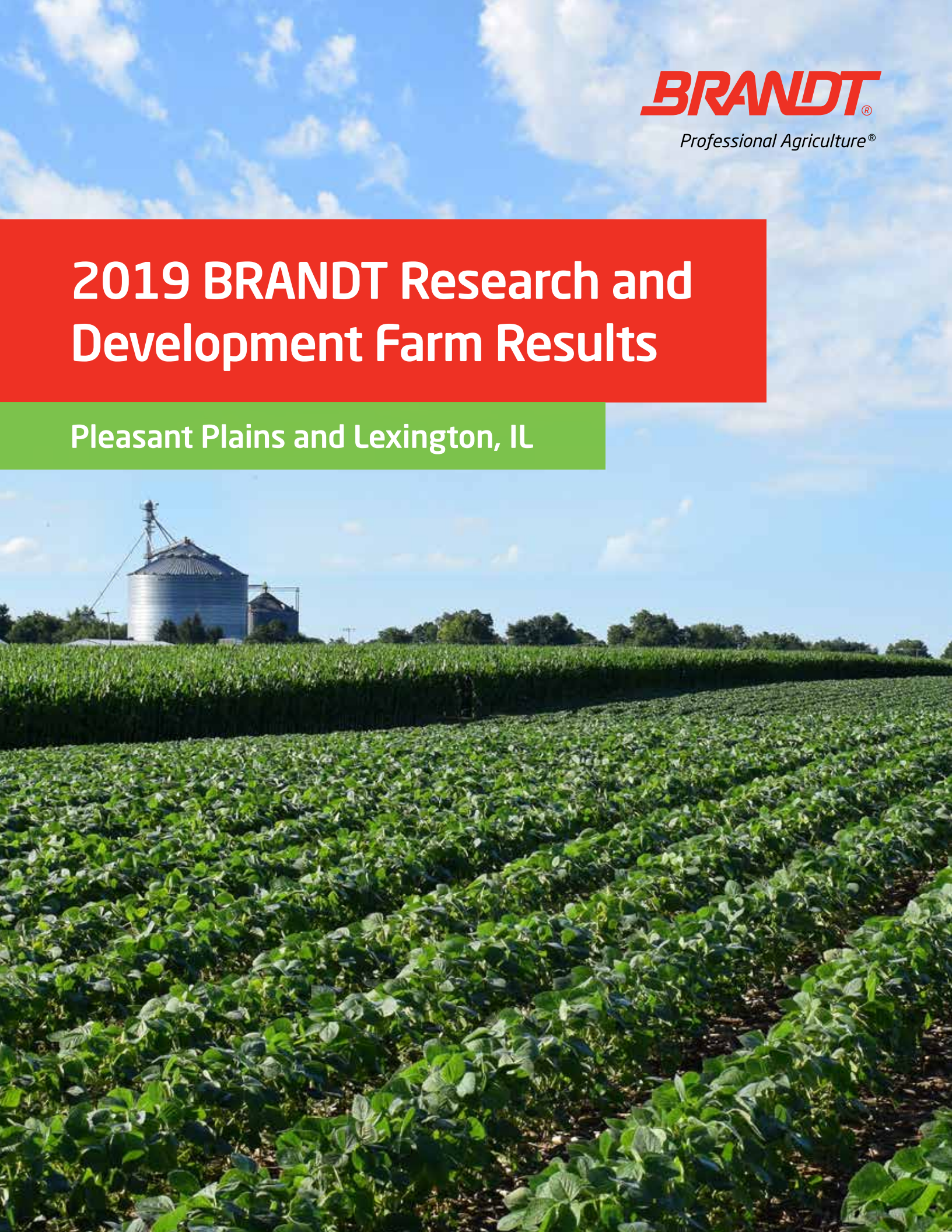
BRANDT®

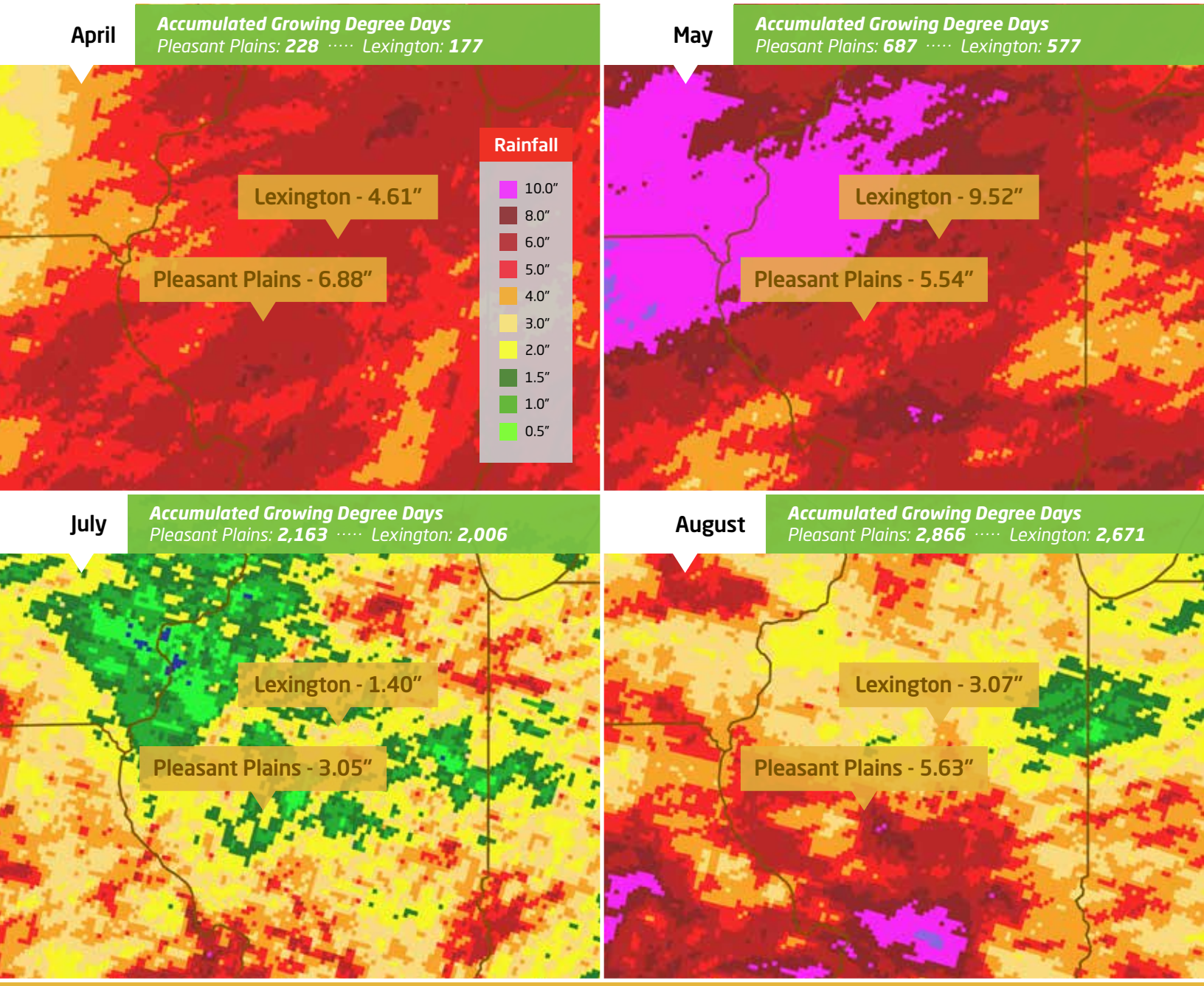
Professional Agriculture®

2019 BRANDT Research and Development Farm Results

Pleasant Plains and Lexington, IL



2019 Illinois Monthly Total Rainfall



BRANDT is pleased to release the 2019 results from our research farms in Pleasant Plains and Lexington, IL.

The weather pattern that started in November 2018 and continued into the early half of 2019 made this one of the most challenging seasons in all aspects of production agriculture in our area. It was no different at our research farms.

Despite all of the hardships, we are proud of the work that was accomplished. And once harvest began, many of us were surprised by the positive results we were seeing and hearing from across our region.

Our team of agronomists have given us results we can use to give our growers confidence to make agronomic choices that yield positive results even in the presence of unsuitable conditions.

Ed Corrigan - Senior Technical Agronomist

Dan Froelich - Technical Agronomist

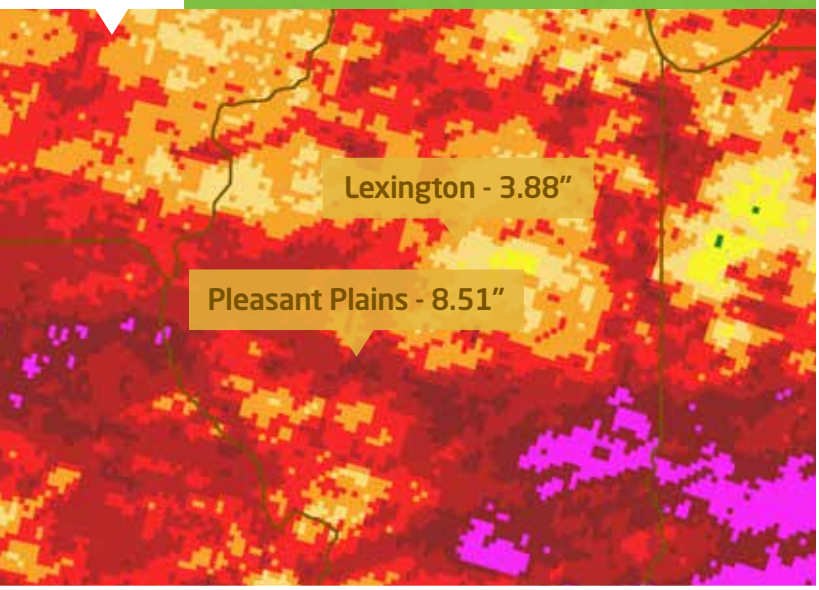
Kyle McClelland - Technical Agronomist

Jacob Winans - Technology Information Specialist

Steve Clement - Technology Specialist

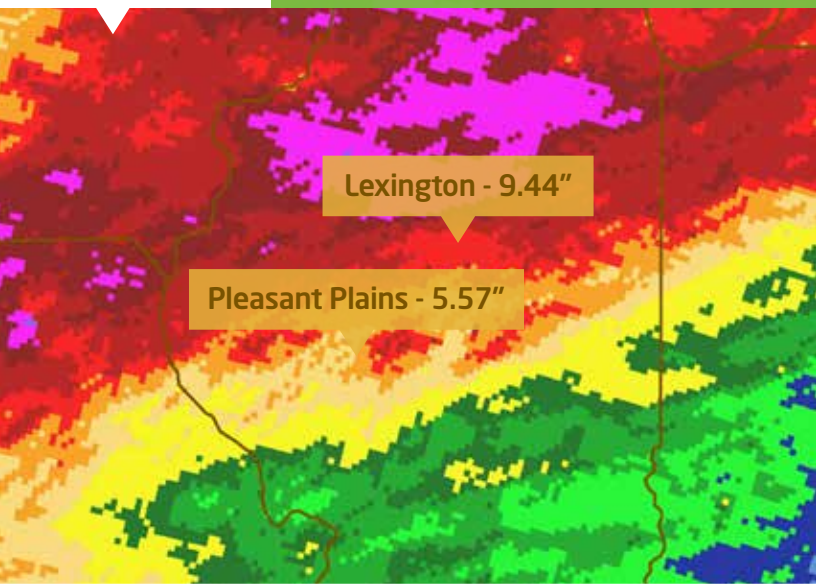
June

Accumulated Growing Degree Days
Pleasant Plains: ***1,340*** ····· *Lexington:* ***1,195***



September

Accumulated Growing Degree Days
Pleasant Plains: ***3,543*** ····· *Lexington:* ***3,280***



We hope you enjoy the 2019 BRANDT Research and Development Farm Results.

If you have any questions or would like a one-on-one consultation, please contact your BRANDT representative.

Precipitation data from NWS AHPS:
http://water.weather.gov/precip and www.isws.illinois.edu/warm

Contents

Pleasant Plains, IL

Omission Trials - Standard Treatment

Fall NH_3	Spring NH_3	Total Nutrition	Planting Date	Population	Harvest Date
150 Units	150 Units	**Corn:** 190-50-150-20S **Soybeans:** 15-50-150-20S	5/16/19 - 5/20/19	**Corn:** 42,000 **Soybeans:** 120,000	10/1/19 - 10/20/19

Fungicide/Insecticide/Nutrition Application	Herbicide/Nutrition Application
Corn: Hero®, BRANDT Smart B-Mo, Delaro™ **Soybeans:** Hero, BRANDT Smart Trio®, BRANDT Smart B-Mo & Quadris®	**Corn:** (Pre-emergent) Resicore®; (Post-applied) BRANDT Smart Trio & BRANDT Smart B-Mo **Soybeans:** (Pre-emergent) Zidua + Metribuzin; (Post-applied) Glyphosate, BRANDT Smart Trio & BRANDT Smart B-Mo, Liberty®, Outlook®

Trial Parameters

Block 1 - Continuous Corn
- Foliar Nutritional Stimulants
- Foliar V4 Stage
- Conventional Till
- 42,000 Population

Block 2 - Continuous Corn
- Hybrid Trials 30" Rows
- SmartStax® vs VT Double PRO®
- Conventional Till
- 42,000 Population

Block 3 - Continuous Corn
- Hybrid Trials 30" Rows
- SmartStax vs VT Double PRO
- Conventional Till
- 42,000 Population

Block 4 - Continuous Corn
- Nutrient Response
- 0 to 300 Units of N (no P&K)
- Conventional Till
- 42,000 Population

Block 5 - First Year Soybeans
- Variety Trials 2.7 to 3.4
- 20" vs 30" Row Width
- Conventional Till
- 120,000 Population

Block 6 - First Year Soybeans
- Variety Trials 3.6 to 4.2
- 20" vs 30" Row Width
- Conventional Till
- 120,000 Population

Block 7 - First Year Corn
- Hybrid Trials 30" Rows
- SmartStax vs VT Double PRO
- Conventional Till
- 42,000, 38,000, 34,000 Population

Block 8 - First Year Corn
- Hybrid Trials 30" Rows
- SmartStax vs VT Double PRO
- Conventional Till
- Population

Block 9 - Continuous Corn
- Spring NH_3
- Sulfur Response at Plant
- Conventional Till
- 42,000 Population

Block 10 - Continuous Corn
- Spring NH_3
- Sulfur Response at Plant
- Conventional Till
- 42,000 Population

Block 11 - Continuous Corn
- Spring NH_3 vs 28%
- Sulfur Response at Plant
- Conventional Till vs No Till
- 42,000 Population

Block 12 - Continuous Corn
- Spring NH_3 vs 28%
- Sulfur Response at Plant
- Conventional Till vs No Till
- 42,000 Population

Block 13 - First Year Soybeans
- 30" Rows Progressive Foliar Treatments
- Sulfur Response at Plant
- Conventional Till vs No Till
- 120,000 Population

Block 14 - First Year Soybeans
- 30" Row Seed Treatment
- Sulfur Response at Plant
- Conventional Till vs No Till
- 120,000 population

