Trial Results
2022

United Prairie℠

At United Prairie, the main focus every day is increasing our grower's success and that is why this company has grown so much over the last 26 years since its inception. On behalf of all the dedicated employees, we are proud to present the 2022 Innovation Farm and Grower Evaluation trial results.

Our Mission with the Innovation farm and side-by-side testing program are to provide independent, local agronomic results to make our growers more successful. Every year new products, technologies, and management practices are introduced to the marketplace. We feel it is our responsibility to make sure that our growers have all the information needed to exceed their goals and navigate through all the information they receive. We have been successfully doing this for a number of years now on this farm and continue to make changes to improve on what we have done in the past.

We continue to ensure that all the information you see from our research is strictly independent and not sponsored by anyone. We feel this is of the utmost importance in ensuring that the information we provide is pure and accurate in the aid of helping our growers make sound purchasing decisions. We are committed to only recommending products that show a Return on Investment, and not just increasing yield.

Thank you so much for taking the time to review this information. Your success continues to be our focus and that will never change. We look forward to seeing all of you at our winter meeting on January 12th. Thank you for your business and support of United Prairie. Thank you for making this a successful, growing company.

Best Regards,

Curt Miller
General Manager

For so many years now all of us here at United Prairie have continued to have one major focused effort, and that is to bring you top quality localized research. As 2022 comes to a close and 2023 starts we hope that we have done that once again this year in our 2022 trial results book. Along with the countless hours and time that is spent each and every season working on this data, the goal in the end is to hopefully assist in the navigation process of finding what products or practices can bring the highest ROI not only on our Innovation Farm but most importantly your farm.

Each season brings with it new challenges and 2022 didn't let us down from that standpoint at all. From early planting season weather fluctuations moving from low 60's to upper 90's, to spotty rainfalls in most places and continued flooding in others. All this followed up with crop tours that alluded that yields were going to be drastically off this growing season, to combines rolling through the fields and all of us asking ourselves where did these bushels come from!!! Many of us are fortunate to farm some of the best ground in the world here in Illinois, but great soils still bring frustrations each farming season as we attempt to not only navigate how to grow a decent crop, but also purchase inputs, compete for land, avoid the tax man, and most importantly try to have a decent work life balance.

As I myself get older and so do my two daughters we all must sit back and fully realize what is the most important part of this job we have as farmers. Is it growing the highest yields? Raising a family? Getting that perfect picket fence stand? Bringing the biggest ear into the coffee shop? Making it to your kids sporting event? Or doing the best you can each and everyday with the key partners in your business? The answer to this question is we hope to achieve all these, and our team at United Prairie hopes to be an integral part in assisting you through whatever you throw at us.

In closing, as we look forward to the 2023 growing season, I ask each of you to step back and take a look at your biggest deficiency, and make sure to address that item first and foremost, because success doesn't happen with one simple action or step, but a precise program that you must follow through from start to finish. Thank you for your continued business and best of luck in 2023!!

Kyle Meece
Agronomy Manager
CCA & 4R NMS

TABLE OF CONTENTS

United Prairie, LLC **Page**

Note from Curt Miller; General Manager
Note from Kyle Meece; Agronomy Manager

Innovation Farm Trial Results

Corn Research

QR Code Instructions on Accessing 6
QR Codes for 2015 – 2021 Trial Results Books 7
Additional focus product QR Codes 8-10
New Year Brought Some Updates 11
Corn and Soybean Overview Innovation Farm 12-13
Year #2 CoverCrops Ahead of Corn 14
Feeding Micros from Start to Finish 15
Whats New in the Furrow?? 16
Is 2 x 2 making a comeback?!?!?! 17
Protecting your Nvestment Take 2 18
Pivot Bio ProveN 19
Sulfur On Corn: Just Plan On It!!! 20
Corn Post Foliar Options 21
Harnessing that Atomopheric N 22
Timing & Product Trials Corn Fungicide 23
Digesting Residue…..Why?? 24

Soybean Research

Year #2 Cover Crops Ahead of Soybeans 25
Soybean Treatment Comparison 26
Direct Placing Nutrients in Soybeans 27
Base Saturation “K” 28
Sulfur Not Just for Corn Anymore 29
Progressive Foliar Applications 30
SAP Analysis 31-33
Soybean Fungicide Timing 34
What else is missing at R3-4??? 35
Innovation Farm 2.0 36

On-Farm Trial Summaries

Corn On Farm S x S Research 37
Soybean On Farm S x S Research 38
What’s New At United Prairie 39
United Prairie Summer Internship Opportunities 40-41
TruTerra 42
United Prairie Technology Service Offerings 43
Accolade Financing 44
Multi-Year Side by Side Summary and ROI Results 45

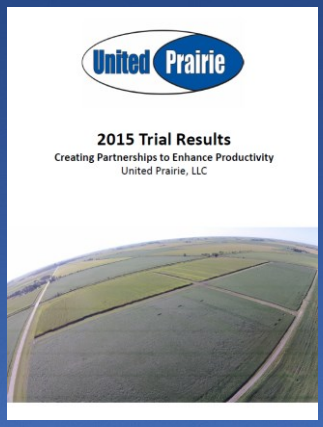
QR Codes Past Years Trial Results Books and Products

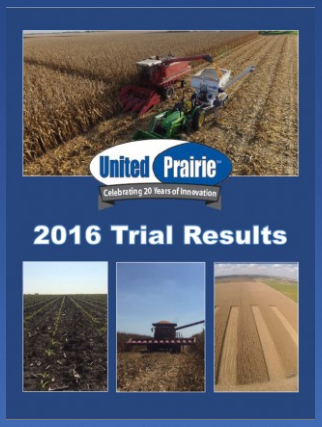
Flow Code Examples

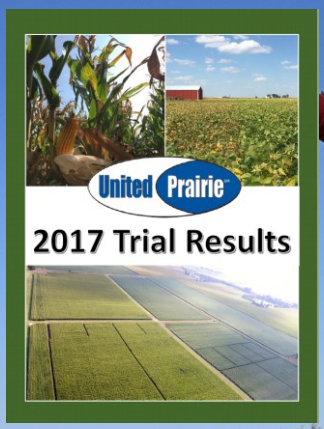
As we did in the 2022 Trial results book, here at United Prairie we always want to make sure that you're not only up to date with the current trials and information we supply, but also have access to past yield results and product information contained in this book. With that being said the following pages include QR codes where your able to access that information at your convenience. We hope that this information provides you a type of road map as your planning for the 2023 growing season. We have worked with some products for a number of years now that have continuously shown consistent ROI, and we highly encourage that if you're not at least trying one new thing on your farming operation, that you implement that process going forward. Don't fall into the trap of just expecting increased yields year in and year out without putting forth the work necessary to achieve them.

Accessing the QR Codes

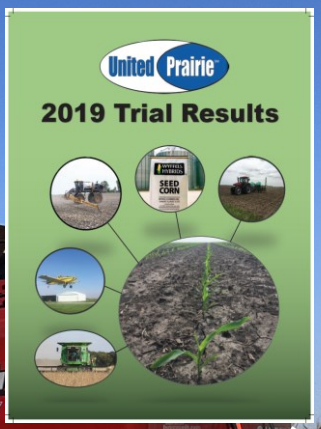
- First go to settings > camera on your mobile device and turn on camera scan QR Codes setting
- To open the flow code on the following pages then, access the camera on your cell phone, and hold phone up to QR code once it is in camera mode
- Camera will automatically sense the QR code and ask you to select and open the QR code link in the web browser by clicking link on your phone screen
- Click link and you will be taken to pdf copies of past trial results books or key products discussed in 2022 trial results book
- If above steps do not work download QR Code Reader app from the app store and follow instructions


United Prairie
2015 Trial Results
Creating Partnerships to Enhance Productivity
United Prairie, LLC


United Prairie
Celebrating 20 Years of Innovation
2016 Trial Results

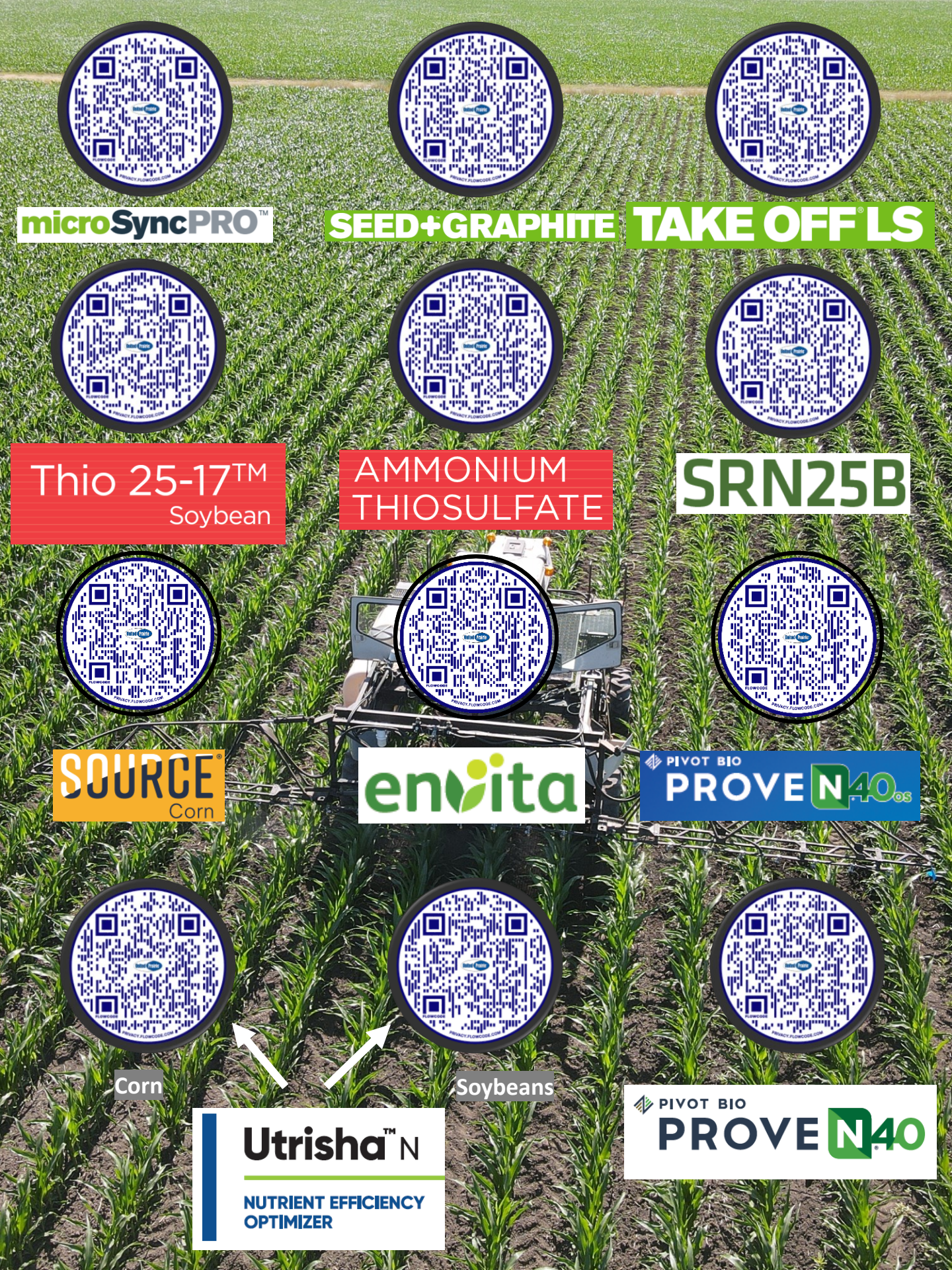

United Prairie
2017 Trial Results

2018 Trial Results
United Prairie


United Prairie
2019 Trial Results

United Prairie
2020 Trial Results

2021 Trial Results
SERVICE - PARTNERSHIP
25
INNOVATION


microSyncPRO™
SEED+GRAPHITE
TAKE OFF® LS
Thio 25-17™
Soybean
AMMONIUM
THIOSULFATE
SRN25B
SOURCE®
Corn
envita
PIVOT BIO
PROVE N40 OS
Corn
Soybeans
Utrisha™ N
NUTRIENT EFFICIENCY
OPTIMIZER
PIVOT BIO
PROVE N40

START RIGHT 2.0

XYWAY LFR FUNGICIDE

ZIRONAR BIOFUNGICIDE/BIONEMATICIDE

CYGIN PRO

Ascend SL

LEVESOL Zn

NH3

UAN

N-EDGE PRO

Instinct NXTGEN

CENTURO

SP-1 Classic

MARCO QuickGrow Complete

TRIDENT N A VERDESIAN NUE SOLUTION

MOXON™ B

MOXON™ MN

MicroPlus

Hydri-Gro Vigor 802

TimaUp

DUO MAXX
RHIZOVIT DUO

iNvigorate®

PREV-AM

ORO-RZ
ROOT ZONE

New Year Brought Some Updates

A 3500 Kinze planter was added to the fleet this past growing season and has been a tremendous asset for the research. The Kinze came as a split row planter but after it received a Hettinger Precision makeover this winter the 15" rows came off to make room for In Furrow starter tanks, Yield 360 bandit starter tanks, AgXcel pump, Clean Sweep row cleaners, DeltaForce, Vdrive, and a couple smartfirmers. This rig is ready to plant in multiple geographies and planting conditions, and with a few more additions still to add ahead of 2023, this old used Kinze planter has come alive with the latest in precision offerings

Another new addition was this 8250 Hagie sprayer. When trying to do applications from pre-plant through fungicide timing, but on a reduced size basis (20' boom), an older Hagie seemed like the right tool for the job. This unit came from a research farm in Michigan and hadn't seen the sun in 5+ years. After a little TLC and some work from our top notch maintenance crew, one tank was removed and replaced with a CO_2 system, and 4 separate product tanks, that can allow us to implement multiple studies at a time before having to refill. Few more add-ons still coming and maybe a small scale dry application ability in '23.

