FIELD RESEARCH REPORT

NUTRICHARGE®

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Agrotech USA's approach is grounded in science and supported by data, with results from a decade of third-party and grower testing outlined in our yield guide.

NUTRICHARGE

STARTER FERTILIZER PHOSPHORUS AVAILABILITY

Introduction:
Phosphorus (P) availability is crucial for crop growth but is often limited due to its fixation by calcium (Ca), iron (Fe), and aluminum (Al) in the soil, depending on the soil pH. NutriCharge, a proprietary product developed by AgroTech USA, acts as a threshold polymer inhibitor, binding with soil cations to prevent the fixation of P, thereby increasing its availability to plants. This study evaluates the effectiveness of NutriCharge in enhancing P availability and nitrogen (N) mineralization under field conditions.

Field Trials Overview: The field trials were conducted at the Webberville research site, characterized by Alfisols, which are moderately weathered soils favorable for agricultural use. The objective was to compare the effects of NutriCharge with standard farmer practices on nutrient availability and corn growth.

Soil Health Testing Package

Soil pH	6.5
CEC	8.7
Phosphorus Bray 1	70
Nitrate	2.8
Organic Matter	2.1

Research Methods:

- Micro-Lysimeters: Installed at two soil depths (4" and 8") to extract soil solutions and measure the concentrations of dissolved P, N, Ca, and Mg.
- Resin Membranes: Used to assess nutrient supply rates, particularly phosphorus desorption and nitrogen mineralization/nitrification rates, by measuring the accumulation of nutrient ions over time.

Treatments:

1. Control (No N and P Application): This treatment served as a baseline to compare against other treatments to evaluate the impact of NutriCharge and farmer practices.
2. Farmer Standard Practice:
   - Preplant broadcast application of 200 lbs./acre (39-0-0-6% S).
   - Blend dry fertilizer applied 2x2 at 175 lbs./acre (6-24-24 with 0.67% Boron).
   - Liquid fertilizer applied in-furrow at a rate of 5 gallons/acre (low salt 6-18-6).
   - Side-dressing with 28 gallons/acre of nitrogen (26-0-0-3% S) at V6 corn stage.
3. Farmer + NutriCharge Treatment:
   - Farmer's standard application plus 3.2 oz/acre of NutriCharge included with the in-furrow liquid blend.
   - An additional side-dressing application of a liquid blend containing 6.4 oz/acre of NutriCharge plus the farmer's standard side-dress application.

Key Findings:

Phosphorus Availability:

The application of NutriCharge significantly increased phosphorus desorption in the soil, making more P available for plant uptake compared to the control and standard farmer treatments. During the first week after corn planting (May 17 to May 24), the P supply rate was 84 micrograms per 10 cm² per 7 days in the NutriCharge treatment, compared to 32 micrograms in the farmer treatment and 27 micrograms in the control.

The increased availability of P in the NutriCharge-treated plots correlated with enhanced corn growth during the initial stages of development, demonstrating the product's potential to improve early crop vigor.

Nitrogen Mineralization:

The NutriCharge treatment also showed a marked increase in nitrate levels, indicating enhanced nitrogen mineralization. Nitrate concentrations were significantly higher in the NutriCharge treatment (528 micrograms) compared to the farmer (431 micrograms) and control treatments (106 micrograms) during the same period (May 17 to May 24).

Figures 12 and 13 illustrate the cumulative supply rates of phosphorus and nitrogen over the duration of the trial (May 17 through July 31). These figures are crucial in understanding the long-term effectiveness of NutriCharge in maintaining nutrient availability:

Figure 12: Cumulative Supply Rate of Phosphorus (P)

The cumulative P supply rate in the NutriCharge-treated plots remained consistently higher throughout the trial period compared to both the farmer and control treatments. This trend highlights NutriCharge's ability to sustain higher levels of bioavailable phosphorus over an extended period, which is essential for continuous crop growth and development.
Notably, the NutriCharge treatment maintained a cumulative P supply rate that was approximately 2.5 times higher than the control by the end of the trial. This sustained release of P is critical for crops that require consistent nutrient availability, particularly in soils prone to P fixation.

FIGURE 12

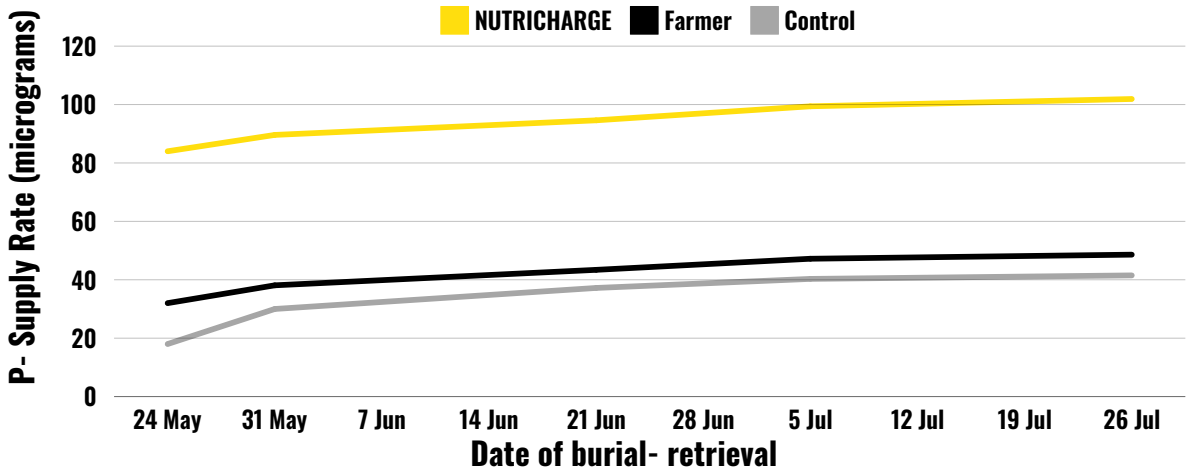


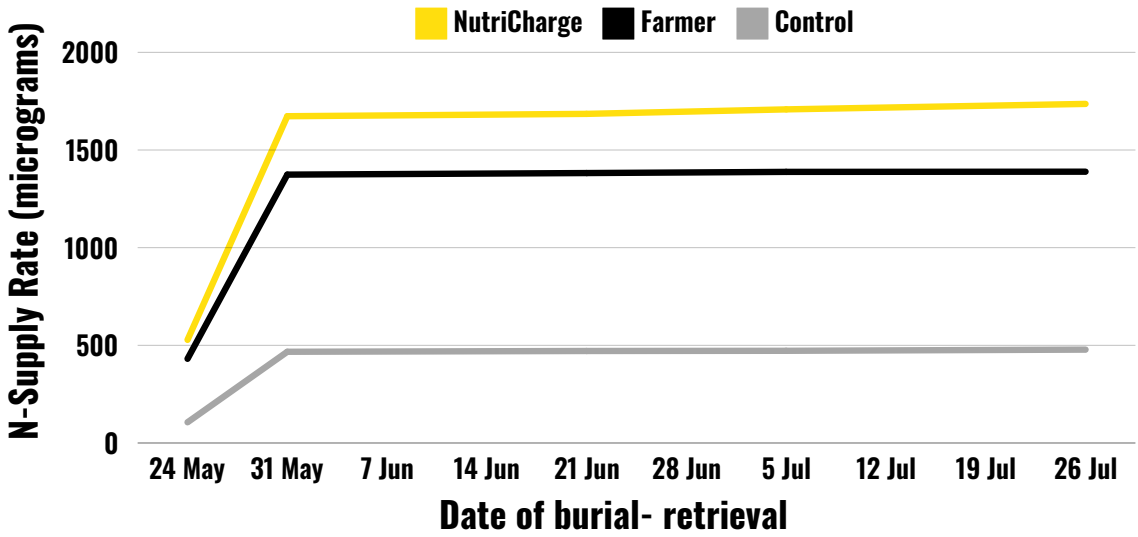
Figure 13: Cumulative Supply Rate of Nitrogen (N)