Block 15 - First Year Corn
- High Yield Trial 20" vs 30" Rows
- Fungicide Response vs Population
- 34,000 to 54,000 Population

Block 16 - First Year Corn
- Sulfur Response at Plant
- Foliar Nutritional Stimulants
- 42,000 Population

Planting Date Trials
- Corn and Soybeans
- 3/28/19 - 6/1/19

Pipeline
- Response to Starters, Vegetative Foliar Nutrients, R Stage Foliar Nutrients
- Population - 42,000 Corn and 120,000 Soybeans

Lexington, IL

Omission Trials - Standard Treatment

Total Nutrition	Planting Date	Population	Harvest Date
Corn: 200-55-150-20S **Soybeans:** 18-46-120-20S	May 2019	**Corn:** 36,000 **Soybeans:** 130,000	10/15/19

Fall NH_3	Preplant 28%	At Plant Nutrition	Side Dress 28%
Corn: 140 Units - with N-Serve	60	0	0

Fungicide/Insecticide/Nutrition Application	Herbicide/Nutrition Application
Corn: Trivapro®, Cobalt® Advanced, plus BRANDT foliar nutrition products **Soybeans:** Quadris Top®, Cobalt Advanced, plus BRANDT foliar nutrition products	**Corn:** Acuron®, Roundup®, Halex® GT, plus BRANDT foliar nutrition products **Soybeans:** Boundary®, Roundup, Engenia®, Outlook, Prefix®, Liberty, Enlist One®, plus BRANDT foliar nutrition products

Trial Parameters

Block 1 - Corn • Nitrogen Rate • Starter • BRANDT EnzUp Zn • P&K	**Block 2** - Soybeans • Stress Mitigation • High-Yield Soybeans • Seed Treatments	**Block 3** - Corn • Hybrid Selection • Population Optimization	**Block 4** - Soybeans • Variety Selection • Seed Treatments
Block 5 - Soybeans • Soybean Seed Traits	**Block 6** - Corn • BRANDT Total Acre® vs Traditional Management • Row Width • Population • Fungicide • P&K	**Block 7** - Corn • Nitrogen Rate • Starter • BRANDT EnzUp Zn • P&K	**Block 8** - Soybeans • Sulfur • ILeVo • Fungicide with BRANDT Nutrients
Block 9 - Corn • Variable Populations	**Block 10** - Corn • Sulfur • Foliar Treatments • Starters	**Block 11** - Corn • Fungicide • Nitrogen Rate • Foliar Nutrients • Hybrids	**Block 12** - Soybeans • Variety Traits • BRANDT Nutrients

We use an omission style plot technique at our research farms to determine the value of the BRANDT Total Acre and each individual application as it is omitted. We can then analyze the data to determine yield and return on investment outcomes. The goal is to develop local insights to maximize yield and return on every acre.

Throughout the book, there are areas where an economic analysis is paired with yield. For consistency, we use the 2019 harvest crop insurance price of $3.90/bu for corn and $9.25/bu for soybeans.

Corn and Soybeans

BRANDT Total Acre

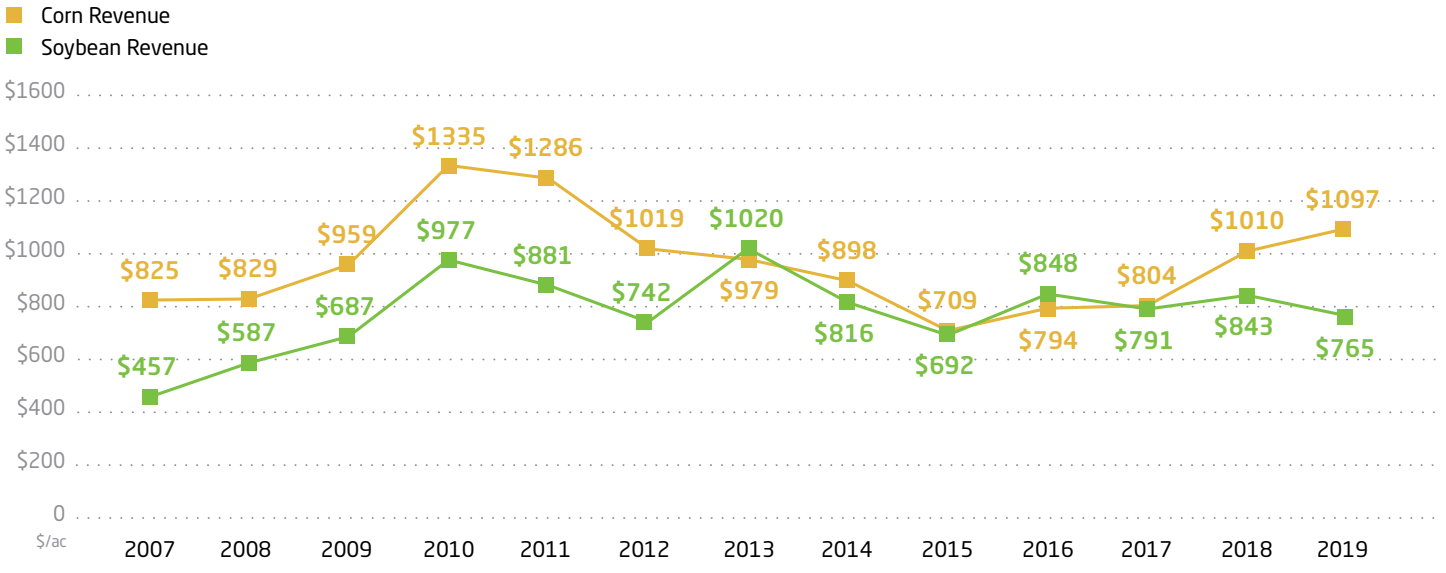
Pleasant Plains, IL

2007-2019 Yield & Revenue

The prices used to calculate revenue were $3.90/bu for corn (+$0.22/bu vs 2018) and $9.25/bu for soybeans (+$0.65/bu vs 2018). 2019 was a challenge, but we stayed focused and at the end of the season we are happy with the results to present to our growers.

The mission of our research farms is to make our customers' operations more sustainable. Helping our growers achieve success in their operations is our #1 goal.

13 Year Crop Revenue



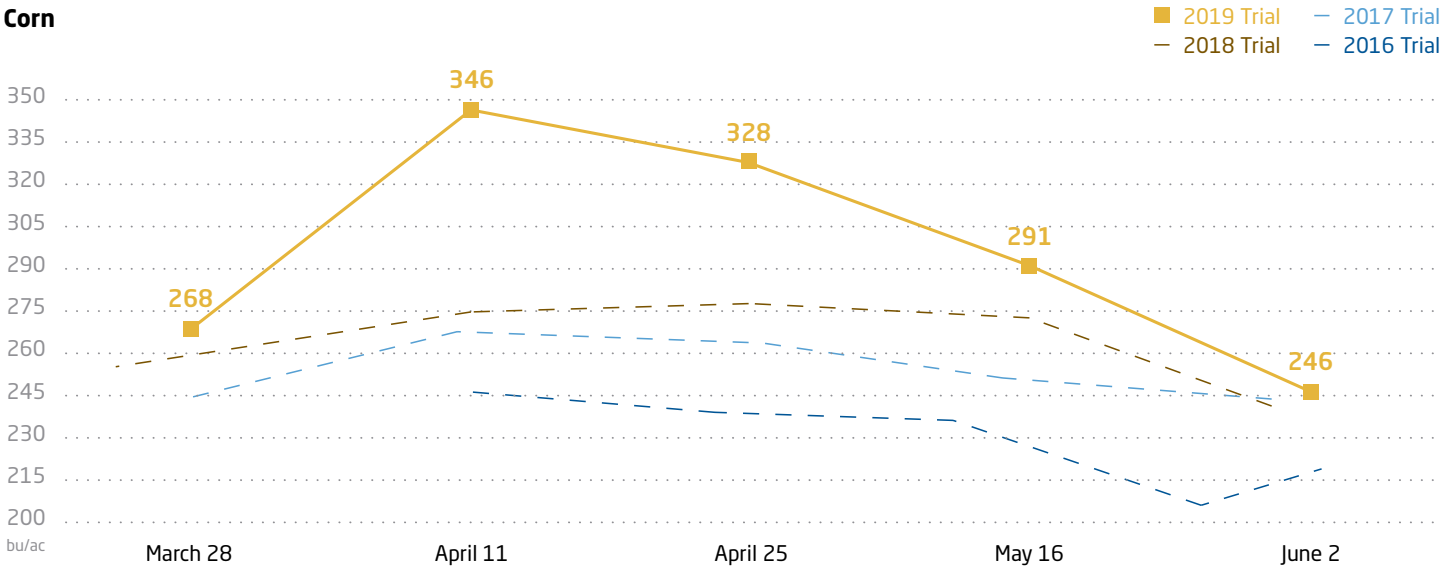
Corn & Soybean Planting Date

The April 11 planting date yielded best for both corn and soybeans. We continue to see a trend for early planted seed, usually the second or third week of April, when conditions are favorable.

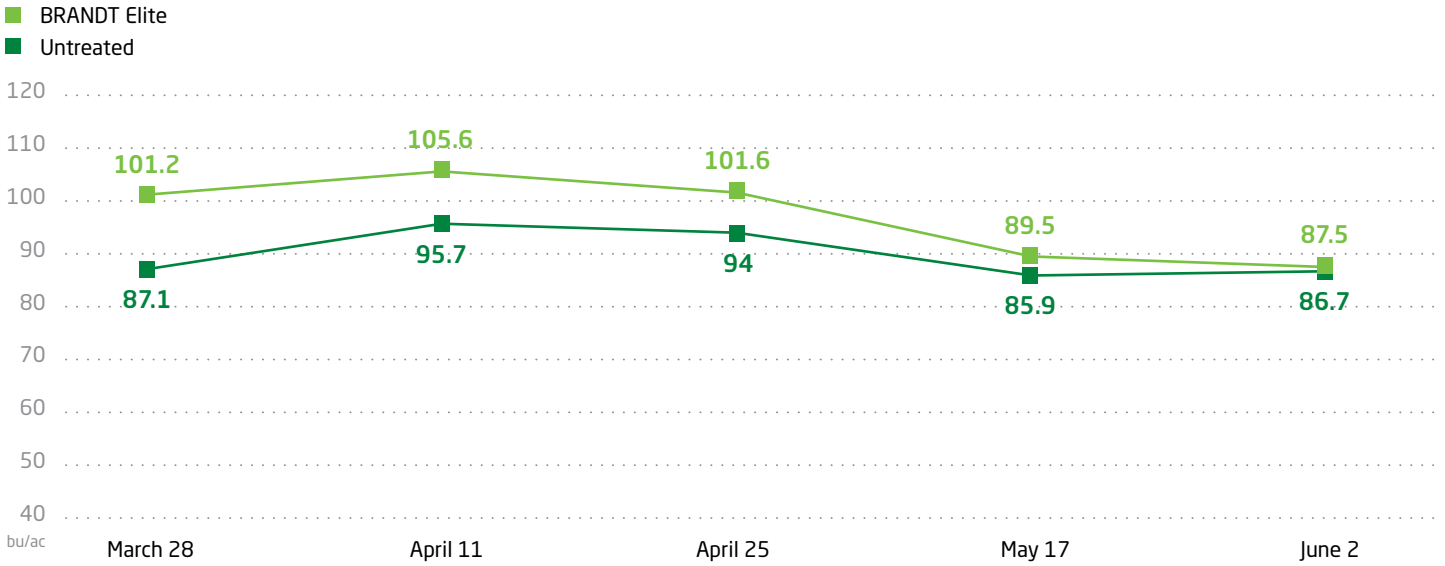
- Consider planting soybeans before or at the same time as corn
- Soybean seed treatments are more important in the earlier planting dates
- Early planting typically means a longer reproductive period

Seed treatments, genetics and proper nutrition all contribute to the success of early soybean planting dates.

Corn



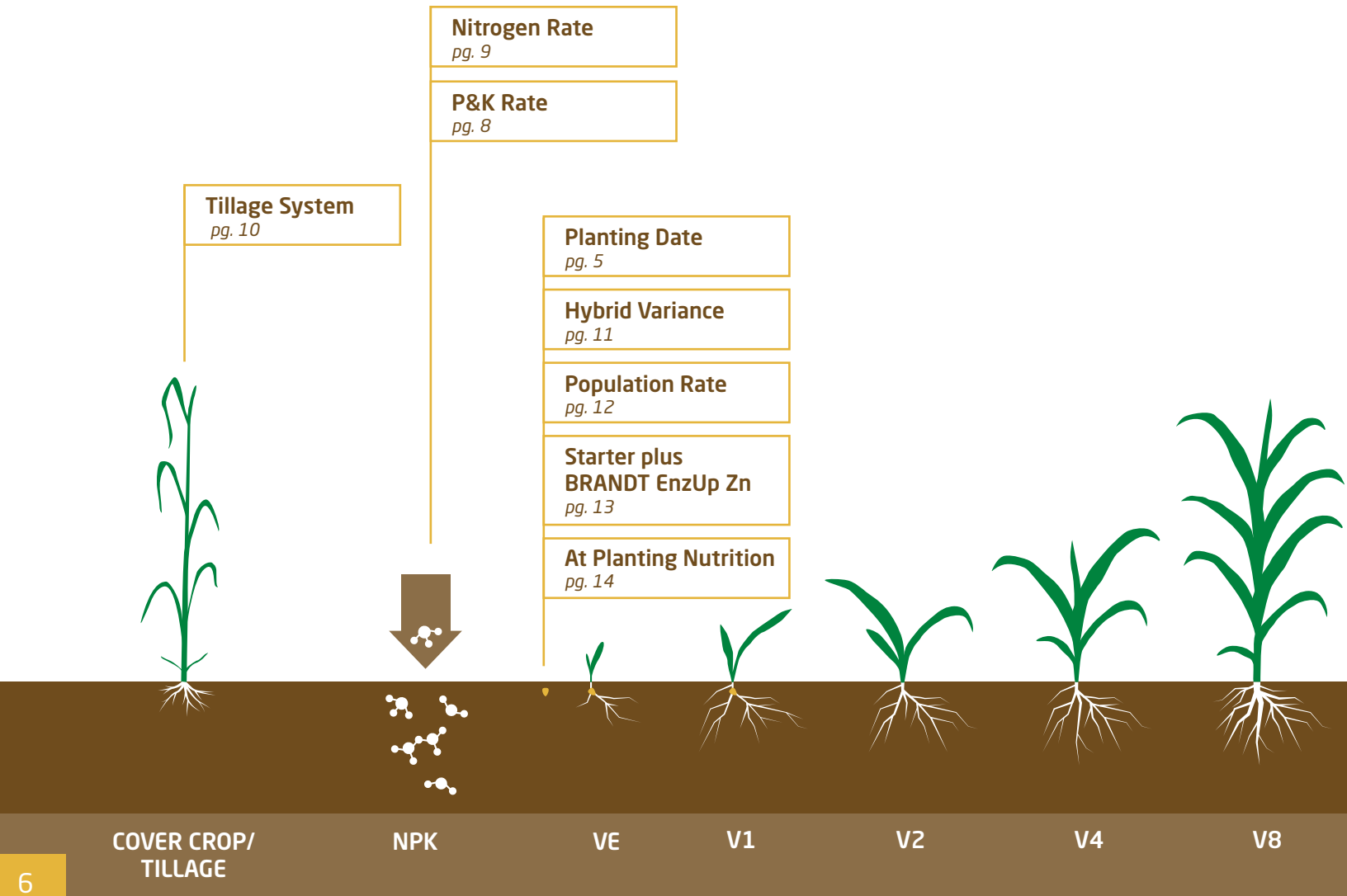
Soybeans



BRANDT Total Acre® Corn Pole Positions

The BRANDT Total Acre base applications reflect a high yield management recommendation that can be implemented in parts or as a whole to fit within a grower's current program. The BRANDT Total Acre base applications for 2019 were:

