreated check (UTC) was established consisting of no previous cover crop.

Plant tissue samples were collected from each plot at V4 and R1 and tested for plant nutrient content. Yields in the cover crop plots were compared to the untreated check.

Corn was harvested on October 15, 2015, yields were adjusted to 15% moisture, and yields in the cover crop plots were compared to the untreated check.

Results and Discussion

All plots with a cover crop prior to corn out-yielded the untreated check. The commercial blend of multiple cover crop species provided the highest yield increase, followed by annual rye, radish, and then cereal rye (Figure 1). These yield results are similar to the results from the 2014 demonstration conducted at the Monsanto Learning Center at Monmouth, IL.

Cover Crop	Average Yield (bu/acre)
Annual Rye	208.75
Radish	206.83
Commercial Mix	211.25
Cereal Rye	203.16
Untreated Check (UTC)	201.74

Figure 1. Yield results of cover crop demonstration trial.

Plant tissue samples from all plots were taken at V4 growth stage and at silking (R1) to compare nutrient content in the cover crop plots to nutrient content in the untreated check. Plant tissue tests were inconclusive and showed no discernible trends between plots. The results from 2015 were different from 2014 results in which relactively immobile nutrients, such as phosphorus and zinc, appeared to be made more available in the cover crop plots.

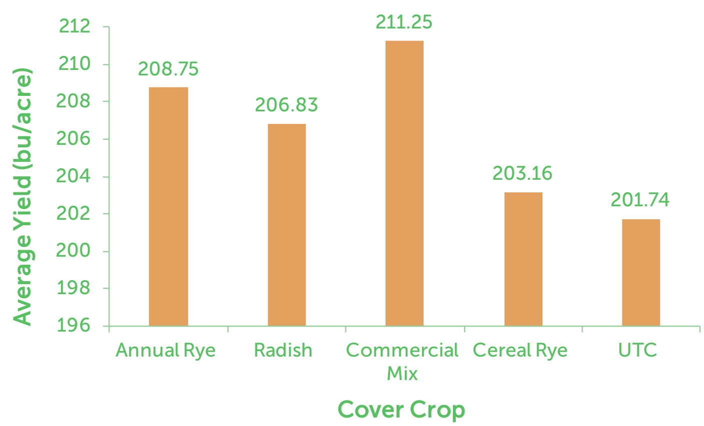


Figure 2. Average yield by cover crop.



Cover Crop Systems

Summary

Yield results from 2014 and 2015 are very encouraging and supported the adoption of cover crops; however, management practices need to be refined. Research will continue on plant tissue test due to inconclusive results.

There are many variables to consider when establishing a cover crop. Some of the most important variables are timing and method of cover crop establishment in the fall and termination of the cover crop in the spring. The Monsanto Learning Center at Monmouth, IL will continue to evaluate the impact of cover crops on yield and the most effective cover crop establishment practices.

Figure 3. Annual rye cover crop prior to corn planting.

Figure 5. Cereal rye cover crop after corn planting.

Figure 4. Cereal rye cover crop prior to corn planting.

Figure 6. Corn crop on plot with cereal rye cover crop.

Cover Crop Systems

Sources

Wander, M., Ugarte, C., and Martin, J. 2010. Can we keep soils covered as climate changes? Issue 1.15. University of Illinois at Urbana-Champaign. http://sustainability.illinois.edu.

Singer, J., Kaspar, T., and Pedersen, P. 2005. Small grain cover crops for corn and soybean. Iowa State University Extension. http://extension.agron.iastate.edu

Cover Crop Systems. 2014. Monsanto Learning Center. Monmouth, IL. http://www.monsanto.com/products/documents/learning-center-research/2014/mlc-lc-cover-crop-systems.pdf

Web sources verified 11/5/15.

Legals



Nitrogen Rate by Product

University of Illinois Professor, Dr. Fred Below, ranks nitrogen (N) second only to weather in a list of seven important interacting factors that contribute to the production of a successful and profitable corn crop. The other factors in Dr. Below's list, in order of importance, included weather, corn product, previous crop, plant population, tillage, and growth regulators.[1]

Historically, N recommendations have ranged from 0.8 to 1.2 lbs of N/bu of corn production goal/acre.[2] These values provide a starting point for N management; however, the factors previously mentioned along with cost of N and corn market price should be considered to help achieve the highest return on N investment.

Product genetics is a factor that deserves research attention because each corn product may have a different N response as a farming operation's N management is fine tuned. To help determine the influence of genetics, a demonstration trial was conducted at the Monsanto Learning Center near Monmouth, IL to:

1. Identify any product by N rate interaction, and
2. Identify the most economical N rate on average for 18 diversely (genetically) different corn products.

Study Guidelines

- 18 corn products representing six different companies were selected for the demonstration with relative maturities (RM) ranging from 107 to 114 days
- The demonstration was planted into second-year corn ground
- Tillage consisted of conventional tillage - fall chisel plow followed by soil finisher in the spring
- Planting date was April 29, 2015
- Seeding rate was 36,000 seeds/acre
- Two reps were planted that consisted of four rows of each product
- Six 32% UAN (lbs N/acre) preplant incorporated treatments were utilized

1. 0	3. 120	5. 240
2. 60	4. 180	6. 300

- Treatments were 60 feet in length
- Harvest date was September 15, 2015 with yields adjusted to 15% moisture content

Results and Observations

1. Random pictures demonstrate the effect that higher N rates can have on corn growth. A corn product with 60 lbs of 32% UAN (Fig. 1) shows considerably more N deficient leaves than a corn product with 300 lbs of 32% UAN (Fig. 2).

Figure 1. Randomly selected corn product with 60 lbs of 32% UAN applied preplant incorporated.

Figure 2. Randomly selected corn product with 300 lbs of 32% UAN applied preplant incorporated.

Nitrogen Rate by Product

2. Yields for each of the 18 products at each of the UAN application rates were captured (Table 1).
3. With a 222.6 bu/acre average yield and gross revenue minus N cost of $676/acre, the 180 lbs/acre N rate was the most profitable (Fig. 3). This finding is in line with previous research findings at the Monmouth Learning Center.[3]
4. The overall yield average of the 18 products at the 240 lbs/acre N rate was more than the 180 lbs/acre N rate, but additional yield was not economical (Table 2).
5. Product genetics responded differently to increasing rates of N, resulting in some products being most profitable at 120 lbs N/acre and others most profitable at 240 lbs N/acre; therefore, consult your trusted seed advisor or agronomist for specific, local recommendations (Figs. 4 & 5).

TABLE 1. RAW YIELD (BU/ACRE) FOR EACH PRODUCT BY NITROGEN RATE

Product	Nitrogen (Lbs/Acre)					
	0	60	120	180	240	300
A	89.11	141.91	173.84	211.54	197.23	172.50
B	76.33	134.74	182.53	210.49	213.92	157.51
C	60.91	130.65	187.31	219.84	223.21	182.07
D	72.56	140.31	196.80	210.61	229.78	176.17
E	74.38	161.69	208.90	225.39	233.66	192.77
F	70.65	148.07	197.28	224.17	223.42	186.02
G	73.63	155.78	212.10	232.18	242.17	216.04
H	80.09	151.82	202.06	214.45	226.77	206.45
I	80.89	148.64	210.69	232.99	246.70	207.65
J	91.22	155.61	206.21	233.41	233.70	201.53
K	82.38	153.43	201.10	215.92	221.39	197.57
L	77.35	147.98	210.05	232.34	232.27	204.50
M	73.49	146.84	199.51	221.13	214.75	182.82
N	80.38	142.97	205.92	230.06	231.15	188.12
O	83.68	142.52	191.53	225.01	230.94	189.54
P	90.27	145.43	191.17	226.60	225.03	186.62
Q	75.17	146.45	194.49	233.30	236.19	191.30
R	79.88	151.25	204.68	206.91	198.10	180.58
AVG	**78.46**	**147.01**	**198.68**	**222.58**	**225.58**	**189.99**

Source: Monmouth Learning Center Data - 2015; Yields adjusted to 15% moisture content.

TABLE 2. COMPARISON OF GROSS REVENUE MINUS NITROGEN COST/ACRE FOR EACH NITROGEN RATE AND YIELD FOR EACH RATE

	Nitrogen (lbs/acre)					
	0	60	120	180	240	300
Gross Revenue Minus N Cost ($/acre)	274.62	480.32	626.97	676.41	652.72	493.95
Bu/acre (15%)	78.46	147.00	198.68	222.57	225.58	189.99

Source: Monmouth Learning Center Data - 2015; Calculations based on a nitrogen cost of $0.57/lb and a corn price of $3.50/bu.