Similarly, the cumulative N supply rate, particularly nitrate, was significantly enhanced in the NutriCharge treatment compared to the farmer and control treatments. The data show that NutriCharge facilitated a more stable and higher supply rate of nitrate, crucial for crop nitrogen uptake, especially during key growth stages.

The enhanced nitrogen supply rate also supports the observation that NutriCharge improves nitrogen mineralization processes in the soil. By the end of the trial period, the cumulative nitrate levels were substantially higher in the NutriCharge treatment, underscoring its role in boosting nitrogen availability and uptake efficiency.

NUTRICHARGE

STARTER FERTILIZER PHOSPHORUS AVAILABILITY



OVER DOUBLE THE DAILY AVAILABLE OF PHOSPHORUS FERTILIZER

These findings are significant because they demonstrate that NutriCharge not only improves the immediate availability of phosphorus and nitrogen but also has a lasting impact on nutrient dynamics within the soil. This sustained nutrient availability can lead to improved crop yields and better overall soil health over time.

Conclusion for the Webberville Field Trial

The Webberville field trial evaluated NutriCharge's effectiveness in enhancing phosphorus (P) availability and nitrogen (N) mineralization in corn fields. The trial compared three treatments: the standard farmer practice, farmer practice with NutriCharge, and a control with no fertilizer.

Key Findings:

Increased Phosphorus Availability:

NutriCharge significantly improved dissolved phosphorus levels in the soil compared to the other treatments, enhancing P availability for crop uptake, particularly during early growth stages.

Enhanced Nitrogen Mineralization:

Higher nitrate levels in the NutriCharge treatment indicated improved nitrogen mineralization, providing a more available nitrogen source for corn growth.

Sustained Nutrient Supply:

NutriCharge maintained higher cumulative nutrient supply rates over time, optimizing nutrient availability and use efficiency throughout the growing season.

Conclusion:

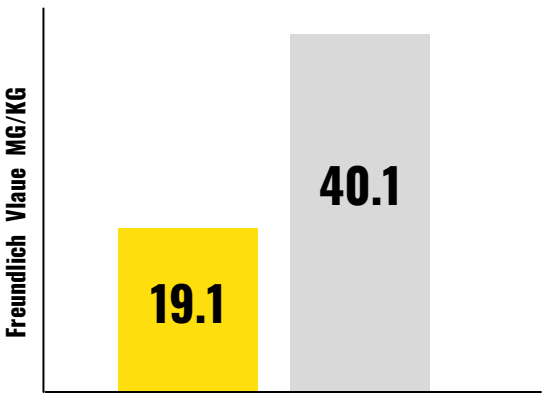
NutriCharge effectively enhances phosphorus and nitrogen availability in soil, supporting better crop growth and higher yields. It is a valuable addition to nutrient management strategies, promoting efficient nutrient use and sustainable agricultural practices.

LIQUID PHOSPHORUS FERTILIZER AVAILABILITY TRIAL
DETERMINING PLANT AVAILABLE PHOSPHORUS FROM APP WITH NUTRICHARGE USING ADSORPTION ISOTHERMS

Trial Location- BYU-Idaho
Investigators: Dr. Jared D. Williams Ph.D.
Student Investigators: Lino Macamo, Dino Matobo, Chance Connelly, Riley Burgeous
Dept. of Applied Plant Science, Brigham Young University-Idaho

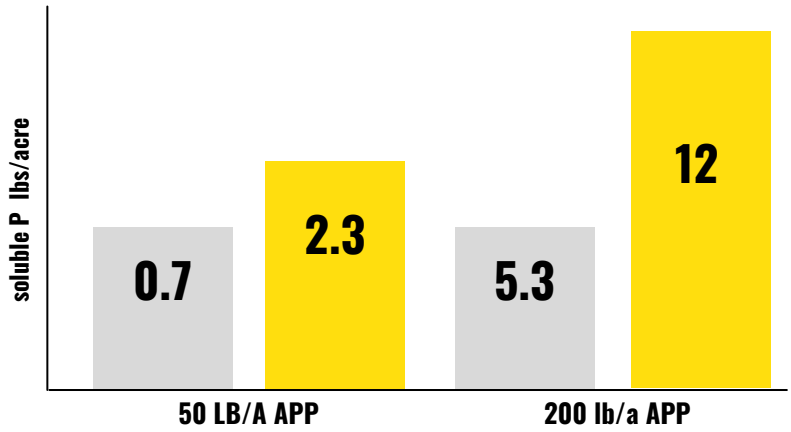
Trial Design
Various rates of Ammonium Polyphosphate (APP) fertilizer with and without NutriCharge were added to high P fixing Idaho calcareous soil with a pH of 8.2. These soils were then added to phosphorus adsorption isotherms. They measure the amount of P adsorbed to soil particle surfaces by adding a known amount of soluble-P to the soil and measuring the amount of P remaining in solution following an incubation period. Phosphorus adsorption isotherms are then used to determine the ability of enhanced efficiency P fertilizer amendments to prevent adsorption or fixation of applied P.

The Freundlich values indicate soil adsorption strength and capacity with higher values indicating higher adsorption of P in the soil



Data shows that the APP with NutriCharge is reducing the amount of fertilizer-P being adsorbed to the soil

The APP with NutriCharge treatment had the highest amount of soluble-P for the 50 and 200 lbs/ac fertilizer rates using the Freundlich model.



Data shows that NutriCharge increased soluble-P and decreased adsorbed-P, which is the result of the NutriCharge polymer interacting with antagonistic P fixing cations.

CONCLUSION
The APP with NutriCharge treatment demonstrated an ability to decrease P-adsorption and increase soluble-P from applied fertilizer-P in this study as compared to untreated APP fertilizers. The data in this study suggests that the NutriCharge amendment is reducing adsorbed-P by reducing the activity of P fixing cations such as calcium in the soil.

NUTRICHARGE

FRACTIONAL SOIL P STUDY

Investigators: Agriculture analysis center of Gyrazi
Dept. of Applied Plant and Soil Science

Trial Design

In a laboratory setting, wheat was germinated and grown under phosphorus fertilizer. The application of DAP fertilizer was applied to according to the recommendation for 120 bushels and 150 bushels per acre yield. The soil selected was a Chernozem high organic soil with the following test levels (pH 8.09, P205 15.1 ppm, K20 94 ppm, N 167 ppm, OM 6,42%). The crop was grown, and the soil was studied to determine the NutriCharge effect on the phosphorus in the soil two weeks post application to the soil.