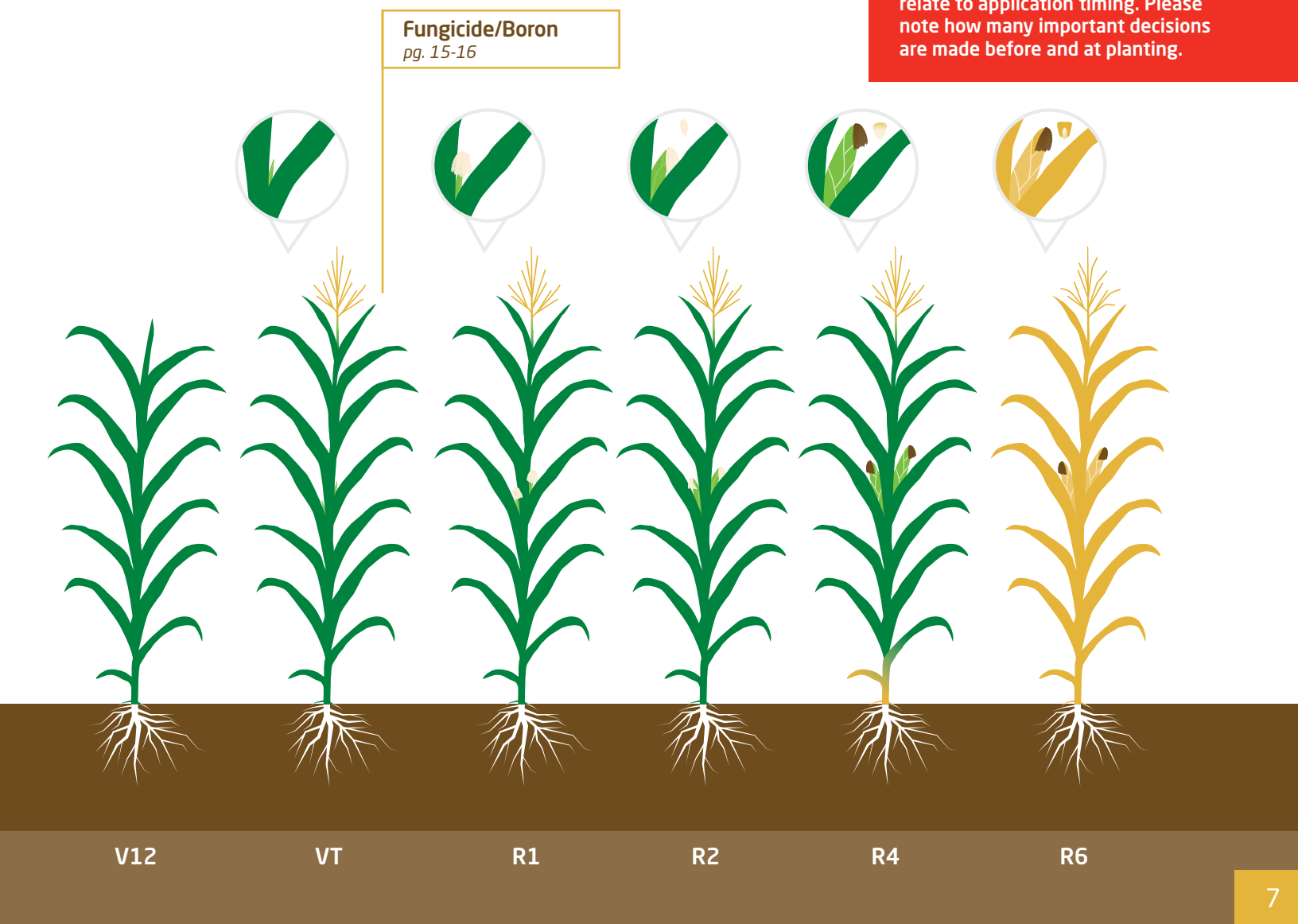
- 15-50-150 suspension in fall
- Fall NH_3 - 150 units
- Band at plant 18-0-0-20S (2x0)
- 2.5 gal/ac in furrow starter + BRANDT® EnzUp® Zn
- 42,000 population
- Conventional till in fall, Salford in spring
- Plant on ammonia line
- Pre-emergent herbicide at plant with water
- 1 qt/ac glyphosate, BRANDT Smart Trio®, BRANDT Smart B-Mo
- Fungicide at R1 + BRANDT Smart B-Mo + insecticide



BRANDT Total Acre Pole Positions		2011	2012	2013	2014	2015	2016	2017	2018	2019	9 yr Avg	9 yr ROI
1	Planting Date	n/a	67.6	99.6	94.2	41.8	97.3	47.0	36.4	100.2	**73.0**	$$$
2	Hybrid Variance	56.2	39.3	18.1	11.5	47.1	33.1	35.1	65.3	66.3	**41.3**	$$$
3	Strobilurin Response	14.1	51.7	13.4	14.3	21.2	27.2	17.0	24.8	46.8	**25.6**	3.0
4	Nitrogen Rate	18.3	16.3	47.8	36.1	35.7	31.2	15.1	14.9	12.6	**25.3**	2.1
5	Row Width 20" vs 30"	n/a	n/a	n/a	n/a	n/a	10.8	4.1	36.5	36.0	**21.9**	$$$
6	Population Rate	13.9	3.7	32.5	27.3	40.4	12.3	16.6	7.0	19.5	**19.2**	1.6
7	Tillage System	n/a	n/a	n/a	19.7	15.0	19.5	18.8	22.1	19.8	**19.2**	3.9
8	BRANDT Smart Trio	15.9	22.0	22.1	34.1	17.5	15.8	6.5	15.1	9.6	**17.6**	15.3
9	Banding Nitrogen	n/a	n/a	13.0	15.4	22.9	11.9	20.9	n/a	n/a	**16.8**	$$$
10	P&K Rate	27.4	23.3	10.7	16.7	10.1	14.1	16.0	24.1	8.3	**16.7**	1.1
11	Nitrogen Timing	n/a	n/a	23.0	20.5	7.6	16.3	2.0	21.7	n/a	**15.2**	$$$
12	Starter (28% Sulfur at Plant)	4.5	4.0	11.1	13.6	13.6	13.4	6.7	21.3	15.5	**11.5**	2.8
13	Boron at Tassel	7.0	4.0	n/a	9.3	5.9	6.8	12.4	n/a	8.5	**7.7**	7.5
14	Zinc (1qt/ac)	10.9	8.1	4.6	20.7	5.0	1.2	4.1	4.1	5.8	**7.2**	4.5

The ROI (Return On Investment) listed is calculated using the 2019 fall crop insurance price of $3.90 per bushel, multiplied by the yield response per acre, minus the cost per acre of a practice. For every dollar invested per acre in a practice, the ROI factor is how many dollars you get in return. We use a symbol of $$$ for practices that had no measurable cost per acre, but offer the best ROI.

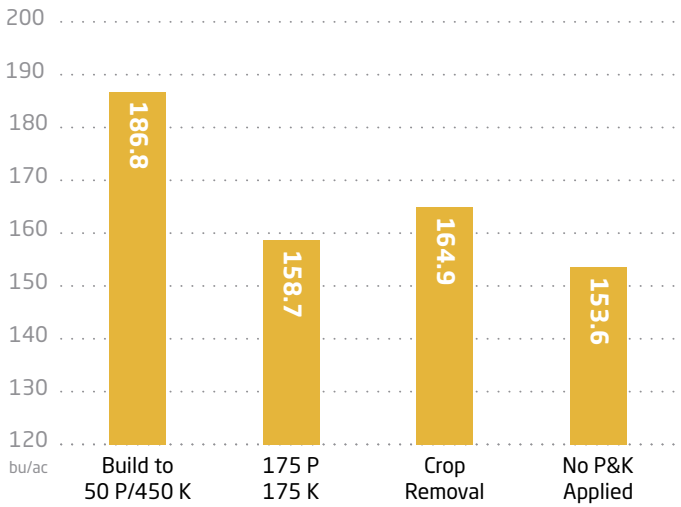
We have illustrated the BRANDT Total Acre Pole Positions as they relate to application timing. Please note how many important decisions are made before and at planting.



P&K on Corn

The BRANDT Research Farm in Lexington moved to a new location in the fall of 2018 after harvest. Our agronomists began addressing the current nutrient levels and after the first year of P&K management, positive results were observed.

First Year P&K Corn Trial



Fertilizer Rate Examples Based on U of I Recommendations

Crop	Nutrients Removed		Fertilizer			
Corn Yield	P_2O_5	K_2O	DAP	*or*	MAP	Potash
300	111	72	241		213	120
275	102	66	221		196	110
250	93	60	201		178	100
225	83	54	181		160	90
200	74	48	161		142	80
(bu/ac)	(lbs/ac)				(lbs/ac)	

Crop	Nutrients Removed		Fertilizer			
Soybean Yield	P_2O_5	K_2O	DAP	*or*	MAP	Potash
100	75	117	163		144	195
90	68	105	147		130	176
80	60	94	130		115	156
70	53	82	114		101	137
(bu/ac)	(lbs/ac)				(lbs/ac)	

Two Crop Combined Fertilizer Maintenance

Corn		Soybeans		DAP	*or*	MAP	Potash
250	+	70	=	315		279	237
(bu/ac)		(bu/ac)				(lbs/ac)	

Corn Response to Nitrogen Rate

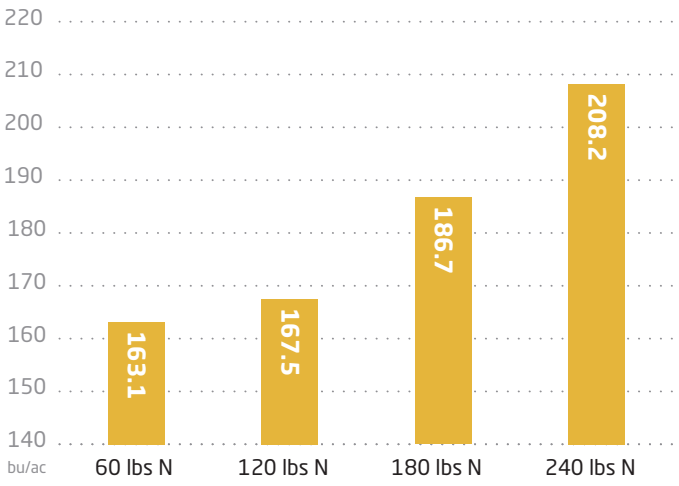
The results from our nitrogen rate trials differ year-to-year due to the many variables that affect the outcome. However, we consistently see our MRTN (Maximum Return to Nitrogen) between 200-250 units of nitrogen.

- Find the MRTN that fits your production practices
- Fall NH_3, spring NH_3, or spring 28% are all viable sources and timings of nitrogen applications
- Use data to determine the best utilization of nitrogen for each field

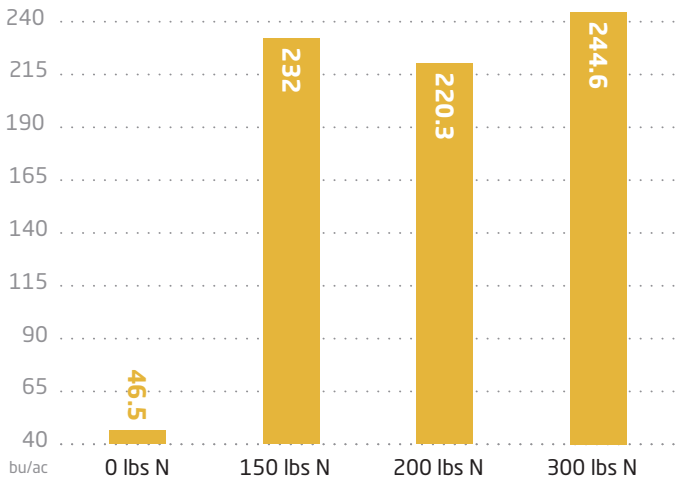
Using data available to growers and to BRANDT can help determine the MRTN for each field.

Note: On average, corn grain removes 1 lb of nitrogen per bu/ac.

Lexington



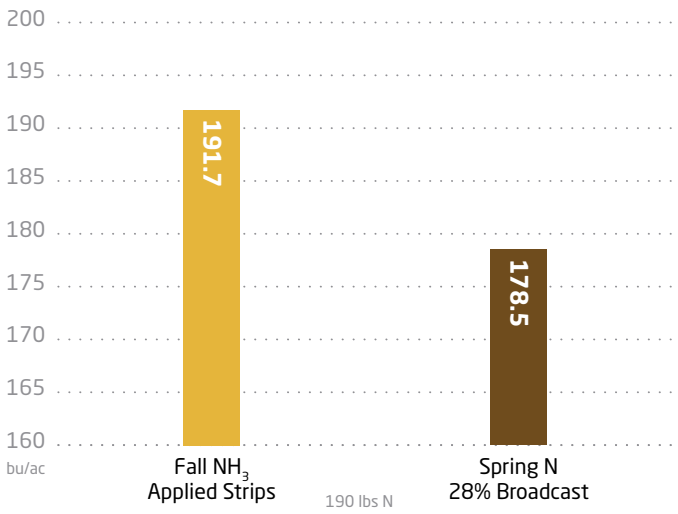
Pleasant Plains



Corn Response to Nitrogen Source

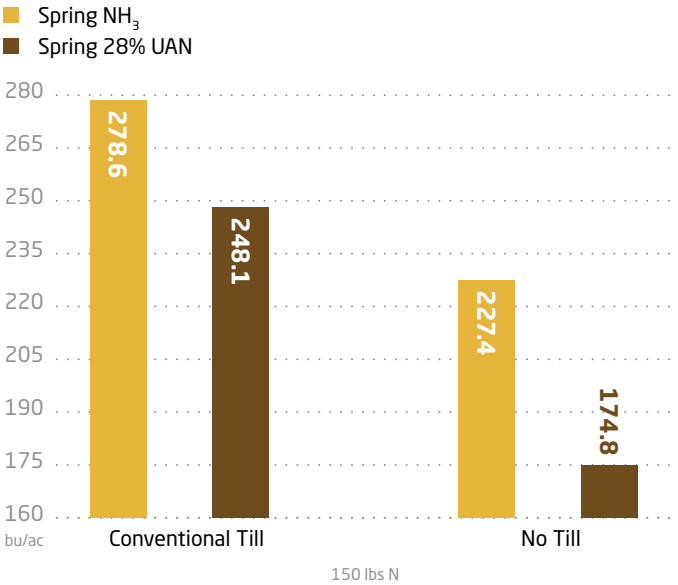
- NH_3 and 28% are both viable sources for nitrogen applications. Our experience at both research farm locations shows an advantage to NH_3 applied in either the fall or spring
- We continue to use the 4R nutrient stewardship guidelines as a benchmark for nitrogen applications
- Geography and weather patterns may determine what source and what timing are the correct method for that season. Fall 2018/Spring 2019 was the perfect example of that

Lexington - Nitrogen Source and Timing

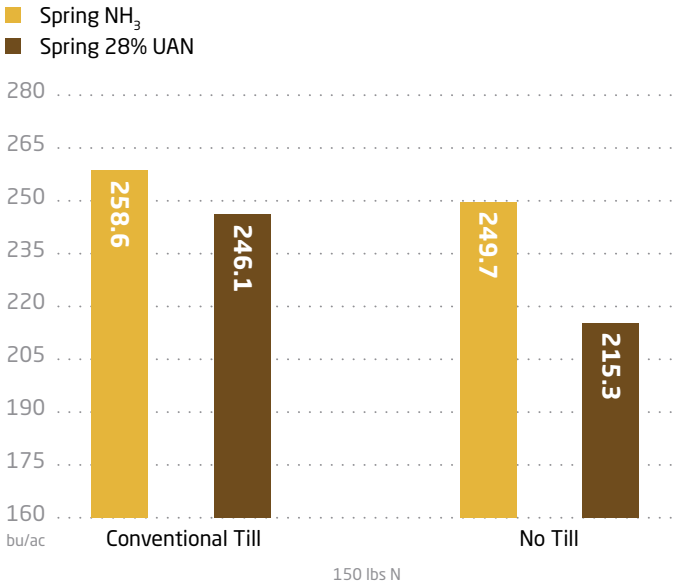


BRANDT has made a significant investment in equipment to help our customers manage their nitrogen applications more efficiently and economically.