United Prairie Innovation Farm
2022 Overview Corn

Quadrants: North East & South East

Planting Date: May 17, 2022

Hybrid: Wyffels 7878 planted on all farm except Pivot Bio Trial was Wyffels 7876

Population: 36,000 ppa

Harvest Date: October 14, 2022

Soil Testing Averages:

- North West Quadrant- pH: 6.8, P:77, K: 306, CEC: 20.8
- South West Quadrant- pH: 6.5, P: 80, K: 308, CEC: 21

Fall 2021 Fertilizer Application: VRT applied Phosphorus and Potassium based off United Prairie CEC based recs, also working on Base Saturation Potassium study in SE quadrant so applied 450 lbs/ac Potash on 140' of area (2nd year in a row of this)

Fall Tillage: Chisel Plowed bean stubble with exception of cover crop or minimum tillage studies

Drainage: Pattern tiled research farm November 2020

Spring Tillage: Soil Finisher

Spring Nitrogen: Pivot Bio Proven40 study received protocoled treatments, remainder of farm received 100 lbs/ac N Spring NH3 on April 12, 2022

Planter Nitrogen: Besides protocoled studies, farm received 10.5 gal/ac 32% & 4.5 gal/ac ATS applied through Yield 360 Bandits at planting (43 lbs N & 12.87 lbs S)

Sidedress Nitrogen: Besides protocoled studies, farm received 20.2 gal/ac 32% & 4.5 gal/ac ATS applied on June 16, 2022 (77 lbs N & 12.87 lbs S)

Herbicide Program:

- Pre-Emerge Application: 1.5 qts/ac Acuron, 1 qt/ac Aatrex, 24 oz/ac Glyphosate, & .375 gal/ac Amsol Plus
- Post Application: 1 oz/ac Impact SC, 1 qt/ac Aatrex, 32 oz/ac Glyphosate, & .375 gal/ac Amsol Plus

Corn Marketing Price Used: $6.44/bushel

Innovation Farm Growing Season Rainfall Amounts (in.)						
Year	**April**	**May**	**June**	**July**	**August**	**Total Rain**
2022	2.54	3.63	1.05	2.19	3.65	13.06

United Prairie Innovation Farm
2022 Overview Soybeans

Quadrants: North West & South West

Standard Planting Date: May 11, 2022

Population: Target 140,000 ppa

Variety: Stine 36EB32 Enlist, Treated with Intellacoat, Ethaboxam, Saltro, & Seed + Graphite, except treatment study which followed the protocol list included in results

Harvest Date: October 14, 2022

Soil Testing Averages:

- North East Quadrant- pH: 6.6, P: 135, K: 416, CEC: 21.2
- South East Quadrant- pH: 6.5, P: 120, K: 389, CEC: 20.3

Fall 2021 Fertilizer Application: Phosphorus and Potassium applications based off United Prairie CEC based recs, also working on Base Saturation Potassium study in SW quadrant so applied 450 lbs/ac Potash on 140' area (2nd year in a row of this)

Fall Tillage: Chisel Plowed corn stalks with exception of cover crop or no-till studies

Drainage: Pattern tiled research farm November 2020

Spring Tillage: Soil Finisher

Herbicide Program:

- Cover Crops: 1 qt/ac Glyphosate 5, 1 qt/ac 2,4-D LV4, .375 gal/ac Amsol Plus, & 15 gal/ac H20
- Early Post Application: 4 oz/ac Anthem Maxx, 2 pts/ac Enlist One, 24 oz/ac Glyphosate 5, .375 gal/ac Amsol Plus, & 15 gal/ac H2O
- Post Application: 2 pts/ac Enlist One, 26 oz/ac Liberty, 8 oz/ac Clethodim, .375 gal/ac Amsol Plus, 15 gal/ac H2O

Soybean Marketing Price Used: $14.09/bushel

Xitavo™ Soybean Seed STINE® BREVANT™ seeds

Year #2 Cover Crops Ahead of Corn

Trial Description

When this initial project was started 3 years ago there was a commitment made to explore the potential affects of implementing cover crops into your operation for a minimum of 5 years. Along with wanting to evaluate cover crops in general and increase knowledge base of not only what they are doing in regard to yields, but the other side of the equation was also getting a better understanding of their benefits below the soil surface. The list of cover crops that one could look at implementing goes on for miles, but for you the bigger focus should be understanding as a grower what you are looking to accomplish within your operation, and then selecting a cover crop that meets those goals. For us on the research farm we have seen what the basics of oats and radishes have done, and wanted to take things to the next level by diving a little bit deeper into overwintering mixes this past growing season. Below are our 2022 findings

Cover Crop & Tillage Practices Ahead of Corn

Treatment	Final Population	Bu/Acre @ 15.5%	Harvested Moisture	Cost Per Acre Additional Trips or Products	Gross Profit/Acre
Chisel Fall, Soil Finisher Spring, & Plant	35,250 ppa	229.61	23.1%	$44.30/Ac Chisel Plow & Soil Finisher	$1,434.39
16 lbs/ac Wheat, 12 lbs/ac Crimson Clover, 2 lbs/ac Camelina	35,250 ppa	226.86	23.4%	$79.55/Acre for Wheat, Clover, & Camelina fb Burndown Herbicide	$1,381.43
60 lbs/ac Wheat Cover Crop	34,500 ppa	220.54	24.0%	$64.87/Acre for Wheat & Burndown Herbicides	$1,355.41

***Wheat: $.60/lb, Winter Camelina: $4.34/lb, Crimson Clover: $2.70/lb Soil Finisher: $16.60/Ac, Chisel Plow: $27.70/Ac, $6.44/bu Fall Corn Price, Generic Glyphosate: $76.50/gal, Amsol Plus: $6.63/gal, Floater Spraying 1st Trip: $7.25/Acre**
***Custom Rates used from University of Illinois Farm Doc. Field Operations Estimates 2021**

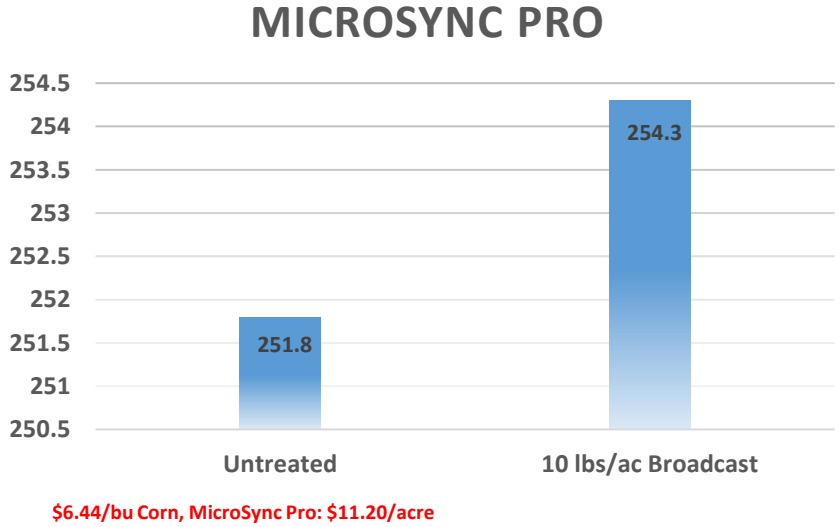
Summary

Cover crops ahead of corn have continued to be something that has been a struggle to figure out overall and see success in regards to ROI. As has been discussed in the past when it comes to final stand of corn after planting it is crucial to set things up for high yields, as every plant and ear of corn matters. The concern with introducing cover crops into the plan is that you now have a competitive crop growing along side the corn plant initially until covers are terminated, and this is pulling key nutrients away from the plant, as well as causing some reduced stands, which you can see is illustrated in the above charts. As you can see as the amount of cover crop volumes implemented went down the final stand (ppa) increased, which also had a direct correlation with yield increases. Part of the decision then if wanting to implement cover crops into your farm, is being very selective of varieties to use and rates that provide benefit. Where I truly feel you can make this process successful is in some sort of strip tillage program, where the covers are still being utilized throughout the field, but your able to plant the corn into a nice, dark, warm, clean tilled strip, and get that plant started off strong. If we are able to introduce a small scale strip tillage trial into our 2023 trials with covers we are definitely going to, and hope to continue to not only explore this concept even more, but also integrate in soil health scores and carbon credits into our data sets. This concept is being talked about a lot in the industry, and although is very challenging to grasp, it is a concept we will work diligently to better understand.

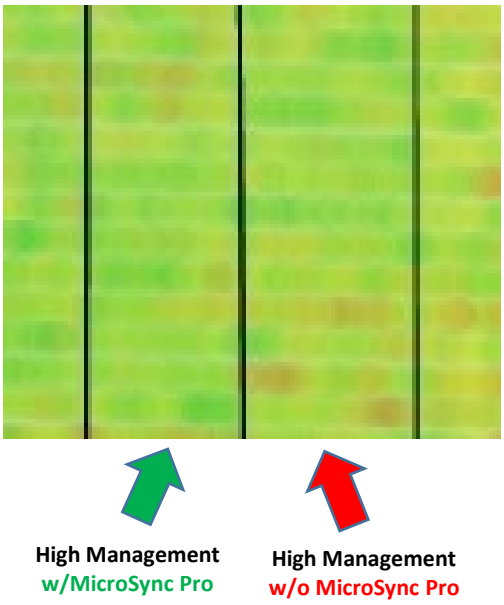
Feeding Micros from Start to Finish

Trial Overview

The addition of MicroSync Pro into our fields has been a tremendous benefit the last few years. After initial testing of this product started down at our Miller Ag facilities, we wanted to bring it north and see just what all we were missing. When you look at each granule of MicroSync Pro it is what is called homogenous, meaning they are very uniform in not only there structure but also the nutrient content of each particle that is applied. Having visited the manufacturing facility in Cape Girardeau, MO and watching this process happen you can see the attention to detail that is taken in making sure that a quality product is being brought to market. This year's study on MicroSync Pro we separated the corn side of the research farm and made applications at 10 lbs/ac broadcast of MicroSync Pro across the rows. Although this application was rough, we wanted to see if we could segment some yield separation between multiple trials within each quadrant of the farm. The data provided below is an overall summary of the corn quadrant that the application was made on, and then yield map segment to the right shows the importance of full management season long, as the left section showing stronger yields.



$6.44/bu Corn, MicroSync Pro: $11.20/acre



Summary

Didn't quite see as much separation in this year's study versus the last 3 but the key to any research is most importantly making sure that we saw some ROI, which we did at $7.40/ac!!! One thing that we did differently this year on the farm, that I haven't done in the past was applied the MicroSync Pro right after planting. This was an easy way to stay in the quadrants and ensure application stayed within the strips but the one thing it didn't do is offer a way to incorporate this key nutrition into the soil profile. As we all know some nutrients are very mobile in the soil while others are not, and Zinc is one of the key ones we need within this application that isn't very mobile. I feel like if I would've kept my protocols the same as past years this might have made a slight difference but none the less ROI was there still. As we move into next seasons trial plans already, we have a few of our Sales Agronomist looking at a stair stepped rate structure with MicroSync Pro of 10, 15, & then 20 lbs per acre applied. We hope to offset what we know high yielding corn really needs with this being a baseline of our treatments and follow that through season long with precisely timed testing procedures, visual observations, and of course yield data come next harvest season.

What's New In the Furrow??

Planted: May 17, 2022
Harvested: October 14, 2022
Hybrid/Population: Wyffels W7878; 36,000 PPA
Rows: 8 row entries (30")
In Furrow: All products applied through Keeton In Furrow seed firmers
Tillage/Rotation: Conventional; corn/soybean rotation
Soil Type(s): Drummer SCL, Flanagan SL; well drained

Trial Overview

In Furrow starter fertilizer products continue to be a large topic of conversation as we look to get that corn plant off to a great start. In this year's research studies we continued to implement our base in furrow offering of Optistart Plus as the carrier for the trials, but as we have expanded our search for alternative options on the marketplace that have shown even greater ROI, we've brought them into the program as well. Some of the tested products for 2022 we have been continuing to monitor for several years now, just trying to capture their response in different growing environments in hopes that they would perform the same. While new additions this year focused on the arenas of biologicals and biostimulants. These types of products seem to be gaining some traction and growth in the industry, but having a clear understanding of how they need to be not only delivered to the plant, but what they can be mixed with is where concerns are being seen.

Corn In Furrow Evaluation Innovation Farm 2022

Yield Rank	Corn In-Furrow Study	Rate per Acre	Bu/Acre	Bu/Acre Diff. from UTC	Net $ Return/A	ROI Rank
1	Quick Grow Complete	3 gal/ac	238.76	6.9	$10.30	4
2	Optistart Plus & Levesol Zn	3 gal/ac & 1 qt/ac	237.98	6.12	$11.89	3
3	Optistart Plus & Cygin Pro	3 gal/ac & 4 oz/ac	237.7	5.84	$13.82	2
4	Optistart Plus & Start Right 2.0	3 gal/ac & 1 qt/ac	237.26	5.4	$6.33	5
5	Hydrite 9-24-3	2 gal/ac	237.23	5.37	$20.28	1
6	Optistart Plus & Invigorate	3 gal/ac & 1 qt/ac	234.94	3.08	-$7.48	7
7	Optistart Plus	3 gal/ac	234.78	2.92	$0.98	6
8	Optistart Plus & Duo Maxx	3 gal/ac & 8 oz/ac	234.13	2.27	-$8.20	8
9	Optistart Plus & Ascend Pro	3 gal/ac & 6 oz/ac	234.12	2.26	-$14.60	10
10	Check	-	231.86	0	-	
	Water & PK Assist	1 pt/ac	230.76	-1.1	-$13.33	9
11	Optistart Plus, SP-1, & Ascend Pro	3 gal/ac, 2 gal/ac, & 6 oz/ac	231.83	-0.03	-$43.75	12
12	Optistart Plus & SP-1	3 gal/ac & 2 gal/ac	230.75	-1.11	-$39.37	11

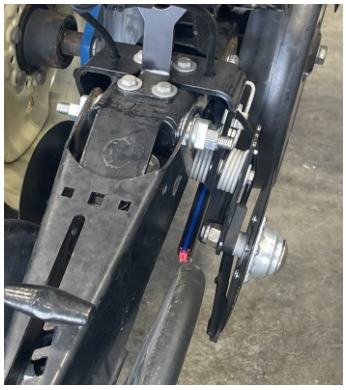
- **$6.44/bu Corn, QuickGrow Complete Corn: $11.38/gal, Optistart Plus: $5.94/gal, Ascend Pro: $241.90/gal, Cygin Pro: $190.94/gal, Hydrite 9-24-3: $7.15/gal, Start Right 2.0: $42.50/gal, Levesol Zn: $38.81/gal, Invigorate: $38.00/gal, SP-1: $7.20/gal, Duo Maxx: $80.00/gal, PK Assist: $50.00/gal**

Summary

The goal this year was to sit back and be patient on ground conditions to warm up and get fit, which should be everyone's focus each year. Sometimes when doing this we all begin to question what we will see out of in furrow applications in regards to yield, since we know that in furrow starters can really get that young corn plant off to a great start, and maybe help even more in less than ideal growing conditions. As with all our studies its crucial to not only look at yield gain versus the check but also what that net return was after we take out the cost of the additional product. Quick Grow Complete had another nice year in our studies, and reinforces that combinations of mixes that are more than just nutrition are playing an integral part in final yields. As we also consider that fertility limiting factors have focused on many fields, another item to consider is what product interactions could be taking place that we are unaware of. One of those is when P levels are greater, the uptake of Zn could be compromised, and this was the first year looking at Levesol Zn, which is not only making nutrition more available in the soil with its double chelation technology, but also adding in a key micronutrient with Zn. As we take a deeper dive into the biological products that we are also evaluating, I strongly encourage growers to ask questions ahead of just dumping these new products into current mixes. Understanding the background of the product and how to keep the biology alive during planting and after can be the difference between having a poor or successful experience in the end.

Is 2 x 2 making a comeback!?!?!?!