Nitrogen Rate by Product

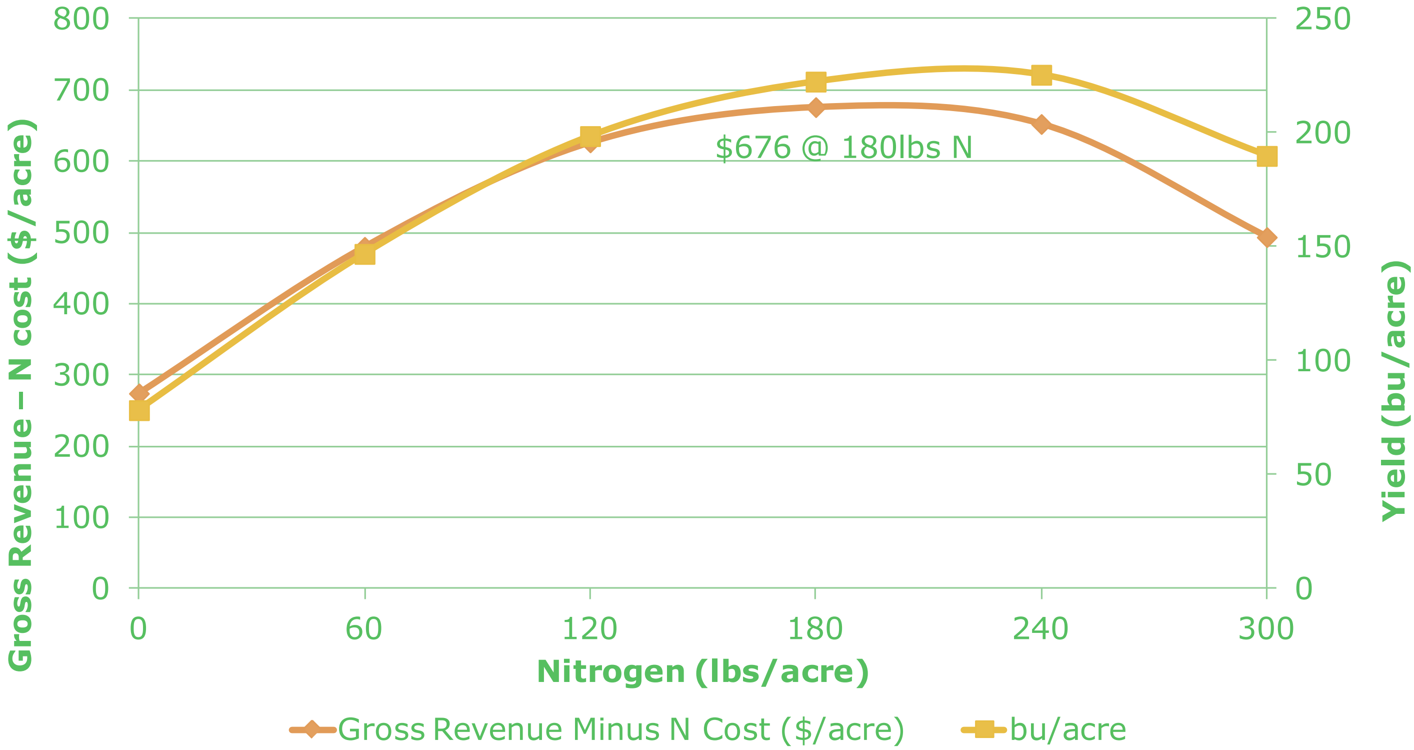


Figure 3. Gross Revenue/Acre after Nitrogen Cost. Source: Monmouth Learning Center Data - 2015; Calculations based on a nitrogen cost of 0.57/lb and a corn price of $3.50/bu.

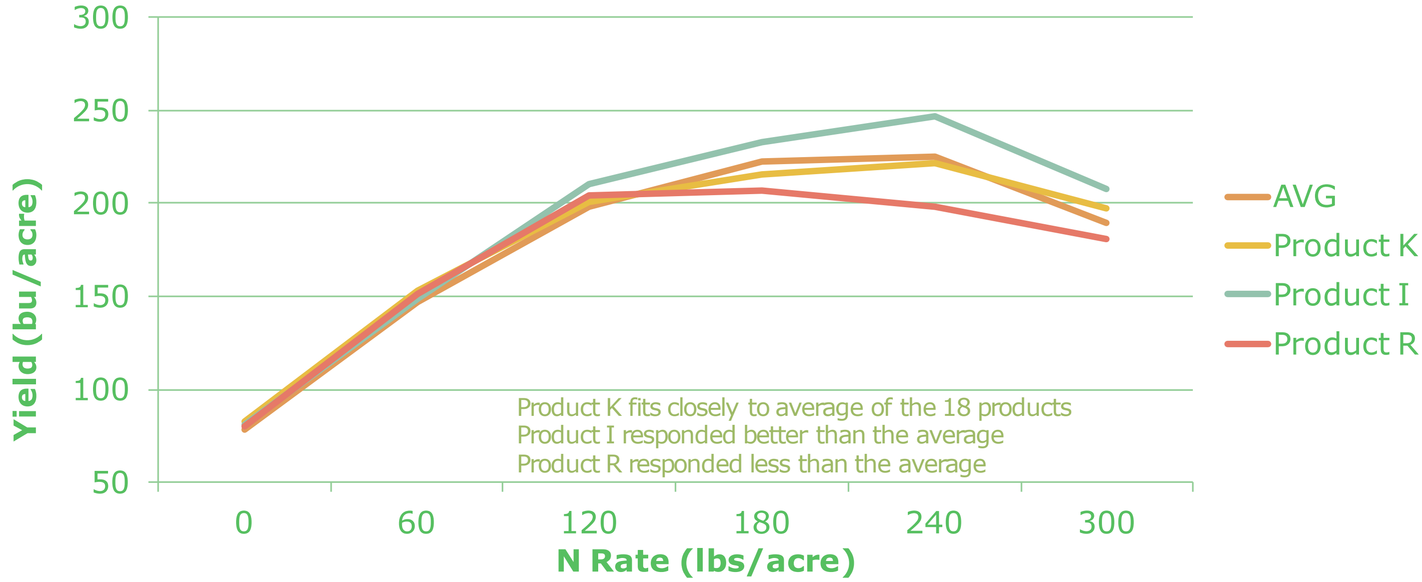


Figure 4. Nitrogen Response of Three Different Products Compared to the Average Response of 18 Products. Source: Monmouth Learning Center Data - 2015; Note: AVG represents all 18 products in this trial.

