



2014 RESULTS



BRANDT RESEARCH AND DEVELOPMENT FARMS



Dedicated to

Pat Schaddel 1966-2014

Schaddel was the manager of the Technical Support Division and instrumental in developing the BRANDT Research Farm. From the beginning, Pat saw the importance of bringing local data to our customers and providing support of the latest technological advances in agriculture. Over the past ten years, Pat and his support team established and grew the research from a couple hundred trials to now over 5000 trials and adding the Lexington Research Farm to support the North Retail group.

BRANDT and the agriculture industry

lost a great young leader this year. Pat

The BRANDT Research Farm was Pat's pride and joy. Every year he and his team pushed the envelope in agronomic practices to bring the best practices to BRANDT customers not only locally, but around the globe.

Pat was a great father, colleague and friend. His legacy will continue at the BRANDT Research Farms as we move forward with his vision of BRANDT being the farmer's trusted advisor. As we publish this year's results, and as in past years, you will see the passion and drive Pat had for building the best practices and taking them to our customers to help them succeed. That is the type of individual Pat was: his drive came from seeing others succeed.

We dedicate the 2014 BRANDT Research Farms results book to Pat Schaddel. BRANDT is proud to present the 2014 results from our Illinois Research and Development farms in Pleasant Plains and Lexington. This marks the tenth year for the farm at Pleasant Plains and the third year at Lexington.

The BRANDT Research Farm was established in Pleasant Plains in 2004 and Lexington in 2011. On both farms the BRANDT team examines farming practices and products in a real-world farm setting. Over the course of the past 10 years nearly 10,000 trials have been conducted.

As a retailer, BRANDT is not limited by product specific research. Rather, we look for the best combinations of seed genetics, plant nutrition and crop



protection products. Our research is also focused on practices such as row width, plant density and tillage.

The results from these trials have been implemented by our BRANDT locations to assist our customers in maximizing production and profitability. In 2015, we will expand our research to take a deeper look at nutrient timing and placement.

You must have good "local information" to create good "local strategies". New products and practices emerge every year from industry companies. BRANDT will continue to monitor and validate these products and practices to reduce your risk and improve your ROI.

Pat Schaddel, Technical Support Manager Ed Corrigan, Technical Agronomist Dan Froelich, Technical Agronomist

TABLE OF CONTENTS

Nitrogen Study6
BRANDT Total Acre® Corn10
20" vs 30" Row Corn16
Strobilurin Fungicide18
Corn Stimulants & Stress Mitigation20
Corn Crop Rotation and Maturity24
Evolution of Best Management Practices28
BRANDT Total Acre Soybeans
Pipeline Research
2014 Trial Parameters40
2014 Grower Observations42
Summary



30" Soybean Plant Stimulant Trials BEAN TRIALS Planting Date Foliar Insecticide Brandt Smart Trio® Manni-Plex® B Moly Experimental Trials

CORN TRIALS

Planting Date Ammonium Thiosulfate Soil Insecticide Foliar Insecticide K-Row 23[™] RyzUp® Brandt Smart Trio 1st Yr Strip Till Experimental Trials

Asgrow® Soybean Variety Trials

30" Soybean High Yield Trials

Conversely, early nutrient stress in combination with residue also led to Crown Rot that didn't show up to near harvest. Similarly, soybeans exhibited yield reducing Brown Stem Rot and Sudden Death symptoms from environmental stresses.

Patterns emerge from our multi-year data providing insights and management opportunities. We have added two new sections, "Evolution of Best Management Practices" and "Grower Observations" to highlight their insights.

In 2015, the trials will focus on the 4R's of management. This data will help to fine tune their nutrient management plans for sustainability.

Our goal in producing this book is to provide you with local data to assist you with decisions on your farm. Please review the data to draw your own conclusions. For economic analysis and return/acre we used the 2014 fall crop insurance price of \$3.49/bu for corn and \$9.65/bu for soybeans.

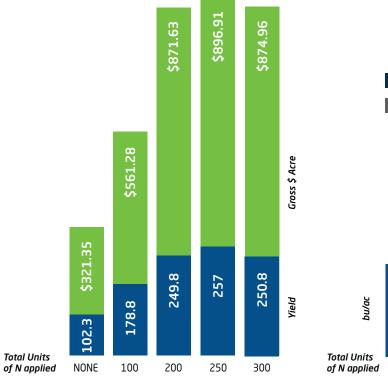


NITROGEN STUDY

Methods to improve nitrogen efficiency



We strive to bring you science-based information to increase your farming operation's return on investment and be better land stewards. Our nitrogen study takes a closer look at the best management practices for the growing crop as well as the environment. The top four nitrogen practices of corn production in 2014 all included a split nitrogen system which incorporated banding of nitrogen at or near planting time. The addition of ammonium thiosulfate (ATS 12-0-0-26S) and balanced phosphorus and potassium increased the efficiency of the nitrogen to maximize plant health, growth and yield.



by the second se



FALL AMMONIA WITH N-SERVE®

Pleasant Plains

In this trial, five rates of fall applied NH_3 with N-Serve® were compared. The 2014 data indicated a yield response to each pound of N applied up to the 200 units per acre rate. This indicates that the N remained stable over the winter and through the spring. The lack of yield response to the fall applied rate above 200 units per acre may indicate a need to split apply additional nitrogen in the spring. This N titration data is displayed in the above graph.

NITROGEN AND CROP ROTATION

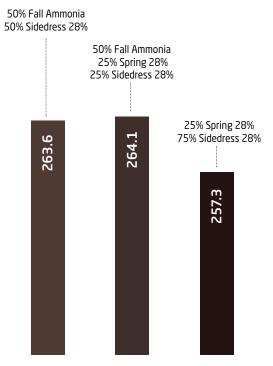
Lexington

As we would expect, when total units of nitrogen are increased, yield follows the same pattern. In both cropping systems, yields began to flatten out at N rates above 240. If conditions are favorable, additional units of nitrogen beyond 240 may be best applied at a V5 stage sidedress application.

This Lexington Research Farm trial looked at splitting nitrogen applications at different times and locations. There are many variables that factor in from year to year, but as in past years, splitting N applications between the fall and spring seems to yield better than applying 100% of the nitrogen at one specific time or one specific location.



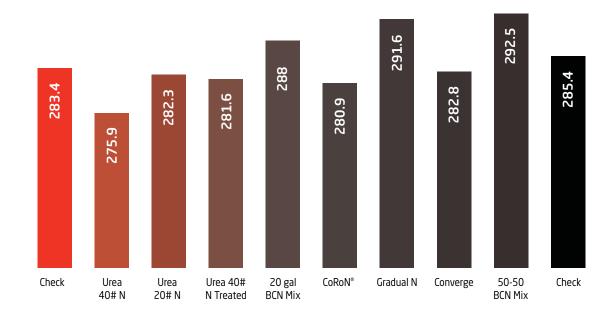
NITROGEN TRIAL EVIDENCE



GROWER INSIGHT

Our 2014 nitrogen study pointed to a couple of key takeaways. First, the optimal range of total nitrogen units fell between 180 and 250, with no additional yield increase above 250 total units of nitrogen. Second, split application and timing showed a significant yield advantage over applying 100% of total nitrogen at one time.

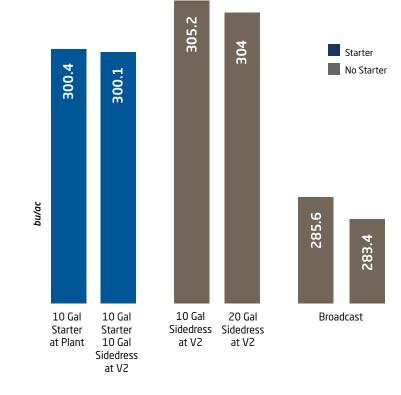




FOLIAR NITROGEN AT V10

Pleasant Plains

Split application of nitrogen can also be accomplished by applying part of the nitrogen at later stages of growth. None of the foliar products that were tested provided a yield increase that was comparable to banding at plant or sidedress at V2 stage. However, three of the products provided a yield response when used in addition to the broadcast weed and feed nitrogen/ sulfur/zinc application made at planting. **Note:** All products were tested in addition using banded at plant starter treatments with no yield increase above the starter treated corn check.



NITROGEN TIMING & PLACEMENT

Pleasant Plains

Split application of nitrogen (N) can provide for increased efficiency of each pound of N applied. Both timing and placement were measured in these trials. This side by side data indicates that either banding "at plant" or "sidedressing at V2 stage of growth" improved corn yield by 15 to 20 bushels per acre respectively when compared to the broadcast weed and feed treatment. A 10 gallon per acre rate at either timing maximized the yield. No additional yield was measured by using both timings together.

Note: All treatments of broadcast, at plant, and sidedress consisted of a blend of 2/3 28% nitrogen and 1/3 ammonium thiosulfate plus 1 quart of 9% Brandt Sequestar® 9% Zinc.

NITROGEN TRIAL EVIDENCE

4R Nutrient Stewardship

The 4R Nutrient Stewardship principles are the same globally, but how they are used locally varies depending on the field and site specific characteristics such as soil, cropping system, management techniques and climate. The scientific principles of the 4R framework include:

RIGHT SOURCE

Ensure a balanced supply of essential nutrients, considering both naturally available sources and the characteristics of specific products in plant available forms.