Planted: May 17, 2022
Harvested: October 14, 2022
Hybrid/Population: Wyffels W7888; 36,000 PPA
Rows: 8 row entries (30")
Tillage/Rotation: Conventional; corn/soybean rotation
Soil Type(s): Drummer SCL, Flanagan SL; well drained



Trial Overview

As each of us continue to try to maximize input applications each and every growing season, as well as find the best way to manage our corn and soybean bean plants, spoon feeding nutrition is something being heavily evaluated. Many years back it was pretty common to find fertilizer application equipment on planters but as times changed, operations grew, and equipment got larger, many of these capabilities went by the way side. Now as another generation of growers are starting to get involved in family operations, we feel like these new but old technologies might be revisited and we want to understand what products make the most sense to apply through these systems. So in the first of many studies to come in this area, we added the Yield 360 Bandits to the new to us Kinze plot planter for the 2022 growing season. The Bandit system not only applies product to one side of the row, but it applies to each side of the plants extensive root system, in hopes that equal amounts of nutrition are delivered to that actively growing root. We kept this study fairly basic this year, with wanting to look at a few key nutritional components that we know the corn plant is demanding, and we are feeding through the implementation of MicroSync Pro, but felt like we needed more. Also wanted to take a peek at a biological we evaluated last year in a sidedress setting, but that helps with the mineralization of nutrients in the soil profile.

2 X 2 X 2 Applications In Corn

Treatment	Bu/Acre @ 15.5%	Treatments	Cost Per Acre Additional Treatments	Bu/Ac Diff. over Standard	ROI
Standard Treatment w/ Moxon B	240.41	10.5 gal/ac 32%, 4.5 gal/ac ATS, & 1 qt/ac Moxon B	$5.92	3.91	$19.27
Standard Treatment	236.5	10.5 gal/ac 32% & 4.5 gal/ac ATS	-	-	-
Standard Treatment w/ Invigorate	236.4	10.5 gal/ac 32%, 4.5 gal/ac ATS, & 1 qt/ac Invigorate	$9.50	-0.10	($10.14)
Standard Treatment w/ Levesol Zn	234.94	10.5 gal/ac 32%, 4.5 gal/ac ATS, & 1 qt/ac Levesol Zn	$9.70	-1.56	($19.75)

Summary

Making sure the plant is efficiently able to access nutrition I feel is one of the keys to continuing to maximize yields. Nutrients are taken up by 3 basic funcitions: Mass Flow, Root Interception, and Diffusion, and H2O can be a key attribute to all of these functions being capable. So in years where plants are stressed or we don't feel like the root system is as extensive as we would like for it to be, think of how that could impact final yields. The other key to understanding what elements you are delivering through these systems and how do they interact in the soil. Are they mobile or immobile nutrients, easily tied up, can they be mixed with your current carrier, and the questions go on. Looking at the above results I feel that we need to continue our testing in more depth for 2023. Seeing that Zn didn't have a return may surprise some, but did you also know that Zn isn't mobile in the soil and holds pretty tight where its placed? Unlike Boron that is a mobile nutrient in the profile. Maybe this is telling us that Zn is better served when put in furrow as close to the roots as you can, and that Boron is showing a nice return at higher levels in the soil, versus foliar delivery per some of our other trials in corn within the trial results books. The biologicals like Invigorate are still a very exciting item for me, but again as mentioned with other biologicals, a more complex understanding of how to utilize them is still a missing piece of what we consider a very complicated puzzle.

Protecting your Nvestment TAKE 2

Planted: May 17, 2022
Harvested: October 14, 2022
Hybrid/Population: Wyffels W7878; 36,000 PPA
Rows: 8 row entries (30")
Nitrogen: 100 lbs/ac N Spring NH3 fb 50 lbs/ac 32% applied PPI w or w/o inhibitors
Tillage/Rotation: Conventional; corn/soybean rotation
Soil Type(s): Drummer SCL, Flanagan SL; well drained, lower CEC zone

Trial Overview

As the marketplace continues to become saturated with more offerings on nitrogen fixating bacteria for corn, yes we feel like these items need to be explored, however the fact of the matter is that synthetic applied nitrogen will continue to be a big part of your corn plants overall N program. Input prices have steadily increased the last few years, which is no surprise to any of you reading this. As prices increase, protecting the investment that you're making and ensuring that its going to be readily available to the corn plant should also be paid close attention to, and there are multiple options available that will assist in doing just that. The results below are part of a 2-year study evaluating different inhibitor offerings within the market. The key to this study is putting enough nitrogen down to grow a good corn crop, but also trying to make it somewhat of a limiting factor, in hopes of seeing these inhibiting products express their full advertised potential. To do this we apply 100 lbs/ac of N as NH3 in the spring with **NO** n-serve, and then come back with 50 lbs/ac N 32% over the top after planting, with different inhibitors being mixed in for the comparative analysis.

UAN Nitrification Inhibitor Comparison

Nitrogen Inhibitor	Rate per Acre	Bu/Acre	Bu/Acre Diff. from CHK	ROI
N-Edge Pro	1.5 qt per Ton	226.53	**17.27**	**$108.64**
Trident N	1.5 qt per Ton	222	**12.74**	**$77.94**
Instinct NXT Gen	24 oz/ac	220.6	**11.34**	**$60.28**
ATS	6 gal/ac	218.98	**9.72**	**$42.80**
Centuro	1.5 gal per Ton	212.95	**3.69**	**$20.07**
UTC	**-**	**209.26**		

*** $6.44/bu Corn, ATS: $600/ton or $3.30/gal, Centuro: $31.48/gal, Instinct NXT: $68.00/gal, N-Edge Pro: $87.99/gal, Trident N: $140.15/gal**

Summary

When it comes to the hundreds of trials that I get the privilege of harvesting over a growing season, the above trial for the 2022 growing season stood out the most to me from the combine cab. I would love to think that we could hopefully see some of these tremendous ROI's every growing season, but the reality of the situation is that will not always be the case. The main key with this study as mentioned in the overview is limiting the total applied Nitrogen to hopefully help these inhibitors express their full potential. One added stress that came into play this year was the fact that we were significantly short from an overall seasonal rainfall compared to the past. Looking at 2021 vs 2022 growing season alone we were down 6" of rain. When we think of what moisture can do other than help the plant, this is also a contributing factor to getting Nitrogen mixed into the soil profile, as well as assisting with mineralization late in the season. Some of our nitrate and ammonium soil sampling from the farm this year told us that we were lacking in late season N being supplied, and therefore why I think we saw some added benefit from all products tested this growing season. The last component and something to always stay aware of is the actives within these products and what are they bringing to the table. Whether it's DCD, NBPT, polymers, or new a.i.'s, knowing how each of them interact with N is something we want to better understand as growers and agronomists. As you look at items to potentially add to your own operation in 2023, this would be one agronomic input that I would encourage implementing.

N-EDGE PRO

TRIDENT N
A VERDESIAN NUE SOLUTION™

Instinct NXTGEN
Optinyte technology
NITROGEN STABILIZER

CENTURO

Pivot Bio Replicated Study

Planted: May 17, 2022
Harvested: October 14, 2022
Hybrid/Population: Wyffels W7876; 36,000 PPA
Rows: 8 row entries (30")
Pre-Plant Nitrogen: 100 lbs/ac N NH3 Spring
Planter Nitrogen: 11.4 gal/ac 32% (40 lbs/ac N) & 3.6 gal/ac H2O thru Bandits on zones needing 140 lbs/ac N base only, 4 gal/ac H2O & Pivot Bio products applied In-Furrow, On Seed Treatment overtreated on W7876 with Pivot Bio certified treater
Sidedrees Nitrogen: Rates varied based on total amount needed per protocoled zone, 140 lbs/ac N base and anything required above was completed via Sidedress
Tillage/Rotation: Conventional; corn/soybean rotation
Soil Type(s): Drummer SCL, Flanagan SL; well drained

PIVOT BIO PROVE N40

PIVOT BIO PROVE N40 OS
The Nitrogen You Need.
Now On-Seed.

Trial Overview

As we continued our research on Pivot Bio nitrogen fixating bacteria we expanded our trials this year to look at a replicated study that was not only looking at different target rates of Nitrogen but also implementing the In Furrow version of Pivot Bio Proven40 product and getting an early look at the On Seed overtreatment product that will be available for the 2023 growing season. We wanted to replicate this study in the research farm this year to get a good look at not only if we can see comparable performance of full rates of synthetic applied nitrogen applied versus a 40 lb/ac synthetic N reduction and adding in the Pivot Bio product offerings, but also wanted to evaluate potential mineralization of Nitrogen on the farm. To get a better idea on mineralization I felt putting in a no applied nitrogen check was necessary, and then evaluating that area season long via visually monitoring the crop progress, as well as having my intern team pulling 0"-12" & 12"-24" inch soil cores to measure both Nitrate and Ammonium amounts in the profile was crucial to telling the whole story. We also had the availability of a SPAD meter, which is a tool that can measure leaf chlorophyll concentrations. This has been a readily adopted tool for the Pivot Bio research team to monitor crops throughout the season and compare treated versus non treated plants, to ensure that chlorophyll concentrations are on par with each other. Since nitrogen is a key part to creating chlorophyll in plants this device has been very helpful in staying proactive in early season observations.

2022 Pivot Bio ProveN Study

Application Rate	Final Yield	Moisture	Rank Yield	Cost Per Acre N Program	Gross Profit	ROI w/ProveN
220 lbs/ac N	234.31	23.0%	1	$223.97	$1,485.36	$1,261.39
140 lbs/ac N + PB Proven 40 IF	221.31	20.5%	2	$166.20	$1,413.39	$1,247.19
100 lbs/ac N	207.95	21.9%	7	$105.84	$1,327.35	$1,221.51
140 lbs/ac N + PB Proven 40 OS	216.81	21.0%	4	$170.20	$1,384.41	$1,214.21
100 lbs/ac N + PB Proven40 IF	208.63	22.1%	6	$126.83	$1,331.73	$1,204.90
140 lbs/ac N	211.18	22.4%	5	$145.20	$1,348.15	$1,202.95
180 lbs/ac N	218.4	23.3%	3	$184.59	$1,382.90	$1,198.31
0 lbs/ac N	151.5	18.4%	8	$0.00	$975.66	$975.66

*** $6.44/bu Corn, 32%: $630/Ton or $.984 per lb N, NH3: $1525/Ton or $.93 per lb N, ProveN40 In-Furrow: $21/Ac or $.525 per lb N, ProveN40 On Seed: $25.00/Ac or $.625 per lb N, NH3 Pre-Plant App: $11.85/ac, 32% SD App: $11.75/ac**

Summary

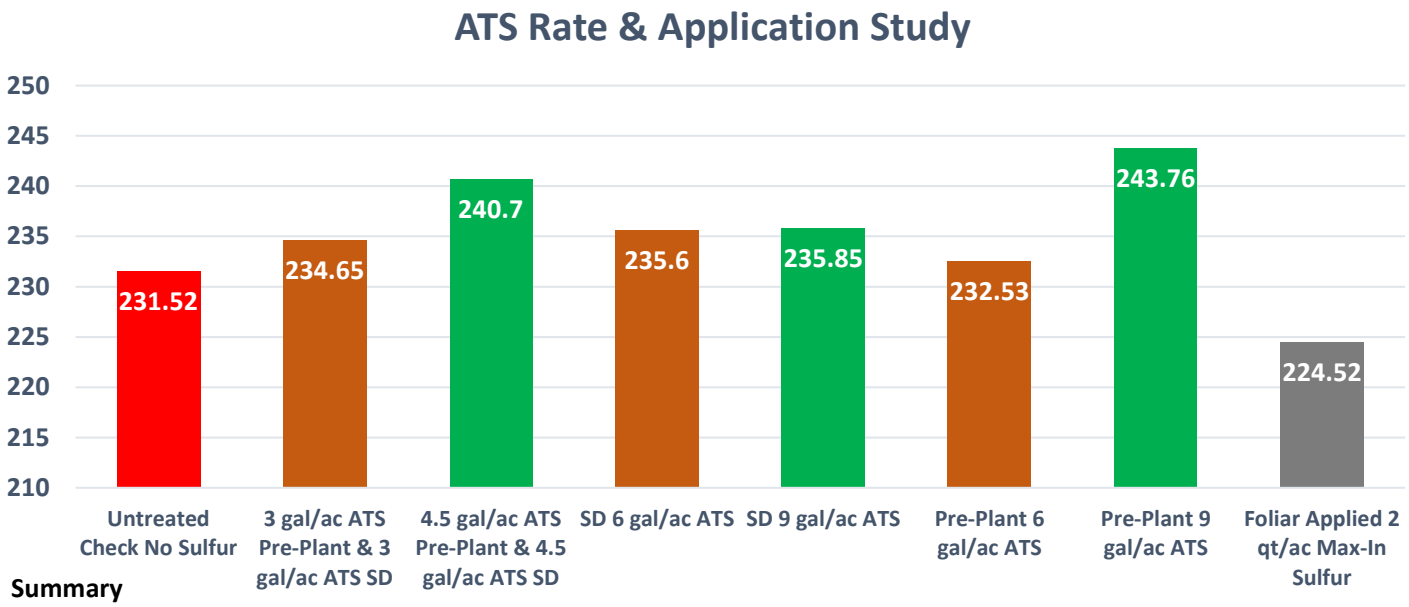
This 2022 study is a lot to get your head wrapped around and look forward to replicating things again in 2023 and taking it another step. Looking at the In Furrow version of Pivot Bio for the 3rd year in a row we are continuing to see the benefit that is advertised. One has to remember that you're not looking for yield gain necessarily with the implementation of Pivot Bio, but that it's providing equal yields in comparison to its matching synthetic applied side by side. The above chart illustrates each of those items with yield as well as the economics to provide a ROI per entry. Just because the yield was higher doesn't always mean that ROI was the highest, and this has to be taken into account. This was also the first look at the On Seed version Pivot is offering, and although yields were slightly lower in comparison to 180 lbs/ac of N, the economics once again came into play. We have additional data points at the end of the trial results book from more trials conducted this spring with On Seed, and have purchased an overtreater to apply this product for the 2023 growing season. We realize that in furrow application capabilities are not available for a vast amount of growers we work with at United Prairie, so we want to stay open minded to alternative methods of delivering new technology to the plant, and this is one mechanism we feel can achieve that. Please contact your local Seed Specialist or Sales Agronomist about the 2023 Pivot Bio On Seed offering.

Sulfur On Corn: Just Plan On It!!!

Planted: May 17, 2022
Harvested: October 14, 2022
Hybrid/Population: Wyffels W7888; 36,000 PPA
Rows: 8 row entries (30")
Tillage/Rotation: Conventional; corn/soybean rotation
Soil Type(s): Drummer SCL, Flanagan SL; well drained

Trial Overview

The team here at United Prairie has spent countless hours and explored multiple on farm trials for the last 8 years continuing to evaluate the implementation of Sulfur into the corn growing equation, and again in the 2022 growing season we saw some tremendous benefit. This particular study was started 3 years ago to narrow down rate per acre of S needed by the corn plant to maximize yield and investment. For starts we know that we are lacking getting sulfur from the atmosphere any longer, and that topic has been discussed for years now, but the major step was discovering what a corn plant utilizes per lb of S versus bu/ac, and then understanding what is the best way to apply that form of S. For the below results Ammonium Thio-Sulfate was the product used, which is a liquid sulfur form that is 60% in the sulfate form and 40% elemental form. What that means is that the sulfate form is readily available to the plant, while the elemental form needs the right environmental conditions to breakdown to become plant available. There are positives and negatives to this makeup, but the positives for years now have far outweighed the negatives.