Pleasant Plains - Croplan® 5370 - Continuous Corn



Pleasant Plains - DKC 65-94 - Continuous Corn

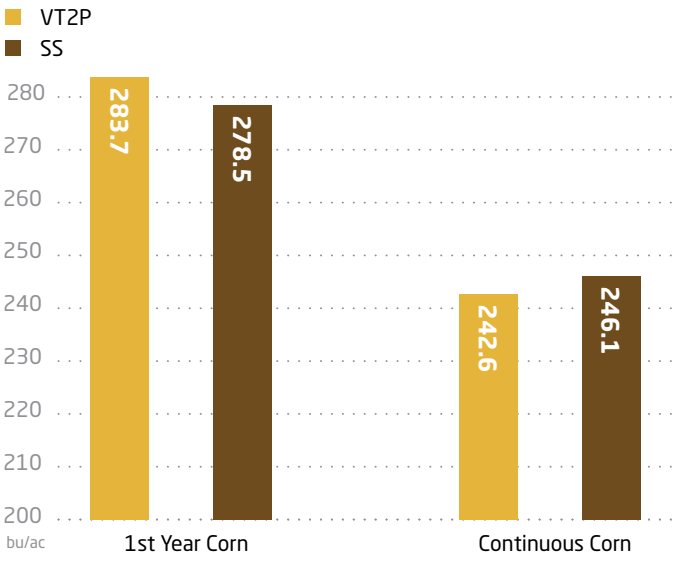


Corn Hybrid Trait Comparison

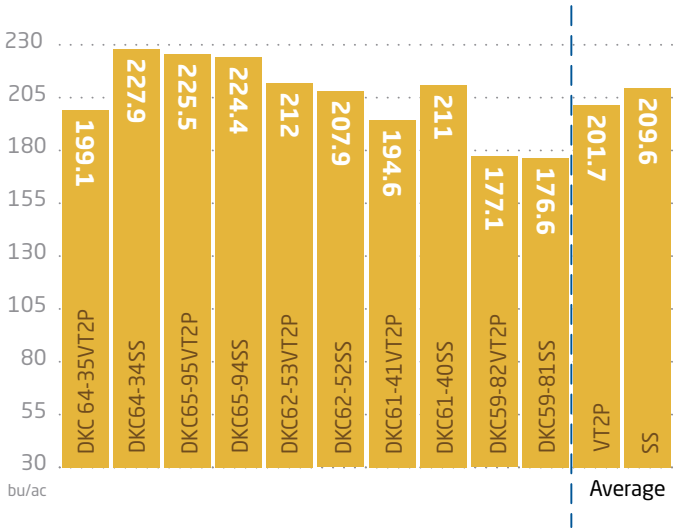
- Choose the appropriate trait package to fit field conditions and level of pest pressure
- Weigh the pros and cons of SmartStax vs VT Double PRO to determine the best ROI scenario
- Use available resources to help determine the best place to plant SmartStax vs VT Double PRO

SmartStax out-yielded VT Double PRO in both continuous corn scenarios at Pleasant Plains and Lexington.

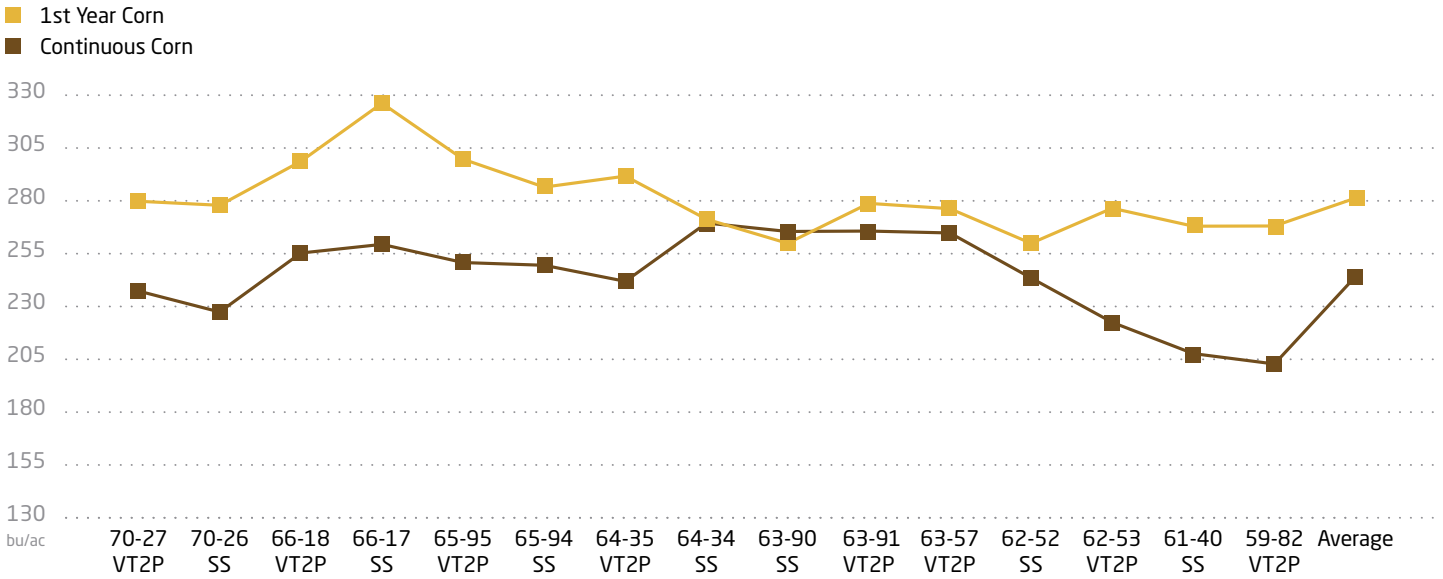
Pleasant Plains



Lexington - Continuous Corn



Pleasant Plains - Corn Hybrid Trait Comparison

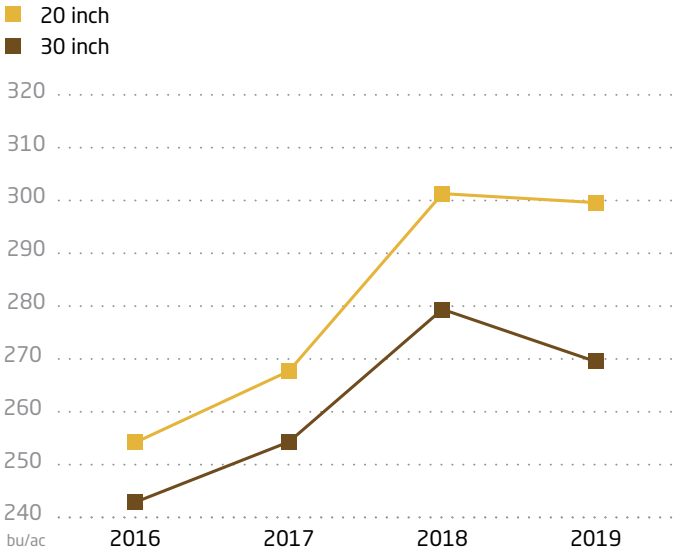


Corn Yield by Row Width & Population

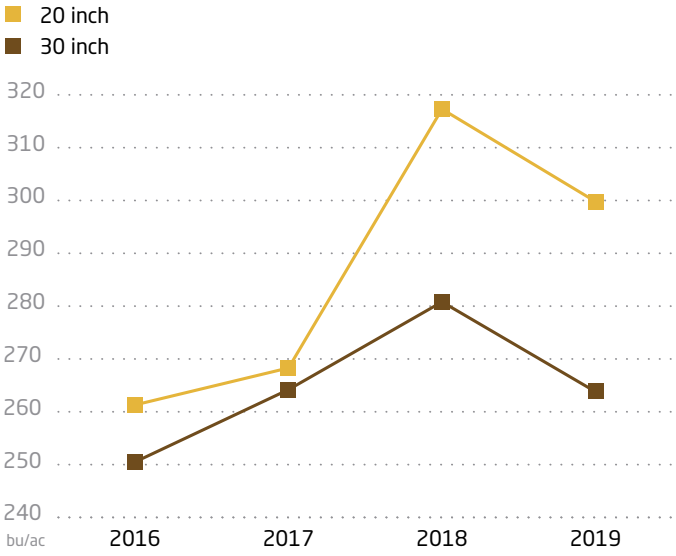
- We continue to see 20 inch rows having an advantage over 30 inch rows
- Plant population should be based on potential yield increase and economic return
- Look to local performance data when making decisions

Whether you have a 20 inch planter or 30 inch planter, use available information to produce a desired outcome.

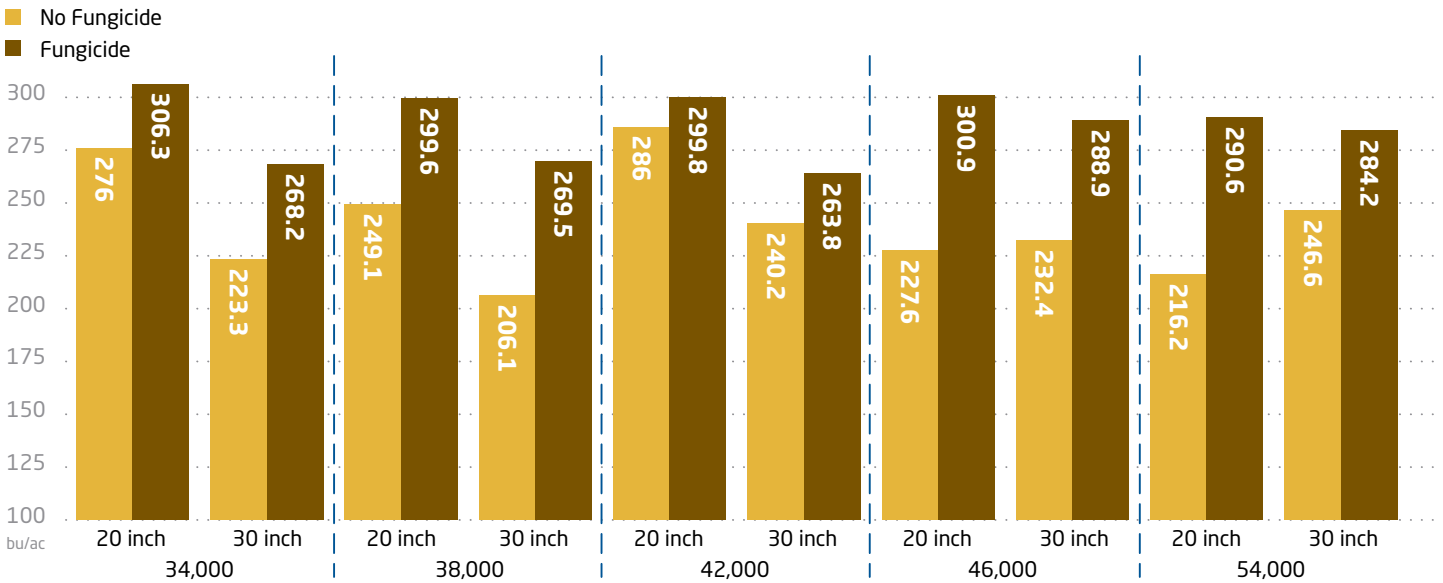
Multi-Year Row Width - 38,000 Population



Multi-Year Row Width - 42,000 Population



Yield Response to Row Width, Fungicide and Population



BRANDT EnzUp Zn

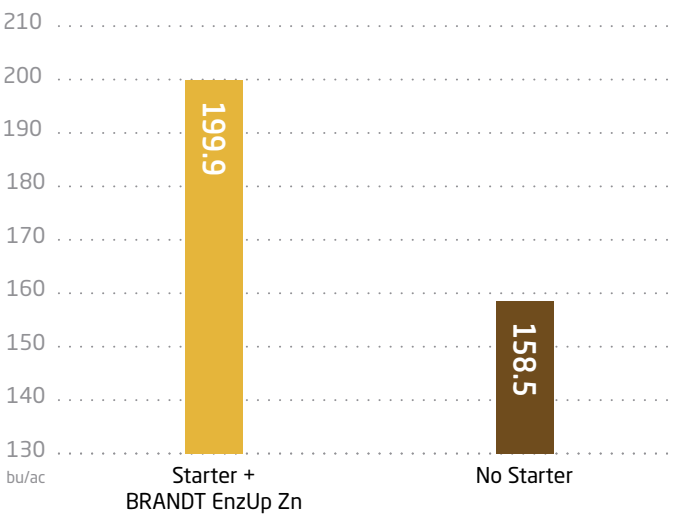
- BRANDT EnzUp is a new enzyme technology that enhances water and nutrient availability, uptake and use by the roots and increases microbial activity
- Increases plant response to fertilizer applications
- For the second year, BRANDT EnzUp Zn has shown promising results at our research farms

BRANDT EnzUp Zn played a role in two record setting yields in 2019. The 616 bu/ac corn yield set by David Hula and the 190 bu/ac soybean yield set by Randy Dowdy.