RIGHT RATE

Assess and make decisions based on soil nutrient supply and plant demand.

RIGHT TIME

Assess and make decisions based on the dynamics of crop uptake, soil supply, nutrient loss risks, and field operation logistics.

RIGHT PLACE

Address root-soil dynamics and the nutrient movement. Manage spatial variability within the field to meet site-specific crop needs and limit potential losses from the field.

CORN ON CORN BRANDT TOTAL ACRE TRIAL EVIDENCE

2012

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YIELD INCREASE



BRANDT TOTAL ACRE

BRANDT Total Acre is an omission style trial system that is focused on exposing the differences between hybrid phenotypes. This system is based on providing all the treatments and then removing one to see what value each practice has on yield of that phenotype. This creates an environment where the yield responses reflect of the total high management system rather than a limited response due to a lack of some or all the parts of the system.



258.4

RED PHENOTYPE 256.4



BLUE PHENOTYPE 255.8

1. Hybrid Variance 56.2 bu/ac 39.3 bu/ 2. Nitrogen Rate 18.3 bu/ac 16.3 bu/ 14.1 bu/ac 51.7 bu/ 3. Strobilurin Response 27.4 bu/ac 23.3 bu/ 4. P&K Rate 5. Population Rate 13.9 bu/ac 3.7 bu/a

2011

TOTAL ACRE POLE POSITIONS

12.3 bu/ 6. Soil Insecticide 20.6 bu/ac 8.1 bu/a 7. Zinc (1gt/ac) 10.9 bu/ac 8. Starter (28% sulfur at plant) 4.5 bu/ac 4.0 bu/a

HYBRID VARIANCE BY PHENOTYPE

Hybrid variance continued to grab the pole position in the BRANDT Total Acre four year average. In 2014, the variance between the hybrids fell to the 7th pole position due to excellent production weather in the Pleasant Plains area. The purple hybrid phenotype group led the field by taking advantage of increased population, disease resistance, and a superior nutrition mining root system.

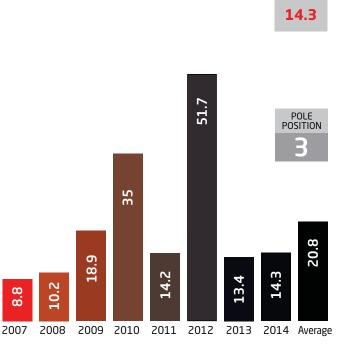


NITROGEN RATE

Grouped by phenotype

Total nitrogen (N) rate continued to rank second in the four year average pole position even though "N rate" lead all positions the last 2 years. As expected, higher yields were attained with the highest rates of N. The response to additional nitrogen rate did diminish above the 210 unit rate to a near break-even cost/ yield reward. Looking back through the yield responses to N

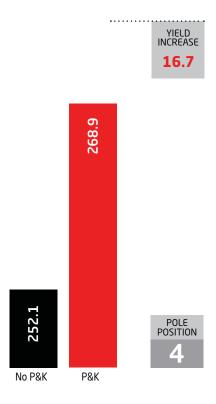
rate trials since 2008 points to this rate as the pivotal position for profitability in our trials. Averaging 262 bushels per acre, the 210 rate this year scored a very efficient ".80" N.U.E. (nitrogen unit efficiency). The long standing university guideline for N.U.E. has been 1.2 units of N per bushel of corn.



EIGHT YEAR STROBILURIN FUNGICIDE WITH N-BORON®

The yield response to a strobilurin containing fungicide and N-Boron application at tassel continues to supply a positive ROI year in and year out. Recording a yield increase of 14.3 bushels per acre this year brings the BRANDT Total Acre 4 year average to 23.4 bushels per acre and the 8 year Pleasant Plains plot average to 20.8 bushels per acre. The addition of N-Boron to a fungicide treatment at tassel coincides with the corn plants transient boron deficiency.

			4 YEAI	२
	2013	2014	AVERAGE YIELD	ROI
ac	18.1 bu/ac	11.5 bu/ac	31.3 bu/ac	\$\$\$
ac	47.8 bu/ac	36.1 bu/ac	29.6 bu/ac	2.3
'ac	13.4 bu/ac	14.3 bu/ac	23.4 bu/ac	2.6
ac	10.7 bu/ac	16.7 bu/ac	19.5 bu/ac	1.2
ac	32.5 bu/ac	27.3 bu/ac	19.4 bu/ac	1.5
ac	8.1 bu/ac	11.5 bu/ac	13.1 bu/ac	2.2
ac	4.6 bu/ac	20.7 bu/ac	11.1 bu/ac	6.2
ac	11.1 bu/ac	13.6 bu/ac	8.3 bu/ac	1.9



P&K RESULTS

Fall Applied

The application of phosphorus and potassium (P&K) to replace the nutrients removed from the previous crop not only improves the yield but also improves the efficiency of the applied nitrogen. How much N efficiency was P&K responsible for in 2014? An additional 60 units of nitrogen per acre had to be added to equal the same yield as treatments that contained P&K. The application of P&K was much more friendly to the environment as well as assisting the plant with improved disease resistance and standability for harvest.





POPULATION RATE

Grouped by phenotype

Corn population drove yields for the second year in a row by averaging an additional 27.3 bushels per acre, grabbing the 2nd pole position in 2014. This is the 2nd year in a row that we did not plant high enough population to exploit each of the hybrids in these 192 trials. To maintain standability, proper plant nutritional balance is one of the keys that the BRANDT Total Acre omission plot system teaches us as plant density is increased per acre. These results were observed at both Pleasant Plains and Lexington Research Farms.

SOIL INSECTICIDE

YIELD INCREASE

11.5

POLE POSITION

6

4.4 lbs/ac Force®

The removal of soil insecticide at planting resulted in a few slightly tipped plants in each row at harvest, indicating slight rootworm pressure was responsible. The rootworm hatch and beetle emergence each of the last four years has been abnormally late in our plots at Pleasant Plains. This shift to later hatch coincides with a lower BT gene expression in the corn roots after tasseling. Corn root growth is minimized after the plant reaches tassel and as the root grows less, the expression of the gene is reduced, increasing the chances for some larva to survive.

No Zinc Brandt Sequestar

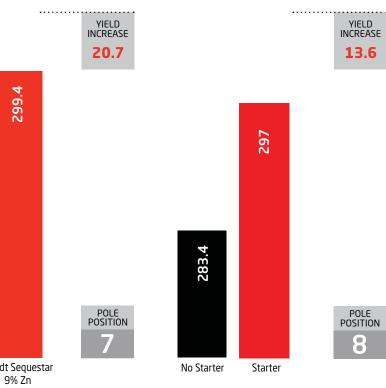
278.7

ZINC RESPONSE

1 qt/ac rate at plant

Brandt Sequestar 9% Zn "at plant" in a band is the ideal placement to maximize value and improve ROI. This trial had a mixture of nitrogen, sulfur and Sequestar zinc in furrow at 3 gal per acre. The removal of zinc from the pop up reduced the yield and increased the instance of crown rot in these trials. Many of the new planters using liquid soil insecticides can be a good option for Brandt Sequestar 9% Zn additions due to its superior compatibility.

BRANDT TOTAL ACRE TRIAL EVIDENCE



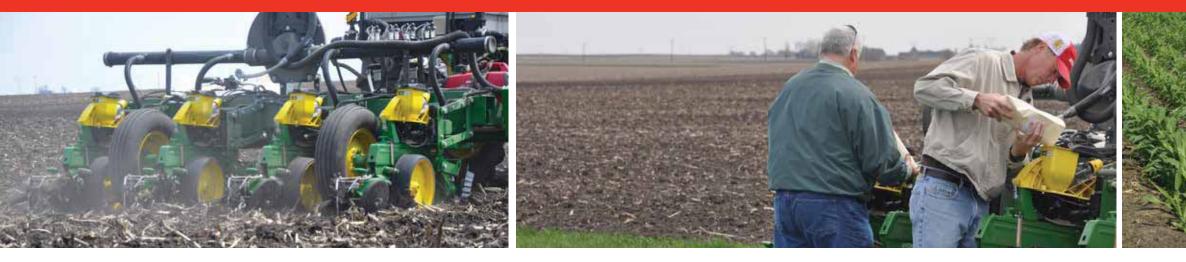
STARTER

10 gal 28% N at plant

The BRANDT Total Acre starter mixture used in this trial contained nitrogen, sulfur and zinc, providing a 13.6 bushels per acre bump in yield. At black layer we documented a noticeable reduction in crown rot in the starter treated rows. Banding at plant with a mix of nitrogen, sulfur and zinc is just one of the ways BRANDT has found to deal with the transient deficiency symptoms during cool/damp spring conditions.