Summary

Once again the use of sulfur in any part of your corn program is showing a nice yield gain over the untreated check, with some rates and timings separating themselves out more than others. This year we dialed the max rate of ATS used to 9 gal/ac, as there has been times in the past that higher rates didn't always show a consistent net return, but on years where rainfall is reduced, I feel like we could've seen even more gain with higher rates. In all 3 comparisons of a total application of 9 gal/ac ATS or 25.74 lbs of S, this showed to be the highest yield gain, with 100% pre-plant this year separating itself from the pack the most. We also introduced a foliar based S application with Max In Sulfur, however there was concerns with trying to provide a plants total season long needs with a foliar app, and this initial hypothesis came to fruition at harvest time. We experienced some foliar burn with this implementation as well, and will go back to the drawing board in 2023 as we explore products in this arena. In conclusion our recommendations as a company is that if you aren't introducing sulfur into your corn program to date, then you 110% need to make that part of your plan going forward. Let our sales agronomist help cater a program that works in your operation and can maximize this investment each and every year.

Corn Post Foliar Options

Planted: May 17, 2022
Harvested: October 14, 2022
Hybrid/Population: Wyffels W7878; 36,000 PPA
Rows: 8 row entries (30")
Tillage/Rotation: Conventional; corn/soybean rotation
Soil Type(s): Drummer SCL, Flanagan SL; well drained

Trial Overview

Every year there is always a ton of new products coming out of the woodwork that are said to provide consistent ROI, and just need to be thrown in with a trip that growers are already making across their farms. The term that I hear most often is this product is a bolt on to add in with the mix you're already doing. We have continued to evaluate many of these products year in and year out, with always wanting to bring a more agronomic perspective to why "x" product makes sense to be added in the mix. This years study's focus was not only to get another year of data on items that we have seen proven the last few years, but also implement some new products that offer some differentiation to what we may already be studying. Most of the products listed below offer some sort of foliar micronutrition that is readily being taken up by the corn plant, as well as other products we have seen a synergistic affect when combining them with others to help stimulate key crop growth and development functions in the plant. The question is in a drought stressed year did triggering the plant to do more help or hurt us?

Corn Standard Foliar Treatments Applied V4	Bu/Acre @ 15.5%	Bu/Acre Diff.	Net $ Return/A	ROI Rank
1 qt/ac Hydrigro 802, 4 oz/ac Cygin Pro, & 1 pt/ac Takeoff	240.27	9.24	$44.53	1
1 qt/ac HydriGro 802	237.94	6.91	$41.10	2
1 qt/ac Hydrigro 802, 4 oz/ac Ascend SL, & 1 pt/ac Takeoff	236.85	5.82	$21.68	3
2 qt/ac Tima-Up	234.84	3.81	$10.54	4
SureShot	232.59	1.56	($2.04)	5
1 qt/ac HydriGro 802 & 1 pt/ac Moxon B	231.37	0.34	($4.17)	6
1 pt/ac Moxon B	230.44	-0.59	($6.76)	7
3 gal/ac SP-1	232.52	1.49	($12.00)	8
UTC	231.03	-		

*** $6.44/bu Corn, HydriGro 802: $13.60/gal, Moxon B: $23.66/gal, Ascend SL: $217.32/gal, SureShot: $12.09/ac, Takeoff: $44.88/gal, Cygin Pro: $190.94/gal, Tima-Up: $28.00/gal, SP-1: $7.20/gal**

Summary

With the lack of rainfall this year there was a lot of concern of how well plants would actively be taking in foliar applied nutrition as well as just metabolizing chemistry. Looking at the above data set from 2022 we saw some continued response out of applications that we have been evaluating the last few years, which is great to see that consistency. When looking at PGR's and Takeoff this is a program that we haven't necessarily seen consistent ROI on every year in a good growing environment, and starting to wonder now if the placement of this application needs to be more selective on what some might consider their variable soils, which coincide with tougher crop growing conditions. As a company we want to continue to dig deeper into better understanding what the crop is demanding and hope that our SAP analysis testing will be another tool in the toolbox to provide us an internal look of our plants needs. Please see section on SAP analysis in this year's trial results book for more detail.

Harnessing that Atmospheric N

Planted: May 17, 2022
Harvested: October 14, 2022
Hybrid/Population: Wyffels W7878; 36,000 PPA
Rows: 8 row entries (30")
Nitrogen: Study received 100 lbs/ac N NH3 in spring fb a pre-plant application of 9 gal/ac 32% & 6 gal/ac ATS (40 lbs/ac N), **Total N Target: 140 lbs/ac N**
Tillage/Rotation: Conventional; corn/soybean rotation
Soil Type(s): Drummer SCL, Flanagan SL; well drained

Trial Overview

Nitrogen fixating bacteria was something in the past that we only thought was associated with soybeans, but as advancements in agriculture continue to be developed, and new products hit the marketplace that can be added in furrow and now on seed, something that shouldn't be overlooked is the foliar application ability that some of these same products bring with them. The goal of this study first and foremost was to make sure that nitrogen applied rates were kept at a level that the corn plant could still thrive off of, but also hopefully take a look at multiple application methods that some key products are labeled for to see if they can help that plant utilize some of the atmospheric nitrogen that is around us each and every day. Some of these products are liquids, while others are dry flowables, but each one of them are lower use rates that allow for easy tank mixes with limited product amounts to handle on a per acre basis.

Nitrogen Fixating Bacteria Products	Bu/Acre @ 15.5%	Bu/Acre Diff.	Net $ Return/A	ROI Rank
3.2 oz/ac Envita Foliar Applied	226.8	1.45	($3.11)	1
.7 oz/ac Source Foliar Applied	226.73	1.38	($5.12)	2
UTC	225.35	-		-
5 oz/ac Utrisha N Foliar Applied	224.67	-0.68	($18.83)	3

- **$6.44/bu Corn, Envita: $498.00/gal, Source Corn: $2562.00/gal, Utrisha N: $46.23/lb**

Summary

When this study was first drawn up the goal we wanted to find out was if we kept the total rate of applied N at 140 lbs/ac, could the addition of any of these added products raise yields most importantly. The check that was implemented kept that baseline of the 140 lbs/ac N, and then what has to be factored in is what is the cost of each product applied. One thing that we feel like we are continuing to find is that these products are not a full replacement, at this time, for a crops total Nitrogen needs. If that plant isn't started off with a good foundation of N to grow, then a strong amount of root exudates being released to feed the bacteria that are colonizing in the root zone of in furrow applied products isn't happening. If good colonialization can't take place, then bacteria struggle to survive and do what they are built to do. As mentioned earlier also knowing how to mix these products and what they can be mixed with can be very important as well. In this trial we used straight water as the carrier for the foliar applications, and made sure that water although was city water, had time to let chlorine gas off and used a neutralizer as an additional precautionary measure. Chlorine in city water is intended to kill bacteria, and if bacteria is what we are wanting to apply and survive, this is a massive watchout. We are still learning more about the foliar product options but are seeing some merit in some of them when it comes to yield response. However ROI in the study this year wasn't on track of what we hoped. Does that mean that these products aren't going to work, absolutely not, and this is just the first year of a multiyear study that we hope to implement. As nitrogen applications are continued to be scrutinized in Illinois and surrounding states, as growers and good stewards we need to stay open minded at looking at alternative application techniques and stay ahead of the curve by doing side by sides of new technologies like this on your own farming operations, and our team of Sales Agronomist and Seed Specialist are more than willing to assist in accessing these products and designing a study that works for your operation.

Timing & Product Trials Corn Fungicide

Planted: May 17, 2022
Harvested: October 14, 2022
Hybrid/Population: Wyffels W7878; 36,000 PPA
Rows: 8 row entries (30")
Tillage/Rotation: Conventional; corn/soybean rotation
Soil Type(s): Drummer SCL, Flanagan SL; well drained
Fungicide Application: Applied at timings listed in protocol via Hagie 8250 research sprayer with 20' boom

Trial Overview

For many growing seasons now we have been thoroughly comparing the yield gains and profit per acre of different fungicide options available to you as growers. It has been pretty eye opening to see the differences year in and year out with certain products, with much of the separation we felt being seen because of the amount or number of active ingredient load that was being delivered during application timing. However, during the 2021 growing season Tar Spot hit many of our fields at full force and caused some very detrimental damage and profit loss from this infection. Some common questions asked of us agronomist were what fungicide should I use, how many times do I need to spray, should we apply ground rig or aerial, and so on. With those questions asked we decided to dial back the trials this year from a multi product comparison to a timing-based incorporation of one key fungicide we have seen nice ROI on over the years. There was a small hope that Tar Spot pressure would repeat itself in this study, to see how different timings responded, but disease pressure for 2022 was very calm, which was to no surprise looking at environmental factors.

Timing of Application	Bu/Acre	Bu/Acre Diff. from CHK	ROI
V14 fb R3 Miravis Neo	238.32	4.49	-$34.78
VT Only Miravis Neo	238.2	4.37	-$9.96
V5 fb VT Miravis Neo	237.72	3.89	-$38.65
2 x 2 Xyway fb VT Miravis Neo	236.86	3.03	-$41.59
V5 Only Miravis Neo	235.18	1.35	-$16.90
V14 Only Miravis Neo	234.78	0.95	-$31.98
UTC	233.83		
VT Miravis Neo & 1 pt/ac Moxon B	230.82	-3.01	-$60.44
2 x 2 Xyway	230.45	-3.38	-$44.77
2 x 2 Tepera Plus	230.32	-3.51	-$45.27
VT Only Hydrite 527	225.76	-8.07	-$53.44

* $6.44/bu Corn, Miravis Neo: $25.60/ac, Hydrite 527: $1.47/ac, Moxon B: $2.96/ac, Tepera Plus: $22.66/ac, Xyway: $23.00/ac, Post App: $7.50/ac, Fungicide App: $12.50/ac

Summary

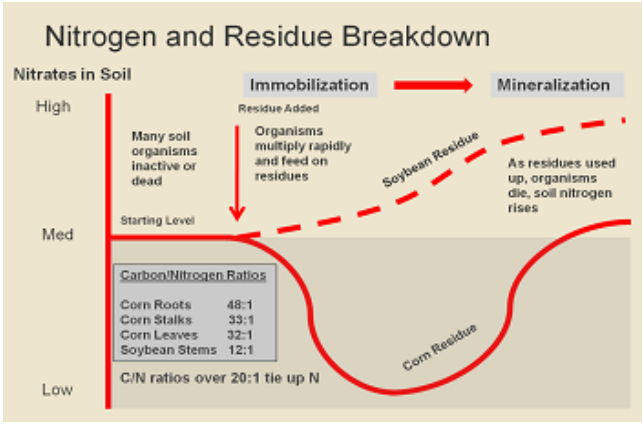
Disease pressure on the research farm at tassel time was very low this growing season. I always go back to the ingredients of the disease triangle (Pathogen, Host Plant, Environment), and we were lacking in one of those ingredients with the environment. Fungicides bring other benefits with them such as slowing down ethylene production, stalk integrity, stress mitigation, and etc, but at times these functions can be challenging to measure. With the stresses that we endured there seems to be additional limiting factors that were also in place that trumped what a fungicide could do. Although double applications seems to produce the highest yields, this wasn't enough to provide consistent ROI on this study in '22. The 2 x 2 products such as Xyway showed tremendous benefits in '21, but why less in '22? Much of that I still think was part of delayed planting into warmers soils that allowed the corn seed to take off in a hurry, and then once again reduced disease pressure present. The key overall here as growers I feel like is you need to look at the law of averages, does fungicide pay every year, sometimes not, but how do you out guess the growing season? The answer is that you can't and more times than not we have seen consistent ROI on this trip across the field, and we encourage you to keep it in your plans going forward, and have many years of data to support that statement.

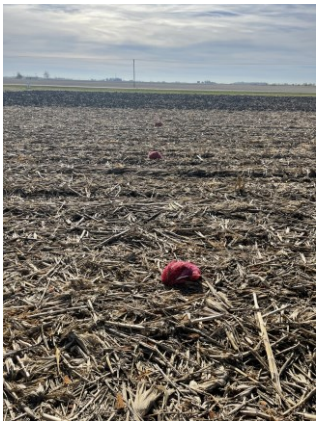
Digesting Residue…Why??

Trial Overview

Do you ever ask yourself the question how can I save some money…….. I would have to think that many of you probably ask yourself this multiple times a week if not a day? With input prices hitting some of the highest levels that any of us had ever seen ahead of the 2022 growing season one thought that we wanted to dive into deeper at the research farm was how do we take all this residue from the 2021 crop and break it down faster. Why would we want to break it down faster you might ask, because there is a large amount of nutrients tied up in that stover that once broke back down could potentially become plant available once again. Figures will vary each year but 1 ton of corn stover can have as much as 16 lbs N, 6 lbs P_2O_5, and 40 lbs K_2O, while 1 ton of soybean stover could contain 40 lbs N, 9 lbs P_2O_5, and 37 lbs K_2O. Needless to say that is a lot of nutrition that it would be great to be able to tap into sooner rather than later.

No Till Corn Stalks		Chiseled Corn Stalks	
Product	**Yield (bu/ac)**	**Product**	**Yield (bu/ac)**
Verdesian	66.59	Verdesian	67.61
Soil Biotics	66.2	Soil Biotics	65.23
QLF Agronomy	65.85	QLF Agronomy	65.06
Oro Agri	64.39	Oro Agri	61.71
Check 63.3 bu/ac			





Summary

The 2022 residue digestion studies were very challenging to measure complete digestion throughout the growing season, let alone look at and feel confident in the final yield separations. Part of the struggle with residue digestion is once it's broke down nutrition can be either taken up by growing crops, or what most likely takes place is nutrients get tied back up in our soil profile and are locked in tight. So we feel like there are multiple parts to implementing these products into your operation with understanding what your applying, how do we keep microbial activity alive and healthy, are there key products that could assist in releasing tied up nutrition (Levesol or other chelating agents??), and what additional steps can be taken to validate this process season long? We have already implemented more trials for the 2023 growing season with a company by the name of DPH Biologicals, and looking forward to capturing a season long story to report on in 2023.

Year #2 Cover Crops Ahead of Soybeans

Trial Description

As with the corn cover crop study we have committed to 5 years minimum looking at cover crops on soybeans as well. This practice as been a lot more common to see throughout our trade area, as many growers first wanted to introduce covercrops to help combat herbicide resistant weed species, such as waterhemp, that we were dealing with. As new trait technologies have emerged and weed control has improved, cover crops ahead of soybeans have still become a more common practice as a way to improve soil health, capture nutrients from being lost, alleviate compaction concerns, and the list continues. This past growing season on the Innovation Farm we wanted to look at not only Cereal Rye alone, but also with the addition of a brassica that was brought to my attention, and then compare these to both a standard no till and conventional tillage program. These 4 items hopefully encompass what most growers are doing on their own operations and allows us to follow the emergence, growth & development, and then most importantly final yield of these soybeans all season long.