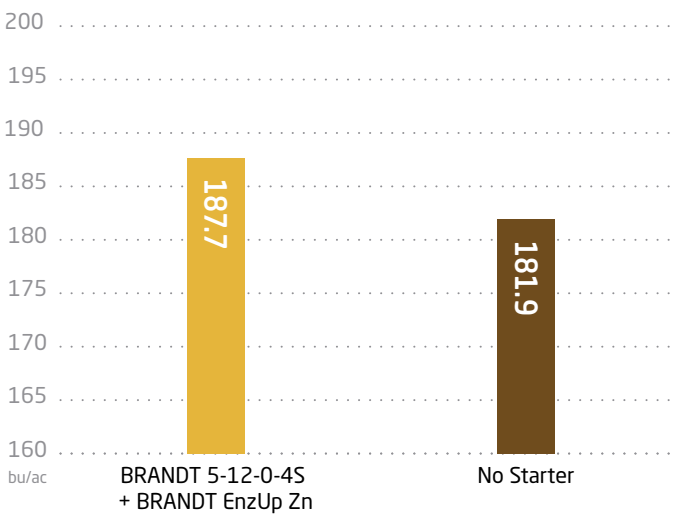
Treated with BRANDT EnzUp Zn

Standard Practice

Trial 1



Trial 2



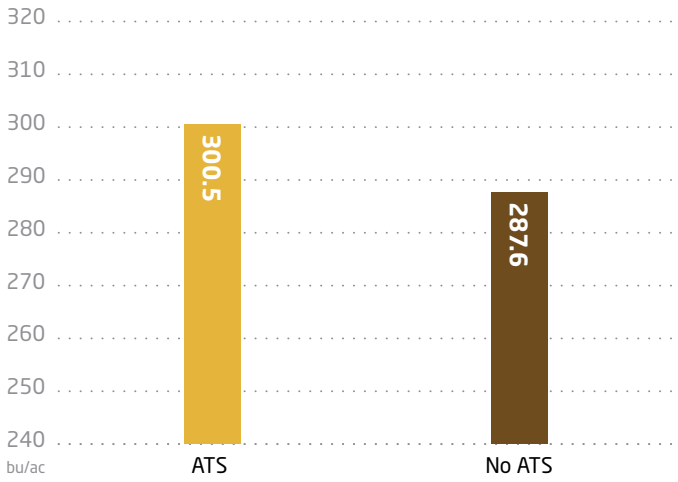
Corn Response to ATS

Sulfur, specifically ATS, in our trial systems continues to improve yields and ROI. All rates and application methods increased yield over no ATS applied.

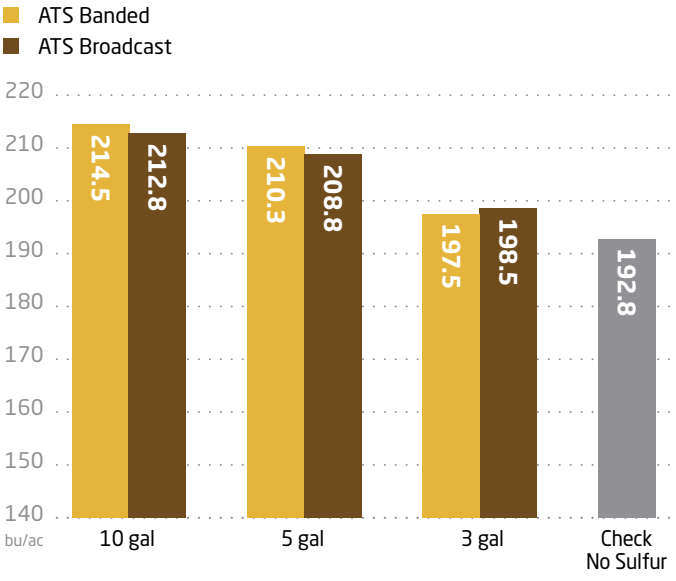
- Based on yield data, our recommended rate is 5-10 gal/ac of ATS
- Both broadcast and banded applications produced positive results and are viable solutions for sulfur applications
- ATS performs best in high management/high yield scenarios where sulfur could potentially be a yield limiting factor

ATS is a great source of both sulfate sulfur and elemental sulfur. It is also compatible with most fluid NPK solutions, making it an excellent early season tank mix partner with 28%.

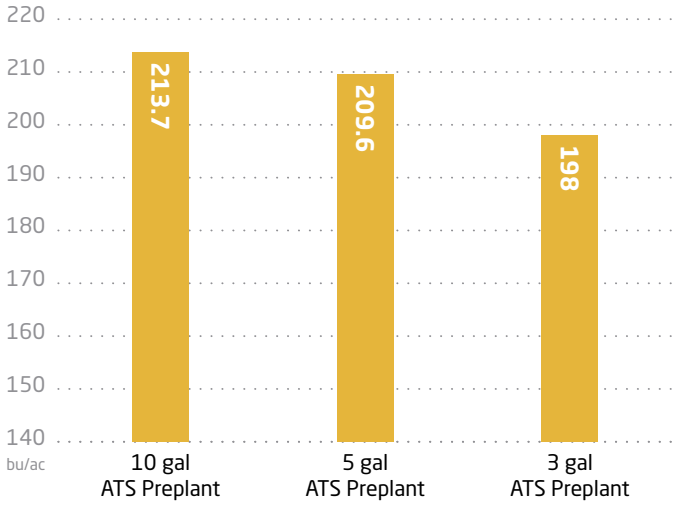
Pleasant Plains - 7 gal/ac of ATS Banded at Planting



Lexington - ATS Rate and Application Method



Lexington - ATS Rate Trial

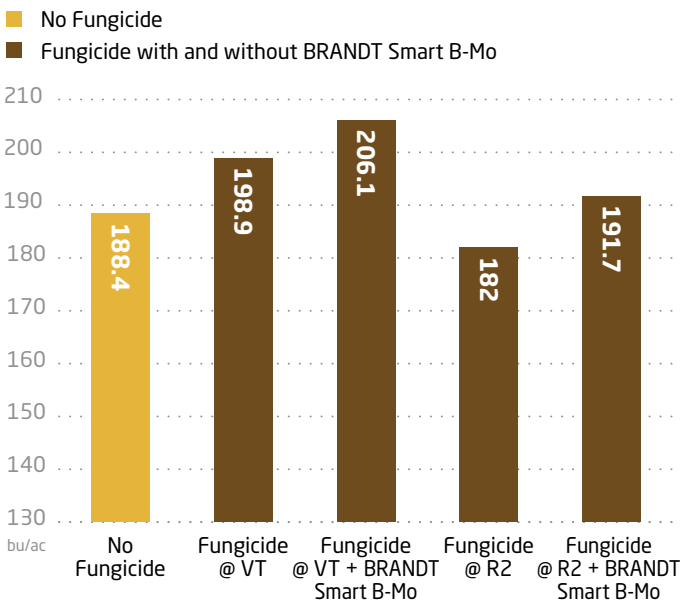


Response to Fungicide & BRANDT Smart B-Mo

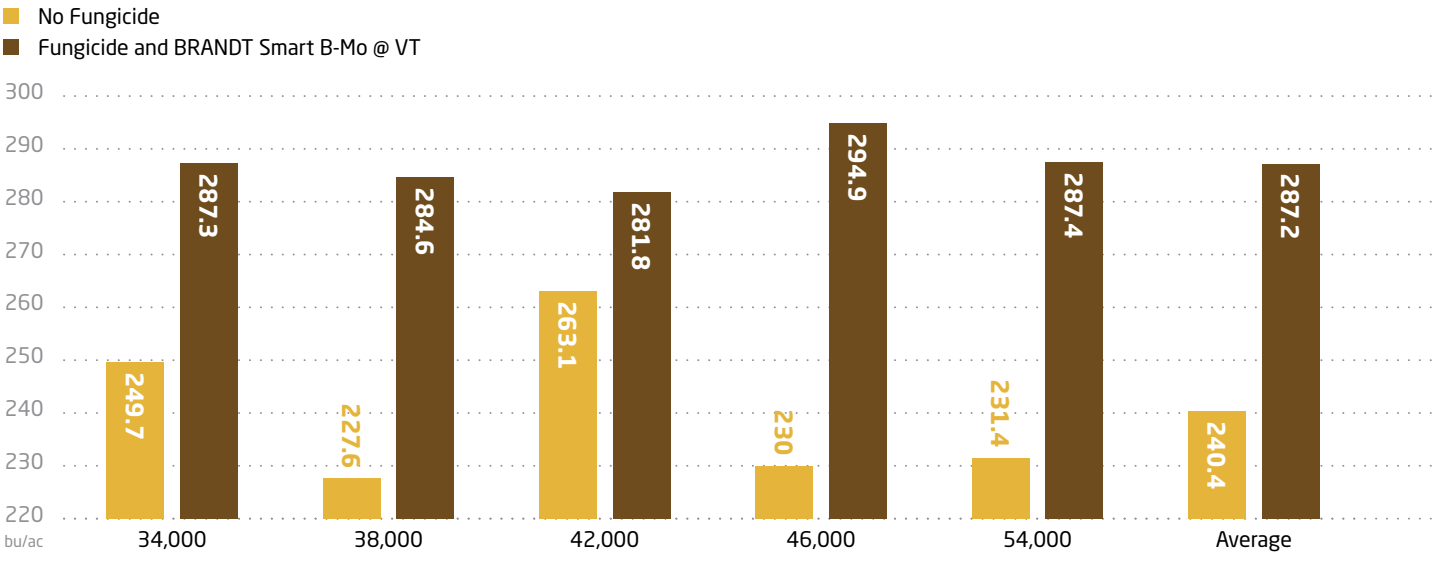
- At the Pleasant Plains research farm, we applied fungicide and BRANDT Smart B-Mo across different populations. All showed a significant response with the average across all populations at a 46.8 bu/ac advantage
- At the Lexington research farm, fungicides were applied with and without BRANDT Smart B-Mo at VT and R1 stages. The greatest result over no fungicide was experienced with BRANDT Smart B-Mo at the VT growth stage +17.7 bu/ac advantage

We support the latest fungicide technologies on the market and pair them with proven BRANDT Smart System® nutrient technologies to improve corn yields.

Lexington



Pleasant Plains



Corn

Foliar Applications

Pleasant Plains, IL

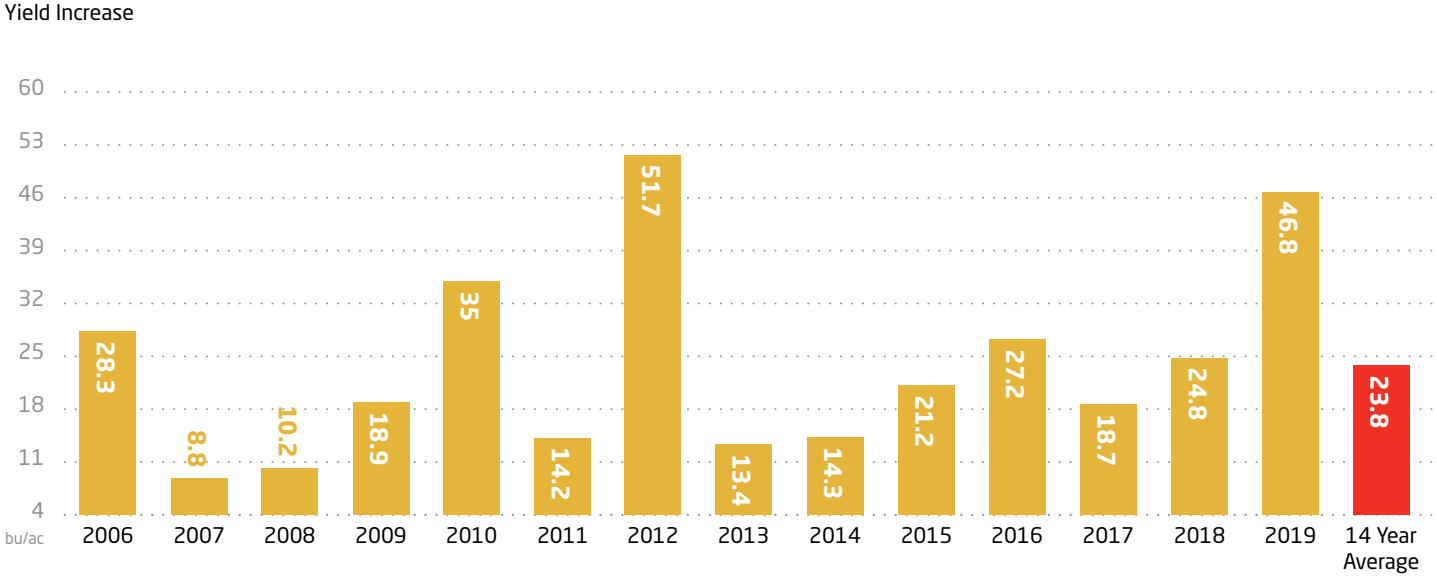
14 Year Fungicide on Corn

We observed a significant response to fungicide at the Pleasant Plains research farm in 2019. It was the second highest yield advantage in our 14 years of recording fungicide data at this location. 2019 was second to 2012, which was a severe drought year.

- Fungicide applications play a major role in high yielding environments
- The two years with the largest response occurred when the plants were under periods of high stress - drought in 2012 and extreme wet periods in 2019
- The addition of BRANDT foliar boron products have been included in fungicide applications all 14 years. In most recent years, the product of choice is BRANDT Smart B-Mo

Fungicide and BRANDT foliar boron products play a significant role in high yielding corn. We see this on our research farms and trials throughout central IL and the US.

Multi-Year Yield Response to Fungicide



13 Year Corn Yield & Revenue of All Corn Plots

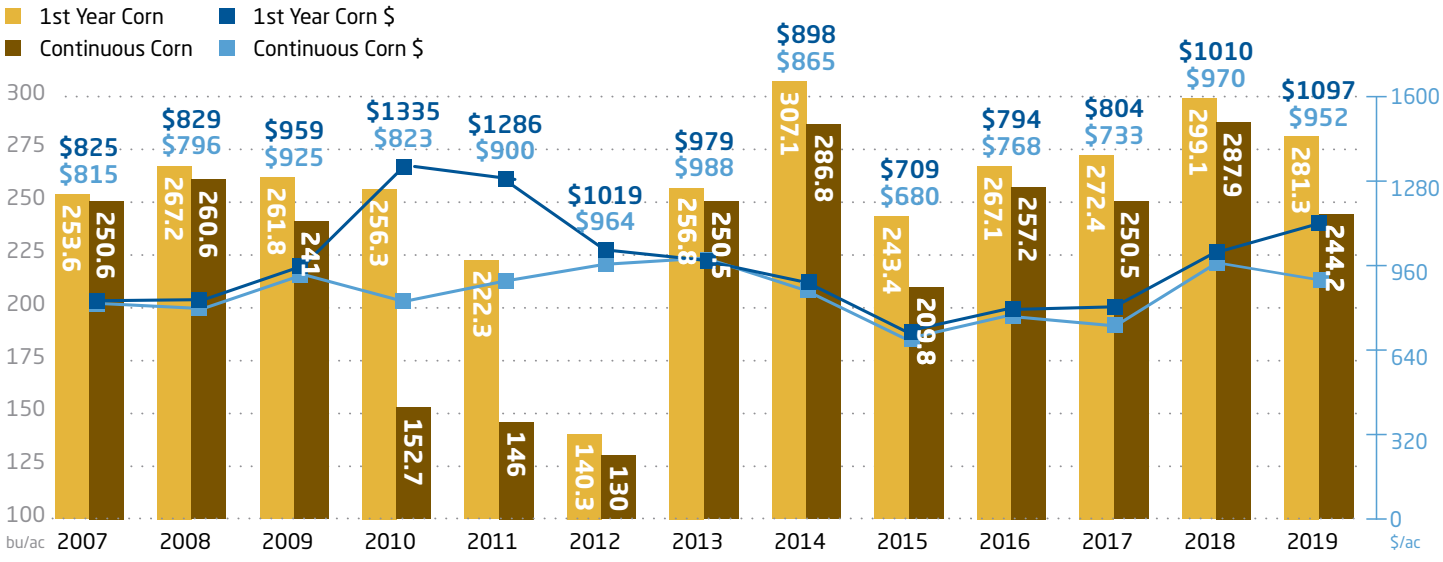
We learned a lot from 2019. Probably the most important lesson was not to give up on the crop. Despite everything Mother Nature threw at us early, we made the BRANDT Total Acre applications. Once the weather improved and conditions turned more favorable, the crop started to catch up and the results were eye opening.