Nitrogen Rate by Product

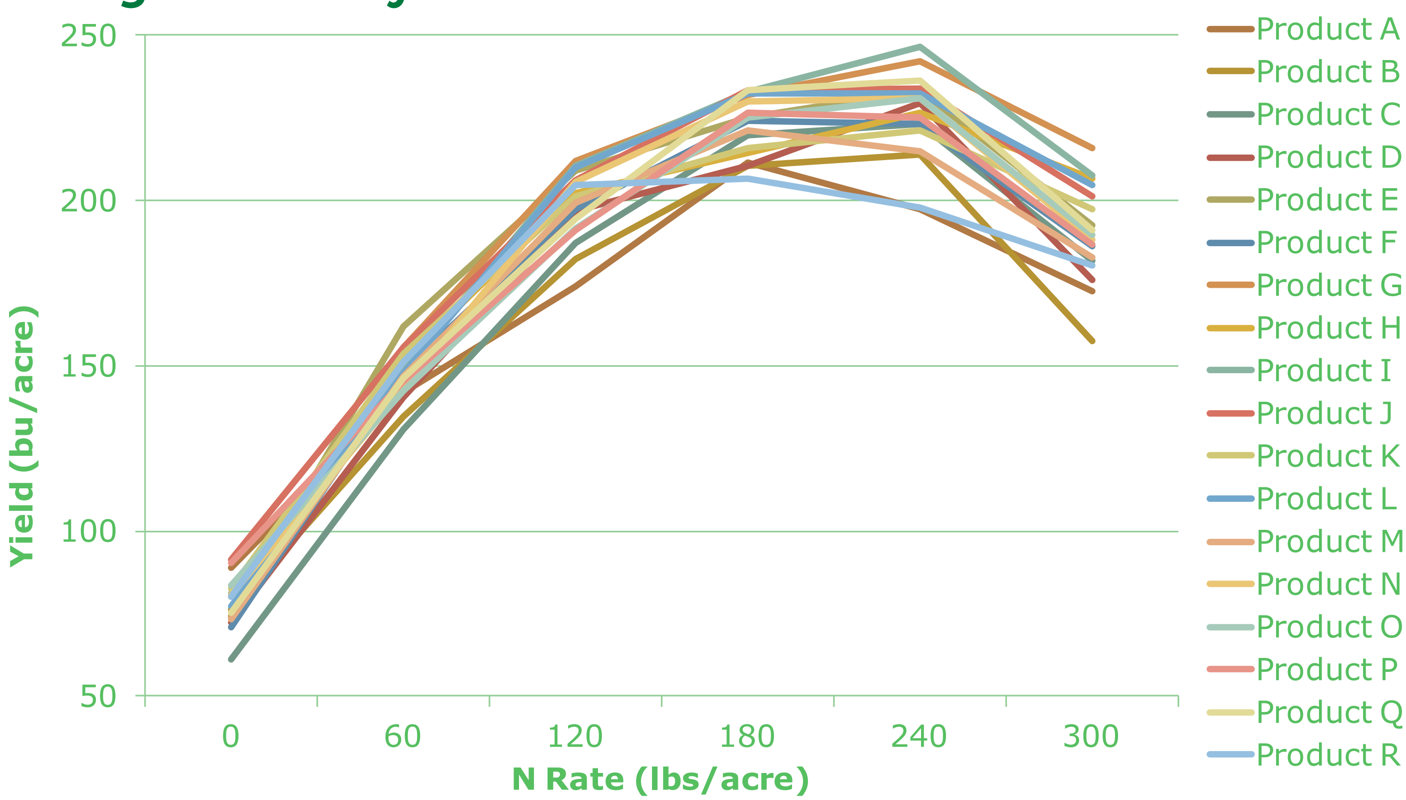


Figure 5. Product Response for all 18 Products to Six Nitrogen Rates.
Source: Monmouth Learning Center Data - 2015

Additional Demonstration Comments

- Many factors (soil type, tillage, rainfall, previous crop, N cost) can influence the profitability of N applications.
- Several tools, including the Iowa State University Maximum Return to N (MRTN) Corn Nitrogen Rate Calculator, are available to help make informed N management decisions.[4]
- It is important to consider yield goals and N cost when making N management decisions.

Sources

[1] Below, F. The seven wonders of the corn yield world. University of Illinois Crop Physiology. http://cropphysiology.cropsci.illinois.edu/research/seven_wonders.html

[2] Camberato, J. 2012. A historical perspective on nitrogen fertilizer rate recommendations for corn in Indiana (1953-2011). Soil Fertility and Plant Nutrition. AY-335-W. Purdue University Extension. https://www.extension.purdue.edu

[3] 2011. Evaluation of a nitrogen rate calculator. Monmouth Learning Center Demonstration Report. Monsanto. http://www.aganytime.com/Documents/ArticlePDFs/LC-Monmouth-Evaluation-of-a-Nitrogen-Rate-Calculator-2.pdf.

[4] Corn nitrogen rate calculator. Iowa State University. http://extension.agron.iastate.edu/soilfertility/nrate.aspx

Legals



Population Response by Corn Product

Background

In some areas, planting populations for corn have been increasing steadily by approximately 300 plants per acre per year over the past 25 years.[1] New breeding technologies have led to the accelerated improvement in the ability of corn plants to withstand the stress that results from higher plant populations. Genetic improvements, along with improved agronomic practices, have been the main drivers behind increased planting populations and the ability to maximize yield potential. The purpose of this study was to determine what effect increasing plant populations has on corn products with different genetic backgrounds.

Study Guidelines

Nine corn products with relative maturities from 105 to 113 days were planted May 13, 2015. The field was in a corn/soybean rotation with conventional tillage – fall chisel plow followed by soil finisher in the spring. Each of the nine corn products were planted at populations of: 25,000; 35,000; and 45,000 seeds per acre. Plots had 30-inch row spacing and were 300 feet long. One replication was planted with four rows of each corn product planted per treatment. Plots were harvested on October 2, 2015, and yield data was adjusted to 15% moisture content.

Results

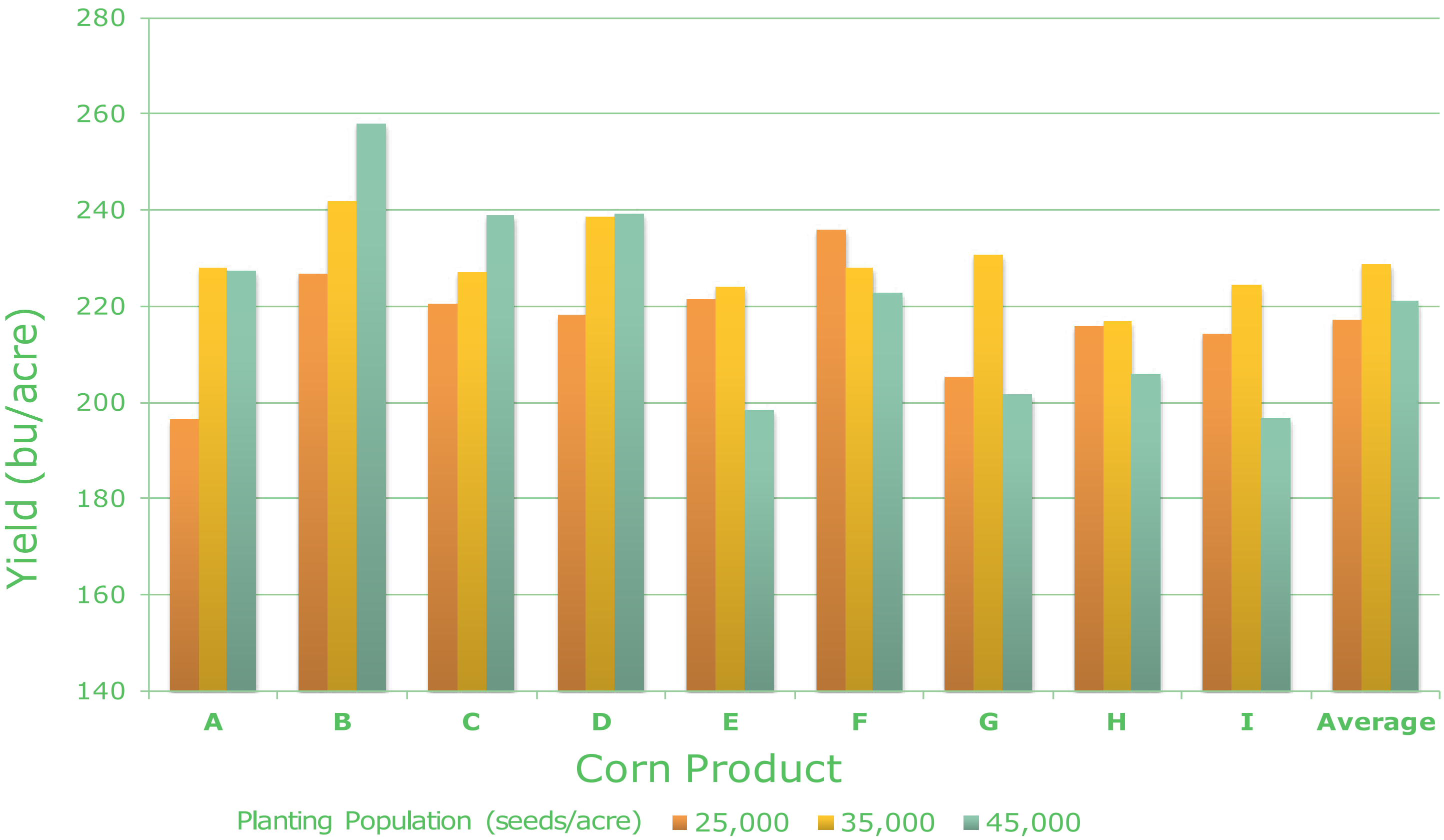


Figure 1. Population response of nine different corn products showing varying degrees of response to increased planting populations.

Population Response by Corn Product

TABLE 1. YIELDS OF NINE CORN PRODUCTS PLANTED AT THREE SEEDING RATES			
Corn Product	25,000 seeds/acre	35,000 seeds/acre	45,000 seeds/acre
		---- bu/acre ----	
A	196	228	227
B	227	242	258
C	220	227	239
D	218	239	239
E	221	224	198
F	236	228	223
G	205	231	202
H	216	217	206
I	214	224	197
Average	**217**	**229**	**221**

Figure 2. Pictorial representation of a corn product (Corn Product B) that maintained ear size as population increased.

Figure 3. Pictorial representation of a corn product (Corn Product I) that failed to maintain ear size as population increased.

Take Aways

On average, for the nine corn products tested in this study, a planting population of 35,000 seeds per acre was optimal. Some corn products responded positively to increasing plant populations, most likely by increasing ear size and/or kernel weight, while others responded negatively. Many factors (genetics, soil type, soil productivity, water availability, etc.) can influence the optimal planting populations for different corn products; therefore, consult your trusted seed advisor or agronomist for specific, local recommendations.

Sources

Nielsen, R.L. 2013. Thoughts about seeding rates for corn. Purdue University. https://www.agry.purdue.edu. Website verified 10/15/15

Legals

The information discussed in this report is from a single site, single year, 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.