Cover Crop & Tillage Practices Ahead of Soybeans

Treatment	Final Population	Bu/Acre @ 13%	Harvested Moisture	Cost Per Acre Additional Trips or Products	Gross Profit/Acre
No Till	95,000 ppa	75.76	11.6%	$40.82/ac Burndown Application	$1,026.64
Chiseled Fall & Soil Finisher Spring	103,750 ppa	74.43	11.5%	$44.30/ac Chisel Plow Fall & Soil Finisher Spring	$1,004.42
50 lbs/ac Cereal Rye & 2 lbs/ac Camelina	104,250 ppa	67.45	11.7%	$65.00/acre Cereal Rye, Camelina, & Spring Burndown	$885.37
50 lbs/ac Cereal Rye	90,250 ppa	64.81	11.7%	$56.32/ac Cereal Rye & Spring Burndown	$856.85

***Cereal Rye: $.31/lb, Winter Camelina: $4.34/lb, Soil Finisher: $16.60/Ac, Chisel Plow: $27.70/Ac, $14.09/bu Fall Soybean Price, Generic Glyphosate: $76.50/gal, 2,4-D LV4: $47.79/gal, Amsol Plus: $6.63/gal, Floater Spraying 1st Trip: $7.25/Acre**

***Custom Rates used from University of Illinois Farm Doc. Field Operations Estimates 2021**

Summary

A big item that we didn't lack in 2021 but did in 2022 was total rainfall accumulation on the research farm, which will always have an influence on final yields. This year though when it comes to straight end of the season yields we were off some on the cover crop applied areas. Looking at populations with a target of 140,000 ppa to drop and ending up with 90-105K in all scenarios, we lost stand from the get go with tough emergence conditions. The week of planting we saw temps go from 60 degrees F to 90 degrees F and something happened which kept the ground from drying out. Some said the tillage areas were staying the wettest underneath, but I felt the no or minimum tilled areas were wetter yet, which I feel could have caused some initial concerns as we planted beans during this spell of weather. None the less you can't ever outguess mother nature, but we all know that warm soils will assist with even emergence and getting that soybean plant off to a great start. Had we waited later in the week to plant, could this of made our results different? Although we will never know I do feel that cover crops could have a spot in the right situations. Are they made for everyone….absolutely not…but on the right farm and with the proper management practices utilizing these expensive acres we all farm to grow a potential beneficial crop all season long is important and as more opportunities are brought to our attention from companies like Truterra, lets make sure to not keep our blinders on to thinking outside the realm of what many of us may call the "norm".

Soybean Treatment Comparison

Planted: May 11, 2022
Harvested: October 14, 2022
Variety/Population: Stine 36EB32, 140,000 ppa
Treatment: Adjusted entries based on protocol listed
Row Spacing: 30”
Rows: 8 row entries
Tillage/Rotation: Conventional; corn/soybean rotation
Soil Type(s): Drummer SCL, Flanagan SL; well drained

Seed Treatment 2019	Yield	Yield Rank
F/I + Intego Solo	71.4	1
Intego Suite or Halifax F/I	70.6	2
F/I + TagTeam	68.7	3
F/I + Moly Dry	68.2	4
F/I + BioFlex	68.2	4
F/I + Cygin	68	6
F/I – **Control****	67.9	7
F/I + Lalfix Duo	66.9	8

Seed Treatment 2020	Yield	Yield Rank
F/I + Ethaboxam	71.9	1
F/I + 1/2 rate Ilevo	70.3	2
F/I + Seed + Graphite	70	3
F/I + Full Rate Saltro	69.8	4
F/I + Ascend Pro & Tuxedo	69.7	5
F/I + Full Rate Ilevo	69.2	6
F/I + Moly Dry	69	7
F/I Only	**68.9**	8
F/I + Azoxystrobin	68.5	9
F/I + Ascend Pro & Takeoff	68	10
F/I + Ascend Pro	67.1	11
F/I + Takeoff	67	12
F/I + Tuxedo **(wheel track issue)**	65.1	13

Seed Treatment 2021	Yield	Yield Rank
F & I (Cruiser Maxx Vibrance) + Vayantis	82.48	1
F & I + Ethaboxam	82.34	2
F & I + Seed+ Graphite	82.14	3
F & I + Ethaboxam + Seed+Graphite	82	4
F & I + Relyna	81.94	5
F & I Only	**81.62**	6
F & I (Defendis)	81.57	7
F & I + Ilevo	81.38	8
F & I (Cruiser Maxx Vibrance)	81.32	9
F & I + Precide Ultra	80.69	10
F & I + Saltro	80.66	11
F & I + Trunemco	80.66	11
F & I + Cygin	80.08	13
F & I + Indigo M34 Talc	79.84	14
F & I + Heads Up	79.58	15
F & I + VPH Biostimulant	79.56	16
F & I + Indigo M34 WP & Biotrinsic E13 WD	79.48	17
F & I + Tag Team LCO	78.95	18

Seed Treatment 2022	Yield	Yield Rank
F & I Cruiser Maxx Apex+Saltro+(Seed+ Graphite)	76.5	1
F & I Cruiser Maxx Vibrance +Saltro	75.8	2
F & I Cruiser Maxx Apex + (Seed+ Graphite)	74.5	3
F & I Cruiser Maxx Apex	73.9	4
F & I Cruiser Maxx Vibrance +(Seed + Graphite)	73.7	5
F & I Only Cruiser Maxx Vibrance	**73.7**	6
F & I Obvius Plus + Ethaboxom+Saltro+(Seed+ Graphite)	73.5	7
F & I Obvius Plus + Ethaboxom +(Seed + Graphite)	72.5	8
F & I Obvius Plus + Ethaboxom	71.7	9
F & I Obvius Plus	**70.4**	10
F & I Obvius Plus +(Seed + Graphite)	70.2	11
F & I Obvius Plus + Saltro	70.2	12

Summary:

Seed treatment studies have been a major focus for our Seed Specialist and Sales Agronomist for multiple years now, as you can clearly see from the above results. Many times, when talking with growers at the farm gate about seed treatments when asked if they know what their treatment package is from competitive dealers the overwhelming answer is “F & I”. I challenge each of you to dig deeper into that statement and truly find out what that actual make up is of that F & I. Multi year data for United Prairie has continued to see great response and easy ROI from products such as Ethaboxam, Seed + Graphite, and Saltro/Ilevo. As we shift from 2022 to 2023 we want to continue to bring each of you that same level of performance and confidence in our treatment packages and will be implementing the CruiserMaxx APX system into part of our offering, along with Saltro for SDS and nematode suppression, and then Seed + Graphite will continue to be the leader in helping flowability through all your planting equipment, and help get that young soybean seedling off to the races with strong emergence and fulfilling a little bit of nutrient demand early in the lifecycle.

Direct Placing Nutrients in Soybeans

Planted: May 11, 2022
Harvested: October 14, 2022
Variety/Population: Stine 36EB32, 140,000 ppa
Treatment: Obvius Plus F & I, Ethaboxam, & Seed + Graphite
Row Spacing: 30”
Rows: 8 row entries
Tillage/Rotation: Conventional; corn/soybean rotation
Soil Type(s): Drummer SCL, Flanagan SL; well drained

Trial Overview

Coming out of the tremendous success that was seen with multiple starter applications on soybeans in 2021, I would be lying if I said that I wasn’t excited about implementing additional studies in ‘22. As it has been mentioned in the past consistent results on response of starter in soybeans has been a continuous challenge. The sensitivity of the soybean seed to begin with is always one major factor to consider, as well as the general schematics of a soybean plants root system in comparison to corn. With these 2 items in mind understanding what product you are applying, the makeup of that product, and then the use rate using is crucial. Followed closely by how the product will be placed, and what will mother nature do in the coming weeks. This growing season we wanted to replicate again some key trials that took the top spots in our 2021 data, as well as throw a few more curve balls at it based on networking and discussions with others in the industry that have studied this in more depth.

In Furrow and 2 x 2 x 2 Starter In Soybeans

Yield Rank	Soybean Starter Study	Application Method	Rate per Acre	Bu/Acre	Bu/Acre Diff. from UTC	Net $ Return/A	ROI Rank
3	ATS	2 x 2	6 gal ATS	77.29	1.76	$5.00	1
4	H2O & Zironar	In Furrow	4 gal H2O & 6 oz Zironar	76.34	0.81	$2.31	2
1	Quick Grow Complete IF & KTS & ATS Bandits	In Furrow & 2 x 2	3 gal QGC, 4.5 gal KTS, & 3 gal ATS	79.2	3.67	($16.63)	3
2	KTS, ATS, LCBF Boost, & 32%	2 x 2	3 gal KTS, 3 gal ATS, 2 gal LCBF, 3 gal 32%	77.4	1.87	($17.16)	4
6	KTS	2 x 2	5 gal KTS	75.51	-0.02	($27.28)	5
5	UTC	-	No Starter	75.53	-		

$14.09/bu Soybeans, QuickGrow Complete Soybeans: $11.38/gal, KTS: $5.40/gal, ATS: $3.30/gal, 32%: $3.47/gal, LCBF Boost: $3.50/gal, Zironar: $194.25/gal

Summary

The 2022 growing season brought back some similar feelings and results from what we had seen over a number of years with starter usage on soybeans….inconsistency!!! Although we did see some nice yield gains on some key formulations used, the uptick in pricing on some of the inputs hurt the bottom line in the end. If you were to plug in input prices from last year, into this year's dataset the ones generating ROI would obviously show more, but even the ones that didn’t got us much closer to breakeven. This enforces the importance of knowing all these moving targets that you as growers deal with each year. Personally, there is still some optimism on applying some of these products in a 2 x 2 x 2 application going forward. Is this practical for most of us today..no..however we have all intentions of replicating a few items again in 2023, and seeing if we can’t only maximize the uptake rate of some key nutrients, but also introduce some amino acid and stress mitigating compounds for the root system to uptake. Not sure if this will be the right way to incorporate these items, but I think we must think outside of the box on this process, and not only consider how we can feed more to the plant through product placement but release stored nutrition out of the soil as well. Then wrap that all up with managing the soybean crop from start to finish.

Base Saturation “K”

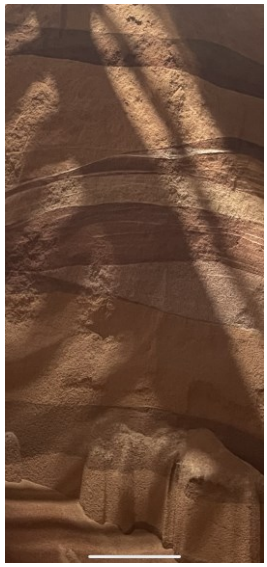
Soil Test Summary

United Prairie Test Plots **Area:** 11.30

Farm: Plots **Sample Date:** Oct 21, 2020

Field: Innovation Farm SE **Lab Name:**

SampleID	PHW	PHB	P1	K	OM	CA	MG	CEC	PERK	PERCA	PERMG
none	none	none	lbs per acre (st)	lbs per acre (st)	none	lbs per acre (st)	lbs per acre (st)	meq/100g	percent	percent	percent
1	7.1	7.0	160	474	3.6	7,770	1,590	26.7	2.3	72.8	24.9
2	7.1	7.0	81	287	3.5	9,033	1,280	28.3	1.4	79.8	18.9
3	6.3	6.9	107	433	3.5	5,537	915	21.2	2.7	65.3	18.0
4	6.2	6.8	107	381	3.6	5,153	837	20.1	2.5	64.1	17.4
5	5.8	6.3	144	361	3.8	4,906	920	21.8	2.2	56.3	17.6
6	6.3	6.9	149	333	3.7	6,302	1,344	25.3	1.7	62.3	22.2
7	6.2	6.9	72	316	3.2	3,471	656	14.1	2.9	61.6	19.4
8	6.6	7.0	73	344	3.2	3,967	707	14.5	3.1	68.4	20.4
9	6.8	7.0	138	542	3.2	4,594	677	15.6	4.5	73.7	18.1
10	6.3	6.9	140	402	3.6	4,846	675	18.0	2.9	67.4	15.7
11	7.0	7.0	97	364	3.7	5,068	925	17.0	2.8	74.6	22.7
12	6.6	7.0	173	432	3.7	5,634	1,020	20.5	2.8	68.8	20.8
Average:	6.5	6.9	120	389	3.5	5,523	962	20.3	2.7	67.9	19.7



Overview:

The first item to realize before even diving into this topic is we must make sure to address our soil structure first and foremost before we shift gears to base saturation adjustments. Base Saturation is the sum of the base cations (Ca^{2+} , Mg^{2+} , K^{+} , & Na^{+}) held onto the soil exchange sites divided by the total CEC and expressed as a percentage. That is a mouthful to say and even harder for most of us to understand. When I look at understanding CEC and Base Saturation, I look at it as if I’m looking at 2 school buses. The big school bus is the larger CEC and has more seats in it for kids to sit in, versus the small school bus is the lower CEC and has less seats to sit in. If I put 15 kids in the big bus, I fill it up a percentage but have many more empty seats to fill, while if I put those same 15 kids in the small bus the bus might be full to capacity and no additional space can be occupied. Therefore the 15 kids in the big bus might have a lower base saturation % level because more spots can be occupied, while the small bus has a large % level because it is full. Many attribute that the higher the CEC the better the farm ground, which from a perspective could be true, but proper management techniques in each situation can obtain high yields relative to the type of ground that it is we feel.

One strategy that we are looking at implementing over the next few years not only on the research farm but on larger scale basis is focusing on building Base Saturation K levels up to 4% or higher, while also making sure our other cations are in check in relation to the soils and farm that we are working on, as well limiting factors as a whole are kept in line. The building of the K can be a very challenging task to do when you're in a high CEC environment many will find. The reason for the interest in this study comes from evaluating tissue tests over the years and now our SAP testing trials from 2022. Results in both testing protocols are continuing to show a lack of K in the plant later in the growing season. Knowing the importance of K to the growing plants in regards to photosynthesis/energy production, enzyme activation, and water use efficiency, ensuring that the plant is able to obtain this macro nutrient throughout the “WHOLE” growing season is important, especially when a vast majority of K is taken up early in the season.

Hopes are that if there is an influx of K available to the plant because the soil profile contains a good ratio based on base saturation levels that the increased cost in raising these values will be offset with higher yields. The problem that many of us can run into is drier conditions can trap that K in between the clay layers of the soil profile, thus making this nutrient unavailable to the plant until moisture can open that pore space and release the nutrition. The 2022 season is a prime example of how that can take place and even in scenarios where we know K levels are high, the deficiency symptoms were still apparent and activating stresses that are never good for the crop. So, in those instances are there steps that need to be taken to offset these demands? What products are available to do this and how can we efficiently and effectively deliver them to the crop? These are the continued steps we are going to take in 2023 as we dive into this large investment even more, and put all the key parts of “our” program in place to maximize final yields and closely monitor dollars spent vs made. We all have our own program and steps we take and believe in to achieve high yields, so if we are supplying that plant potentially more nutrients in the form of potassium from beginning lets make sure we aren’t starving it someplace else in our yield equation.