What worked:

- Fall applied NH_3
- P&K maintenance
- Hybrid/population placement
- Sulfur at planting
- Herbicides with foliar micronutrients
- Fungicide/insecticide with foliar micronutrients

The BRANDT Total Acre program is designed to optimize products and practices to make our customers' acres more profitable. Each item can be executed individually to achieve benefits, but when a whole systems approach is implemented, the potential increase is much greater.

Multi-Year Yield Response to Rotation



Evolution of Management Practices

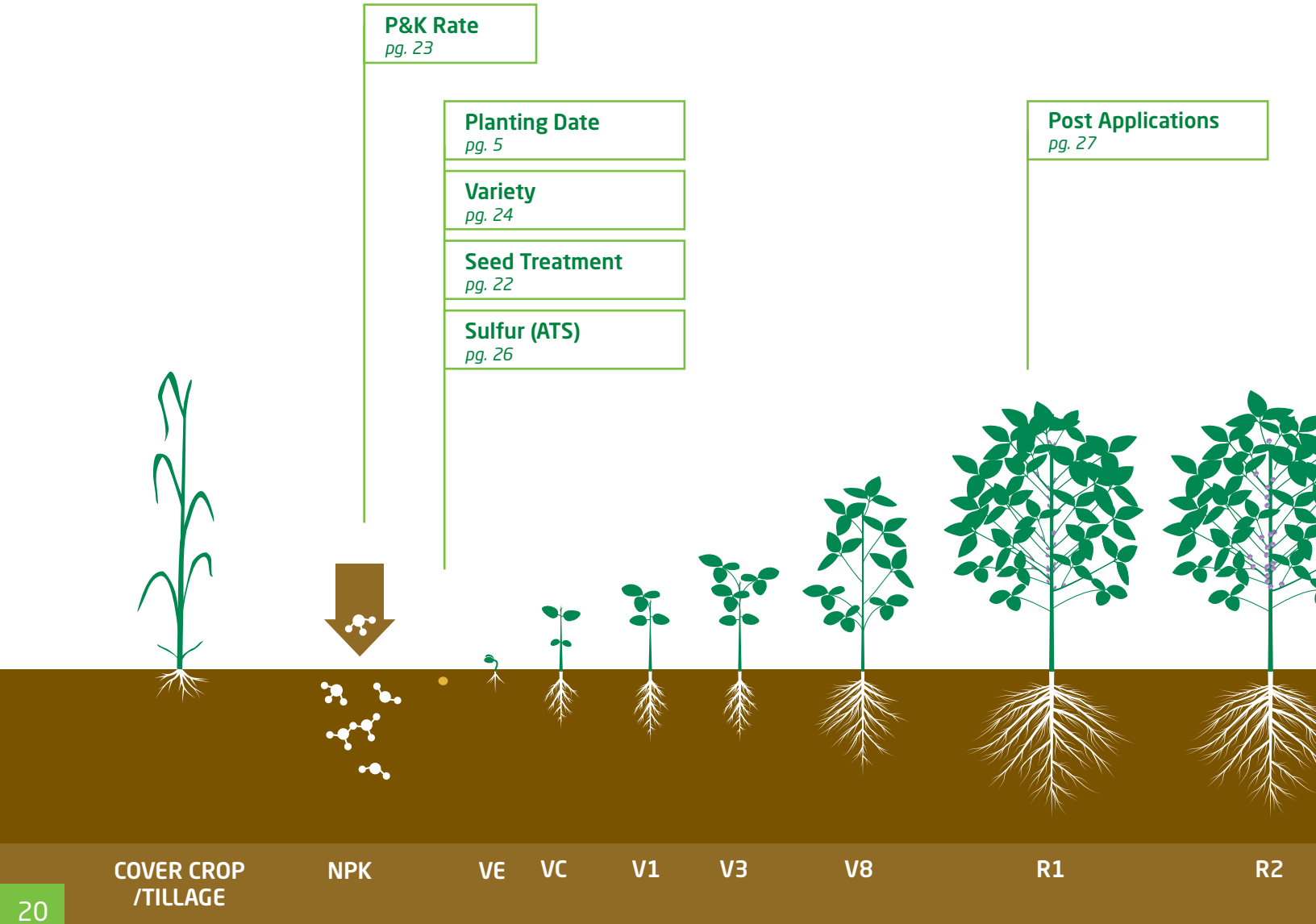
	2010	2011	2012	2013	2014
Environment	Collapsed soils from the wet winter immobilized nitrogen into the residue. Soil mineralization was shut down. The summer nights were hot and humid. Drying trend for harvest. Tillage used to reduce residue/soil density layers.	Light rains during April and May combined 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.	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.	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 with ample moisture. The fall began dry and quickly moved into a cold and rainy late harvest.
Identified Practices	• 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	• Fall applied nitrogen moved deeper into the 2nd 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	• 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
Advancing Practices	• Nitrogen immobilization • Soybean fungicides • Split nitrogen apps • 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	• Hormones assist plants • Apply sulfur • Split apply nitrogen • Higher populations • Apply side dress nitrogen early • Long maturity soybeans • Seed treatments • Foliar applications mitigate transient nutrient deficiencies	• 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

2015	2016	2017	2018	2019
A moderately cool/moist winter led to a cool/dry spring. Light rains fell in April and May making good planting conditions with slow corn emergence due to the cold. June was unusually wet with 20 plus inches for the month. July and August were dry and cooler than normal.	A record rainfall in late December flushed a lot of residue and mobile nutrients into the watersheds. Even with this loss of nutrients, the soil conditions at planting time were excellent. A 45 day dry spell starting in June led to one of the wettest July's on record with above average temps.	A mild and dry winter led to an early spring warm up. Excellent soil conditions for early April planting was interrupted on April 27 with heavy rains over 7 days. A dry summer with periods of high night time heat stressed crops through August.	A mild and near record dry fall and winter preceded gentle rains in February and March that recharged soils for planting. Excellent soil planting conditions and near perfect emergence set the stage for top yields.	Wet conditions began on Halloween 2018 which impeded harvest, tillage and fertilizer applications. Wet conditions continued through the winter to spring. This made for unprecedented late and unfavorable planting conditions.
• Even emergence fields were critical for top yields • Banded nitrogen at planting time improved nitrogen efficiency • Hybrids with early plant vigor maximized yields • Insect damage was minimal in 2015 due to the wet June • Cover crops improved soybean yields	• Plant early for the best yields • Mobile nutrient management had the best ROI • Strobilurin and boron applications greatly improved yields by reducing stress on corn and soybeans • At plant applications of nutrients were the most efficient due to the dry June weather • Cover crops improved soybean yields	• Plant early for the best yields • Sulfur management had the best ROI • Strobilurin and boron applications greatly improved yields by reducing stress on corn and soybeans • At plant applications of nutrients were the most efficient due to the dry May to August weather • Cover crops improved soybean yields	• Plant early for the best yields • Yellow corn from sulfur deficiency was the talk of the state! Must apply sulfur at planting • Strobilurin and boron improved yields by re-ducing disease and stress on corn and soybeans • At plant applications of nutrients were the most efficient due to the dry June to August weather • The coldest April on record pushed record yields in conventional tilled fields	• Must apply sulfur "at plant" in a sulfate form. Early and late application timing failed due to rainfall • Strobilurin and boron improved yields by reducing disease and stress on corn and bean • At plant applications of nutrients were the most efficient due to a wet spring followed by a dry June • Foliar applications of micronutrients, hormones, and fungicides drove yields
• Even corn emergence • Band nitrogen at plant • Cover crop allelopathy did not affect soybeans • Allelopathy in corn was stopped by strip tillage • Amplified boron deficiency • Zinc at plant continues to improve yields • Plant soybeans by the end of April to maximize yields	• Even corn emergence • Band nitrogen at plant • Cover crop allelopathy did not affect soybeans • Allelopathy in corn was stopped by strip tillage • Amplified boron deficiency • Zinc at plant continues to improve yields • Plant soybeans by the end of April to maximize yields	• Even corn emergence • Band nitrogen at plant • Terminate cover crops in mid March • Protect early planted crops with foliar insecticides • Increase B applications; amplified boron deficiency • Sulfur at plant continues to improve yields and mineralization • Plant soybeans by mid April to maximize yields	• Near perfect corn emergence • Band nitrogen at plant • Terminate cover crops early • Protect early planted soybean with foliar insecticides and seed treatments • Sulfur at plant continues to improve yields and starts early season mineralization • Multiple post foliar applications of nutrients turns poverty peas into prairie pearls	• Plant soybeans first • Band nitrogen at plant • Protect early planted soybean with foliar insecticides and seed treatments • Wet soils at planting respond to fungicide seed treatments • Sulfur at plant continues to improve yields and starts early season mineralization • Multiple post foliar applications of nutrients turns poverty peas into prairie pearls

BRANDT Total Acre Soybean Pole Positions

BRANDT Total Acre is an omission style trial system that is focused on exposing the differences between variety phenotypes. The "omission design" 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 the total high management system rather than a limited response due to some or all parts of the system.

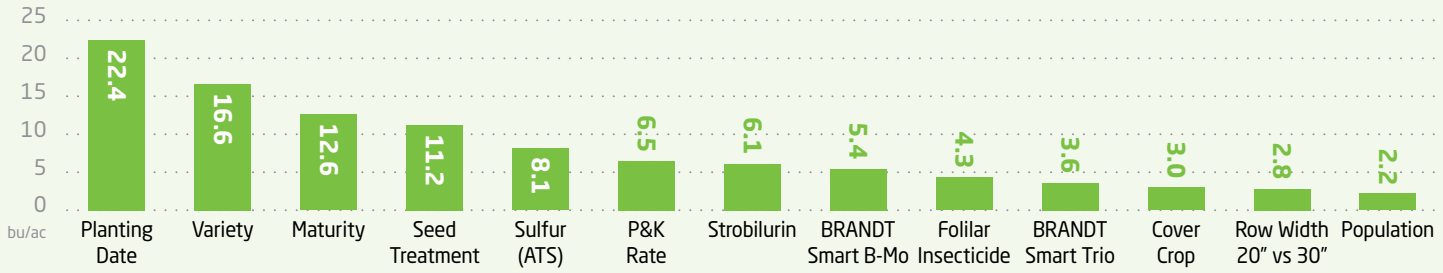
- 15-50-150 suspension in fall
- 120,000 population
- 7 gal/ac ATS at plant (2x0)
- BRANDT Elite seed treatment
- Conventional tillage
- Pre-emerge prior to plant
- Post applied herbicide tank mixes + BRANDT Smart Trio + BRANDT Smart B-Mo at 3rd trifoliate
- Foliar insecticide at R1 plus 1 qt/ac BRANDT Smart Trio + 1 pt/ac BRANDT Smart B-Mo
- Strobilurin at R3/insecticide + 1 pt/ac BRANDT Smart Trio + 1 pt/ac BRANDT Smart B-Mo



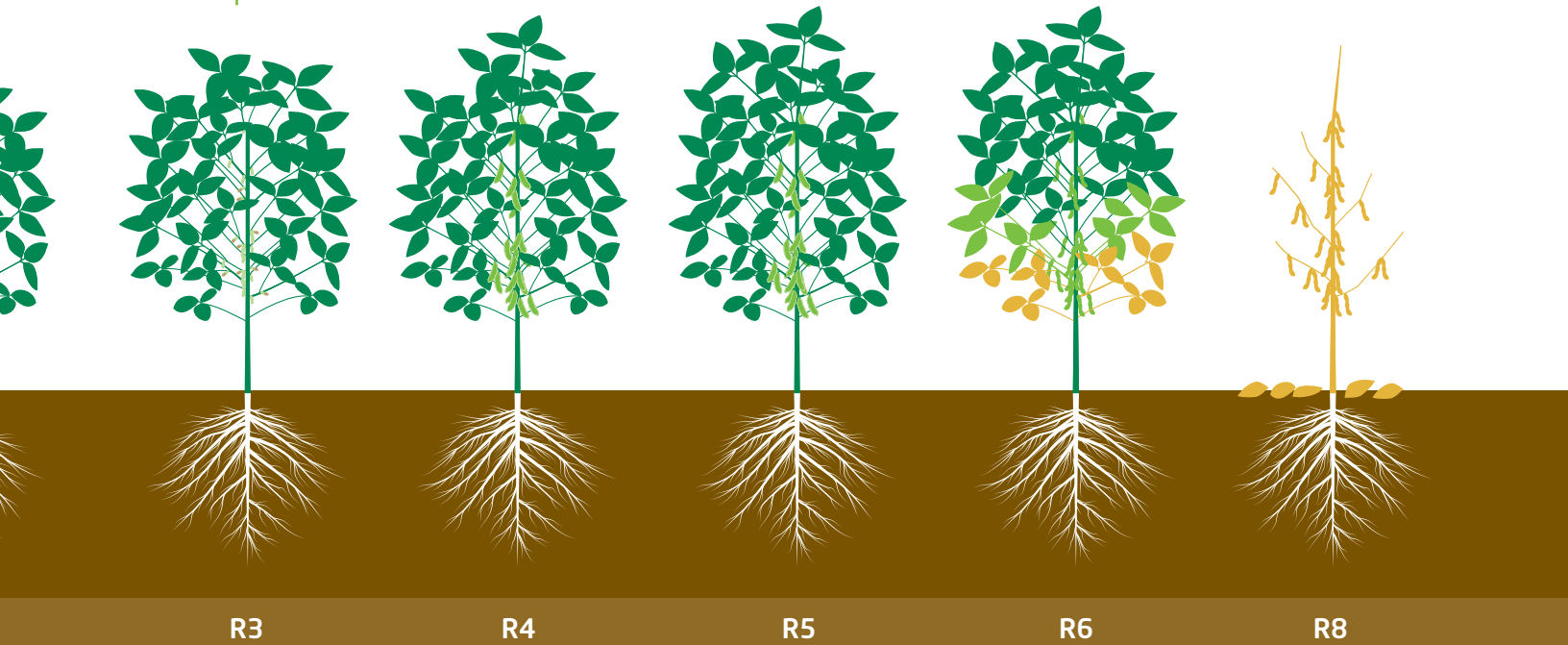
BRANDT Total Acre Pole Positions		2011	2012	2013	2014	2015	2016	2017	2018	2019	9 yr Avg	9 yr ROI
1	Planting Date	n/a	6.8	8.3	13.6	11.0	45.3	51.8	23.9	18.1	**22.4**	$$$
2	Variety	25.6	14.6	19.3	17.5	7.0	12.4	23.5	16.7	12.5	**16.6**	$$$
3	Maturity	17.0	10.2	13.0	8.5	0	12.4	23.5	16.7	12.5	**12.6**	$$$
4	Seed Treatment	6.1	11.9	7.4	5.5	8.5	12.9	7.5	16.3	24.4	**11.2**	5.3
5	Sulfur (ATS)	n/a	n/a	3.8	4.8	4.8	8.8	12.2	14.1	8.1	**8.1**	6.2
6	P&K Rate	1.6	3.5	4.0	5.2	n/a	n/a	15.4	n/a	9	**6.5**	1.2
7	Strobilurin	n/a	4.0	3.1	6.5	3.2	9.1	4.2	10.0	8.7	**6.1**	2.9
8	BRANDT Smart B-Mo at R2-R4	n/a	n/a	1.0	7.4	n/a	2.0	10.3	6.3	5.2	**5.4**	9.3
9	Foliar Insecticide	3.5	5.7	4.9	3.4	n/a	2.9	5.1	n/a	n/a	**4.3**	5.2
10	BRANDT Smart Trio	3.2	3.9	3.4	3.3	n/a	n/a	2.0	2.8	6.5	**3.6**	7.4
11	Cover Crop	n/a	n/a	n/a	n/a	9.5	0	1.4	-2.0	n/a	**3.0**	1.6
12	Row Width 20" vs 30"	n/a	n/a	n/a	n/a	n/a	2.8	1.3	5.0	2.1	**2.8**	$$$
13	Population	2.5	2.8	3.6	0	n/a	n/a	n/a	n/a	2.1	**2.2**	1.9

The ROI (Return On Investment) listed is calculated using the 2019 fall crop insurance price of $9.25 per bushel, multiplied by the yield response per acre, minus the cost per acre of a practice. For every dollar invested per acre in a practice, the ROI factor is how many dollars you get in return. We use a symbol of $$$ for practices that had no measurable cost per acre, but offer the best ROI.