Treatment	Total P205 mg/100 of soil	Cal-P	Call-P	AL-P	Fe-P	Sum
Initial Soil	131.5	0.17	2.60	2.57	5.69	11.02
Control	128.2	0.30	3.96	5.66	5.53	15.2
10-26-26- 0.1g	136.5	0.19	4.79	5.25	5.51	15.7
10-26-26- 0.1g + NC	139.0	0.17	3.31	4.75	4.75	12.9
10-26-26- 0.5g	139.0	0.24	5.32	5.44	5.08	16.1
10-26-26- 0.5g + NC	144.0	0.23	4.33	4.60	4.48	13.6

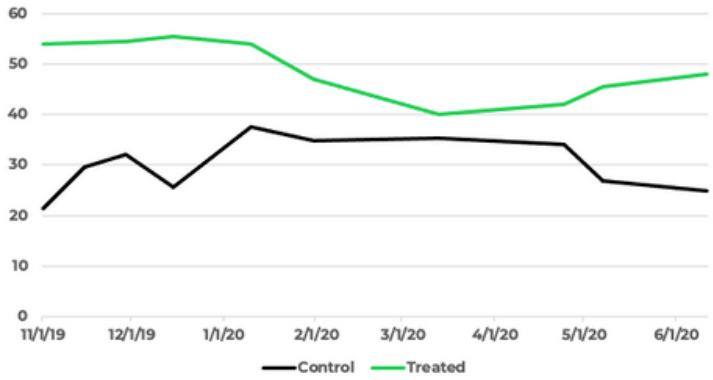
Conclusion: NutriCharge was able to increase total P205 while reducing fractional bound phosphorus in the soil profile.

DETERMINING THE EFFECT OF NUTRICHGARGE ON PHOSPHORUS DYNAMICS IN THS SOIL

Trial Location-Center for Plant Science, Rostov University
Investigator: Director of Institute O.G Nazarenko

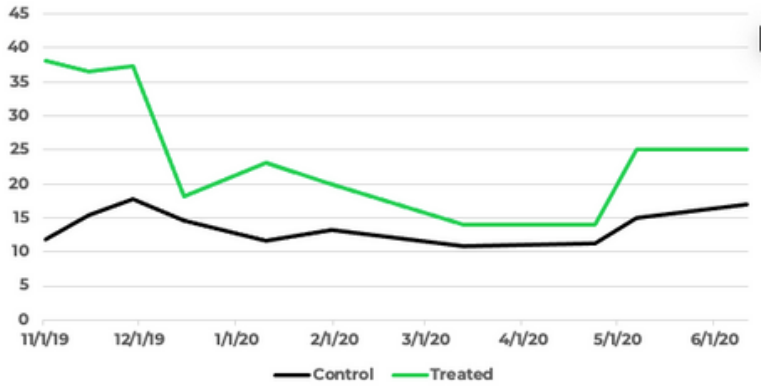
Trial Design- Replicated field study using GPS sample locations. 15-15-15, both treated by NutriCharge and untreated, applied at 125 lb per acre. Sampling was conducted throughout the season at two depths, 0-8 in and 8-16 in. In addition to soil phosphorus levels, leaf analysis was conducted, and biological yield was measured.

AVAILABLE PHOSPHORUS 0-20 CM



On average 1.65 X the available phosphorus during the 6 months

AVAILABLE PHOSPHORUS 20-40CM



On average 1.8 X the available phosphorus during the 6 months

PHOSPHORUS REMOVAL RATES

A study of the mass removal of phosphorus was conducted in the experiment. An initial application rate applied 29.9-32.3 ppm of phosphorus from the granules. At the end of the growing season, 11.7 ppm to 14.2 ppm was used. This is the difference between the extraction of P from treated fertilizer at the beginning and last sampling. Therefore, for the P treated with NutriCharge, the plant took up 39%-49% of the phosphorus.

After harvest, the P content in the soil was 38.6 ppm and 25.5 ppm; the difference of 13.1 ppm in the 0-8 range is the remainder of the phosphorus from the application. Therefore for the P treated with NutriCharge from 16.7-19.2 ppm or 56%-59% of the total fertilizer was used.

It can be concluded from the experiment that the dissolution and the mobilization of soil P occur later than the control. Therefore, the winter wheat plants were more constantly supplied with nutrients during the late stages of development. This is evident in the higher biological and morphometric parameters of the crop.

YIELD RESULTS

CONTROL

# PLANTS	# TILLER M2	GRAIN IN EAR	WEIGHT PER GRAIN	YIELD
22.2	50.3	35	31 GRAMS	96.28 BUSHEL

NUTRICHARGE TREATED FERTILIZER

# PLANTS	# TILLER M2	GRAIN IN EAR	WEIGHT PER GRAIN	YIELD
23.9	56.8	37	33 GRAMS	113.07 BUSHEL

GRAIN QUALITY CONTROL

GLUTEN	IDK	PROTEIN	N	P	K
16.7	78.3	9.23	1.62	0.38	0.45

GRAIN QUALITY NUTRICHARGE

GLUTEN	IDK	PROTEIN	N	P	K
21	81.7	10.87	1.91	0.41	0.45

YIELD RESULTS SUMMARY

The yield in the NutriCharge treatment was 11.6 bushel/acre higher than in control.
It was achieved due to an increase in plant characteristics because the number of tillers per square ft. was 6.5 more, and due to the difference in the number of grains in the ear, on the plots of the experiment, there were two more grains in the ear. A particular influence on the quality indicators of winter wheat grain was also revealed; the content of gluten, protein, and phosphorus increased.

Agricultural Research Report: NutriCharge Nitrogen Release Study

1. Introduction

Nitrogen (N) loss in agriculture is a significant challenge that reduces crop yields and contributes to environmental issues like leaching and volatilization. AgroTech developed NutriCharge, an experimental product designed to enhance nitrogen retention and inhibit nitrogen mineralization in soils. This report presents the results of a replicated incubation study conducted in collaboration with Ward Laboratories in spring 2024. The study evaluated NutriCharge's performance at two nitrogen application rates (150 lbs/acre and 300 lbs/acre) in sandy and loam soils over 10 and 20 days.

2. Materials and Methods

2.1 Soil Types:

- Sandy Soil: Characterized by low organic matter (2.2%), a pH of 5.6, and a cation exchange capacity (CEC) of 8.8 meq/100g.
- Loam Soil: Contains moderate organic matter (3.2%), a pH of 6.7, and a CEC of 10.1 meq/100g.

2.2 Fertilizer Treatments and Nitrogen Rates:

Three fertilizer sources were tested at two nitrogen application rates:

- Untreated Urea applied at 150 lbs/acre (standard) and 300 lbs/acre (double the standard rate).
- Urea treated with 0.125% NutriCharge, applied at both 150 lbs/acre and 300 lbs/acre rates.
- Urea treated with 0.25% NutriCharge, applied at both rates.