Sulfur Not Just for Corn Anymore

Planted: May 11, 2022
Harvested: October 14, 2022
Variety/Population: Stine 36EB32, 140,000 ppa
Treatment: Obvius Plus F & I, Ethaboxam, & Seed + Graphite
Row Spacing: 30"
Rows: 8 row entries
Tillage/Rotation: Conventional; corn/soybean rotation
Soil Type(s): Drummer SCL, Flanagan SL; well drained

Trial Overview:
As with most trials that are implemented on the research farm you spend months evaluating previous years data, networking with others in the industry, and then hopefully implementing the study during the growing season. In 2021 we saw some decent results out of the application of Sulfur on soybeans through two different forms of S being looked at (Dry AMS & Liquid ATS). In 2022 we wanted to look at the same rates, same application methods, but also introduce a 3rd application method of placing that sulfur right next to the growing root system of the plant via 2 x 2 x 2 on the planter. For the most part everything went as planned on this study, with the exception that a mistake was made myself on the higher rate studies and not enough product was applied per my mixing. Live and learn on that but took part of my data set out unfortunately, that was proving some of the highest yield differences in 2021, but none the lest the lower rate studies were still in place.

Sulfur On Soybeans

Sulfur Source	Rate per Acre	Rate of N & S	Bu/Acre	Bu/Acre Diff. from CHK	ROI
ATS & 32% Broadcast	4.25 gal/ac ATS & 1.4 gal/ac 32%	10.5 lbs N & 12 lbs S	74.93	**5.69**	**$61.29**
ATS & 32% 2 x 2 x 2	4.25 gal/ac ATS & 1.4 gal/ac 32%	10.5 lbs N & 12 lbs S	72.93	**3.69**	**$33.11**
Dry AMS Broadcast	50 lbs/ac AMS	10.5 lbs N & 12 lbs S	69.75	**0.51**	**($7.81)**
UTC	**3 gal/ac 32%**	**10.5 lbs N**	**69.24**	**-**	**-**

***$14.09/bu Soybeans, ATS: $3.30/gal, 32%: $3.47/gal, Dry AMS: $.30/lb**

Summary:
Although the final study in the end wasn't complete without the higher rate structures that were initially in place, I think we are starting to see some trendlines and benefits of Sulfur ahead of soybeans. This makes absolute sense in the fact of the lack of Sulfur being deposited out of the atmosphere these days, and the big responses seen when implementing this nutrient into our corn plans. When looking at the data the first thing noticed and maybe questioned is why didn't we see the ROI on the AMS vs the ATS. Sometimes things like this can't always be answered but my thoughts looking back at the season is when you look at Dry AMS this is a Ammonium and Sulfate based product only being applied over the top of the planted soybeans. Again with minimal rainfall throughout the growing season thoughts are that incorporation of this application might have responded better as it would of protected these nutrients from being potentially lost to the atmosphere, or just not in a place to be taken up by the root system timely. When comparing how the ATS was applied, this product is a 60% sulfate and 40% elemental sulfur form, so even though it was still applied on top of the soil profile after planting as well, could that elemental portion hanging on later possibly been of some benefit…thoughts are yes I believe so. The other item that was honestly surprising was that there were some thoughts that applying that S right down close the root zone might show the highest yield response and return, but in reality the inverse of this happened. I don't want to give up on this planter applied method of introducing S to the plant as I still feel there is some merit to this, but am also cognicent of the fact that most of us don't have 2 x 2 capabilities on our corn planters let alone soybean planters, so it might not be practical. In conclusion this will be looked at once again in 2023, but feel like this might be yet another piece to the yield puzzle on soybeans to look at.

Progressive Foliar Applications

Planted: May 11, 2022
Harvested: October 14, 2022
Variety/Population: Stine 36EB32, 140,000 ppa
Treatment: Obvius Plus F & I, Ethaboxam, & Seed + Graphite
Row Spacing: 30”
Rows: 8 row entries
Tillage/Rotation: Conventional; corn/soybean rotation
Soil Type(s): Drummer SCL, Flanagan SL; well drained

Trial Overview:
This timing of application in soybeans is crucial for a number of reasons. Herbicides are introduced to the growing crop that are intended to kill broadleaves, yet the broadleaf plant we are spraying is able to metabolize that chemistry. This is a pretty interesting transaction if you think deeply about it, and realizing that for any plant to breakdown chemistry intended to kill it, offering that growing organism some assistance throughout this process could provide some nice yield benefit and dollars in your pocket. That is what we have seen for so many years now, and what we wanted to continue to hone in on this past growing season, by using our foundation product of MicroPlus in every post app blend, and then adding to that mix in hopes of seeing a synergistic affect that enhances the plant, to produce bigger photosynthetic factories which equals more nodes…more pods….more beans….and more bushels!!!

Summary:
As it is described by many the post herbicide application trip on soybeans can sometimes be considered a free ride for many products. For 10+ years now we have seen so much advancement in products applied in this window and have a better grasp of what the soybean plant is demanding and how we can supplement those demands. The 2022 season didn’t disappoint once again with a number of old standby’s continuing to show the maximum economic return, and has gotten to a point where studying these applications are likely no longer needed, and this should just be “Part of the Program”. New players in the game also started showing some merit in a handful of categories, and deserve a broader look in ‘23. I believe biologicals, stress mitigators, and amino acids will play a part in next years studies, as well as sequencing the usage and rates of what has performed in ‘22 under what we all would consider less than ideal growing conditions. Keep your eyes open to opportunities to add in your own program, and make sure to maximize each and every trip across your farm.

Progressive Steps To Take in Soybean Foliar Applications

Treatment	Bu/Acre	Bu/Acre Diff.	Net $ Return/A	ROI Rank
1 qt/ac MicroPlus Post fb 1 qt/ac MicroPlus R3-4	78.94	7.14	$79.35	2
1 qt/ac MicroPlus Post & 4 oz/ac Cygin Pro Post	77.35	5.55	$65.23	3
1 qt/ac MicroPlus Post	75.29	3.49	$42.17	1
1 qt/ac MicroPlus, 4 oz/ac Cygin Pro, & 1 pt/ac Takeoff Post	75.54	3.74	$34.69	5
1 qt/ac MicroPlus & 1 pt/ac Takeoff Post	74.84	3.04	$30.22	4
UTC	71.8	-	-	-
1 qt/ac MicroPlus & 1 qt/ac TimaUp Post	72.28	0.48	($7.24)	6
1 qt/ac Micr0Plus & SureShot	72.19	0.39	($11.89)	9
1 qt/ac MicroPlus & 1 gal/ac KTS Post	71.3	-0.5	($19.45)	8
1 qt/ac MicroPlus & 1 qt/ac Moxon Mn	71.28	-0.52	($26.83)	10
1 qt/ac MicroPlus & 1 pt/ac Iron Plus Post	70.55	-1.25	($27.55)	7
1qt/ac MicroPlus & 1 qt/ac Moxon B	68.19	-3.61	($63.78)	11

SAP Analysis

What is it?

- **SAP Analysis is a way to get a better idea of the nutrients flowing within your growing plant at key uptake timings**

Why do we use it?

- A way to identify deficiencies that are not showing in soil test
- Focuses on 23 key nutrients in the plant
- Measures dissolved nutrients in the plant
- Very precise, accurate, and science driven test

How is it completed?

- The oldest trifoliate and the youngest (newest) trifoliate for soybeans are pulled and kept separate. And the 3rd from the bottom and the 3rd from the top of the collared leaves on corn are pulled and kept separate.
- After the corn leaves are pulled, they must be cut into a small section, so you only test the middle of the leaves.
- Use scissors to cut the trifoliate or leaves off, placing them in Ziploc baggies, and measuring them out. The samples must weigh 5-6 ounces each.
- As these must be shipped off to be tested, the Ziploc baggies must be clearly labeled for the field, grower, and when they were gathered. The box must be overnighted to the facility to ensure accurate test results.

How does this effect you?

- Although this seems easy, samples must be obtained early in the day. As temps increase throughout the day plants can shift into a defense mode, which could reduce the flow of nutrition throughout that plant and skew final results.
- This condensed time frame to collect samples properly, makes it difficult for this practice to grow without the help of growers pulling samples within their own operation, and working with UP representatives to interpret.

"We utilize tissue testing"

- Tissue tests are looking backward, as SAP Analysis looks forward
- Tissue test show fewer data points as SAP Analysis reveals nutritional imbalances before they are visual

Equipment Needed

- Scissors
- Nail Apron
- Ziploc baggies
- Small Gram Scale
- Cooler
- Small Towel (If leaves are wet)

Corn	Old Tissue			New Tissue		
	Deficient	Optimum	Excessive	Deficient	Optimum	Excessive
Total Sugars	4.2%	16.7%	79.2%	25.0%	66.7%	8.3%
pH	4.2%	45.8%	50.0%	0.0%	37.5%	62.5%
EC	79.2%	20.8%	0.0%	20.8%	79.2%	0.0%
K	91.7%	8.3%	0.0%	41.7%	54.2%	4.2%
Ca	0.0%	95.8%	4.2%	25.0%	75.0%	0.0%
Mg	4.2%	54.2%	41.7%	4.2%	58.3%	37.5%
Na	70.8%	29.2%	0.0%	62.5%	33.3%	4.2%
NH4	16.7%	37.5%	45.8%	0.0%	66.7%	33.3%
NO3	4.2%	95.8%	0.0%	8.3%	91.7%	0.0%
N in Nitrate	4.2%	95.8%	0.0%	12.5%	87.5%	0.0%
N - Total Nitrogen	16.7%	16.7%	66.7%	4.2%	33.3%	62.5%
Cl	50.0%	41.7%	8.3%	16.7%	20.8%	62.5%
S	50.0%	50.0%	0.0%	33.3%	66.7%	0.0%
P	75.0%	20.8%	4.2%	4.2%	37.5%	58.3%
Si	0.0%	87.5%	12.5%	0.0%	79.2%	20.8%
Fe	33.3%	12.5%	54.2%	41.7%	50.0%	8.3%
Mn	87.5%	8.3%	4.2%	83.3%	16.7%	0.0%
Zn	70.8%	20.8%	8.3%	33.3%	16.7%	50.0%
B	50.0%	41.7%	8.3%	8.3%	25.0%	66.7%
Cu	66.7%	33.3%	0.0%	16.7%	4.2%	79.2%
Mo	75.0%	25.0%	0.0%	79.2%	20.8%	0.0%
Al	8.3%	54.2%	37.5%	58.3%	16.7%	25.0%

Included are the results from our 2022 SAP analysis testing program on corn. When it came to fields selected for this procedure it was asked that all farms included be considered the typical highest yielding farm per a growers operation. This request was to hopefully then take out some potential limiting factors that could be in place on poorer producing acres.

Results from ‘22 show a number of nutrients being deficient in the older tissue, but Mn & Mo being standouts in older and newer tissue. Mn can attribute to abiotic stress tolerance and Mo is essential in converting NO3 to NH4, as well as can be limited in uptake when S & N is applied. Things to start keeping record of though and seeing so many nutrients deficient in older growth concerns me that we may need to continue to feed on a regular basis, with such products as MicroSync Pro, as well as monitor season long movements within the plant.

Soybeans	Old Tissue			New Tissue		
	Deficient	Optimum	Excessive	Deficient	Optimum	Excessive
Total Sugars	59.1%	36.4%	4.5%	59.1%	40.9%	0.0%
pH	13.6%	40.9%	45.5%	36.4%	40.9%	22.7%
EC	9.1%	50.0%	40.9%	13.6%	45.5%	40.9%
K	81.8%	18.2%	0.0%	40.9%	50.0%	9.1%
Ca	4.5%	72.7%	22.7%	22.7%	77.3%	0.0%
Mg	0.0%	27.3%	72.7%	54.5%	0.0%	45.5%
Na	40.9%	22.7%	36.4%	45.5%	45.5%	9.1%
NH4	9.1%	27.3%	63.6%	4.5%	18.2%	77.3%
NO3	13.6%	54.5%	31.8%	13.6%	68.2%	18.2%
N in Nitrate	13.6%	54.5%	31.8%	18.2%	63.6%	18.2%
N - Total Nitrogen	9.1%	63.6%	27.3%	0.0%	59.1%	40.9%
Cl	31.8%	45.5%	22.7%	50.0%	40.9%	9.1%
S	27.3%	54.5%	18.2%	22.7%	72.7%	4.5%
P	36.4%	22.7%	40.9%	0.0%	27.3%	72.7%
Si	4.5%	81.8%	13.6%	0.0%	0.0%	100.0%
Fe	13.6%	13.6%	72.7%	22.7%	54.5%	22.7%
Mn	40.9%	54.5%	4.5%	72.7%	22.7%	4.5%
Zn	45.5%	50.0%	4.5%	27.3%	72.7%	0.0%
B	9.1%	63.6%	27.3%	9.1%	45.5%	45.5%
Cu	18.2%	54.5%	27.3%	9.1%	40.9%	50.0%
Mo	40.9%	59.1%	0.0%	9.1%	90.9%	0.0%
Al	4.5%	22.7%	72.7%	4.5%	45.5%	50.0%

Just as was requested for corn samples, when it came to soybean fields it was asked to only sample top yielding fields for growers. Again this was to hopefully take away a concern of having other limiting factors in place that needed addressed even ahead of getting to SAP testing.

Soybean samples just as corn showed some inconsistencies from top to bottom on the plant. Mn once again was a standout, which could be correlating to environmental conditions and K should also stay on the radar.

The one standout was sugars within the plant being lower at this crucial stage in development. Sugars ahead of R3 are being stored and ready to move into developing pods. Could this info be telling us that sugar production was down and potentially a cause of reduced yields?? This will be a major item to keep track of in 2023, and likely bring some BRIX testing into the equation as well.

Soybean Fungicide Timing

Planted: May 11, 2022
Harvested: October 14, 2022
Variety/Population: Stine 36EB32, 140,000 ppa
Treatment: Obvius Plus F & I, Ethaboxam, & Seed + Graphite
Row Spacing: 30”
Rows: 8 row entries
Tillage/Rotation: Conventional; corn/soybean rotation
Soil Type(s): Drummer SCL, Flanagan SL; well drained

Trial Overview

Soybean fungicide and insecticide applications have shown a lot of consistent ROI over the years, and is a general practice for many of you likely reading this. Past years we have been comparing multiple products to each other to see if we could find some products that were out performing others, which that information can be accessed in previous trial results books. For the 2022 growing season it was time to dial in not only on a single fungicide, but much like the corn lets look at some different timings of application to determine if something is being missed from protecting our investment in the crop and seeing additional yield. We also wanted to drop in an item such as Xyway into soybeans as an In Furrow application play, which is NOT labeled to do but this is also part of the fun of research and discovery.