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.

Fungicide Yield Response by Corn Product

Background

Corn leaf diseases, such as Gray Leaf Spot (GLS), Northern Corn Leaf Blight (NCLB), and Anthracnose Leaf Blight, can reduce yield potential when environmental conditions are ideal for disease development, such as the humid, wet conditions observed across the Corn Belt through much of the 2015 growing season.

Decisions of whether or not to protect yield from leaf blights by applying a fungicide are frequently made at tasseling (VT).

Yield losses may be more substantial when disease development progresses above the ear leaf, as approximately 75% of the carbohydrates in the grain are produced by the top eight or nine leaves on the corn plant.[1]

Leaf diseases may lead to reduced photosynthesis during grain fill, which can result in reduced levels of carbohydrates in stalks and roots due to demands to fill the ears.[2]

Figure 1. NCLB lesions beginning to form on the ear leaf and upper leaves at silking (R1) growth stage.

This stalk cannibalization process may result in increased susceptibility to stalk and root rots and increased amounts of physiological stalk lodging.

Study Guidelines

The objective of this trial was to determine the return on investment of a fungicide application at VT growth stage for eight different corn products.

Eight corn products, ranging in maturity from 108 RM to 116 RM, were planted in a single demonstration at three Illinois locations. The previous crop was corn at two locations and soybean at one location. Product reactions ranged from moderate to moderately susceptible to GLS and from moderately resistant to moderately susceptible to NCLB. Plots were located in Champaign, Greene, and Warren counties in Illinois. Field preparation included fall chisel plow followed by a spring soil finisher. Rows were 30 inches wide. All plots were planted between April 17 and April 28 at seeding rates between 34,500 seeds/acre to 36,000 seeds/acre.

Treatments

- Untreated check
- 14 fl oz/acre of Headline AMP® Fungicide applied at VT growth stage

Eight rows of each corn product were planted side-by-side. Four rows of each corn product were treated with Headline AMP® Fungicide at VT growth stage and the remaining four rows were left untreated. Plots were harvested between September 18 and September 26. Yield data was adjusted to 15% moisture content.

Results and Discussion

A nearly record amount of rainfall was received during June and July which contributed to ideal conditions for disease development during vegetative and early reproductive growth stages. GLS was the primary disease present in the plot and NCLB was also observed.

Fungicide Yield Response by Corn Product

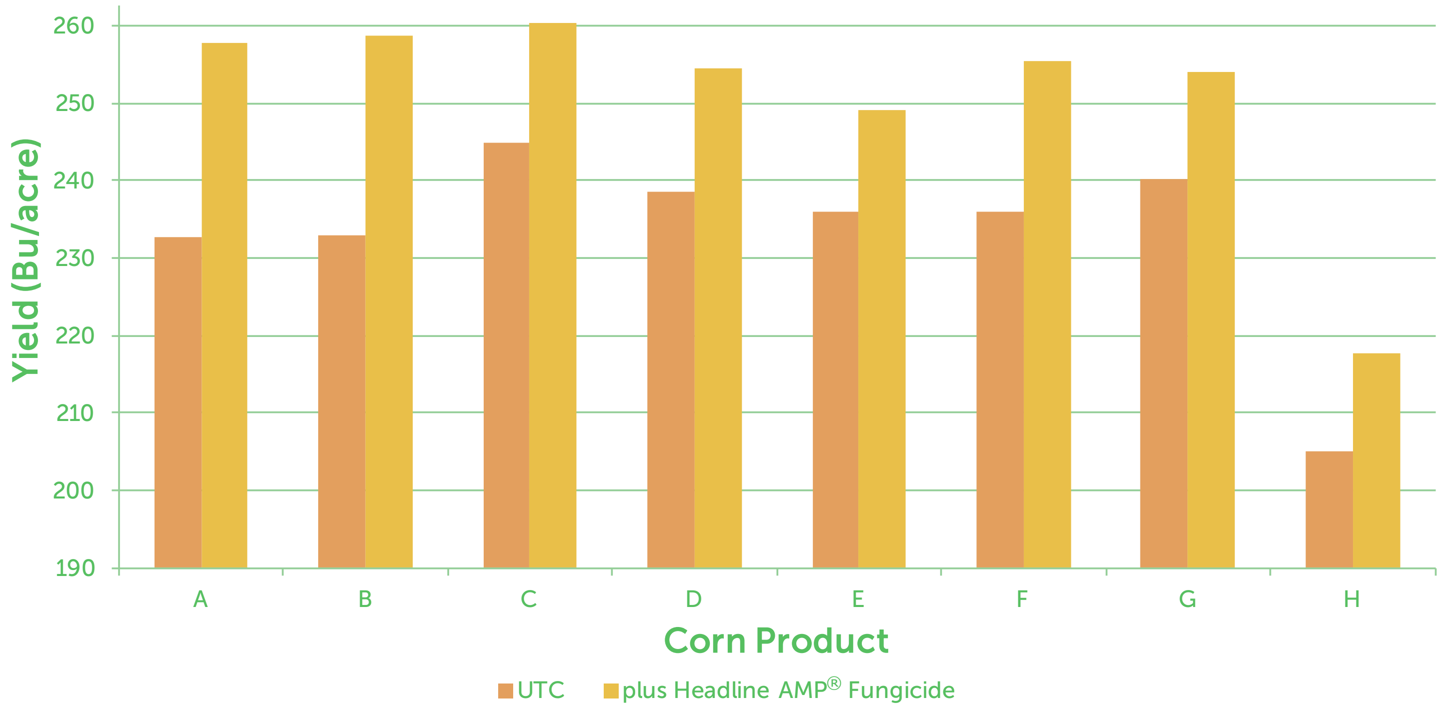


Figure 2. Average Yield Response from Fungicide Application by Corn Product

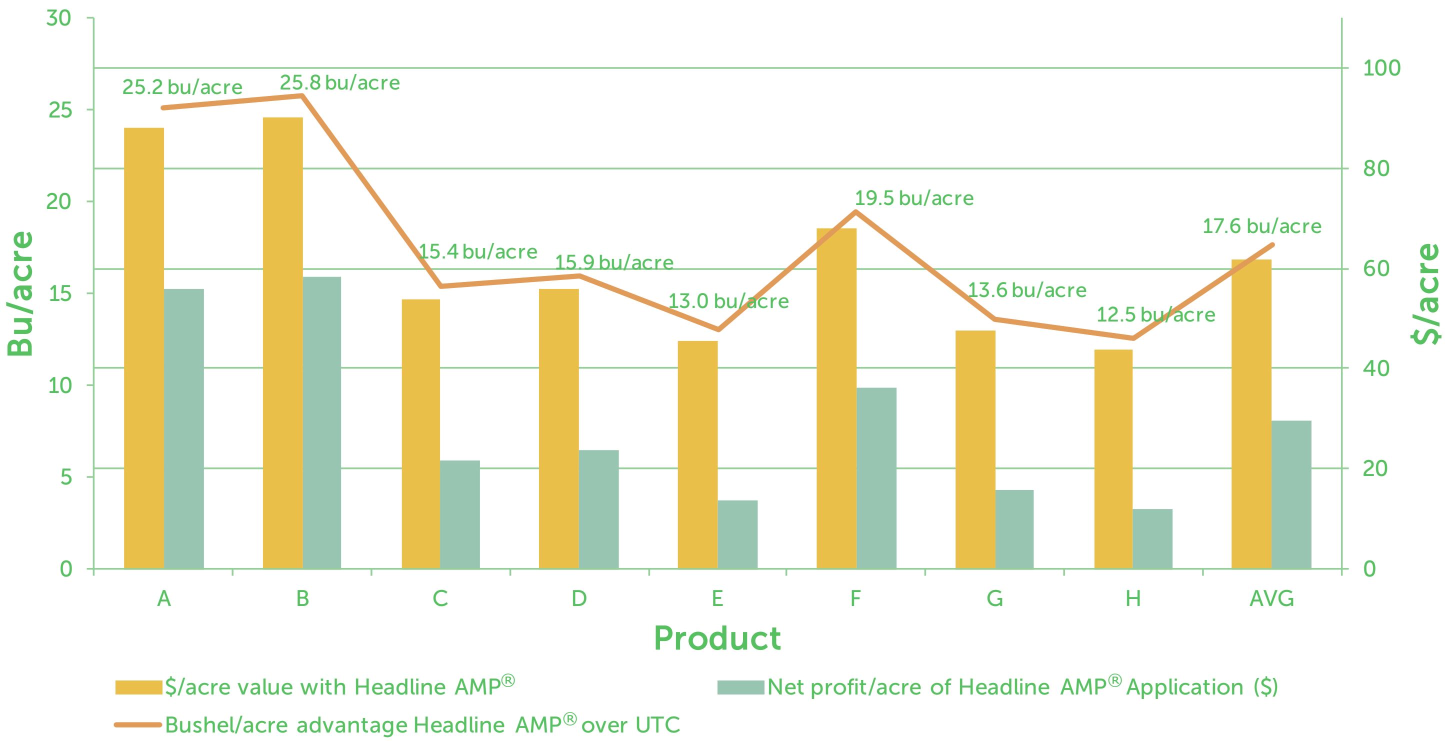


Figure 3. Economic Analysis of Headline AMP® Fungicide Application*

**Economic analysis assumes $3.50/bu corn and $32.00/acre fungicide application cost.*



Fungicide Yield Response by Corn Product

TABLE 1. AVERAGE YIELD RESPONSE BY CORN PRODUCT'S DISEASE REACTION*		
Corn Product's Least Desirable Reaction to NCLB or GLS	Difference (bu/acre) Untreated vs 14 fl oz/acre Headline AMP®	% Yield Protection from Fungicide
Moderately Resistant (Products C and H)	14.0	5.9
Moderate (Products B, D, E and G)	17.2	6.7
Moderately Susceptible (Products A, and F)	22.4	8.7
*GLS was the primary disease present and NCLB was also observed		