FIGURE 1. FERTILIZER SOURCES UREA, 0.125% NUTRICHARGE AND 0.25% NUTRICHARGE

2.3 Incubation Process:

Soil samples were sieved to less than 4 mm and placed in plastic cups. They were incubated at 25°C for 20 days, with deionized water added at regular intervals (Days 0, 5, 11, and 15) to simulate rainfall. This regular watering aimed to maintain soil moisture levels that could affect nutrient mobility and retention.

Soil samples were collected at 10 and 20 days to analyze nitrate (NO_3^-) and ammonium (NH_4^+) concentrations.

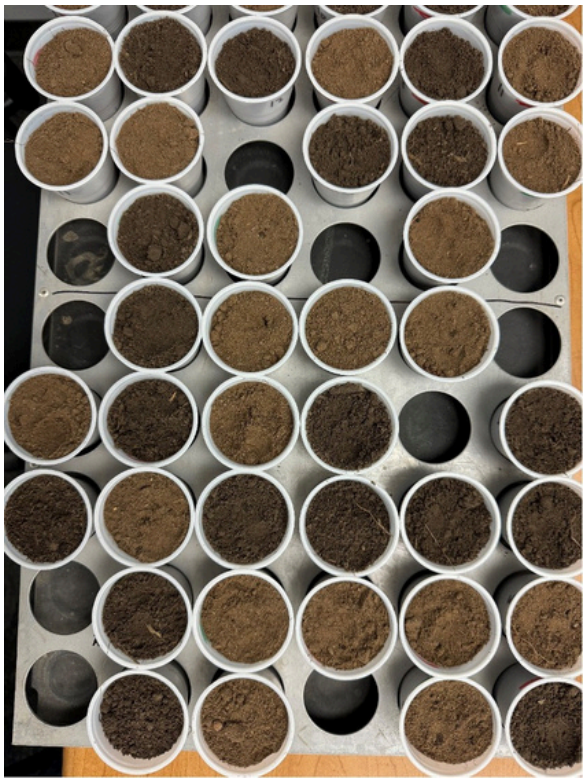


FIGURE 2 REPLICATED TREATMENTS WITH FERTILIZER

2.4 Replication:

Each treatment was replicated twice for statistical robustness.

3. Results

The tables below summarize nitrate and ammonium levels after 10 and 20 days for each fertilizer treatment across both soil types (sandy and loam).

3.1 NITRATE (NO_3^-) AND AMMONIUM (NH_4^+) LEVELS AT 10 DAYS:

Treatment	NO_3-N ppm	NH_4-N ppm	NO_3 Lbs-Acre	NH_4 Lbs-Acre	Sum Mineral N
Control-150 lbs urea Sandy	61.78	31.82	148	76.5	224.5
Control-150 lbs urea Loam	31.185	189.35	75	454.5	529.5
150 lbs urea + 0.125% NutriCharge Sandy	85.89	108.1	206	259.5	465.5
150 lbs urea + 0.125% NutriCharge Loam	39.51	226.35	94.5	543	637.5
150 lbs urea + 0.25% NutriCharge Sandy	109.39	127.35	262.5	305.5	568
150 lbs urea + 0.25% NutriCharge Loam	37.905	214.1	91	513.5	604.5
Control-300 lbs urea Sandy	100.89	102.35	242	245.5	487.5
Control-300 lbs urea Loam	36.955	276.1	89	662.5	751.5
300 lbs urea + 0.125% NutriCharge Sandy	100.39	178.35	241	428	669
300 lbs urea + 0.125% NutriCharge Loam	55.63	346.1	133.5	830.5	964
300 lbs urea + 0.25% NutriCharge Sandy	116.64	208.35	280	500	780
300 lbs urea + 0.25% NutriCharge Loam	42.81	291.6	102.5	699.5	802

3.2 NITRATE (NO_3^-) AND AMMONIUM (NH_4^+) LEVELS AT 20 DAYS:

Treatment	NO_3-N ppm	NH_4-N ppm	NO_3 Lbs-Acre	NH_4 Lbs-Acre	Sum Mineral N
Control-150 lbs urea Sandy	224.95	54.75	539.5	131	670.5
Control-150 lbs urea Loam	94.95	151.2	228	362.5	590.5
150 lbs urea + 0.125% NutriCharge Sandy	240.45	72.2	577	173.5	750.5
150 lbs urea + 0.125% NutriCharge Loam	92.6	125.7	222.5	301.5	524
150 lbs urea + 0.25% NutriCharge Sandy	208.45	39.8	500.5	95.5	596
150 lbs urea + 0.25% NutriCharge Loam	95.95	137.7	230.5	330.5	561
Control-300 lbs urea Sandy	324.45	75.2	778.5	180	958.5
Control-300 lbs urea Loam	153.45	165.2	368	396.5	764.5
300 lbs urea + 0.125% NutriCharge Sandy	369.45	96.85	887	232.5	1119.5
300 lbs urea + 0.125% NutriCharge Loam	168.45	161.2	404.5	387	791.5
300 lbs urea + 0.25% NutriCharge Sandy	361.45	73.25	867.5	176	1043.5
300 lbs urea + 0.25% NutriCharge Loam	187.95	171.2	451	410.5	861.5

4. Discussion

NutriCharge demonstrated substantial increases in ammonium retention, aligning with its mode of action to keep nitrogen in the ammonium form.

NutriCharge demonstrated substantial increases in ammonium retention in sandy soils, aligning with its mode of action to keep nitrogen in the ammonium form, which is more stable and less prone to leaching.

- At 150 lbs/acre:
  - 0.25% NutriCharge increased ammonium retention by **300% at 10 days.**
  - 0.125% NutriCharge improved ammonium retention by **240% at 10 days.**
  - After 20 days, ammonium retention was **32.4% higher** with 0.125% NutriCharge and 27.1% lower with 0.25% NutriCharge.
- At 300 lbs/acre:
  - 0.25% NutriCharge increased ammonium retention by **103.7% at 10 days.**
  - After 20 days, ammonium retention was **33.9% higher** with 0.25% NutriCharge.

5. **Conclusion**

These results confirm that NutriCharge effectively retains nitrogen in the ammonium form, particularly in sandy soils, where nitrogen loss through leaching is most prevalent. The improvements in ammonium and total nitrogen retention observed with NutriCharge-treated urea can help reduce nitrogen loss and improve crop availability, potentially leading to higher yields.

Introduction:

The soil column study was conducted to evaluate the effectiveness of NutriCharge, a polymer-based phosphorus enhancer, in improving phosphorus (P) availability and nitrogen (N) mineralization under controlled conditions. The soil columns were designed to simulate real-world soil environments and investigate the impact of different treatments on nutrient dynamics. The study focused on assessing the influence of NutriCharge on the mobility and availability of P and N in the soil profile.

Study Design and Methodology:

Soil Type: The study used sieved Alfisols soil collected from the Webberville research site, known for its moderate weathering and high agricultural productivity.
Column Preparation: Four soil columns (12" height and 6" width) were prepared using sieved soil passed through a 5 mm screen. Each column was packed with 24 pounds of soil.

Treatments:

1. Control - No fertilizer application.
2. Farmer Treatment - Standard farmer practice with a mix of nitrogen (N) and phosphorus (P) fertilizers.
3. NutriCharge Only Treatment - Application of NutriCharge without any other fertilizers.