Product & Timing Applied	Rate per Acre	Bu/Acre	Bu/Acre Diff.	Net $ Return/A	ROI Rank
V4 Tilt fb R3 Miravis Top & Lambda Cy	4 oz fb 13.7 oz & 3.8 oz	67.84	2.14	($6.87)	1
V4 Tilt (Propiconazole)	4 oz	65.77	0.07	($9.60)	2
R3 Miravis Top & Endigo ZC	13.7 oz & 3.5 oz	67.13	1.43	($16.12)	3
2 x 2 Xyway	15.2 oz	65.17	-0.53	($30.47)	4
R3 Miravis Top & Lambda Cy	13.7 oz & 3.8 oz	65.63	-0.07	($34.67)	5
UTC	-	65.7			

***$14.09/bu Soybeans, Lambda Cy: $4.66/gal, Tilt: $106.88/gal, Miravis Top: $203.51/gal, Endigo ZC: $264.54/gal, Application: $7.25/acre**
NO REBATE OFFERS WERE FACTORED INTO FINAL PRICING OF INDIVIDUAL PRODUCTS

Summary

Unfortunately much like the corn fungicide application research that was provided earlier in the book here, fungicide on soybeans didn’t show consistent ROI in the 2022 growing season. Disease pressure was very limited this year with the lack of rainfall seen throughout the growing season, and even insect pressure wasn’t of huge concern. As you review the above information though you can see that yield gain was still achieved with some of the applications, which is always a plus, but as we have mentioned for years now this is only one part of the profit equation, and when the product and application expense was added in then net return was a negative. As frustrating as things like this can be, this is just reality on some growing seasons, and we can’t ever outguess what each year is going to entail. The planning for your operations program usually starts in the winter months and then the implementation begins at planting. These steps and your personal program is usually followed through all season long, and then as we get to fungicide timing many times this is the last dollar spent on the crop. I encourage each of you to never give up on your crop unless unthinkable measures have happened and can’t be recovered from. Sticking with your own system season long more times than not provides the highest ROI in the end, and as I look myself into the 2023 trial season, I’m going to continue to make sure that we address all limiting factors that could potentially effect our final results with some studies in the end.

What else is missing at R3-4???

Planted: May 11, 2022
Harvested: October 14, 2022
Variety/Population: Stine 36EB32, 140,000 ppa
Treatment: Obvius Plus F & I, Ethaboxam, & Seed + Graphite
Row Spacing: 30”
Rows: 8 row entries
Tillage/Rotation: Conventional; corn/soybean rotation
Soil Type(s): Drummer SCL, Flanagan SL; well drained

Trial Overview

Once again as we hit the crucial time of reproductive stages of the soybean plant we not only want to make sure that we are protecting that yield with the basics of foliar fungicide and insecticide, but what else can be utilized to maximize this trip across the field. The 2021 growing season proved once again that there was some tremendous responses at this timing in what was our highest yielding overall average on the research farm since its inception. Heading into 2022, goals were to continue to surpass those yields achieved in 2021 by not only comparing like trials from last growing season, but also incorporating some additional measures into the mix. This years studies were really focused on delivering additional late season nutrient needs. The basis for this thought process was continuing to go back to multi-year tissue testing initially, but then as SAP analysis results started to show up this piece of information really started to provide a direction that we felt we needed to head down.

Treatment MT = Miravis Top & L=Lambda Cy Insecticide	Bu/Acre	Moisture	Bu/Acre Diff.	Net $ Return/A	ROI Rank
R3 MTL, 1qt/ac MicroPlus, & SureShot Rep	76.58	12.6%	7.64	$93.20	1
R3 MTL & 1 qt/ac Moxon B	75.29	12.6%	6.35	$83.56	2
R3 MTL & 1 qt/ac TimaUp	75.29	12.6%	6.35	$82.47	3
R3 MTL & 1 lb/ac NutriComplete	74.79	12.9%	5.85	$78.43	4
R3 MTL & 1 qt/ac Moxon Mn	74.35	12.6%	5.41	$63.73	5
R3 MTL & 8 oz/ac PrevAM	71.83	12.7%	2.89	$36.85	6
R3 MTL & 1 gal/ac KTS	71.24	13.1%	2.3	$27.01	7
R3 MTL & 1 qt/ac MicroPlus	70.97	12.7%	2.03	$21.60	8
R3 MTL & 1 gal/ac SRN25B	70.55	12.7%	1.61	$14.21	9
R3 MTL	68.94	12.6%			

$14.09/bu Soybeans, MT= 13.7 oz/ac Miravis Top Fungicide, L= 3.8 oz/ac Lambda Cy Insecticide, Miravis Top: $203.51/gal, Lambda Cy: $156.80/gal, MicroPlus: $28.00/gal, TimaUp: $28.00/gal, Moxon B: $23.66/gal, Moxon Mn: $50.00/gal, NutriComplete: $4.00/lb, SureShot Rep: $6.64/Acre, PrevAM: $62.00/gal, KTS: $5.40/gal, SRN25B: $8.47/gal

Summary

For as dry as things seemed to be up until August I was pretty concerned that we wouldn’t see a tremendous amount of response out of this data set in 2022. However late season August rains on this section of the research farm really helped push yields higher, and not giving up on the crop when the dry weather had set in I felt really pushed us above and beyond yield expectations. The location of this trial on the Innovation Farm is in our back NW quadrant that has a little rise through it and poorer soils, so anticipation of stress is typically assumed from the beginning, which was important part of this trials positioning. When dry weather isn’t allowing some nutrition to be pulled in from the soil profile, and this is validated through some of our avenues of testing, then supplemental additives might be necessary to attempt to offset some demand for a period of time, especially ahead of reproductive stages. Foliars can not and may not ever be able to provide growing crops with their full season nutritional demand, but are a key to spoon feeding those needs at key growth stages of the crop. We have seen this for 10+ years now with MicroShield/Plus. There is a lot being asked of soybean plants in their reproductive growth stages, so let's make sure to help them work smarter not harder to achieve yield.

Miller Ag Service Innovation Farm 2.0

Plans were in place, protocols put together, and the crop got planted on June 3, 2022 down at Miller Ag Services Cowden, IL. For the 2022 growing season we decided that we wanted to include the addition of a secondary research farm, but on much different soils than what we are used to dealing with here in Champaign county. So we moved south of Rte 16 to our Miller Ag Cowden Facility to begin work on Innovation Farm 2.0. The goal of this farm was to broaden our research geography and to ensure that we were bringing valuable agronomic data for everyone across the footprint that we cover. This will be a continued focus moving forward as moving south was step 1, and going north is hopefully in the not to distant future.

Although we got the crop out of the ground, consecutive heavy rainfalls plagued this area and with drainage already being known to be a huge issue here, mother nature reinforced what we feared, and drowned out a number of our replicated studies, a soybean variety plot, and a hybrid plot. As frustrating as this can be we are not going to give up on our goals of having a research farm in our southern territory. Ditch work has already been completed this fall redirecting water and FINALLY providing an outlet point. Tile options are being looked at as well, and the John Deere plot planter that we once used at the original Innovation Farm, will be getting a few items removed and added. We are optimistic that '23 will hopefully have a better outcome.

Corn On Farm Research

Side by Side Results - United Prairie 2022

Corn Treatments	# of Trials Yield Data Received	% Positive Yield Response	Range of Bu/Ac Response	Ave. Response bu/a	Average Return on Investment $
On Seed Products					
Pivot Bio On Seed (Standard Rate N Applied Synthetic vs Synthetic Less 40 with Pivot Bio OS)	6	57%	-3.4 to 6.6	0.06	First look at On Seed was in 2022. Must remember to factor cost per unit of N versus yield difference in the end to determine true ROI
In Furrow Liquid Products					
Levesol Zn	3	100%	1.38 to 4.45	2.44	$6.01
Pivot Bio ProveN40 In Furrow (Standard Rate N Applied Synthetic vs Synthetic Less 40 w/ Pivot Bio IF)	4	75%	-.74 to 3.78	1.704	If Pivot Bio vs all Synthetic shows equal performance this is a win for Pivot based on its current lower per unit of N price vs Synthetic
QuickGrow Complete	3	67%	-3 to 5	0.893	($28.39)
Foliar Products					
Source (Sound Ag)	2	100%	3 to 4.97	3.99	$11.69
Moxon B	4	50%	-3.01 to 2.21	-0.35	($8.17)
SureShot (EXP Foliar Blend)	3	67%	-.65 to 6.48	3.75	$12.07
Corn Fungicide					
Summary corn VT Fungicide Applications 2022	4	75%	-5.16 to 7.17	2.71	($20.65)

Levesol Zn (1qt/ac): $9.70/ac, ProveN40 In Furrow (12.8 oz/ac): $21.00/Ac, QuickGrow Complete (3 gal/ac): $34.14/ac, Source Corn (.7 oz/ac): $14.01/ac, Moxon B (1 qt/ac): $5.92/ac, SureShot EXP Foliar: $12.08/ac, Miravis Neo (13.7 oz/ac): $25.60/ac, Fungicide App.: $12.50/ac
(Bu/Ac difference from UTC x $6.44/bu corn - cost of treatment = Net $ Return/Ac)

Corn Products S x S Summary

Although goals were to have a lot more data points in place for the 2022 growing season to summarize in the above chart, the other side of this equation is ensuring that the data points that are provided are quality. This was an overwhelming challenge in 2022 as many trials were well thought out initially, just final execution and follow through was the bigger struggle. As we sit back and reflect though on what we were able to acquire this year, the above chart shows some promises on a handful of products that could potentially add the next few bushels into your operation that you've been looking for. One major item I want to point out when looking at the Pivot Bio In Furrow and On Seed data is that many times when we are looking at new products in this nature our expectations are to see higher yields. We all must remember though that when using Pivot Bio products these are nothing more than a nitrogen product. Just like purchasing a unit of N via 32% or Anhydrous Ammonia, with the Pivot Bio line up you are looking at an N source that today is quite a few cents per unit of N cheaper than some of our standard synthetic sources. Therefore, although we might have seen some overall average yield gains in both studies, this is not what we are always necessarily looking for. The goal would be for comparisons to show a net equal yield in the end, which would then validate the Pivot Bio is doing exactly what it claims it would do, and that is supply necessary N to that growing plant. If however, we would see a potential yield gain, then going back and evaluating the season is a must. Was nitrogen a limiting factor from the beginning? Did we have heavy rains which may have induced N loss via denitrification or leaching for the synthetic forms, but the colonizing bacteria were unphased? Was mineralization lacking overall in some soils, and this caused a lack of necessary N late in the season? All great questions to keep in mind going forward.

As you sit back and gear up for the 2023 corn growing season, our goal at United Prairie is to thoroughly strategize what we want to look at as a company, and get a large data set of. Having 25+ sales men and women throughout a large geographic footprint allows for multiple replicated studies with growers and a rather large data set that can be evaluated in depth at the end of 2023. Although plans aren't 100% in place yet, I anticipate targeting at least 2-4 replicated studies at the minimum per sales professional to bring to growers like yourself. I would like the studies to be replicated the best that they can and will make sure that our team of United Prairie Agronomy Interns assist every step of the process once they come on board this year. I look forward to not only standardizing this process, but allowing our sales teams to help mentor our intern team, while also getting a chance for everyone to network with you during the whole process. Together we will have a combined focus and goal of compiling quality data sets that can once again assist us in generating a road map to higher yields and ROI.

Soybean On Farm Research

Side by Side Results - United Prairie 2022

Soybean Treatments	# of Trials Yield Data Received	% Positive Yield Response	Range of Bu/Ac Response	Ave. Response bu/a	Average Return on Investment $
Foliar Products					
Cygin Pro & Takeoff	2	0%	-2.52 to -1.85	-2.185	($42.37)
Source Soybeans	3	67%	-.62 to 1.57	0.455	($3.59)
Moxon B	2	100%	.18 to 1.17	0.675	$3.59
Moxon Mn	2	0%	-1.14 to -.39	-0.765	($23.28)
Yield On	2	100%	2.06 to 3.8	2.6	$25.42
Soybean Fungicide					
Ground vs Aerial Application	2	-	-.04 to .37	-	
Summary of all Soybean R3-R4 Fungicide Applications 2021	1	100%	3.24	3.24	$16.62

Cygin Pro (4 oz/ac): $5.97/ac, Takeoff (1 pt/ac): $5.61/ac, Moxon B (1 qt/ac): $5.92/ac, Moxon Mn (1 qt/ac): $12.50/ac, Yield On (1.5 pts/ac): $11.21/ac, Source Soybeans (2.5 oz/ac): $10.00/ac, Miravis Top (13.7 oz/ac): $21.78/ac, Fungicide App: $7.25/ac

(Bu/Ac difference from UTC X $14.09/bu soybeans - cost of treatment = Net $ Return/A)

Soybean Products S x S Summary

Soybean studies consisted of a decent amount of foliar applications this growing season looking for that next best option to add into the tank when making a trip across the field already. Although we always hope we can find that next "Bolt On" product, sometimes that is easier said than actually done, and the 2022 on farm studies reinforce that. Looking through the list of trials provided in the above chart we are seeing a little more red this year than green, which of course is not the goal but sometimes reality. In a year where stress from high heat and drought was the biggest limiting factor, we sometimes find that triggering that plant to do even more can sometimes have a negative result, unless we are taking the time to do what I like to call our pre-trial checklist. I know many times these studies can be last minute thoughts and just thrown into the mix in random places, but the key to getting quality data in making sure that the system that we put in place is being followed through from start to finish, and most importantly positioned correctly onto the farm. As discussed on the previous page with the corn data we are going to take a new approach at these on farm studies in 2023 with implementing a standardized list of protocols that we expect our whole sales team to implement with a hand full of growers. This once again helps to make certain that we aren't only getting quality data for each of you to see, but that we are implementing studies across our whole trade territory. If we can see positive trendlines from North to South & East to West, this will provide that next level of confidence necessary in implementing decisions from an overall operation standpoint in 2024.

I can tell you now that one study that will definitely come into play based on not only United Prairies few data points, but other studies across the area is looking at the product Yield On. This was a new biostimulant brought to us late in the season for application during fungicide timing. The goal of this product is to increase the number of nodes and pods in soybeans and the number of kernels per row in corn. There is a vast amount of biostimulant choices on the market these days, and as we continue to navigate through this murky water, we hope that our key strategic partners/suppliers that we work with as an organization each day can assist us in segmenting out what makes sense and what doesn't. Today I'm staying optimistic that this is one of those products that can start to show consistency. Be on the look out for this product and more protocoled studies for the 2023 growing season.

What's New At United Prairie?

Spray Drone

2023 plans are to have a spray drone at our disposal throughout the season. We will implement this tool on trial protocols within operations, as well as demonstrate what all this technology is bringing to the industry in the future.

New Location!!!

United Prairie has purchased the old PSW facility located just west of Flatville, IL. We look forward to this new addition in '23 and our 14th location as a company.

Accolade Financing

CHS Accolade financing is a new addition to the offering from United Prairie. Talk with your local Sales Agronomist or Seed Specialist about how to secure low interest financing on your UP input purchases.