Takeaways

- An average yield increase of 17.6 bu/acre was observed with the VT treatment of Headline AMP® fungicide.
- An average net profit of $29.64/acre was attributed to a VT application of fungicide in this study.
- All genetics responded positively to the VT fungicide application, but they did not all respond equally. Benefits of fungicides were about 8.4 bu/acre greater on seed products which were moderately susceptible to GLS and/or NCLB. Therefore, it is important to reference your local seed guide or speak with your agronomist for specific corn product recommendations.
- Disease development and progression is highly dependent on environmental conditions and corn product genetics. June and early-July weather was nearly ideal for the development of GLS and NCLB. Therefore, an economic yield response to fungicide application is highly variable from year-to-year.
- Prior to tasselling, scouting plans should be in place for fields with susceptible genetics, continuous corn fields, or in fields with a history of disease; especially with wet weather.
- When scouting, take into consideration the severity of disease symptoms and the incubation period. The long incubation period for GLS prolongs the appearance of symptoms.
- To determine if a fungicide application is warranted consider yield potential, corn growth stage, potential for additional development of disease symptoms, fungicide application cost, and the price of corn.

Sources

[1]Rees, J.M. and Jackson, T.A. 2008. Gray leaf spot of corn. NebGuide G1902. University of Nebraska-Lincoln Extension. www.ianrpubs.unl.edu.

[2]Nielsen, R.L. 2013. Stress during grain fill: A harbinger of stalk health problems. Purdue University. https://www.agry.purdue.edu/ext/corn/news/timeless/stalkhealth.html.

Web sources verified 10/6/15.

Legals

Fungicide Yield Response by Corn Product

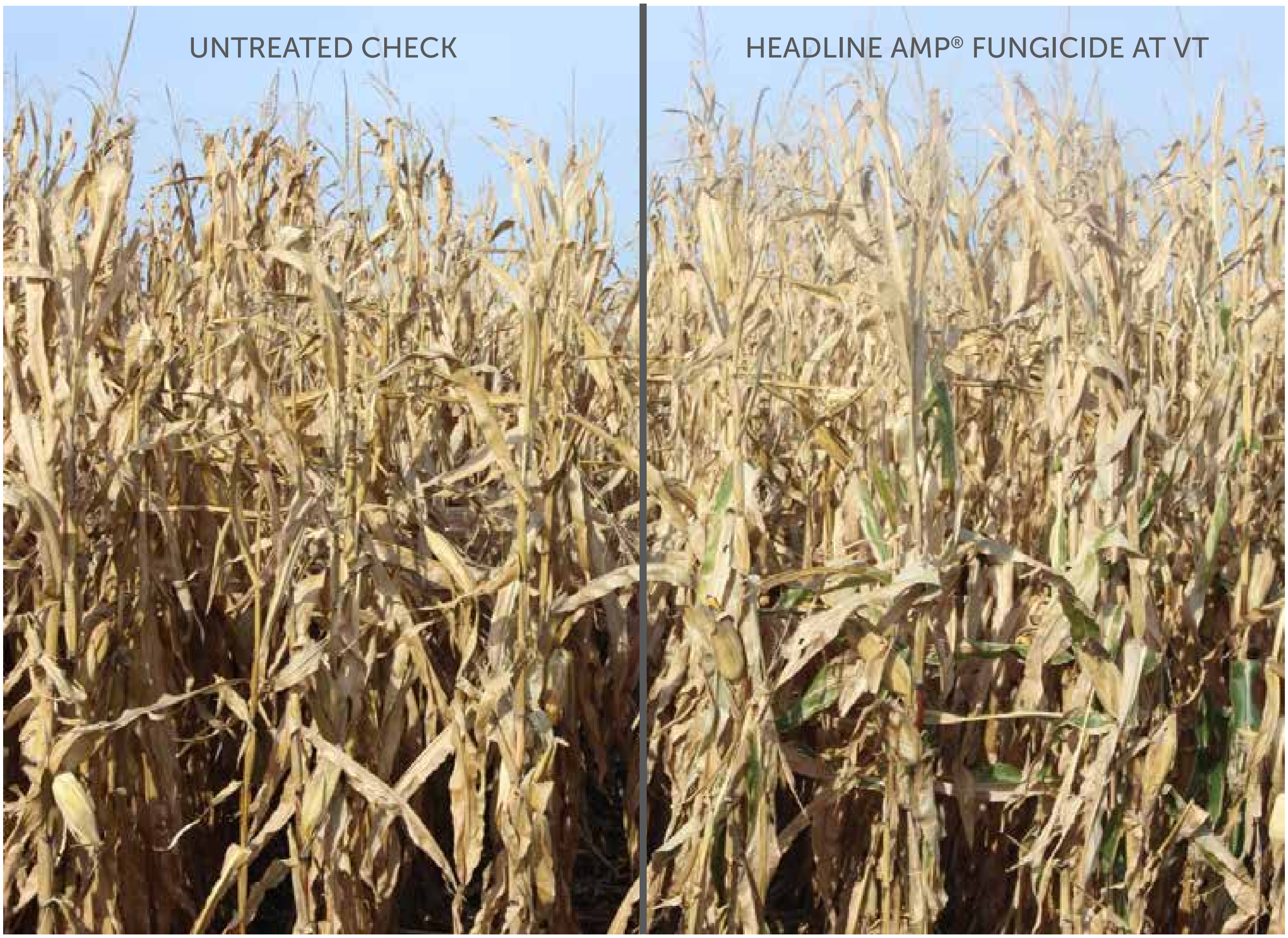


Figure 4. Intactness and "stay green" comparison of the Untreated Check versus Headline AMP® Fungicide treatment at physiological maturity.

Fantasy Farming Program Challenges Students

Since 2013, the Monsanto Learning Center at Monmouth, IL (MLC) has conducted an educational competition (Fantasy Farming Challenge) for area high school agriculture students. In 2015, hundreds of students from 17 high schools in Illinois and Missouri took the opportunity to learn more about crop production and the agriculture industry.

Program Description

In February, students attend a presentation by MLC staff at their school to learn about basic corn production, key decisions a grower must make every season, and the risks and costs associated with those decisions. Student teams then design a corn production plan and make the following decisions:

- Select a corn product from a list of several different genetic families and trait packages
- Decide whether to add a soil insecticide
- Determine planting date (early, mid, or late)
- Select a planting population
- Select either 20-inch or 30-inch row spacing
- Determine the pounds of nitrogen per acre
- Determine timing of nitrogen application (all preplant or split between preplant and in-season applications.
- Decide whether to use a foliar fungicide

Costs were determined for each selected input. Fixed costs were assigned to each plot based on equipment, fuel, herbicides, land rent, etc.

MLC staff planted each plot, implementing all of the choices the students made. During the season, each school took a field trip to the MLC to see their plot and learn more about agronomy and opportunities in agriculture.