Watering Regimen: Deionized water (DI) was added daily to maintain soil moisture and ensure homogeneous water flow through the soil columns.

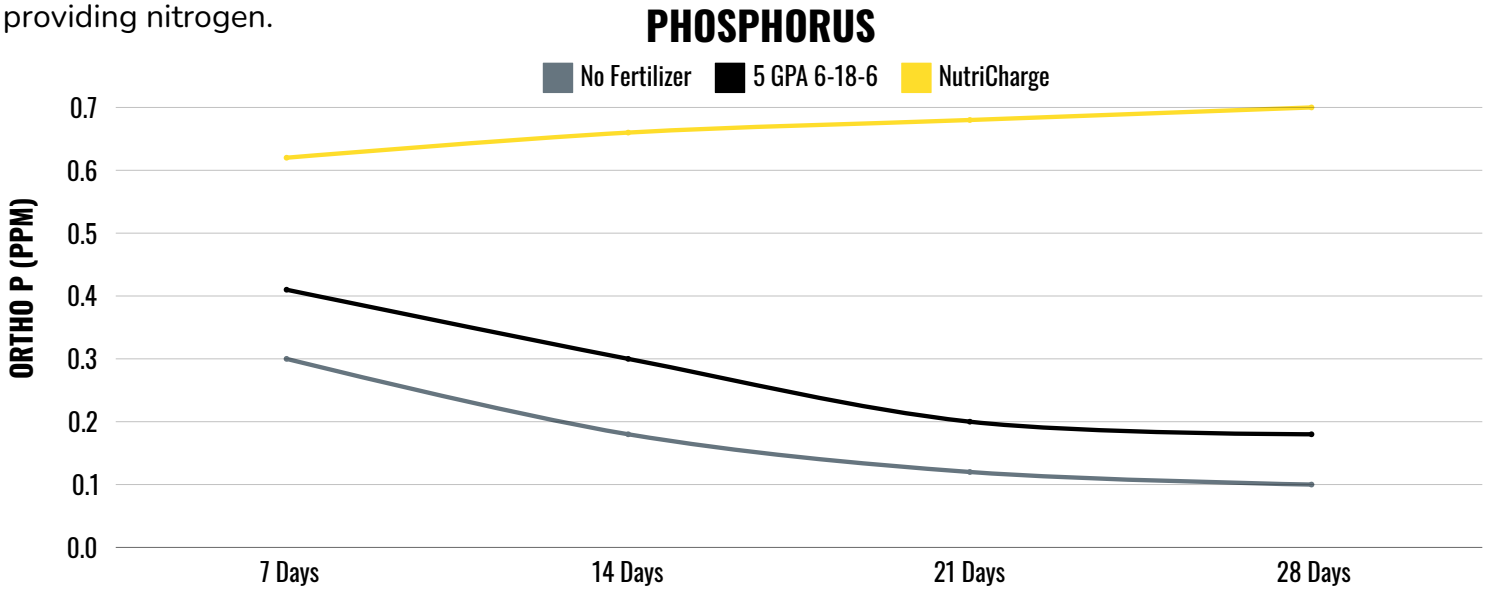
Nutrient Measurements: Soil solution was extracted using micro-lysimeters at 4” and 8” depths to measure dissolved phosphorus (P), nitrate (NO3-N), ammonium (NH4+), calcium (Ca^{2+}), and magnesium (Mg^{2+}).

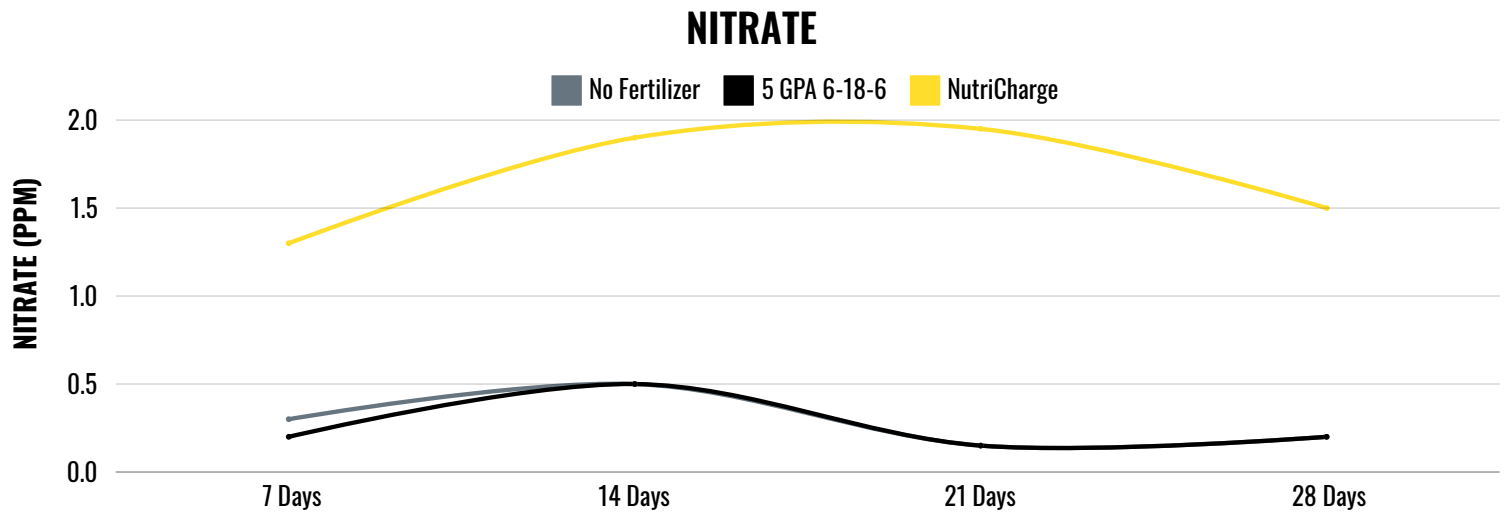
Key Findings:

Dissolved Phosphorus (P) Availability:

The NutriCharge Only Treatment consistently showed the highest levels of dissolved phosphorus in the soil solution across all extraction dates, indicating that NutriCharge effectively prevents phosphorus fixation and promotes its availability in the soil.
The Farmer Treatment had lower dissolved phosphorus levels compared to the NutriCharge Only treatment but was generally higher than the Control, reflecting the impact of traditional phosphorus fertilization.

Nitrate (NO3-N) Levels:
The NutriCharge Only Treatment resulted in significantly higher nitrate levels compared to both the Farmer and Control treatments, suggesting enhanced nitrogen mineralization and availability when NutriCharge is applied without other fertilizers.
The Farmer Treatment showed moderate nitrate levels, higher than the Control but lower than the NutriCharge Only treatment, demonstrating the effectiveness of standard fertilization practices in providing nitrogen.





Conclusion:
The soil column study demonstrated that NutriCharge effectively enhances phosphorus availability and promotes nitrogen mineralization under controlled conditions. The NutriCharge Only Treatment consistently showed the highest levels of dissolved P and nitrate, indicating its potential to improve nutrient dynamics in the soil compared to traditional fertilization practices and no-fertilizer controls.