CHS®

ACCOLADE®

Fendt High Clearance

Continued hopes that our new Fendt high clearance sprayer will arrive for the 2023 growing season. New sprayer has capability to lower and raise itself at the flip of a switch, and will increase efficiencies in the field.

United Prairie Summer Internship

Our Internship Programs goal is to create a hands-on learning experience for those interested in general crop production, agronomy, seed, and sales. The internships are offered through the months of May through August, and allow for young men and woman to work alongside our agronomy team learning the ins and outs of the retail business.

Our Agronomy Internship program works side by side with our Agronomy Manager during the growing season. They work to diagnose field issues on-site, understand and identify weed, diseases, and insects, as well as scouting and monitoring farms season long for local growers. Each intern is also assisted in obtaining their Part 107 Drone license, as drones are a key tool in our summer scouting process.

Our Seed Specialist Internship program works side by side with our Agronomy Manager and the Seed Manager. They work on helping manage seed returns, field sign set up, work with the seed sales team, and assist the agronomy interns in the daily activities when needed.

Please contact Kyle Meece with any questions!
Cell: 217-552-9350
Email: kmeece@unitedprairie.com

United Prairie Summer Internship

Our Internship Program goal is to create a learning experience for those interested in operations. The internship is offered through the months of March through August, and allows for an in the seat, hands on opportunity to run some of the newest equipment and technology on the market, alongside seasoned professionals.

The Operational Internship is something new we are bringing to United Prairie for the 2023 growing season based on demand from young professionals looking to better understand this side of the retail business.

Our Operational Internship works side by side with our Operations Manager and our Operations Team. While spending time learning to run equipment, you will also be gaining knowledge on the newest technology being implemented today. The technology ranges from something as simple as an iPad, to our Viper 4 monitors, Raven Vision Cameras, and machinery of all sizes and colors (John Deere, RoGator, Hagie, Fendt, Case IH, and etc). If you're looking for knowledge or experience in any of these areas, please reach out today!!

Please contact Josh Rund with any questions!
Cell: 217-649-2206
Email: jrund@unitedprairie.com

TRUTERRA™

Who is Truterra?

Truterra partners with Farmers and Agricultural Retailers that are sustainability focused to better our fields.

Why Farmers?

- Farms require evolving practices to improve crop production and soil health in the coming years.
- Farmers get assessments to help better their management practices and implement new technologies within each of their fields.

Why Ag Retail Companies?

- Truterra helps enable deeper conversations with customers about improving profitability and new opportunities.

What do they do?

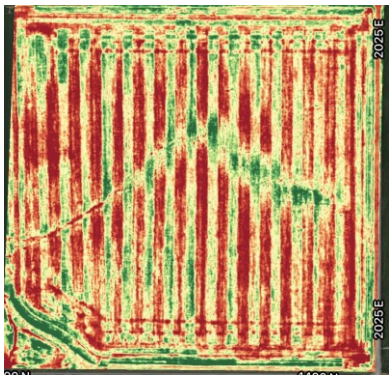
- They look at soil vitality and health, use of water, use of other ag inputs, as well as give the farmer an understanding of their erosion, carbon sequestration, cropping rotation, fertilizer management, crop protection, irrigation and water management, and nitrogen use efficiency.
- This gives the farmer a sense of what is happening within their farm and a sense of how their management practices have worked over the years.
- These assessments along with additional recommendations from United Prairie and Truterra, could then provide market access for alternative revenue streams to growers, based on sustainable practices being implemented within their operations.

Why did we choose Truterra?

Truterra has been a leader in attracting new options and markets in this arena. We felt with their expertise and our understanding of grower operations, that we could continue to stay ahead of the industry in IL on new market offerings.

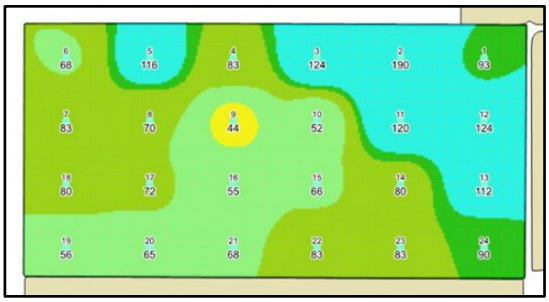
United Prairie Technology Services

United Prairie is always striving to find the next tool from a technology perspective that can bring value to your operation. The foundation of any program though should start with implementing a strong soil testing service to gather results looking at not only OM, pH, P, & K, but also taking into account CEC and Base Saturation. Those levels are then put into an algorithm where we are looking at building fertility levels on the farm from a number of different angles, whether that be through a standard removal practice, VRT applying based off your soil holding capacity, looking at historical yield data to provide necessary amounts where needed, or even taking a different approach and looking to build or maintain levels using Base Saturation and CEC as part of the algorithm. As we continue to also dig deeper into understanding what all happens within our soil profile we are beginning to evaluate micronutrient levels within our soil testing program and how to alleviate yet another potential limiting factor. We are also implementing drones into our scouting program and with some of our sales agronomist. These devices not only allow us to evaluate fields from a different perspective, but also will give us the ability to review stand counts established early in the season, as well as capture imagery in the event we are trying to diagnose an issue or look at a potential trial implemented on a portion of the farm. Technology is an ever-changing environment, and we will continue to strive to be leaders in the industry when it comes to bringing new ideas and innovations to the market in this arena. **Contact your United Prairie Sales Agronomist or Seed Specialist for more information about all our technology service offerings.**

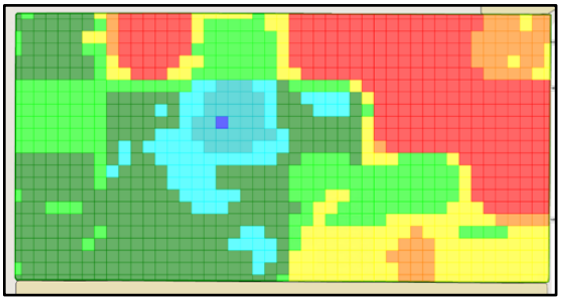


Drone Low Resolution Imagery

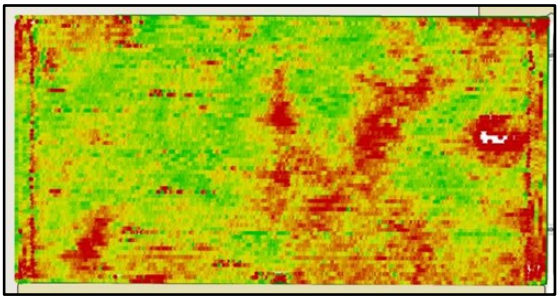
Drone Aerial Photography



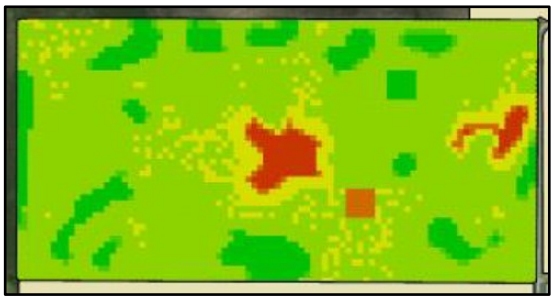
Soil Testing



VRT Fertilizer Recommendations



Yield Mapping



Variable Rate Seeding Recommendations

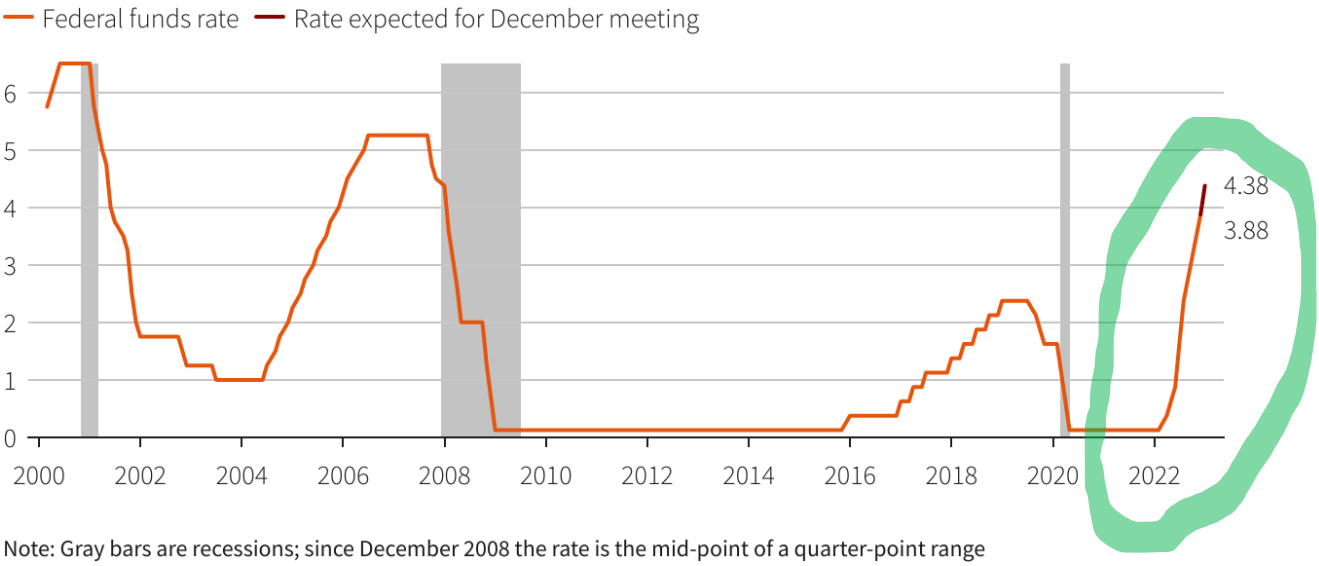
The Results Are In

Interest rates are rising.

United Prairie's financing program, through CHS Accolade, provides fixed interest rates as low as 1.9% to reduce interest rate risk during this inflationary rate environment.

The Federal Reserve's target interest rate

At December's meeting, the Fed is expected to lift rates to their highest since the financial crisis.



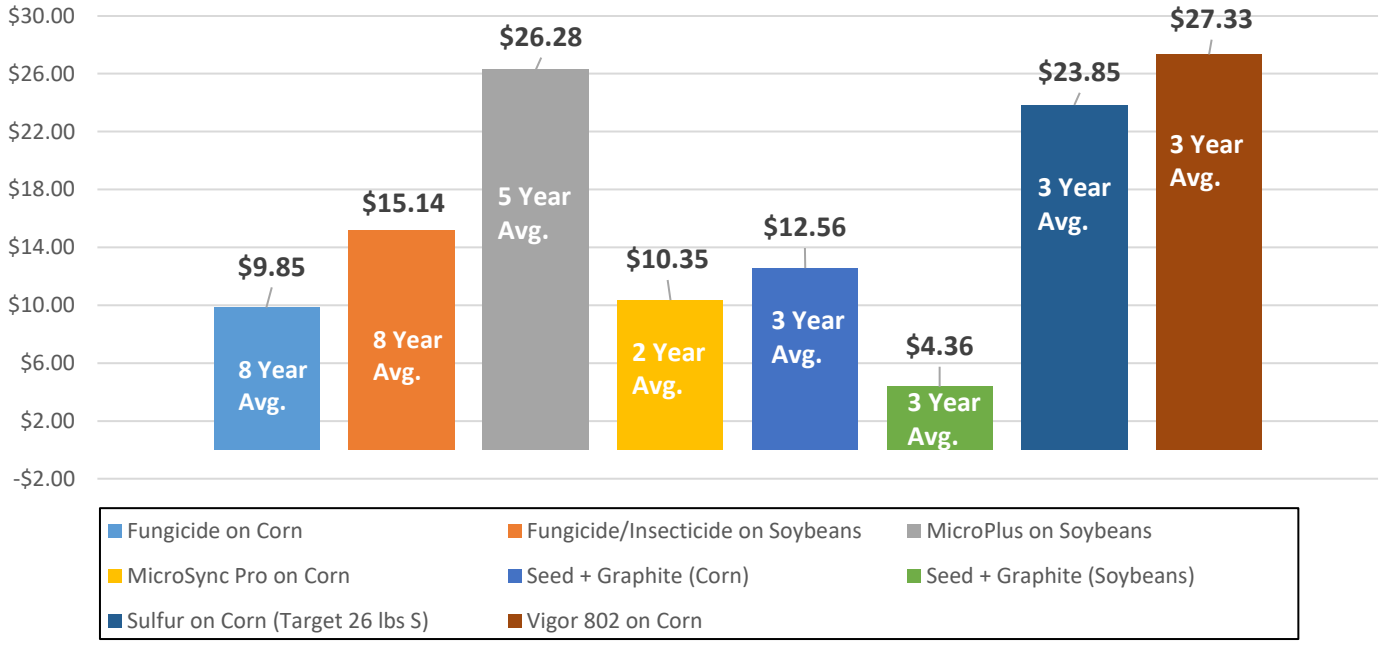
Note: Gray bars are recessions; since December 2008 the rate is the mid-point of a quarter-point range
Source: U.S. Federal Reserve

Fed interest rates rose 4.25% in 2022 with no expected end in sight.

Contact Keith Toczynski – Finance Manager
Cell: (608)530-2781
Email: ktoczynski@unitedprairie.com

Multi-Year Side by Side Summary **ROI** Results

As you sit back and reflect on not only the 2022 growing season, but multiple years of farming and yield data, we've always felt it was nice to have some cumulative information showing trendline data on key products that we feel should just be part of the program. I debated this year whether or not to change up the design and look of this page, but sometimes keeping things consistent and familiar to what you've seen in the past is important, and this page right here provides just that. One change we did want to do was to separate a few more layers and add some clarity to some of the side by sides, so you will see Seed + Graphite results for now corn and soybeans. Also wanted to drop in the Vigor 802 information because this was our 3rd season testing this product and the confidence in what it could bring to your operation is now in place, and encourage you to look at some if you haven't already. In closing the one thing to note was that this was the first year in 8 that a negative ROI went in for fungicide on both corn and soybeans. Truly feel that is an important statement and want to reinforce to everyone reading this why its necessary to look at a cumulation of info rather than making a decision that could affect your bottom line just on one seasons worth of data.



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15420 US Highway 36
Chrisman, IL 61924
Brian Sheehy
217-264-3721

Jamaica
7061 E 850 N Road
Fairmount, IL 61841
Phone: 217-485-3427

Emery
375 East Emery Road
Maroa, Illinois 61756
Phone: 800-989-1922

Crescent City
950 Jerry Ash Ave.
P.O. Box 430
Crescent City, Illinois 60928
Phone: 815-683-2126

Danvers
200 S West Street
Danvers, IL 61732
Phone: 309-963-4305

Hoopeston
18978 E 3850 N Rd
Hoopeston, IL 60942
Phone: 217-283-0011

Miller Ag Service
IL-128
Cowden, IL 62422
Phone: 217-783-6321

Westridge
11756 N 1350 E
Tuscola, IL 61953
Phone: 217-599-0131

United Prairie

2022 Trial Results