9 Year Average Yield Advantage



Fungicide plus BRANDT Smart B-Mo at R2-R4
pg. 28



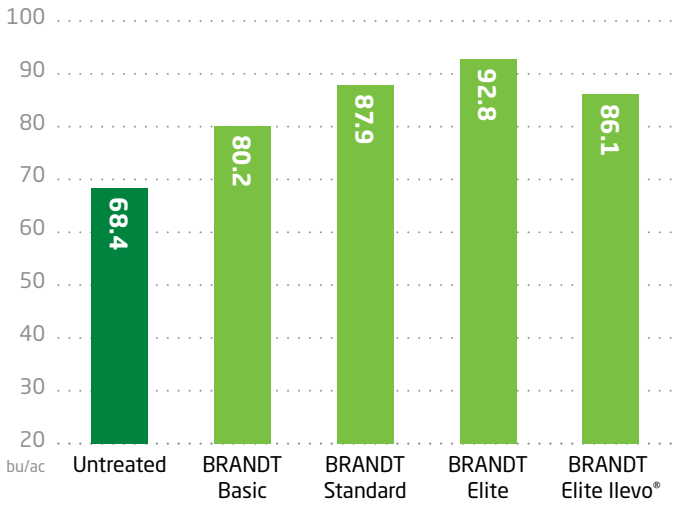
Soybean Seed Treatments

Soybean seed treatment technologies are a major contributor to the high yields we see at our research farms. They are particularly beneficial for early planting dates.

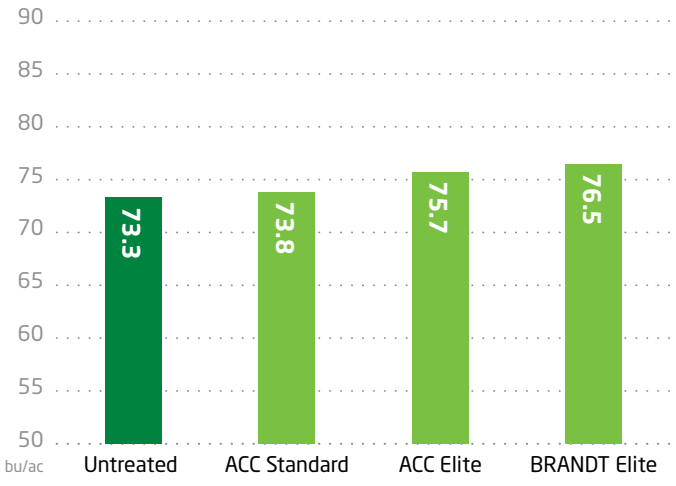
- Yield winners in our soybean seed treatment trials were treatments that contained fungicide, insecticide, nematicide and a biological
- Observation from 2019: seed treatment resulted in timely and even emergence, less insect feeding and increased yields over untreated seed

Soybean seed treatments can be a complicated landscape of products. BRANDT is very selective in offering the products that give our growers a distinct advantage.

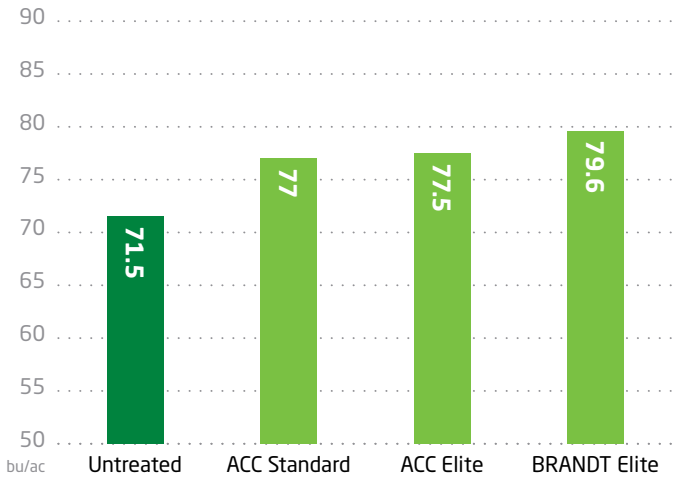
Pleasant Plains - Treated vs Untreated



Lexington - Treated vs Untreated - Trial 1



Lexington - Treated vs Untreated - Trial 2



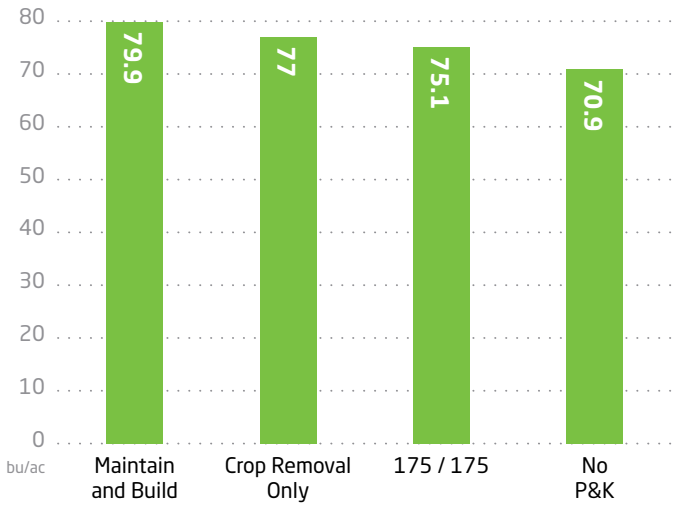
P&K on Soybeans

As noted in the P&K corn trial, this is the first year for a new research farm location in Lexington. From year one we will be able to manage different strategies and outcomes to show the overall response to P&K applications.

- After the first year we are seeing the benefits of proper P&K management
- Understand soil test results, nutrient removal from grain and a yield projection to build a sound fertility program

Soil fertility is the foundation for a successful crop. There are penalties, in all crops, for not maintaining adequate levels to support desired yields.

P&K on Soybeans



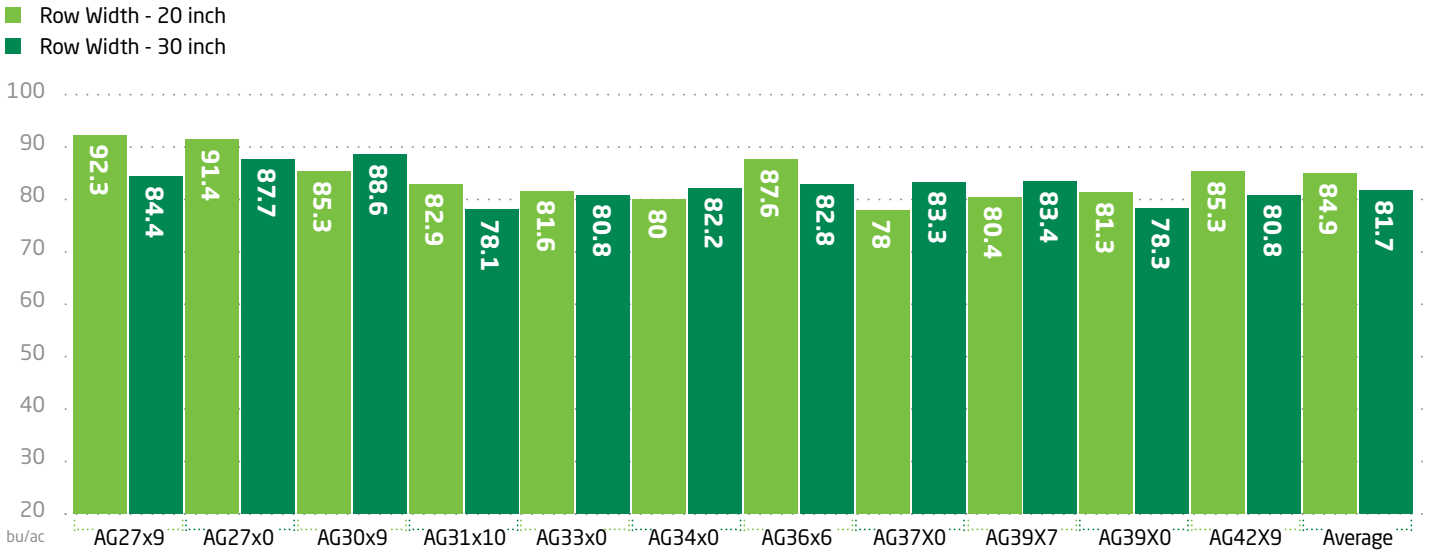
Soybean Variety vs Row Width Trials

The 2019 soybean variety and row width trial continued the trend of 20 inch rows out-performing 30 inch rows. We were surprised that the lowest relative maturity varieties were among the highest yielding in 2019.

- Population: 120,000
- Planting date: 4/11/2019
- Previous crop: Corn
- 36X6 continues to be solid performer year-after-year

In our trials, 20 inch rows consistently perform better than 30 inch rows. There are many good varieties to best fit management practices and increase ROI potential.

Soybean Variety and Row Spacing



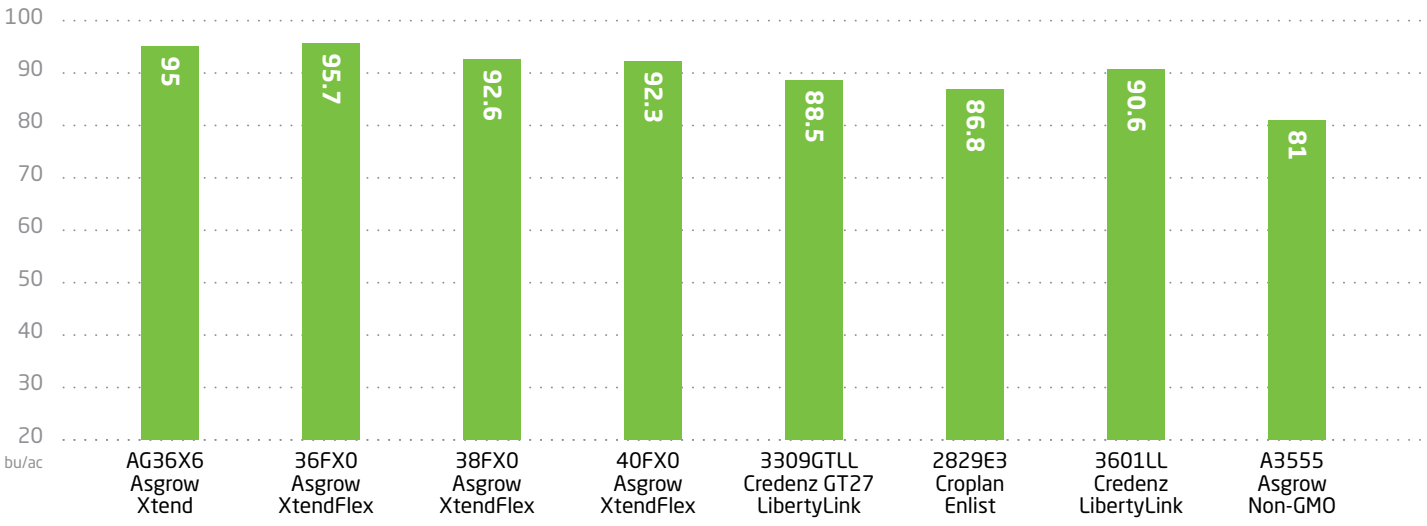
Soybean Trait Yield at High Management

In 2019 we had the opportunity to take three of the new XtendFlex® varieties to yield along with measuring them against other new and existing trait technologies under a high management scenario.

- All varieties performed well, but the Xtend and XtendFlex varieties out-performed the others
- High management refers to use of ATS at planting, fungicide and insecticide applications and BRANDT foliar products. The same treatments were applied across all varieties

The new trait package technologies all performed well. Besides yield, it is important that they give us tools to use against weed resistance.

Yield vs Trait @ High Management



Soybeans

At Planting Nutrition

Pleasant Plains, IL

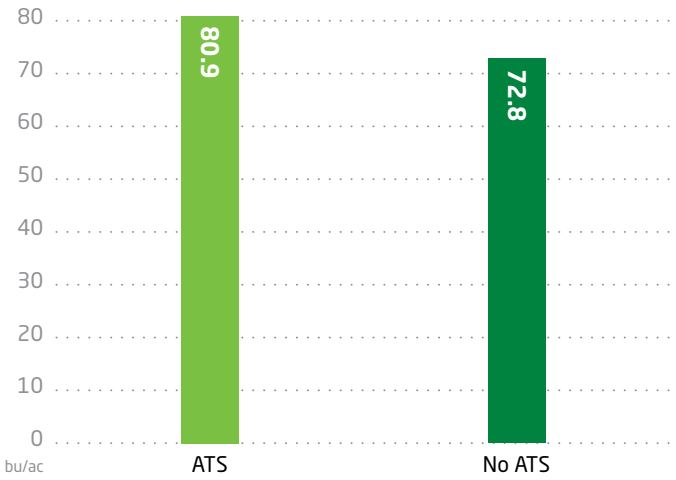
Sulfur on Soybeans

7 gal/ac of ATS was applied at planting and for the third consecutive year it produced a positive ROI. Sulfur continues to be an element that achieves a lot of gain and can be easily incorporated in most production management plans.