This focused approach reveals the distinct advantages of using NutriCharge for improving soil nutrient availability, making it a promising addition to nutrient management strategies in agriculture.

NUTRICHARGE

UNIVERSITY OF MARYLAND- CORN

TRIAL DETAILS

Research Facility- University of Maryland 2016/17
Collaborator- Ron Mulford
Locations: Hebron, MD
Crop- Corn
Fertilizer- 11-37-0 + 2% Zn 2x2
Objective- Evaluate NutriCharge with starter fertilizers

TREATMENT	YIELD BPA	YIELD INCREASE
11-37-0 + 2% Zn 2x2 @ 20 LBS-4.7 GPA		
CONTROL	180.2	
NUTRICHARGE	191.3	+11.1 BPA
11-37-0 + 2% Zn 2x2 @ 40 LBS- 9.5 GPA		
CONTROL	194.7	
NUTRICHARGE	203.2	+8.5 BPA
CHECK		
CHECK	175	

TRIAL DETAILS

Research Facility- North Carolina State University
Collaborator- Dr. Ron Heiniger
Locations: Elizabeth City, North Carolina
Crop- Corn, Replicated 4 times
Fertilizer- 10-27-0 2x2
Objective- Evaluate NutriCharge treated 10-27-0 at planting.

TREATMENT	YIELD BPA	RETURN/ACRE
CHECK NO STARTER	164	
10-27-0 @ 10 GPA	177.4	
10-27-0 @ 10 GPA + NC	188.6	+11.2 BPA
10-27-0 @ 20 GPA	179.5	
10-27-0 @ 20 GPA + NC	201.8	+22.3 BPA

TISSUE TEST RESULTS

TISSUE TEST RESULTS											
TREATMENT	N	P	K	Mg	Ca	S	B	Zn	Mn	Fe	Cu
Check – no starter	4.50	0.28	2.91	0.225	0.41	0.29	5.75	22.75	41.75	124.8	13
10-27-0 @ 10 gal/acre	4.43	0.325	2.83	0.263	0.45	0.28	6.5	23.75	48	120.8	13.5
10-27-0 @ 10 gal/acre + NCharge	4.32	0.333	3.00	0.233	0.39	0.28	6.5	41.25	46.25	120.8	13.5
10-27-0 @ 20 gal/acre	4.42	0.315	2.78	0.23	0.42	0.28	5.75	21.25	42.25	120.3	13.5
10-27-0 @ 20 gal/acre + NCharge	4.64	0.353	2.49	0.23	0.45	0.27	6.25	25.75	47.5	126.0	13.5

TRIAL DETAILS

Research Facility- North Carolina State University
Collaborator- Dr. Ron Heiniger
Locations: Columbia, North Carolina
Crop- Corn, Replicated 4 times
Fertilizer- 10-27-0 2x2
Objective- Evaluate NutriCharge treated 10-27-0 in furrow vs a 2x2 application of 10-27-0 untreated.

YIELD RESULTS-COLUMBIA		
TREATMENT	YIELD BPA	RETURN/ACRE
CHECK NO STARTER	136	
10-27-0 @ 20 GPA 2x2	156	
10-27-0 @ 6 GPA IF + NC	169.2	+13.2 BPA

Stalk Nitrate After Harvest

	Columbia Stalk NO3-N - PPM
10-27-0 – IF @ 6 gal acre-1 + NutriCharge @ 0.5%	642.5 B
10-27-0 – 2 x 2 @ 20 gal acre-1	965.8 AB
Check – no starter	1707.5 A

TRIAL DETAILS

Research Facility- North Carolina State University
Collaborator- Dr. Ron Heiniger
Locations: Plymouth, NC
Crop- Corn, Replicated 4 times
Fertilizer- 17-17-0 in furrow
Objective- Evaluate NutriCharge with in furrow starter fertilizers.

TREATMENT	YIELD BPA	RETURN/ACRE
6-24-6 + 2% Zn IF @ 5 GPA		
CONTROL	137.31	
NUTRICHARGE	157.40	+20 BPA
17-17-0 IF @ 3.5 GPA		
CONTROL	132.70	
NUTRICHARGE	157.92	+25.2 BPA

July 3 Soil Test Results

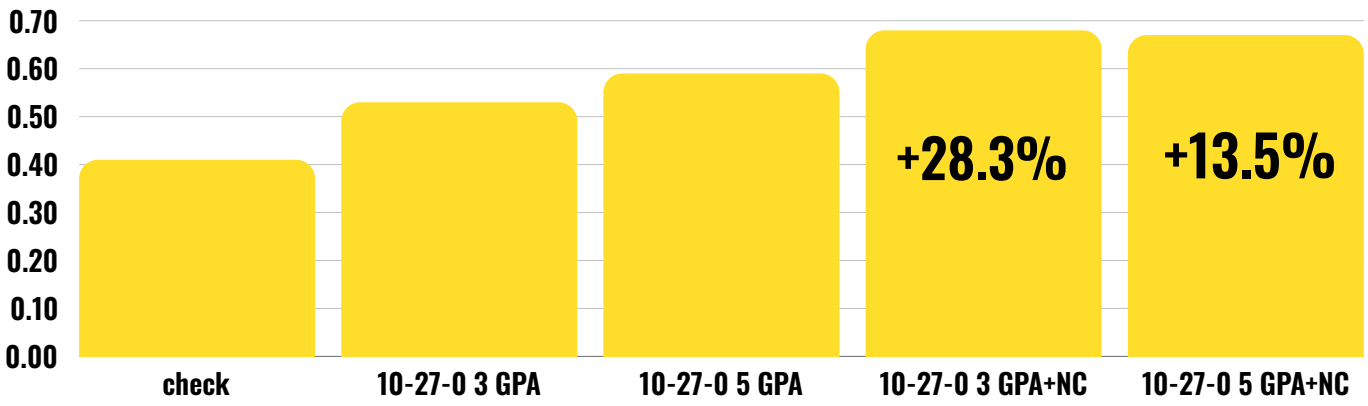
Treatment	P (lbs/a)	K (lbs/a)	Mg (lbs/a)	Ca (lbs/a)
6-24-6 @ 3GPA + Zn + NC	194.5	568	344.75	2018.25
6-24-6 @ 3GPA + Zn LO	131.25	479.5	339.5	1944
Increase	48.2%	18.5%	1.5%	3.8%
6-24-6 @ 5GPA + Zn + NC	177.5	495.5	376.5	2080.5
6-24-6 @ 5GPA + Zn	139.75	451.75	319.75	1876.75
Increase	27.0%	9.7%	17.7%	10.9%

TRIAL DETAILS

Research Facility- North Carolina State University
Collaborator- Dr. Ron Heiniger
Locations: Plymouth, NC
Crop- Corn, Replicated 4 times
Fertilizer- 10-27-0 2x2
Objective- Evaluate NutriCharge treated 10-27-0 at planting.