MLC staff harvested all plots. Yields were adjusted to 15% moisture content and the grain was sold on the cash market. Prizes were awarded to the student team that produced the highest yield and

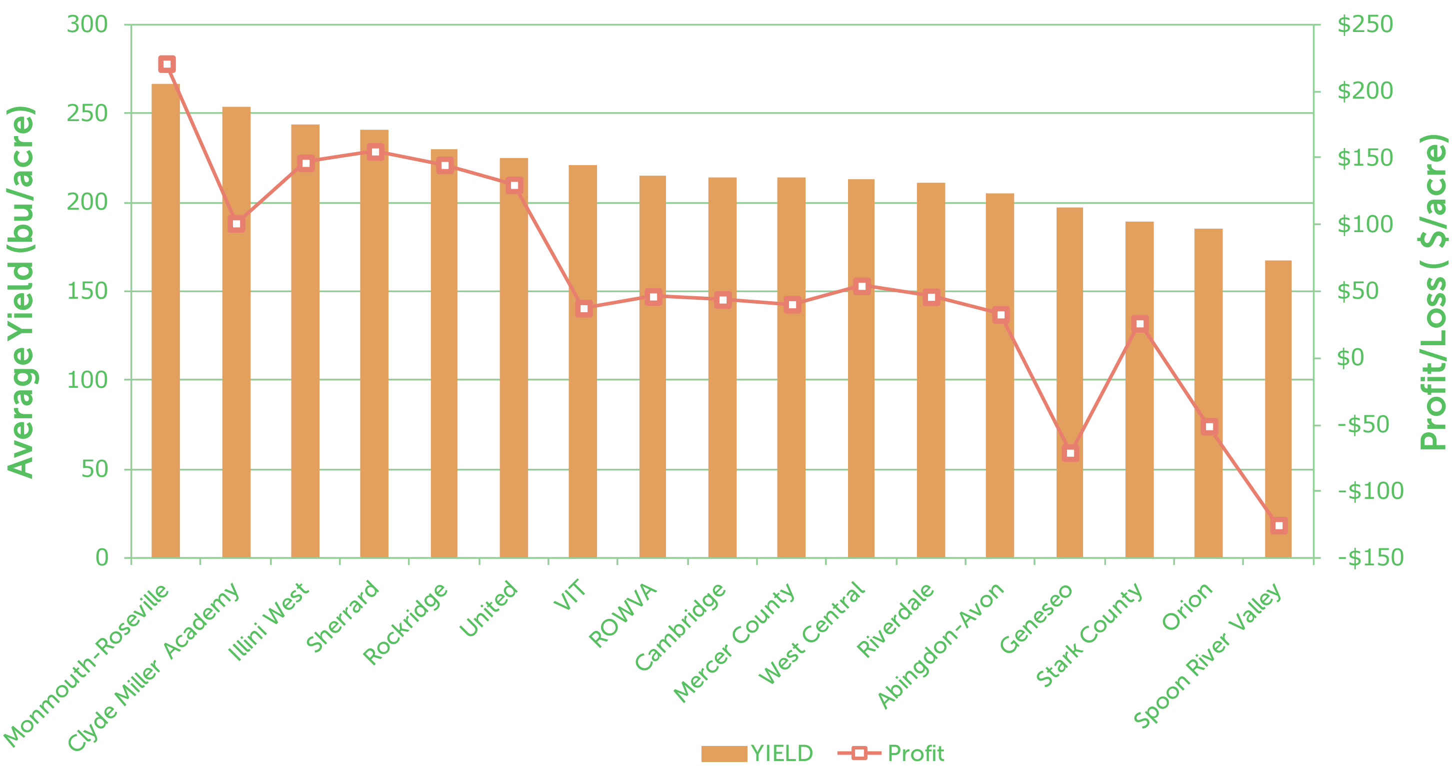


Figure 1. Average yield and profit/loss per acre for 17 Fantasy Farming Challenge corn plots in 2015.

Fantasy Farming Program Challenges Students

also to the school that returned the highest profit based on their decisions. In 2016, for the first time, one school (Monmouth-Roseville High School in Monmouth, IL) won in both categories.

Observations

- This is the first time in this competition that the top yield winner was also the most profitable. Obviously yield is tremendously important, but it is not the only factor in profitability. The second highest yielding plot placed sixth for profitability. This is proof that farmers must be efficient with their input costs.
- The most profitable plot did not use the least expensive seed, cut way back on nitrogen fertilizer or eliminate other important inputs.
- The most profitable plot was also the fourth most expensive to produce. This emphasizes that it is generally not possible to cut your way to profitability. It is important to find the most efficient combination of inputs for each field.
- Congratulations to the FFA students at Monmouth-Roseville high School in Monmouth, IL for their outstanding performance, resulting in first place for both highest yield and highest profit in 2015 Fantasy Farming Program Challenge.
- MLC staff looks forward to offering this challenge to area schools again in 2016.

Legals

Figure 2. All Fantasy Farming Challenge corn plots were planted and managed by Monsanto Learning Center staff.

Weed Management Systems in Corn

Background

- Weeds compete with crops for water, light, and nutrients.
- Starting with clean fields followed by timely control of emerged weeds are essential components of maximizing yield potential.
- Use of residual herbicides as well as herbicides with multiple sites of action to control weeds can provide more effective weed control and minimize the risk of developing weed resistance.
- Preemergence (PRE) residual herbicides provide early-season weed control, more flexibility for timing of postemergence (POST) applications, and herbicides with different sites of action for managing weed resistance.
- Roundup Ready PLUS® Crop Management Solutions (RoundupReadyPLUS.com) provides excellent weed control recommendations that can help optimize corn production systems.

Study Guidelines

- Fields were chisel plowed in the fall, followed by a soil finisher in the spring to prepare the seedbed and kill any germinated weeds.
- A Genuity® SmartStax® RIB Complete® corn blend product (112 RM) was planted on May 29, 2015.
- Weed management treatments included 9 different PRE herbicide products with residual weed control applied at planting.
- Each PRE-only treatment was compared to the same PRE herbicides followed by Roundup PowerMAX® herbicide applied at 32 fl oz/acre when weeds were 4 to 6 inches tall.
- Corn was harvested on October 15, 2015.
- Yields were adjusted to 15% moisture content and compared across treatments.

Figure 1. Advantage of PRE followed by POST herbicide program (right) over PRE herbicide only (left).

Weed Management Systems in Corn

Results and Discussion

- Treatments with PRE only herbicide application averaged at least 9 bu/acre less than treatments with a PRE followed by a POST herbicide application.

Take Aways

- With the exception of two anomalies (products G and H), yields were similar across all products.
- Treatments with a PRE followed by a POST herbicide application averaged 9 or more bu/acre higher than treatments with only a PRE herbicide application.
- These results demonstrate:
  - The reduction in yield potential that can occur from weed competition.
  - The importance of having a comprehensive weed control plan in place.
- The most effective weed management system includes both residual PRE herbicides and a timely POST application to control any emerged weeds.
- A good scouting program can help identify weed species present, level of weed pressure, and can enable timely application of a POST herbicide.

Legals

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.

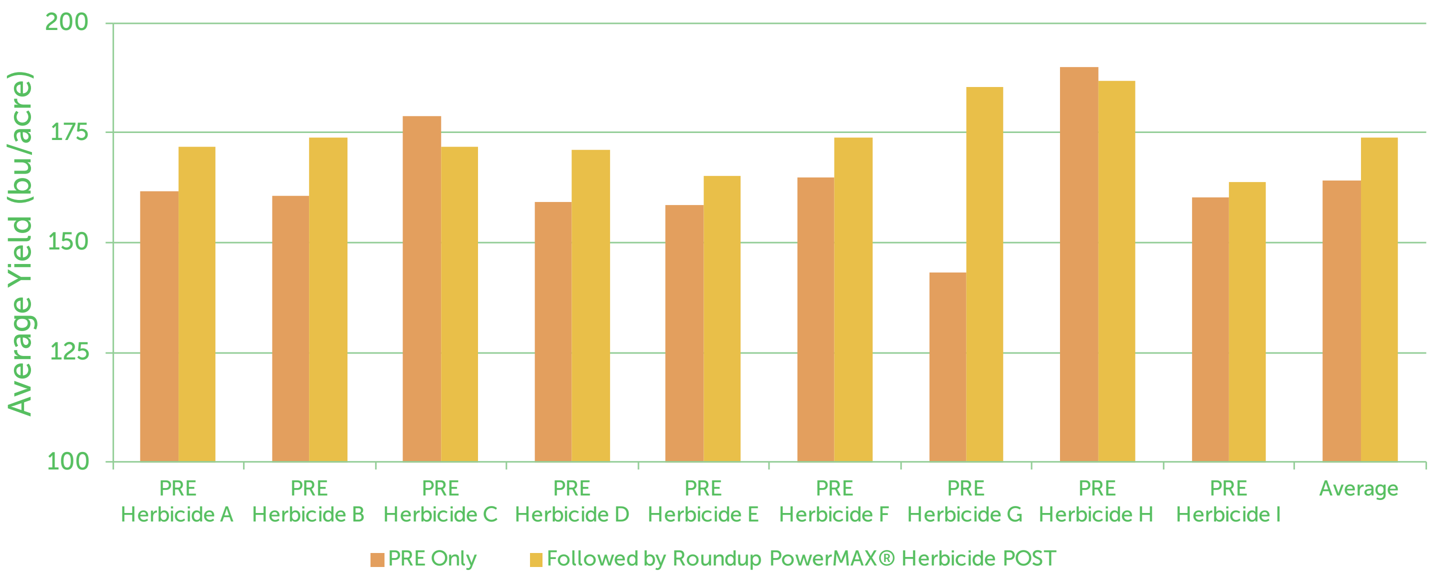


Figure 2. Corn yield potential advantage of PRE followed by POST herbicide program vs PRE herbicide alone.