YIELD INCREASE

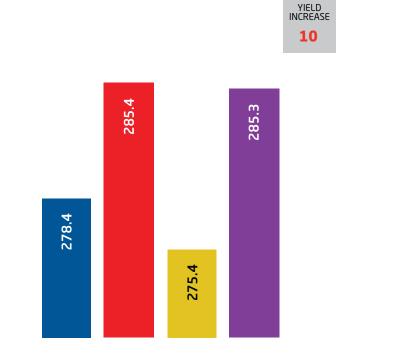
23.5



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YIELD INCREASE

10.8

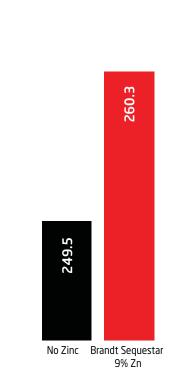


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HYBRID VARIANCE BY PHENOTYPE

Lexington

The BRANDT Seed Rx[®] hybrid selection algorithm uses this data to help choose and place hybrids. These trials show that the environmental conditions of 2014 allowed superior performance of certain groups in a high yield environment. It also demonstrates why selection and diversification are so important.



ZINC RESPONSE

1 qt/ac rate at plant - Lexington

The addition of zinc at planting continues to provide more yield response than we expected. Zinc, particularly Brandt Sequestar 9% Zn, is important at early stages of corn production. Brandt Sequestar 9% Zn is a liquid EDTA formulation that is more efficient than other zinc sources such as an oxide or granular formulation. Yield response versus cost per acre indicates a good return on investment for implementing a zinc application at plant.

P&K

Fall applied suspension - Lexington

256.2

None

Applied

Phosphorus and potassium applications are very important in balancing the overall soil nutrition, which is the foundation for the entire growing season. Reestablishing P&K levels is not only important for the next growing season, but also important for early nitrogen utilization, germination and establishing a good stand. Adequate levels will assist the plant to push through the cold periods we often experience in Illinois springtime with early planting dates.

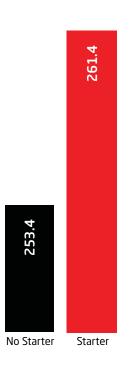
Maintenance

279.7



LEXINGTON BRANDT TOTAL ACRE TRIAL EVIDENCE







STARTER

5 gal of 28% N, S, Zn at Plant - Lexington

The addition of a starter fertilizer at plant increased yields by 8 bushels over the area where no starter was applied. 28% N plus sulfur and zinc were banded at plant. Cool and wet springs tend to set the plant back, but the use of a starter can alleviate stresses produced by these conditions.

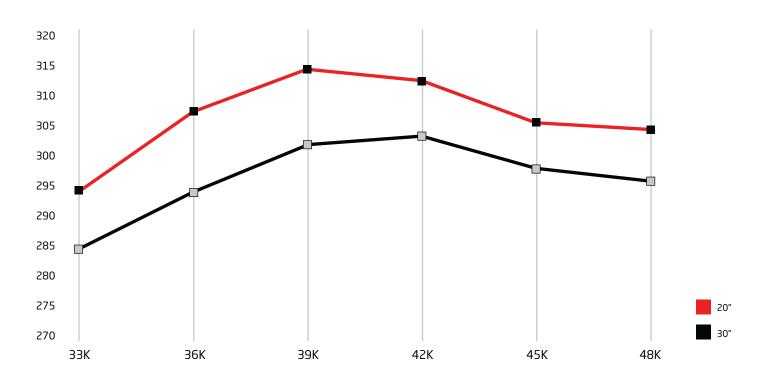


20" VS 30" ROW CORN

This is the fifth year that BRANDT has evaluated 20" row widths compared to 30" rows.



PLEASANT PLAINS

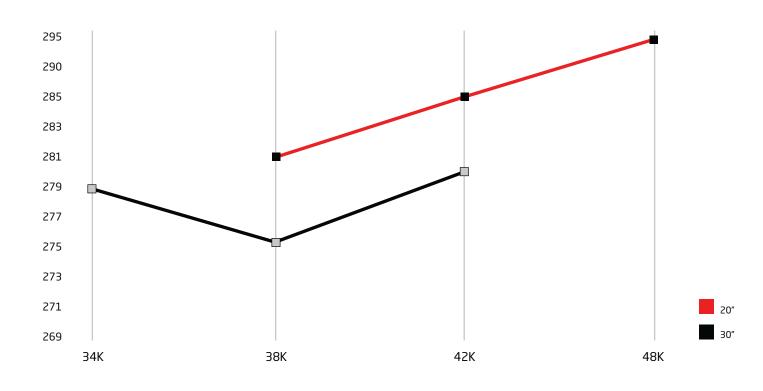


20" VS 30" VARIABLE POPULATION

Pleasant Plains

Narrower row widths added an average of 10 bushels per acre to each population tested in 2014. All populations tested maintained good standability to harvest. From emergence to harvest, both row widths were visually the same in crop stage and color, leaving only the increased light interception and improved rooting area as possible reasons for the yield increase for 20" rows. This is the second year that 20" rows outperformed the wider 30" rows by an average of 10 bushels per acre.

LEXINGTON



20" VS 30" VARIABLE POPULATION

Lexington

As observed at the Pleasant Plains Research Farm, 20" row width produced higher yields than 30" row widths when planted at the same population. This trend continued even as populations increased.

20" VS 30" TRIAL EVIDENCE

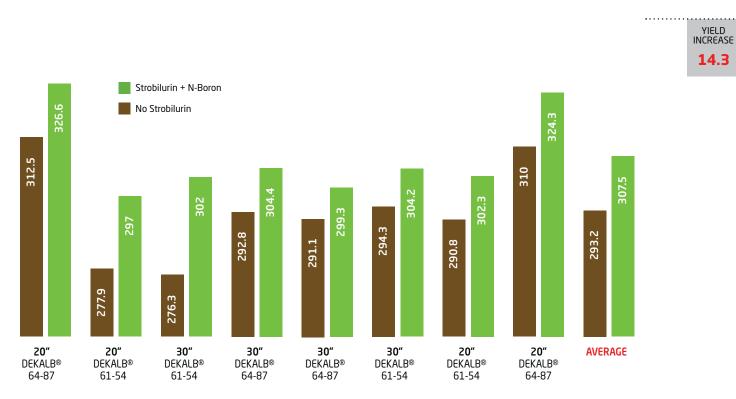
GROWER INSIGHT

20" rows continue to outperform traditional 30" row planting widths, especially at higher populations. In a square acre, you will increase the number of rows by nearly 35% when choosing 20's over 30's. This provides for a less crowded root zone while still providing adequate row width for light interception.



STROBILURIN FUNGICIDE ON CORN

The Strobilurin class of fungicide is used for protection from disease and must be applied before the disease has spread heavily through the crop. This class of fungicide is responsible for reducing stress by decreasing ethylene gas in the plant (sometimes referred to as plant health). The reduction of ethylene (one of the 5 classes of plant hormones) slows the maturity of the plant allowing for increased nutrient efficiency. When plants are heavily stressed from weather, disease, etc. the amount of ethylene rises and the plant speeds up maturity reducing yields.



STROBILURIN/N-BORON HYBRID RESULTS

Pleasant Plains

The yield response to a tassel application of a strobilurin fungicide with N-Boron was 4 bushels per acre larger at the higher population of 42,000 vs the lower 39,000 plants per acre. The tassel application response to row width measured nearly the same with 20" rows averaging 14.8 bushels per acre compared to the 30" row yield addition of 13.9 bushels per acre.



 9002
 20"
 20"
 30"
 30"

 No Strobilurin
 With Strobilurin
 No Strobilurin
 With Strobilurin

20" VS 30" WITH AND WITHOUT STROBILURIN

Lexington

Two results come from this graph. One, 20" rows yield higher than 30" rows as we concluded in our row width trials. Two, the use of strobilurin fungicides with N-Boron significantly increased yields on both 20" and 30" row widths. Strobulurin fungicides are effective in disease management and in improving overall plant health.

STROBILURIN TRIAL EVIDENCE



GROWER INSIGHT

Strobilurin fungicide applications paired with N-Boron or Manni-Plex B Moly continue to result in increased yield. This has been the case for past years, even in the instance of zero or low disease pressure. The combination provides a positive impact on the overall plant health. Best results have been observed when applied at tassel.

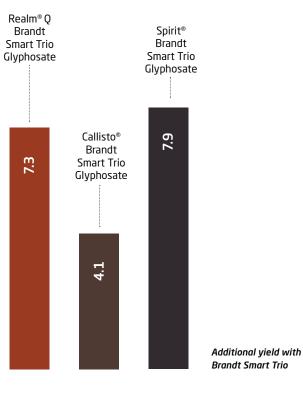


STRESS MITIGATION & STIMULANTS

Brandt Smart Trio provides sulfur, zinc, manganese and boron to stimulate plant growth and increase metabolism of post applied herbicides.