YIELD RESULTS		
TREATMENT	YIELD BPA	RETURN/ACRE
CHECK NO STARTER	121.4	
10-27-0 @ 3 GPA	124.4	
10-27-0 @ 5 GPA	127.4	
10-27-0 @ 3 GPA + NC	137.7	+13.3 BPA
10-27-0 @ 5 GPA + NC	136.0	+8.6 BPA

PHOSPHORUS UPTAKE



TRIAL DETAILS

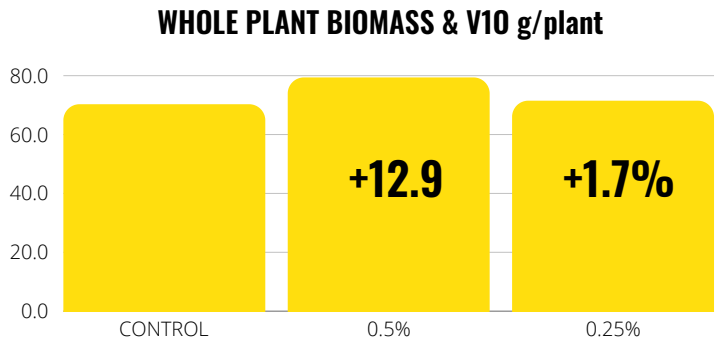
Research Facility- North Carolina State University
Collaborator- Dr. Ron Heiniger
Locations: Plymouth, NC
Crop- Corn, Replicated 4 times
Fertilizer- 17-17-0 in furrow
Objective- Evaluate NutriCharge with in furrow starter fertilizers.

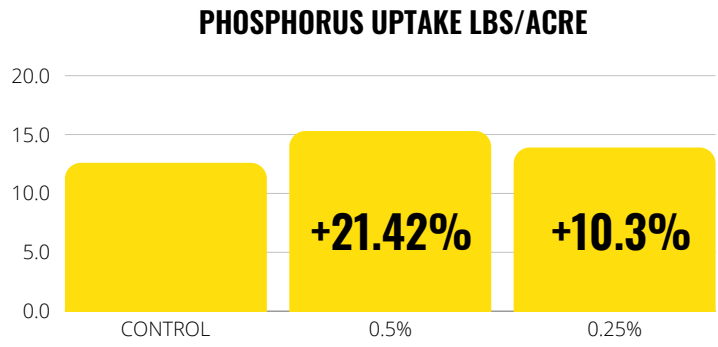
TREATMENT	YIELD BPA	RETURN/ACRE
17-17-0 IF @ 5 GPA		
CONTROL	224.9	
NUTRICHARGE	228.3	+3.4 BPA
17-17-0 IF @ 3.5 GPA		
CONTROL	223.1	
NUTRICHARGE	232.5	+9 BPA
CHECK		
CHECK	175	

TRIAL DETAILS

Research Facility- North Carolina State University
Collaborator- Dr. Ron Heiniger
Locations: Plymouth NC
Crop- Corn, Replicated 4 times
Fertilizer- 10-27-0 2x2
Objective- Evaluate NutriCharge treated 10-27-0 2x2

YIELD RESULTS		
TREATMENT	YIELD BPA	RETURN/ACRE
20 GPA 10-27-0 2X2	223.3	
20 GPA 10-27-0 2X2 + NC 0.5%	240.1	+16.8 BPA
20 GPA 10-27-0 2X2 + NC 0.25%	236.8	+13.5 BPA



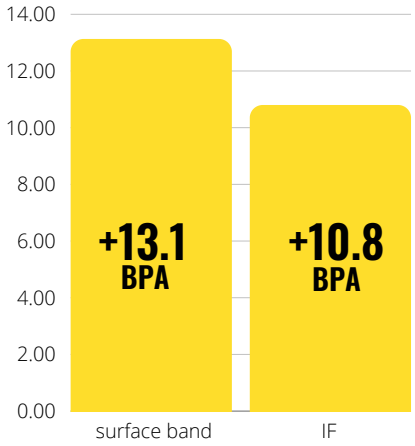


TRIAL DETAILS

Research Facility- North Carolina State University
Collaborator- Dr. Ron Heiniger
Locations: Plymouth, NC
Crop- Corn, Replicated 4 times
Fertilizer- 10-27-0, 6-24-6
Objective- Evaluate NutriCharge treated phosphorus fertilizer in different application methods.

YIELD RESULTS		
TREATMENT	YIELD BPA	RETURN/ACRE
20 GPA 10-27-0 Surface Band	225.19	
20 GPA 10-27-0 + Surface Band + NC	234.28	+9 BPA
6-24-6 IF @ 5 GPA	221.15	
6-24-6 IF @ 3 GPA + NC	232.03	+10.8 BPA
CHECK	215.94	

YIELD VS TRADITIONAL IN FURROW APPLICATION



Conclusion:
NutriCharge provided a positive yield response for the 6th consecutive year. NutriCharge provided a significant yield benefit to surface banded 10-27-0 fertilizer.

"The surface application worked surprisingly well. Shows what protecting nutrients can do." Dr. Ron Heiniger

TRIAL DETAILS

Collaborator- Michael Patram
Locations: Wallace, North Carolina
Crop- Corn
Fertilizer- 20-10-0-4 2x2 and 7-14-17 IF
Objective- Evaluate NutriCharge treated 7-14-7 at planting.

YIELD RESULTS		
TREATMENT	YIELD BPA	RETURN/ACRE
7-14-7 @ 5 GPA IF	216	
7-14-7 + NC @ 5GPA IF	224	+7 BPA

PLANT TISSUE ANALYSIS (VT) WATERS AGRICULTURAL LAB

TISSUE TEST RESULTS												
Treatment	N	P	K	Mg	Ca	S		B	Zn	Mn	Fe	Cu
7-14-7 @ 5 gal/acre	3.34	0.29	2.21	0.69	0.69	0.24		15	45	84	104	11
7-14-7 @ 5 gal/acre +NC	3.00	0.34	3.09	0.64	0.64	0.26		11	34	56	124	13
Difference	10.2%	-17.2%	-39 %	7.2%	7.2%	-8.3%		26%	24%	33%	-19%	-18%

Check

NutriCharge

TRIAL DETAILS

Research Facility- XtremeAg.farm Kevin Matthews
Collaborator- Kevin Matthews
Locations: NW North Carolina
Plant Date: May 2021, temps low 50s to high 80s
Soil Type: Dan River Loam
Soil pH: 6.4-6.6
Crop- Corn
Fertilizer- 3-18-18 IF at planting, 3 GPA with 10oz Sweet Success
Objective- Evaluate NutriCharge with starter fertilizers.

TREATMENT	YIELD BPA	RETURN/ACRE
3-18-18 @ 3 GPA		
CONTROL	163.9	
NUTRICHARGE	173.73	+9.83 BPA
3-18-18 @ 3 GPA		
CONTROL	167.26	
NUTRICHARGE	172.74	+5.48 BPA
3-18-18 @ 3 GPA		
CONTROL	175.04	
NUTRICHARGE (HV)	197.78	+22.74 BPA

Grower Observations: "Our soils are naturally low on phosphorus it is my belief this why we are seeing these strong numbers."