- ATS is the recommended source for sulfur applications by BRANDT
- The sulfate sulfur in ATS is immediately available to the plant whereas the elemental sulfur portion of ATS will be broken down to sulfate over time

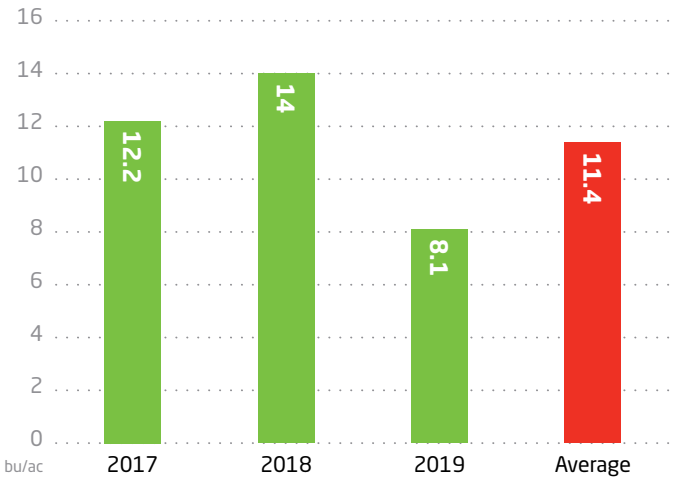
Sulfur plays a valuable role in high yielding soybeans. Atmospheric sulfur has decreased, therefore supplemental sulfur is key in our area.

Sulfur ATS on Soybeans - 7gal/ac



Sulfur on Soybeans - 3 Year

Yield Increase

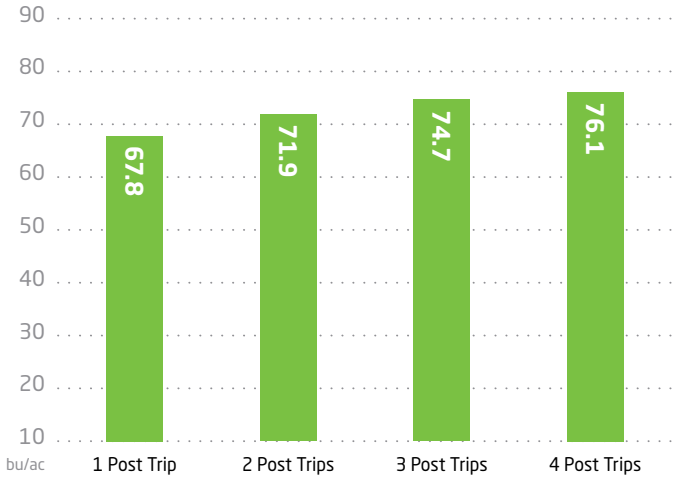


Soybean Post Application Trips

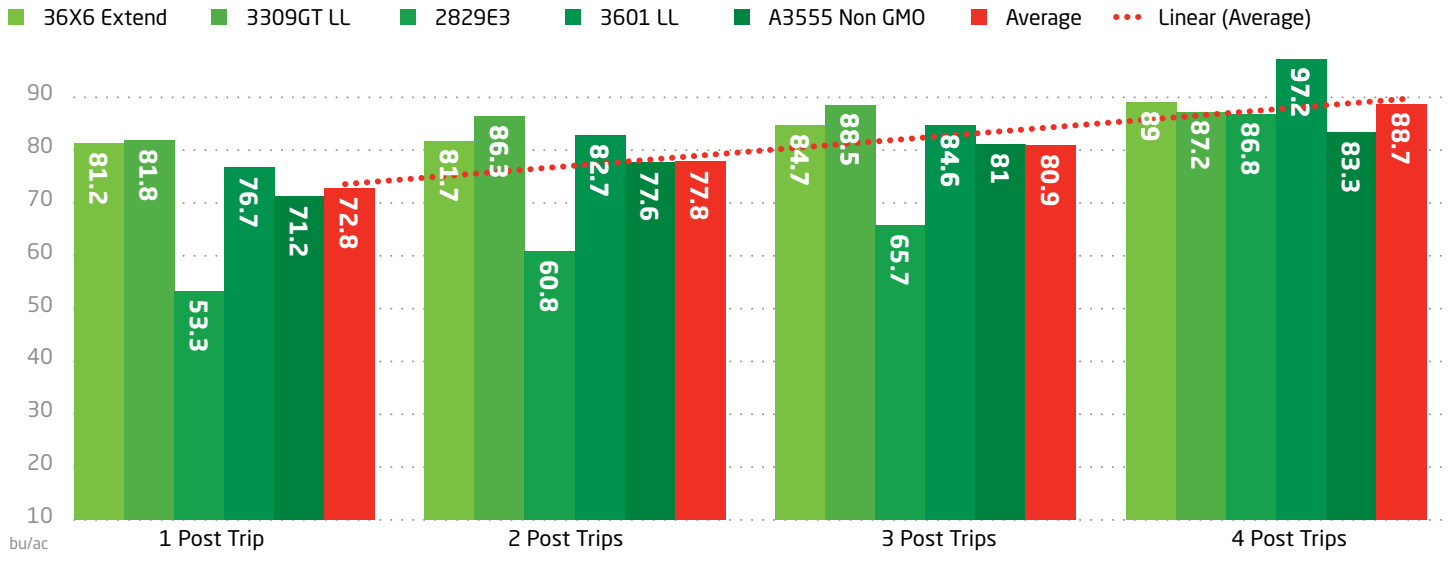
- This trial is designed to maximize yield through post-applied crop protection and BRANDT nutrition products
- BRANDT Smart System products used in combination with crop protection products were BRANDT Smart B-Mo, BRANDT Smart Trio and N-Boost® 5
- At Pleasant Plains we looked at the trial system across different traits and how each would respond

As genetics change we need to take a look at how they react to different product applications as well as timings of those applications. Knowing how they respond to each individual treatment assists us in making an accurate overall recommendation.

Soybean Post Applications - Lexington



Soybean Post Applications - Pleasant Plains



Soybeans

Foliar Applications

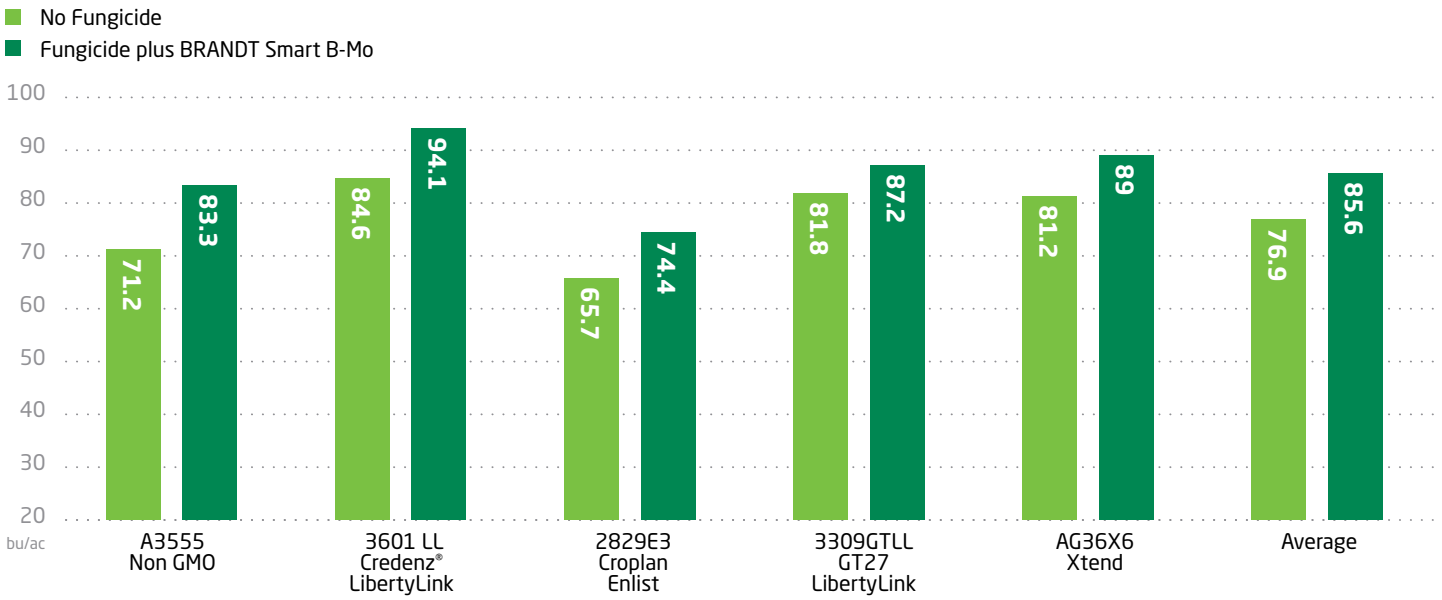
Pleasant Plains, IL

12 Year Response to Fungicide, Insecticide & BRANDT Smart B-Mo

The yield advantage of a fungicide, insecticide and BRANDT Smart B-Mo application was 8.7 bu/ac, which is 3 bu/ac above our 12 year average. This is one of our longest running trials at the Pleasant Plains research farm and has seen major improvements in crop protection products and BRANDT foliar nutrition technologies over the course of the trial.

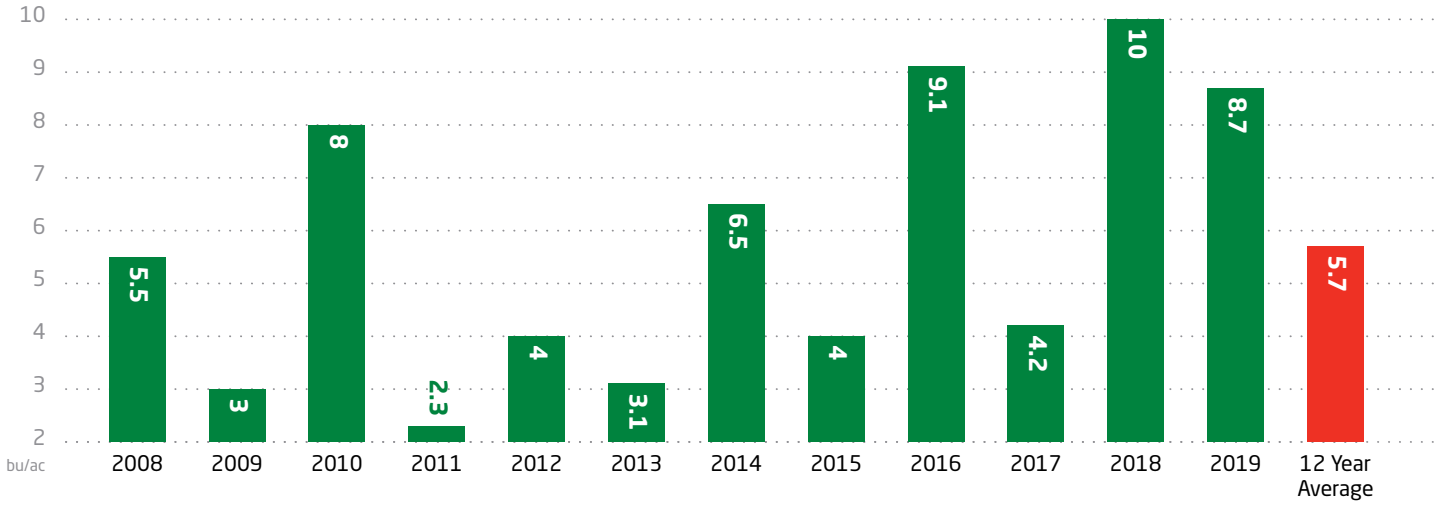
Applications of fungicide, insecticide and BRANDT Smart B-Mo are essential for high yield soybeans as experienced on our research farms and high yield fields throughout the BRANDT trade area.

Soybean Trait Response to Fungicide



Multi-Year Response to Fungicide

Yield Advantage with Fungicide, Insecticide and BRANDT Foliar Boron Products



Summary

On behalf of BRANDT we want to thank you, our customers for your business. We hope you have enjoyed and benefited from the 2019 BRANDT Research Farm book. We enjoy the process.

This is the 15th year for the Pleasant Plains farm and the 8th year for Lexington. We continue to build on a solid foundation of multi-year data that you can apply to your own operation. I have heard many say that they would be glad to see 2019 pass on by! It was a challenge in all of its seasons, but for most of our customers the results were better than expected. We hope our advice had a small part to play in that.

During the summer we held our annual Agronomy Days at each farm. These well attended events feature BRANDT agronomists and guest experts. The Keynoter at Pleasant Plains was Dr. Shaun Casteel of Purdue University who spoke on precision soybean management with emphasis on sulfur nutrition. A timely topic for growers. At Lexington, Rich Morrison of Diversified Services discussed grain marketing and trade issues that are impacting growers. We were also pleased to have another presentation by Dr. Casteel. Be sure to join us next summer.

Over the years our agronomists have uncovered some valuable local trends to assist our customers. I've pulled out a few notable items. First the importance of planting date for both corn and beans is tremendous. As you read this book this winter you can plan to take advantage of this opportunity. Also look at the 14 year average corn yield increase of 23.8 bu/ac with fungicide and BRANDT foliar products and the 12 year, 5.7 bu/ac increase in soybeans. By now we should all be believers! Now we have to make sure we use the right products and timing. Talk to your local BRANDT advisor. On page 9 there is a line that reads, "Use data to determine the best utilization of nitrogen for each field". I would extend it to say that BRANDT can help you use data to make all agronomic decisions on a field by field basis. Ask us.

BRANDT has a great team to organize and implement the farms and the publication of this book. Ed Corrigan is the manager of the Pleasant Plains Research Farm and the primary author of this book. Dan Froelich is the manager of the Lexington farm. Rod Riech organizes and edits the book and keeps it on track. They are joined by many other BRANDT employees to produce this work. Thanks to all.

2020 will present its own set of challenges. We encourage you to work with the BRANDT Agronomy Team, Ed Corrigan, Kyle McClelland, Dan Froelich, Steve Clement and Jacob Winans to participate in BRANDT's precision agronomy and data collection programs.

Seems odd to say 2020, but it is here and we stand ready to serve you this year and beyond. Here's to farming for success and profit in 2020!

Tim McArdle
General Manager

BRANDT RETAIL LOCATIONS

Ashland	217 476 3438
Auburn	217 438 6158
Cooksville	309 725 3710
Cropsey	309 377 3121
Curran	217 483 4512
Fairbury	815 692 2612
Farmersville	217 381 2546
Fisher	217 897 6920
Franklin	217 675 2302
Galesville	217 489 2141
Greenview	217 968 5589
Gridley	309 747 2233
Lexington	309 365 7201
Lincoln	217 735 2571
Mt. Auburn	217 676 3231
New Berlin	217 488 3125
Niantic	217 668 2228
Oakford	217 635 5765
Pleasant Plains	217 626 1123
Raymond	217 229 3442
Towanda	309 728 2293
Virginia	217 452 3545
Waverly	217 391 9705
Williamsville	217 566 2113

BRANDT
2935 South Koke Mill Road
Springfield, Illinois 62711 USA
www.brandt.co
217 547 5800

BRANDT®
Professional Agriculture®

2020-01