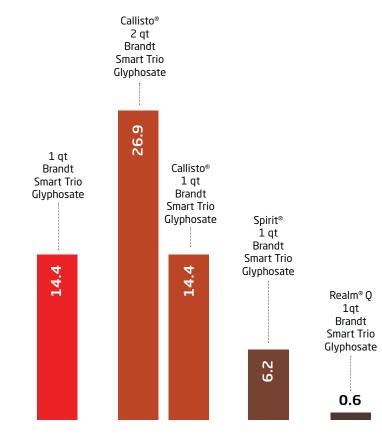




STRESS MITIGATION

11th year continuous corn

Brandt Smart Trio in corn on corn side by side trials averaged an additional 6.4 bushels per acre when added to glyphosate plus a second mode of action herbicide. Emerging university trial results demonstrate the role micronutrients play in plant stress reduction, especially when applied with the herbicide. The mitigated yield response decreases each day that the application of micronutrients are delayed after herbicides are applied. Hormone applications like gibberellic acid can also create plant stress if nutrition is not correct. Brandt Smart Trio can assist with this stress as well.

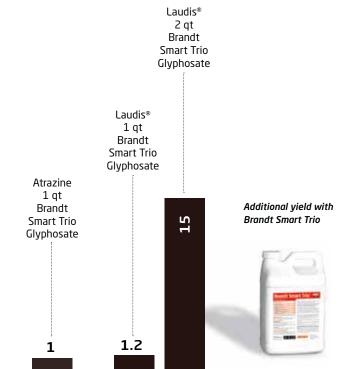


STRESS MITIGATION

1st year corn

This is the 6th year at Pleasant Plains that we have evaluated the ability of Brandt Smart Trio to mitigate plant stress by increasing photosynthesis and assisting the plant to metabolize the post herbicide. Plot results and customer field results sometimes vary in yield results, but always immediate and visual in positive plant responses. However, Brandt Smart Trio has been the most consistent product that can be mixed with all modes of action crop protection products.

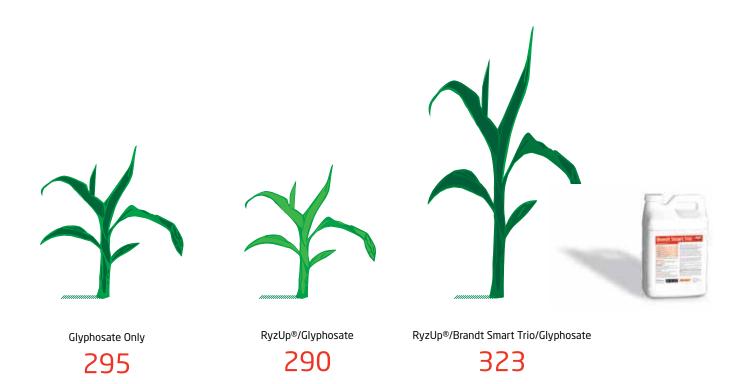
STRESS MITIGATION & STIMULANTS TRIAL EVIDENCE

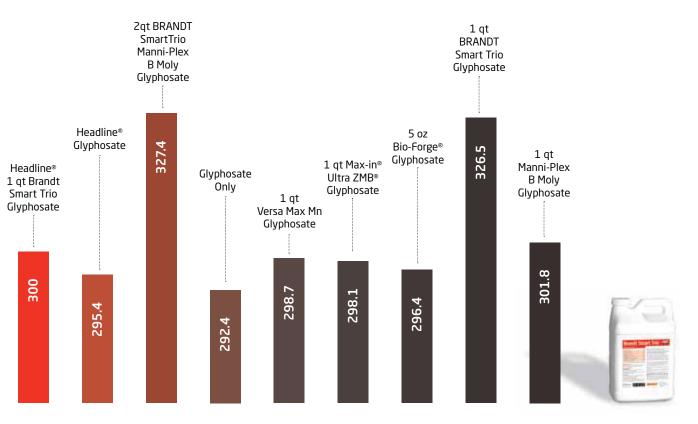


GROWER INSIGHT

Brandt Smart Trio, for the 6th consecutive season, continues to provide a beneficial response when combined with post applied herbicide applications. Post applied herbicide tank mixes continue to be more complex involving more than one mode of action. Brandt Smart Trio is the perfect tank mix partner for all modes of action.







POST APPLIED STRESS MITIGATION

1st year corn

This is the second year that we tested RyzUp® by adding it to the V5 glyphosate application in a blend with Brandt Smart Trio. RyzUp® contains gibberellic acid which is one of the 5 general classes of hormone groups found in all plants. Trial results demonstrate one simple principle when considering using hormones. The plant must have adequate (balanced) nutrition to get the value from the addition of a hormone by itself. The addition of Brandt Smart Trio to RyzUp® gave the plant enough zinc, manganese, and sulfur to utilize the increased growth stimulation provided by the hormone treatment.

V5 APPLICATION WITH GLYPHOSATE

1st year corn

For the second year in a row, all stimulants used at the V5 stage increased yield when combined with the post glyphosate application. These positive responses have created interest in early growth stage (planting to V7) crop management. Nutrition continues to provide the greatest response. This is one year data in a high yield environment and may not always be reflective of results under all conditions. Tank mix compatibility and "free ride" application create opportunities for further innovation for improved crop response.

STRESS MITIGATION & STIMULANTS TRIAL EVIDENCE

GROWER INSIGHT

Supplemental nutrition at or around the V5 stage provides additional yield increase. We tested our own Brandt Smart Trio and Manni-Plex B Moly against competitor products in the market. Very favorable results were observed. This is true not only at our research farms, but also on many customer acres.

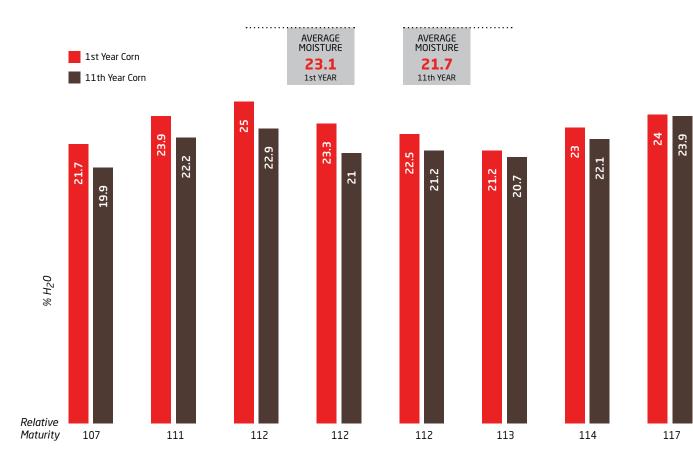
CROP ROTATION & MATURITY

Hybrid responses to crop rotation and maturity.

POPULATION FIRST YEAR CORN

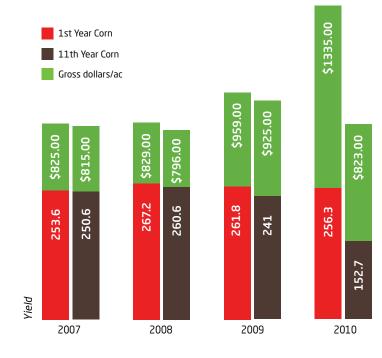
The corn following soybean rotation hybrid trial comparisons used a 20" row strip till system of applying NH_3 in the fall into bean stubble. In the spring we planted into those strips with a 20" row planter. This tillage system choice reduced the residue contact with the seedling corn plants and maintained plant health to harvest. The plant health coupled with higher populations allowed the plot to break the 300 bushel per acre ceiling.

		ω	\$871.50 0
34,000	\$859.00 Gross 293.9 YIELD AVERAGE	8,000	299. Vield aver



GRAIN MOISTURE VS TILLAGE METHOD

For the second year in a row, corn on corn grain moisture measured 1.5 points drier than the corn on soybeans. Drier grain is an indication of reduced plant health or nutrient imbalance. If plants are unhealthy or a nutrient is missing, corn reduces its maturity rating and a pre-mature death occurs which may reduce yields.

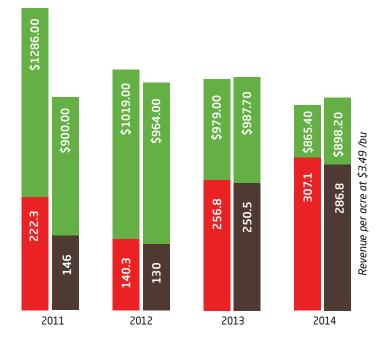


CROP ROTATION RESULTS OF HYBRID TRIAL AVERAGES

A comparison of the last eight years of corn yield and gross dollars at Pleasant Plains provides some very interesting comparisons. This data comes from the average hybrid trial yield and the average price per bushel of corn from that years fall crop insurance price.

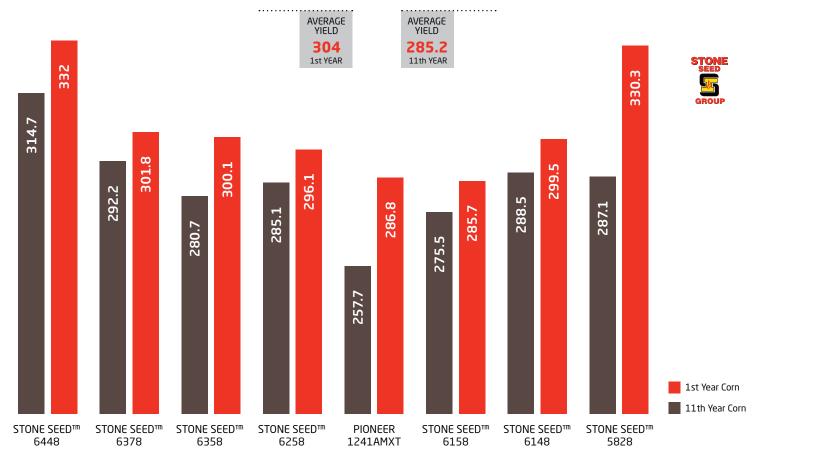
Yield and rotation values remained fairly constant until 2010 where we began to see the influence weather played in crop rotations.