Effects of Planting Date in Corn

Background

If temperature, soil moisture, and other weather conditions permit, the optimum planting window for corn is known across the Corn Belt.[1] In northern and central Illinois, early April through mid-May provides the optimum planting date that may guarantee 97-100% realization of the potential yield.[2,3] Planting before this optimum window, even when conditions are fit, incurs some risks such as cold temperatures or a frost after emergence, diseases, and insects which could impact yield. Planting towards the early part of the window can permit more days for plant development, reduced pest pressure, earlier pollination to help avoid heat stress, improved standability due to shorter plant height, and earlier maturity and faster dry down.[3]

These benefits are lost with late planting, with a commensurable loss of potential yield to the magnitude of 1 to 2 bu/acre/day past the optimum planting window.[1] This trial was conducted to investigate the interactions between planting dates to achieve optimal yield.

Study Guidelines

A corn demonstration trial was conducted at the Monsanto Learning Center at Monmouth, IL comparing two different relative maturity products and three planting dates. The trial was planted with a 105 RM and a 112 RM Genuity® SmartStax® RIB Complete® corn blend product.

PLANTING DATES:

- Early Plant: April 15, 2015
- Mid Plant: May 1, 2015
- Late Plant: June 3, 2015

The trial was conducted on a corn-on-corn system. Soil was prepared under conventional tillage with a chisel plow in the fall followed by a soil finisher in the spring. Plot sizes were 10 ft x 100 ft (0.023 acre)/treatment. Corn was planted in 30-inch single rows, 4 rows/treatment. UAN was applied and incorporated in the spring and the seed bed was established using a soil finisher. Weed management across the trial was uniformly controlled using a residual/post weed control program.

Figure 1. Corn on the left (early planting date) and right (mid planting date) demonstrates the difference in growth stage based on planting date.

Effects of Planting Date in Corn

HARVEST DATES:

- September 16 for April 15 planting
- September 22 for May 1 Planting
- October 2 for June 3 planting

Results

In the 105 day RM corn product, the mid planting date yielded the highest in this trial, slightly higher than the early planting date (Figure 2).

In the 112 day RM corn product, the early planting date yielded the highest in this trial, followed by mid and then late planting dates (Figure 3).

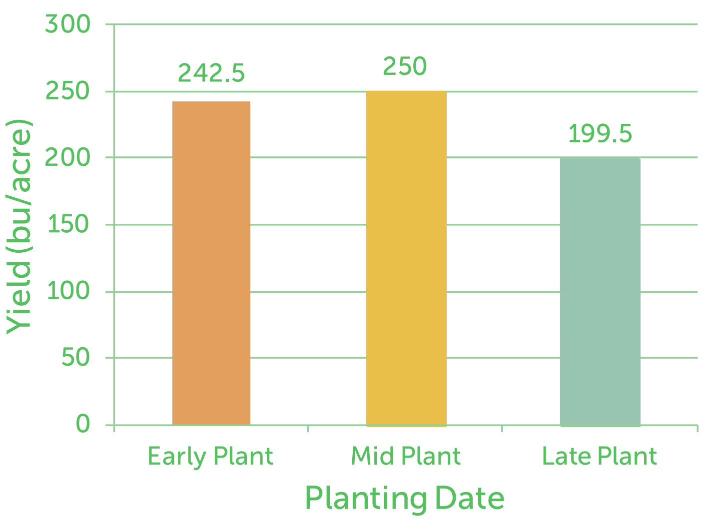


Figure 2. 105 Day RM Corn Product Average Yield

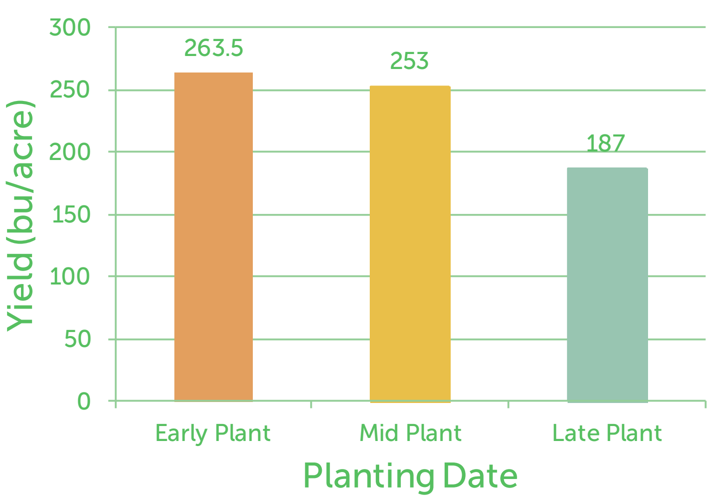


Figure 3. 112 Day RM Corn Product Average Yield

Take Aways

Overall, this trial provided the following findings:

- There was an interaction between planting date and yield.
- The earlier planting dates demonstrated the highest yields in this trial.
- If environmental conditions permit and optimum planting date is utilized, a better response for increased yield can be realized.

Sources:

[1] Agronomic Spotlight. 2014. Determining when to begin corn and soybean planting. Technology Development & Agronomy. Monsanto Company.

[2] agKnowledge Alert. 2013. Cool temperatures and corn planting. Technology Development & Agronomy. Monsanto Company.

[3] Agronomic Spotlight. 2012. The risks associated with planting corn before the optimum window – IA, IL, IN. Technology Development & Agronomy. Monsanto Company.

Nafziger, E. 2008. Thinking about corn planting date and population. Issue 1, Article 7. The Bulletin. University of Illinois.

Legals



Stair Step Soybean Management

Background

Achieving maximum soybean yield potential depends on increases in stress tolerance, environmental conditions, and management practices. Mitigation of stresses with fertilizer or inoculant, fungicide, and insecticide can help achieve maximum yield potential. A demonstration trial conducted at Monsanto Learning Center at Monmouth, Illinois was designed to investigate how different treatments for minimizing stress on soybean affected yield potential.

Study Guidelines

- 2.9 relative maturity (RM) soybean product.
- Soybean planted on May 18, 2015 at 130,000 seeds per acre in twin rows.
- Conventional tillage: Fall chisel plow followed by spring soil finisher to establish seed bed.
- Weeds were uniformly controlled using a residual/postemergence control program.
- 3 replications
- Plot size was 10 feet by 100 feet (0.023 acre).
- 30-inch rows – 4 twin rows per treatment
- Harvested on October 14, 2015.
- Treatments consisted of:
  - Untreated Control (UTC)
  - Rhizobium Inoculant (RI)
  - Foliar Fungicide at R3 (FF)
  - Rhizobium Inoculant + Foliar Fungicide at R3 (RI + FF)
  - Foliar Insecticide at R3 (FI)
  - Rhizobium Inoculant + Foliar Insecticide at R3 (RI + FI)
  - Foliar Insecticide at R3 + Foliar Fungicide at R3 (FI + FF)
  - Rhizobium Inoculant + Foliar Insecticide at R3 + Foliar Fungicide at R3 (RI + FI + FF)