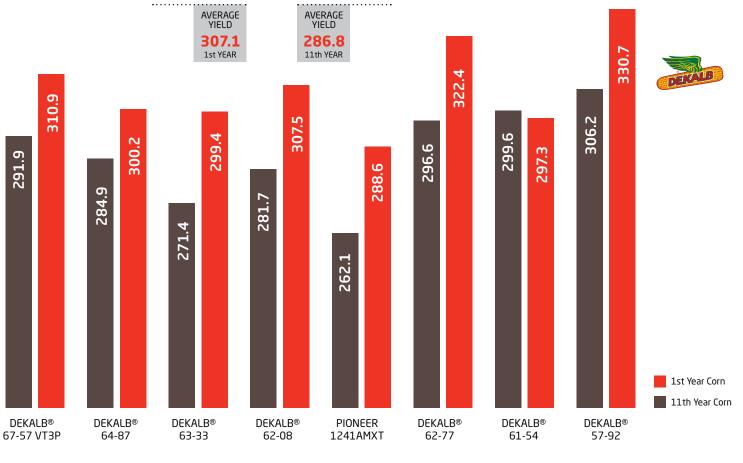




A damp fall and winter followed by a wet spring began in the fall of 2009 and continued through 2011. This weather pattern favored the production of 1st year corn over continuous corn by nearly 100 bushels per acre. The drought of 2012 not only broke the pattern of depressed yields from continuous corn, it was also instrumental in providing improved soil conditions and solid yields the last two years.







STONE CROP ROTATION

The 2014 hybrid yields are a real indication of just how blessed with good weather we were in the Pleasant Plains area. Today's hybrids that contain insect resistance, massive root systems, and the standability to plant at high populations were just the ticket for high yield.

The performance of the first year corn consistently out yielded continuous in all ranges of maturity. The Stone Seed[™] hybrid

lineup provided good standability and disease resistance to take advantage of the 20" row width at 42,000 population per acre. The strip till system used in the 1st year corn provided a slightly better seedbed compared to the conventional till 20" rows in our continuous corn. The heavy residue from the 2013 corn crop left us no choice but to use conventional tillage.

DEKALB® CROP ROTATION

This year's hybrid trial using 20" rows had 7 hybrids that were either above or bumping into the 300 bushel per acre mark. The response to maturity tended to favor shorter maturity vs longer to maximize yields. All hybrids this year emerged very evenly which provided for a solid comparison at all stages of growth. The hybrids that flowered earliest tended to once again take advantage of a long grain fill. In these trials, the taller hybrids were once again unable to take advantage of the light on lower leaves which minimized sugar formation and reduced grain fill.

* All DeKalb® hybrids contain Smartstax® and Refuge-In-A-Bag traits, except DeKalb® 67-57, which is a VT3.

* All Stone Seed[™] hybrids contain Smartstax[®] and Refuge-In-A-Bag traits.

CROP ROTATION & POPULATION TRIAL EVIDENCE

GROWER INSIGHT

First year corn consistently out yields continuous corn. However, the yields illustrated are a perfect example of the yield potential today's genetics can achieve when combined with adequate nutrition and proper crop protection.

EVOLUTION OF BEST MANAGEMENT PRACTICES

When we look back at our historical data we see patterns or trends in practices that have brought us to the production levels we see today. Environmental factors are always a key element in the outcome of a succesful harvest, but unpredictable.

The established trials combined with environmental pressures result in practices we identify as noteworthy, and also take the results and implement new or existing practices in the next growing season. Below is a timeline of how our best management practices have evolved over the last 8 growing seasons.



2007	2008	2009	2010	2011	2012
Good early planting condi- tions with a soaking rain at pollination provided for perfect pollination and nutrient miner- alization to fill the ears. Corn harvest began September 1 and grain dried faster than it could be harvested.	A cool/damp spring evolved into a wet summer and fall. Damp conditions delayed planting in the no till corn on corn due to the residue. Damp conditions minimized nutrient mineralization and tightened soils.	A repeat of 2008 - cool/damp spring that evolved into a wet summer and fall. Delayed planting in no till. Minimized nutrient mineralization and tightened soils. Insects at silking caused Diplodia. Too wet for fall tillage.	Collapsed soils from the wet winter immobilized nitrogen into the residue. Soil min- eralization was shut down. The summer nights were hot and humid. Drying trend for harvest. Tillage used to reduce residue/soil density layers.	Light rains during April and May combined with a warming trend into summer. Timely rains with a hot summer produced high heat unit numbers and sped up crop progress. Drying trend for fall harvest.	Record warm temperatures and dry spring creating perfect soil conditions. Light frost April 9. The warm and dry spring led into a very dry and hot summer. An early dry harvest!
Population too low to maximize yields.No-till was susceptible to a late frost the third week of May.Longer maturity hybrids paid the bills.Long maturity soybeans responded best to increased management like fungicides.Rootwoom damage handled best by traits.	Early plant growth was hampered by micronutrient deficiencies. Hybrid phenotype response to NPK rate and population. Applying the fungicide at the correct time improved performance. Japanese beetles attacked the soybeans and a foliar insecticide was applied to manage feeding. As plant density is increased the value of picket fence stands are noted.	Residue begins to create plant health issues. Maturity vs fungicide and insecticide response. Vield response to micronutrients vs nitrogen rate. Ear worm and Japanese beetles attacking silks and husk cause Diplodia. Potash applications responsible for standability at harvest.	Sulfur, zinc, manganese, boron deficiencies. Nitrogen immobilized by residue Higher P&K rates needed to maximize higher populations. Hybrid rooting response to damp/tight soils. Soybeans respond to total management system.	Planting date affected corn yields in corn on corn. Split timing of nitrogen and banding near planting. Foliar insects attack soybeans at flowering. Narrow rows compliment shorter hybrids and lower N rates. Applying 210 units of nitrogen/acre maximized yields.	Early planting maximized yields except for scattered frosted fields. Corn tasseling followed potash applications. Fungicides applied at VT slowed plant metabolism and drought stress Sulfur applications with zinc maximized yields. Foliar insecticides improved yields and reduced "green stem syndrome"
Higher populations Longer maturities Traits Picket fence stands	Higher populations Longer maturities Traits Picket fence stands	BRANDT Smart Trio RR2Y Trait Strobilurin at tassel Residue management Phenotype vs nutrient interactions Narrower rows to maximize rooting	Nitrogen immobilization Soybean fungicides Split nitrogen applications Narrow rows Soybean seed treatments Plant soybeans early Late nitrogen applications worked	Zinc at planting Soybean maturity Potash applications Omission plots Short hybrids with narrow rows	Apply sulfur Fungicides reduce stress Potash reduces stress Early flowering Lower pH of foliar insecticides Narrow row shading improves yields Strobilurins stopped frost damage

Cover crops absorb unused nutrition

FARMING PRACTICES TIMELINE

2013

A moderately cool and moist winter led to a cool and wet spring. Light rains in April and late May with cloudy conditions. A cloudy summer was warm with ample moisture slowing crop maturity. Warm and dry harvest conditions through the fall.

> Fall applied nitrogen moved deeper into the second foot of soils.

Crops suffered from transient nutrient deficiencies until June.

At plant applications of nitrogen, sulfur, and zinc were valuable.

Early growth stage applications of nutrients and stimulants added yield.

Late applied side dress nitrogen had no effect on yield.

Hormones assist plants

Apply sulfur

Split apply nitrogen

Higher populations

Apply sidedress nitrogen early

Long maturity soybeans

Seed treatments

Foliar applications mitigate transient nutrient deficiencies

2014

A cold winter led to an early spring with warm temperatures and dry soils. A rainy May and June turned into a moderate temperature summer and ample moisture. The fall began dry and quickly moved into a cold and rainy late harvest.

Banding beats broadcast nitrogen applications at plant.

Late side dress nitrogen applications did not perform well.

Higher plant densities and narrow rows maximized the nutrition.

Sulfur is needed on corn and soybeans.

Hormone applications need adequate nutrition to perform.

Banding at plant

Early foliar applications

Votivo treated seed

High populations

Strip till provided better plant health

> Sulfur "at plant" on soybeans

Crown rot controlled with potash

BRANDT TOTAL ACRE

Soybean production that combines expertise in agronomy and data management

BRANDT Total Acre is an omission style trial system. The "omission design" is based on providing all the treatments and then removing one to see what value each practice has on yield. This creates an environment where the yield responses reflect the total high management system rather than a limited response due to lack of some or all the parts of the system.



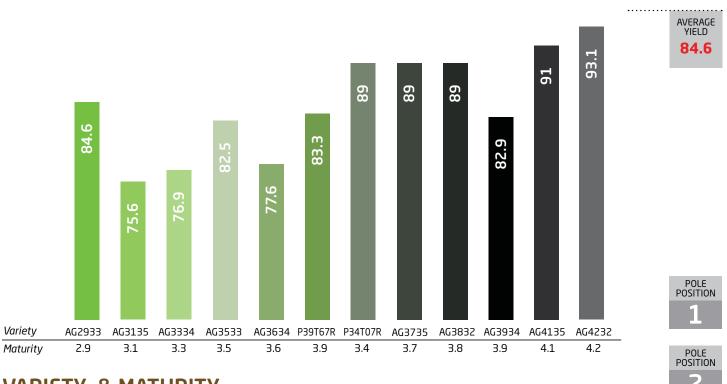


8 YEAR PLOT AVERAGES

Pleasant Plains

A comparison of the last eight years of soybean yield and gross dollars at Pleasant Plains provides some very interesting comparisons. This data comes from the average variety trial yield and the average price per bushel of soybeans calculated using each year's fall crop insurance price. Just like corn, soybeans have taken advantage of the great soil conditions created from the drought of 2012.

TOTAL ACRE POLE POSITIONS	2011	2012	2013	2014	AVERAGE YIELD	ROI
1. Variety	25.6 bu/ac	14.6 bu/ac	19.3 bu/ac	17.5 bu/ac	19.3 bu/ac	\$\$\$
2. Maturity	17 bu/ac	10.2 bu/ac	13 bu/ac	8.5 bu/ac	12.2 bu/ac	\$\$\$
3. Planting Date	n/a	6.8 bu/ac	8.3 bu/ac	13.6 bu/ac	9.6 bu/ac	\$\$\$
4. Seed Treatment	6.1 bu/ac	11.9 bu/ac	7.4 bu/ac	5.5 bu/ac	7.7 bu/ac	5.3
5. Foliar Insecticide	3.5 bu/ac	5.7 bu/ac	4.9 bu/ac	3.4 bu/ac	4.4 bu/ac	8.44
6. Sulfur (Ammonium Thiosulfate)	n/a	n/a	3.8 bu/ac	4.8 bu/ac	4.3 bu/ac	8.9
7. Manni-Plex B Moly	n/a	n/a	1 bu/ac	7.4 bu/ac	4.2 bu/ac	10.1
8. Strobilurin	n/a	4 bu/ac	3.1 bu/ac	6.5 bu/ac	4.5 bu/ac	2
9. P&K Rate	1.6 bu/ac	3.5 bu/ac	4 bu/ac	5.2 bu/ac	3.6 bu/ac	0.4
10. Brandt Smart Trio	3.2 bu/ac	3.9 bu/ac	3.4 bu/ac	3.3 bu/ac	3.5 bu/ac	8.3



VARIETY & MATURITY

Pleasant Plains

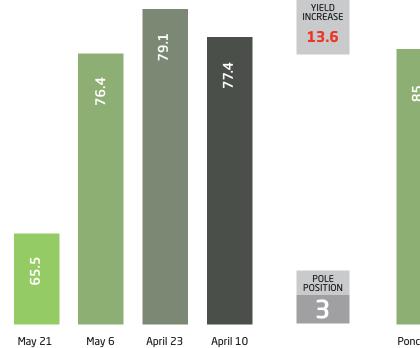
Variety selection and maturity continue to grab the pole positions of our BRANDT Total Acre four year average. Remember, the key to maximizing your long maturity choice is to protect the soybeans during the R stages with an application of foliar insecticides and strobilurins. Shorter maturity varieties tend to fair better in years where insect damage or foliar diseases are a problem in late reproductive stages (R3-R6). Management matters, and the pole positions are pointing at the system that has worked the last 4 years.

SOYBEAN BRANDT TOTAL ACRE TRIAL EVIDENCE

GROWER INSIGHT

Variety and maturity selection is the foundation for soybean production. Proper plant nutrition and crop protection to support the genetics will take a good crop to a great crop. This year, early planting date combined with later maturing varieties was the winning combination given the environmental conditions.





So Field Solution of the second secon

PLANTING DATE

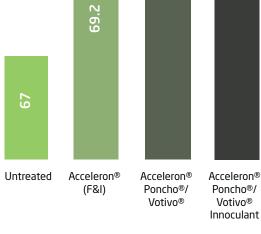
Pleasant Plains

The response to planting date is a textbook response this year. There was no influence from insects, disease, or weed control to skew the results. Proper planting date is usually based on two main factors. Plant in the last 2 weeks of April when the soils warmed above 55 degrees and are dry enough for a good seedbed.

SEED TREATMENT

Pleasant Plains

Poncho®/Votivo® led the soybean seed treatments again for the third year in a row with a 5 1/2 bushel advantage over untreated seed. Once again, the early plant vigor was noticeable just after emergence compared with the untreated soybeans. This vigor was evident into the reproductive stages of growth by producing a darker green color and taller soybean. Poncho®/ Votivo® limited the activity of the cyst nematode which in turn minimized the soil diseases in our plots.



71

YIELD INCREASE

4.3

71.3

SEED TREATMENT

Lexington

Continued seed treatment trials at our Lexington Research Farm showed similar results to those observed at our research farm in Pleasant Plains. The addition of a seed treatment produced a higher yield than that of the untreated seed. Particularly, Poncho®/Votivo® seed treatment when combined with Acceleron® seed treatment gained the highest yield of our seed treatment trial at Lexington. Protecting the seed from disease and insect pressure will increase plant stand and get the crop off to a good start during a fragile period.

SOYBEAN BRANDT TOTAL ACRE TRIAL EVIDENCE

SEED TREATMENTS IMPACT YIELD

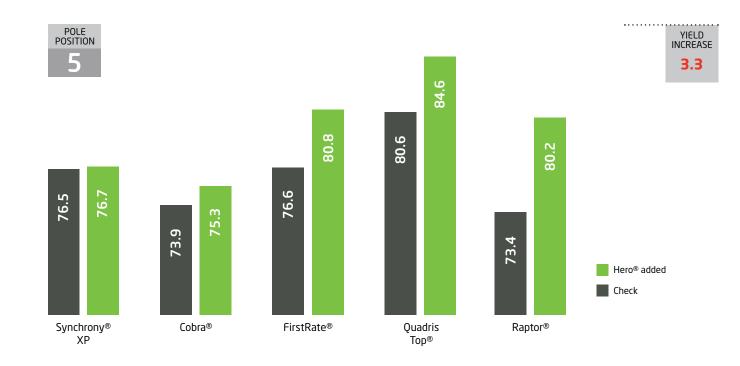
Seed treatments have become an effective way to control pests (diseases and insects) and also start off the growing season with a more vigorous crop. In today's high yielding environments (high amounts of surface residue) it's very important to keep up with the latest information on what's available and how seed treatments are performing.

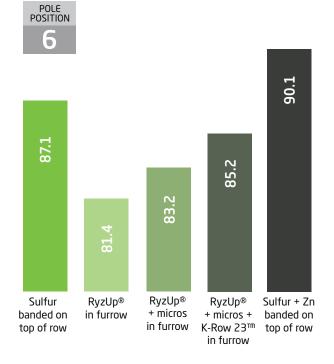
Since we can't predict what the weather will be like for the spring of 2015 we need to look at past performance as an indicator of future success. Our research farm data demonstrates seed treatments such as Poncho®/Votivo®, Acceleron® (F&I), Cruiser Maxx® and ClarivaTM pn, all have a positive impact on yield. On the average over the past 3 years, seed treatments have returned \$3.3 dollars for every \$1 dollar invested. That's something you can bank on. Just as with the other treatments listed in our 'pole positions' chart - seed treatments are one of many management strategies. It goes without saying that seed treatments work on all levels of maturity, however, a longer maturing variety tends to benefit more. Keep this practice at the top of your list.

GROWER INSIGHT

BRANDT established its own bulk seed treatment facility in Curran, Illinois in 2014. The state-of-the-art facility is designed to better serve our customers with top seed treatment options and produce and deliver them efficiently. Seed treatments establish and protect soybeans from emergence through the growing season and are important in any crop protection program.







FOLIAR INSECTICIDE

Applied at R2

Insect pressure was lighter this year in the plots overall. We had a noticeable reduction in the amount of Japanese beetles feeding during early flowering. However, we documented an increase in the number of stink bugs and bean leaf beetles (3rd generation) in the later reproductive stages compared to previous years. The trial results demonstrate the stress that each herbicide can create and the response that an insecticide provides. Soybean stress can be responsible for a hormone release that triggers insects to feed. Iowa State University in 2012 documented the soybeans reaction to this insect feeding as responsible for "Green Stem Syndrome".

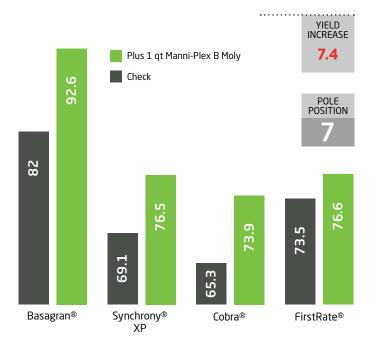
We now know that insect control during reproductive stages can provide more than just a yield increase.