Stair Step Soybean Management

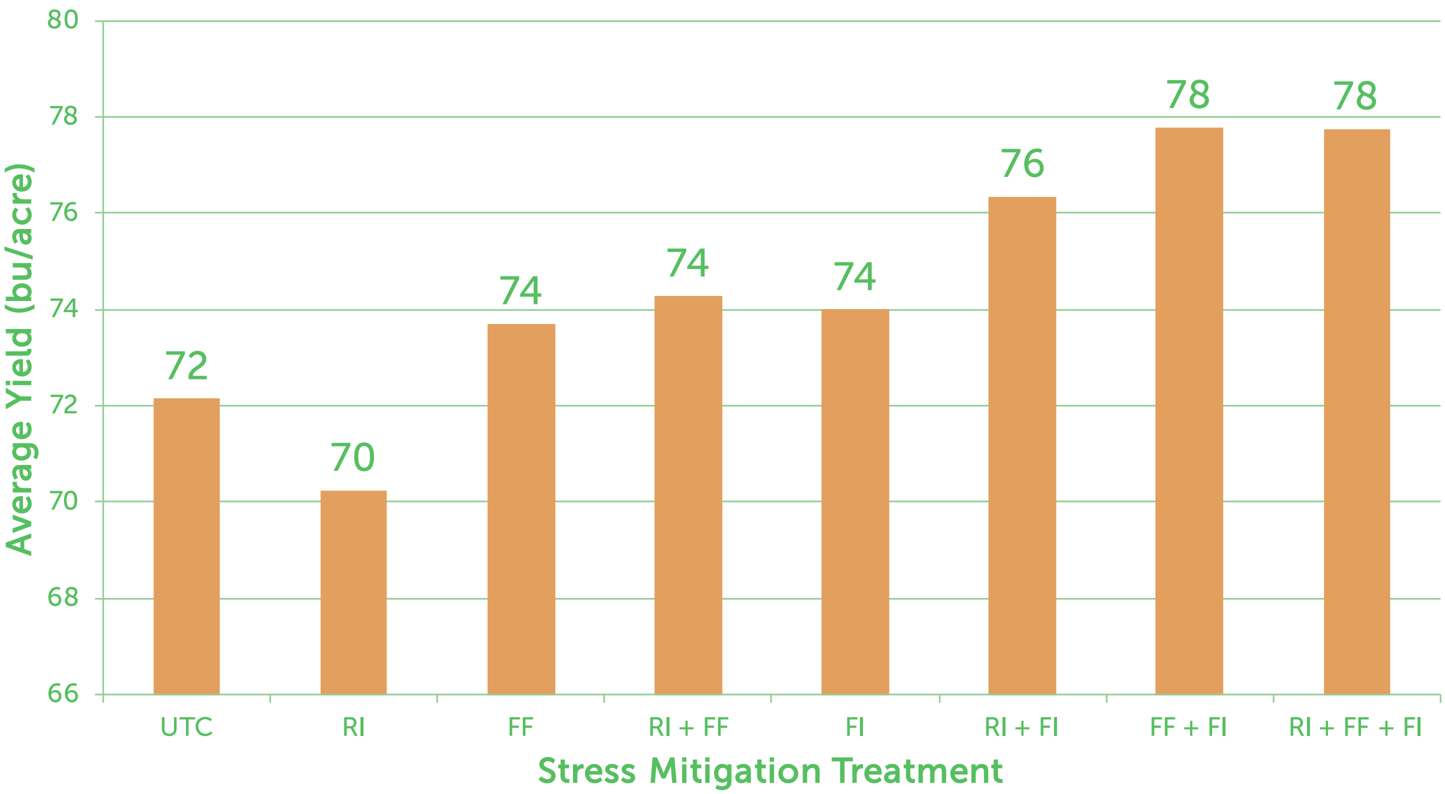


Figure 1. Effect of stress mitigation treatment on average yield.

Results and Takeaways

- A greater response with stress mitigation was seen when treatments were combined.
- Of the 7 management components studied, foliar fungicide + foliar insecticide applied at R3 growth stage showed the biggest yield response.
- Good agronomic practices such as row spacing, proper planting date, and population can help reduce environmental stresses.
- We will continue to look at decreasing stress on soybeans and its ability to increase yield potential.
- The Monsanto Learning Center at Monmouth will continue to investigate the yield effects of stress mitigation in soybean in the future.

Legals

Fungicide Application Yield Response by Soybean Planting Dates

Study Guidelines

The objectives of this trial included the following:

- Determine if there was a yield response to soybean planting dates.
- Determine if there was a yield response to fungicide application.
- Determine if there was a yield response to the interaction between soybean planting dates and fungicide application.

A 3.8 relative maturity (RM) soybean product was planted at 130,000 seeds/acre in 30-inch rows. The previous crop was corn and field preparation included fall chisel plow followed by a spring soil finisher. Weeds were uniformly controlled using a residual/POST control program. Plots were harvested on October 13, 2015.

Treatments

- Planting Dates
  - May 14, 2015
  - June 2, 2015
- Fungicide Application
  - 8 fl oz/acre of Priaxor® Xemium® Brand Fungicide applied at beginning pod (R3) growth stage
  - May 14 planting date had a July 21 fungicide application
  - June 2 planting date had a July 28 fungicide application
  - Untreated check
- Four rows, 100 feet long, of each treatment were planted with two replications at one location.

Fungicide Application Yield Response by Soybean Planting Dates

Take-Aways

- Minimal soybean foliar disease symptoms were observed throughout the trial.
- May 14 planting provided a yield advantage compared to the June 2 planting across treatments.
- Adding a fungicide application at R3 growth stage increased yield potential.
- Soybean from both planting dates treated with Priaxor® Xemium® Brand Fungicide demonstrated a similar yield increase.
- The yield increase may have been influenced by the cool, wet growing season.
- In contrast, a previous trial at the Monsanto Learning Center at Monmouth, IL indicated that a April 18 planting date benefited more from a fungicide application as compared to a June 2 planting date.[1]

Sources

[1] Effect of foliar fungicide use on soybean yield. 2010. Learning Center Summary. Technology Development & Agronomy.
http://www.monsanto.com/products/documents/learning-center-research/2010/

[2] Thompson, A., Walker, E., and Mengistu, A. 2007. Interactions of planting dates, seeding rate, and fungicide and insecticide treatments on soybean yield and yield components. United Soybean Board. http://www.soybeancheckoffresearch.org/

[3] Bestor, N.R., Robertson, A.E., and Mueller, D.S. 2014. Effect of Foliar fungicides on late-season anthracnose stem blight on soybean. Plant Health Progress. Plant Management Network. https://www.plantmanagementnetwork.org/

Web sources verified 11/13/15.

Legals

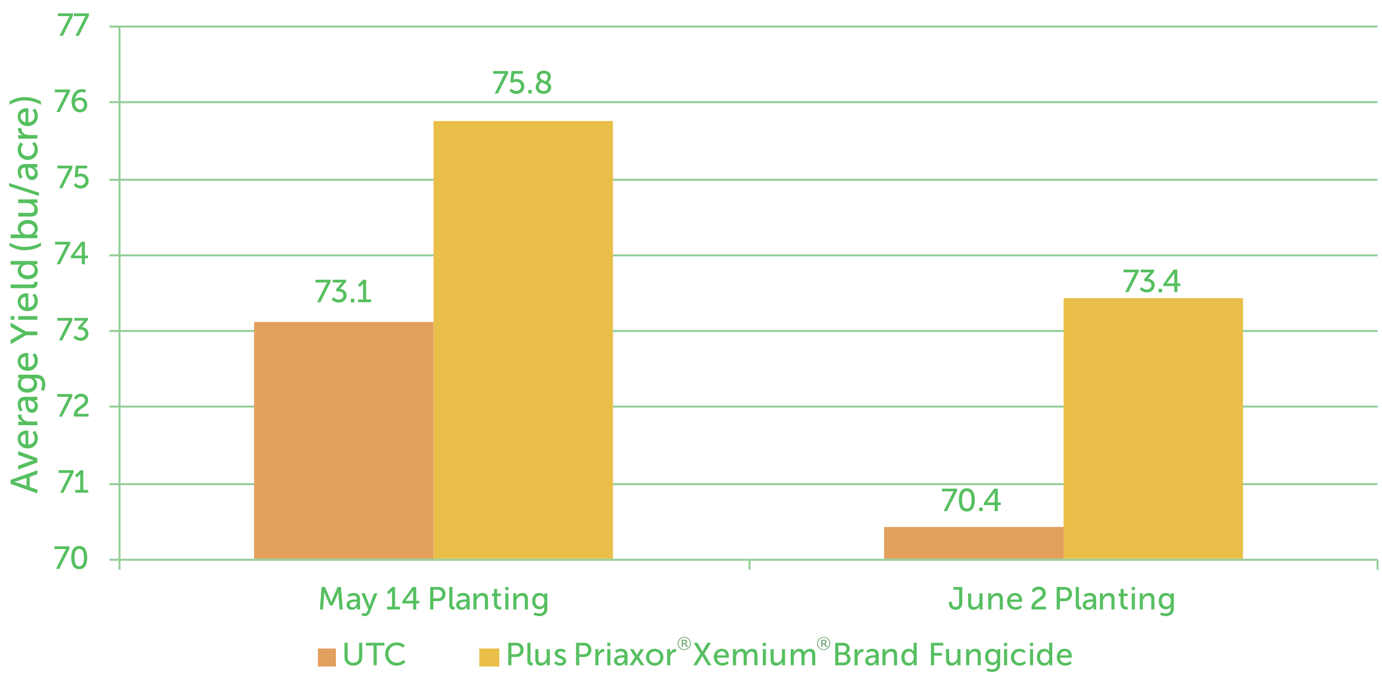
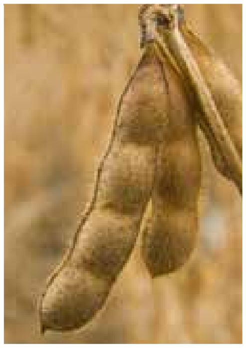


Figure 1. Average Yield Response to Fungicide Application by Soybean Planting Dates



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