STARTER/SULFUR

Applied at plant

This is the fourth year that starter fertilizer treatment trials have been evaluated. We have developed a pattern of reducing the soybean yield each time we try to provide nutrition "in furrow" from macronutrients to micronutrients and hormones. The successful placement in our trials has been to either use deep placement in the fall or banded on top of the soil at planting. Our best response, so far, has included sulfur and zinc applied on top of the row. The untreated trial averaged 85 bu/ac.

SOYBEAN BRANDT TOTAL ACRE TRIAL EVIDENCE

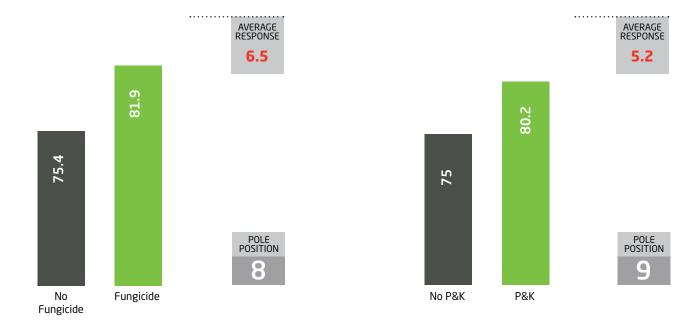


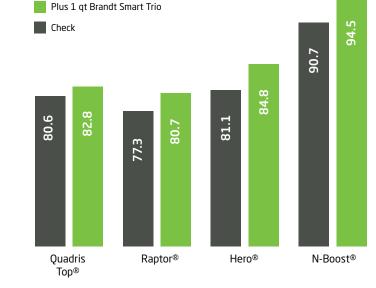
MANNI-PLEX B MOLY

1 qt/ac at R3-4

Manni-Plex B Moly provides boron and molybdenum in a foliar spray and can be blended with herbicides, fungicides, and insecticides. When applied during the reproductive stages, boron and molybdenum provide a boost to root nodules responsible for manufacturing nitrogen as well as improving the bloom and pod set on soybeans. At the R3 stage of growth, nodules begin to produce less nitrogen each day which coincides with a heavy draw of nutrition from the pod fill. Manni-Plex B Moly can assist the soybean plant with improving the nitrogen efficiency which improves sugar production to fill pods.







STROBILURIN

Pleasant Plains

Quadris Top® was chosen as the fungicide that would provide the strobilurin necessary for enhanced photosynthesis and sugar production. Strobilurin trials were applied at the R3 stage and contained a foliar insecticide to minimize feeding induced by the increased plant health. This summer's cloudy and cool conditions during August reduced photosynthesis and set the stage for a good response to the applications.

P&K RATE

Pleasant Plains

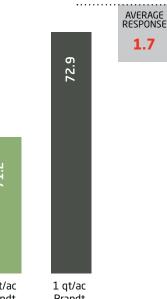
This is the largest response to an application of phosphorus and potassium that we have recorded in the last 4 years of trials at the Pleasant Plains plots. A yield response of over five bushels per acre is a very substantial yield, however, at this year's soybean prices, does not cover the full cost of the application. Just as with every management choice, the hidden benefits are more than we realized. Louisiana State University just uncovered the best reason to supply potassium chloride to your soybeans which is disease control. SDS (sudden death syndrome), is one of the soybean diseases caused by Fusarium. Imagine reducing or eliminating diseases through the use of potash applications. What is that worth?

BRANDT SMART TRIO®

Pleasant Plains

Brandt Smart Trio was responsible for a 3.3 bu/ac yield increase in 2014. This equated to a return on investment of over eight to one. Spend a dollar and get \$8 back. Reducing plant stress has been the true value of the Brandt Smart System for over 6 years by simply adding it to a post application on your soybeans. The original "no brainer" continues to perform.

SOYBEAN BRANDT TOTAL ACRE TRIAL EVIDENCE





Untreated

1 qt/ac Brandt Smart Trio 1 qt/ac Brandt Smart Trio, Manni-Plex B Moly

STRESS MITIGATION

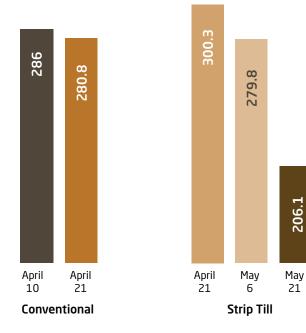
Lexington

Brandt Smart Trio continues to be the lead horse in our stress mitigation trials. There have been discussion whether or not 2 qt/acre would yield better results than 1 qt/acre. Our research has shown that there is no negative response to a 2 qt/acre application of Brandt Smart Trio. Certain applications at 2 qt/acre may be more beneficial for some of the intensive herbicide tank mixes that tend to knock back the plants more and also at some of the herbicide application at the later growth stages versus an early growth stage herbicide application.

PIPELINE RESEARCH

Experimental products tested for their effect on current row crop production

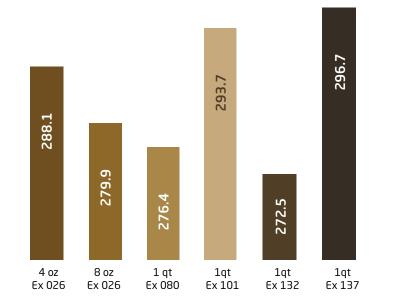
BRANDT's product pipeline looks at experimental products and their effect on yield and plant health in current production practices. Proprietary plant health products are developed in-house or by means of plant health technology acquisition or partnership. Products are tested in a variety of modern production settings before taken to market. Products are developed to increase yield through overall plant health, and be incorporated in to current tank mixes for efficiency.

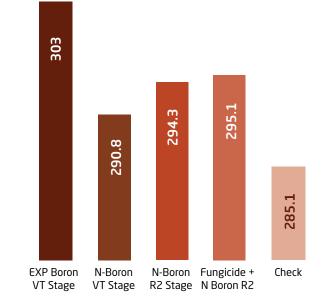


CORN PLANTING DATE TRIALS

Pleasant Plains

The corn planting date trials contain two practices that fit well together in 2014. First, the earlier you planted, the greater the opportunity was for higher yields. Second, strip till was substantially better yielding than conventional tillage in these 1st year corn trials. The strip till took advantage of reduced seedling contact with the soybean residue maximizing plant health through to harvest. Grain moisture at harvest of the strip till was 2 points wetter giving testament to the improved plant health.





EXPERIMENTAL PRODUCT TRIALS

Pleasant Plains

The BRANDT Specialty Formulations division develops new products that are tested in the pipeline trials. We will continue to evaluate these products here and at other test sites and universities for the best rates, timing and crop response. Brandt Smart Trio was developed through this system.

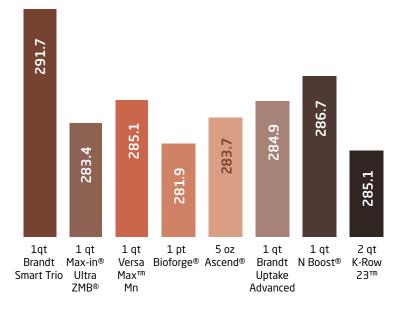
FOLIAR NUTRIENTS AT TASSEL

Pleasant Plains

All the treatments at tassel provided meaningful yield increases. The timing of the boron treatment to maximize the yield was textbook and gave us the greatest response at the VT stage of growth. The product of choice for the largest yield increase was a new boron product developed by BRANDT that will be available for 2015. This boron product has some improved plant mobility and handling benefits that come with the yield.

PIPELINE TRIAL EVIDENCE





FOLIAR TRIALS V5 STAGE

Pleasant Plains

Many products are marketed for V5 foliar application usually in combination with post applied herbicides. In the high yield environment of 2014, most products gave a positive response. BRANDT will continue to compare these products.

2014 TRIAL PARAMETERS

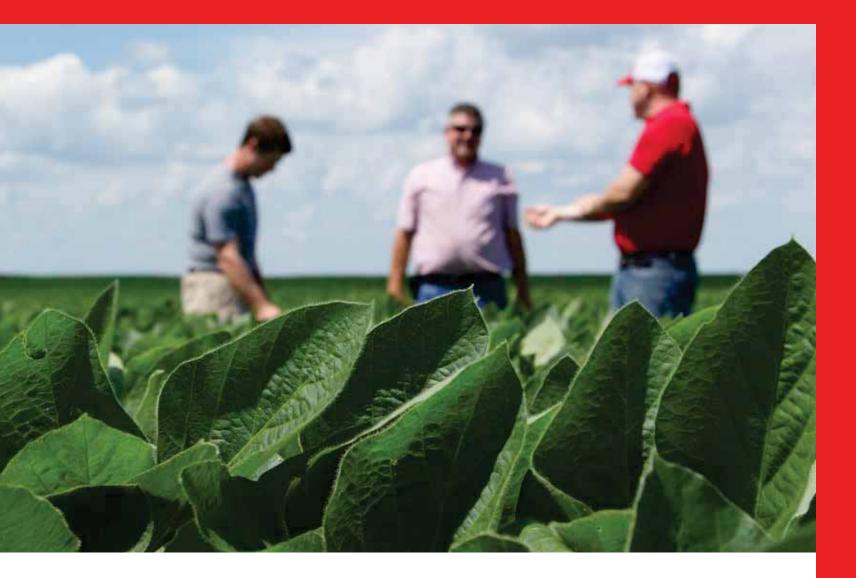
In any research farm there are applications that are standards and variables. Through this year's results book we brought attention to the products or practices that were being trialed in the specific blocks. The information highlighted in the graphs points directly to the information we were seeking. In addition to the variables tested were "grower standard" applications to grow a successful crop, but also give a real-life picture of how the different variables effect the overall outcome. Below is a detailed chart outlining the variables and grower standards throughout the BRANDT Research Farms. Our farms are so extensive that it's difficult to describe each trial in great detail, so please consult your BRANDT representative for further details or clarification.

CHART REFERENCE X - Grower standard practice: a practice consistent		2013	CROP	ī	TILLAG	iE	PLANTING POPULATION		HENO VARI	ΟΤΥΡΕ ΕΤΥ	PLANTING DATE	Pi F	RE-EME IERBICI	RGE DE	PC	OST AI	PPLIED	HER	BICID	E	INSECTIC	IDE	FUI	NGICIDE	N AF	NITROG PPLICA	EN TION	c	ROP N	UTRI	ION				HARVEST DATE
throughout the trial to support proper plant growth T - Products or practices tested	REFERENCE PAGES	CORN	BEANS	CONVENTIONAL	STRIP-TILL	NO-TILL	33,000 - 48,000	BLUE	RED	AELLOW		BRASH® W/P&K SUSPENSION	DUAL II MAGNUM®	LEXAR® EZ (3 qt)	GLYPHOSATE	CALLISIO® SPIRIT®	REALM® Q	ATRAZINE	UDIS®	BRANDT SMART TRIO	AT	HERO® AT R2	HEADLINE®	QUILT XCEL® N-BORON (NUTRITION)	IIA W/ N	SPRING 28%	SIDEDRESS 28%	TOTAL NUTRITION	0 UNITS	180 UNITS	200 UNITS	250 UNITS	300 UNITS	28% WITH ATS, Zn, Starter	
NITROGEN STUDY	6-9																																		
PLEASANT PLAINS		Х		Т	Т		42,000				4/21/14			Х	X					Х			х	X	Т	Т	Т	Т	Т	Т	Т	т	Т	Т	9/18/14
LEXINGTON		Х			X		42,000				4/21/14			Х	X					Х			X	X	Т	Т	Т	Т	Т	Т	Т	Т	Т	Т	9/18/14
TOTAL ACRE	10-15																																		
PLEASANT PLAINS		Х		X			33,000-48,000	Т	Т	Т	4/22/14	X		х	Х					Х	Т	Т	Т	Т	Т	Т	Т	Т		Т	Т	Т	Т	Т	9/20/14
LEXINGTON			Х	X			34,000-46,000	Т	Т	Т	4/29/14		X		Х					Х				ТТ	Т	Т	Т	Т		Т	Т	Т	Т	Т	10/2/14
20 VS 30 INCH ROW WIDTH	16-17																																		
PLEASANT PLAINS			Х		X		33,000-48,000				4/22/14	X		Х	Х					Х		Х	х	X	X	Х		240-90-180-85							9/20/14
LEXINGTON			Х	X			34,000-46,000				4/29/14		X		Х					Х		Х		х	X	X		230-92-150							10/2/14
STROBILURIN FUNGICIDE	18-19																																		
PLEASANT PLAINS		Х	Х		X		VARIABLE																												
LEXINGTON		Х		X			VARIABLE																												
STRESS MITIGATION/STIMULANTS	20-23																																		
PLEASANT PLAINS		Т	Т	Т	Т		42,000				4/21/14	X		Х	X	Т	Т	Т		Х					X	X		240-90-180-85							9/19/14
LEXINGTON			Т	Т			38,000				5/2/14		X		X					Х		X		X X	X	X		230-92-150							10/2/14
CROP ROTATION AND VARIETY	24-27		_																																
PLEASANT PLAINS		Т	Т	Т	Т		42,000	Т	Т	Т	4/22/14			X	X					Х		X	Х	X	X	X		240-90-180-85						X	9/20/14
PIPELINE	38-39						42.000				4/24/4			X	~							X	X					240.00.100.05							0/10/14
PLEASANT PLAINS			Х		X		42,000				4/21/14	Х		Х	Х							Х	Х	X	X	Х		240-90-180-85						Х	9/19/14

		2013	CROP	Т	ILLAG	E	PLANTING POPULATION	VARIETY MATURITY	PLANTING DATE		E-EMER ERBICID		POST	I APPLIE	ICIDE	INSEC	TICIDE	FU	NGICI	DE TOTAL NUTRITIO	J	SEED TREATMEN	HARVEST DATE		
SOYBEANS	REFERENCE PAGES	CORN	BEANS	CONVENTIONAL	STRIP-TILL	NO-TILL				BRASH® W/P&K SUSPENSION	DUAL II MAGNUM®	LEXAR® EZ (3 qt)	GLYPHOSATE	ANTHEM™	MANNI-PLEX B MOLY	BRANDT SMART TRIO	FORCE® 3G (AT PLANT)	HERO® AT R2	QUADRIS TOP®	PRIAXOR®	MANNI-PLEX B MOLY	PONCHO®/VOTIVO®	CLARIVA® PN	ACCELERON®	
VARIETY AND MATURITY	31																								
PLEASANT PLAINS		Х		Х			140,000	VARIOUS	4/23/14	X			Х	Х	Х	х		Х	X		X 20-60-120				10/1/14
SEED TREATMENT	32-33																								
PLEASANT PLAINS		Х		Х			140,000	Х	4/23/14	X			Х	Х	Х	Х		Х	Х		X 20-60-120	Т	Т		10/20/14
LEXINGTON		Х		Х			140,000	Х	5/2/04		Х		Х			Х		Х		Х		Т		т	10/24/14
STRESS MITIGATION	36-37																								
PLEASANT PLAINS		Х		Х			140,000	Х	4/23/14	X			Т	Т	Т	Т					20-60-120				10/20/14
LEXINGTON		Х		Х			140,000	Х	5/2/14		Х		Т	Т	Т	Т		Х		X					10/24/14



2014 GROWER OBSERVATIONS



2014 CORN GROWER OBSERVATIONS TO INCREASING YIELDS

- Increasing plant densities per acre
- Ammonium thiosulfate at planting increases plant vigor
- Sidedress nitrogen at V2 to V3 no later
- Picket fence stands
- Strip till was the healthiest
- Split nitrogen timing for top yields

2014 SOYBEAN GROWER OBSERVATIONS TO INCREASING YIELDS

- Plant longer maturity varieties
- Fungicide and insecticides at R3 to R4
- Votivo seed treatments pay
- Plant late April for top yields

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SUMMARY

We are particularly proud of the BRANDT Total Acre omission trials that Ed Corrigan has developed. The tables on pages 10 and 31 show multiyear data on high performing practices that you can implement on your farm.

This year we have integrated the Lexington Farm data along with the Pleasant Plains data. We believe it makes the data set stronger for both farms and for both sets of customers.

BRANDT has had many quality employees work on these farms over the years. However the primary architect and "sweat equity" contributor at Pleasant Plains is Ed Corrigan and at Lexington, Dan Froelich. We owe them a debt of gratitude.

Most importantly, we hope we did a good job of communicating this to you, our valued customer. The Farm and the data are only as good as the results it helps you achieve. Please give us your feedback and let us know how we can improve.

In 2006 in the first published Research Farm book I wrote, "you must have good local information to create good local strategies". We hope we have accomplished this for 10 years and look forward to 10 more. Here's to farming for success and profit in 2015 and beyond!

The ten year anniversary of the Pleasant Plains Research Farm is a good time to pause and reflect. BRANDT has invested greatly in this farm and is a leader in the Retail Agronomy business for providing a high level of information for its customers. There have been many high points and I list a few:

We used the farm to validate the value of foliar fungicides on corn and soybeans. Ten years ago we were just starting this work and you can see the consistency of performance in the graph on page 12.

Brandt Smart Trio was tested and proven on this farm. This product which was developed and is manufactured in Pleasant Plains, Illinois has become a leading product in its category nationwide. The Pipeline data on pages 38 and 39 demonstrate our on-going quest for new technologies.

In 2015 we are adding 234 acres adjacent to the existing Research Farm in Pleasant Plains. Our plan is to use this acreage to validate data on a larger scale.

Tim McArdle **General Manager**

RETAIL LOCATIONS

217 476 3438
217 438 6158
309 725 3710
309 377 3121
815 692 2612
217 897 6920
217 675 2302
217 489 2141
217 968 5589
309 747 2233
309 365 7201
217 735 2571
217 676 3231
217 488 3125
217 668 2228
217 635 5765
217 626 1127
217 229 3442
309 728 2294
217 452 3545
217 435 5463
217 566 2113

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