TRIAL DETAILS

Collaborator- Everett Moore
Locations: Lumberton, North Carolina
Crop- Corn
Fertilizer- 15-15-0-2 2x2 @15 GPA
Objective- Evaluate NutriCharge treated 15-15-0-2 in a 2X2 placement at planting

YIELD RESULTS		
TREATMENT	YIELD BPA	RETURN/ACRE
15-15-0-2 @ 15 GPA 2x2	139	
15-15-0-2 + NC @ 15 GPA 2x2	157	+18 BPA

PLANT TISSUE ANALYSIS (VT) WATERS AGRICULTURAL LAB

TISSUE TEST RESULTS											
Treatment	N	P	K	Mg	Ca	S	B	Zn	Mn	Fe	Cu
15-15-0-2 @ 15 gal/acre	3.54	0.33	2.58	0.15	0.45	0.33	7	52	76	136	16
15-15-0-2 @ 15 gal/acre +NC	3.09	0.28	2.61	0.18	0.39	0.28	5	37	40	124	13
Difference	12.7%	15.2%	-2.8%	-20%	14.9%	15.2%	28%	28%	47%	8.8%	18.8%

NutriCharge | Check

NutriCharge | Check

Collaborator- Hamilton Growers
Locations: Elenton, GA
Plant Date: May 3, 23
Harvest Date: July 18th, 23
Soil Type: Sandy
Soil pH: 6.2-6.8
Crop- Sweet Corn
Fertilizer- Growers starter fertilizer mixture @ 20 GPA applied

YIELD RESULTS			
TREATMENT	PICK 1	PICK 2	TOTAL YEILD
Control	105	320	425
Starter + NC @ 3.2 oz/acre	140 +40	340 +20	480 +65
Control	140	300	440
Starter + NC @ 6.4 oz/acre	155 +15	338 +38	493 +53

Collaborator- Hamilton Growers
Locations: Elenton, GA
Plant Date: August 2, 23
Harvest Date: October 5, 23
Soil Type: Sandy
Soil pH: 6.2-6.8
Crop- Sweet Corn
Fertilizer- Growers starter fertilizer mixture @ 20 GPA applied

YIELD RESULTS		
TREATMENT	PICK 1	TOTAL YEILD
Control	520	520
Starter + NC @ 3.2 oz/acre	596 +66	596 +66
Control	527	527
Starter + NC @ 6.4 oz/acre	437 -90**	437-90

The 6.4 oz plot did not undergo a second picking.
It also had 12 fewer growing days, resulting in a large proportion of 2 ear corn that did not have sufficient time to size out.

TRIAL DETAILS

Research Facility- North Dakota
Collaborator- Kevin Misek
Locations: Finley, North Dakota
Crop- Corn, Replicated 3 times
Fertilizer- 6-24-6 IF

YIELD RESULTS		
TREATMENT	**YIELD BPA**	**RETURN/ACRE**
6-24-6 IF@ 4 GPA	130.1	
6-24-6 IF @ 4GPA + NC	151.8	+21.7 BPA

IRRIGATION RESEARCH FOUNDATION

Trial Location-Yuma Colorado
Crop: Corn
Variety: DKC 54-38
Population: 34K
Plating Date- 4/30/2020
Harvest Date- 10/6/2020

FERTILIZER ANALYSIS
STRIP TILL- 4-8-1-4.6 S @ 10GPA
2X2 High- 18-10-1.55-1.54S-0.5Zn (18GPA)
2x2 Low- 18-10-1.55-1.54S-0.5Zn (13GPA)
UAN- 32%@ 60GPA
MICROS- 3S-.18Fe- 2Mn-3.3Zn -0.2B

TREATMENTS AND RESUTS

YIELD RESULTS		
TREATMENT	YIELD BPA	RETURN/ACRE
STRIP TILL + 2X2 LOW + UAN	187.9	
STRIP TILL + NC + 2X2 LOW + UAN	198.4	+10.5 BPA
STRIP TILL + 2X2 HIGH + UAN	191.6	
STRIP TILL + NC + 2X2 HIGH + UAN	207.5	+15.5 BPA
STRIP TILL + 2X2 LOW + UAN + MICROS	205.2	
STRIP TILL + 2X2 LOW +NC + UAN + MICROS	220.7	+15.5 BPA
STRIP TILL + 2X2 HIGH + UAN + MICROS	196.7	
STRIP TILL + 2X2 HIGH +NC + UAN + MICROS	219.2	+22.5 BPA
STRIP TILL + 2X2 HIGH + UAN	188	
STRIP TILL + 2X2 HIGH +NC + UAN + EZ-N	226.5	+38.3 BPA

PERFORMANCE CROP RESEARCH GREAT BEND KANSAS

Trial Location- Great Bend Kansas
Crop: Corn
Variety: G13N18-3111 Liberty Link
Population: 30K
Plating Date- 5/03/2020
Harvest Date- 10/3/2020

FERTILIZER ANALYSIS
In Furrow- 10-34-0
SOIL TYPE
Silt Clay Loam
pH-7.1
P level- 36PPM

YIELD RESULTS		
TREATMENT	**YIELD BPA**	**RETURN/ACRE**
10-34-0 @ 5 gal/acre	223	
10-34-0 @ 3.75 gal/acre	219	
10-34-0 @ 3.75 gal/acre + Nutricharge	251	+32 BPA

NUTRICHARGE Y-DROP TRIAL

Trial Location- Queenstown Maryland
Grower- Temple Rhodes
Crop: Corn
Replicated: 3 times

YIELD RESULTS		
TREATMENT	YIELD BPA	RETURN/ACRE
Control	217	
NutriCharge in Furrow @ 3.2oz	239	+22 BPA
NutriCharge In Furrow @ 3.2 oz + Y-drop @ 6.4 oz	254	+37 BPA

Trial Location- Queenstown Maryland
Grower- Temple Rhodes
Crop: Corn
Trial Goal- Evaluate the addition on Release to current NutriCharge program

- **Standard IF & 2x2- 3.2 oz/a NutriCharge in each application**
- **2x2 No Phosphorus- Standard IF 3.2 oz/a NC + Release 1 lb per acre in replacement of 2x2 P**
- **Standard IF 3.2 oz/a NC +0.5 lbs per acre Release in Y-drop application**

YIELD RESULTS		
TREATMENT	YIELD BPA	RETURN/ACRE
Standard IF & 2X2	280	
2x2 - No Phosphorus	299	+19 BPA
Standard IF & 2X2 + Y-DROP	301	+21 BPA

NUTRICHARGE CONTROLLED IN-FURROW TRIAL

Trial Location- Quebec, Canada

Grower- Samuel Coutu

Crop: Corn , 20 acre controlled plot;

Application: In Furrow @ 3.2oz/acre + 5 GPA 7-24-3+ Micros

YIELD RESULTS		
TREATMENT	YIELD BPA	RETURN/ACRE
Control	183	
NutriCharge in Furrow	196	+13 BPA

NUTRICHARGE CORN IN FURROW 2023

Trial Location- McGehee Arkansas
Grower- Miles Farms
Crop: Corn
Application method: Nachurs First Down @ 1 GPA
Replications: 9
Planting Date: 4/1/2023
Harvest Date: 8/21/2023
Soil Type: Silt Loam
Soil pH: 6.3

YIELD RESULTS		
TREATMENT	YIELD BPA	RETURN/ACRE
Control- Starter @ 1GPA	245	
Starter @ 1GPA + NutriCharge @ 3.2 oz/acre	263	+5 BPA

NUTRICHARGE CORN IN FURROW 2022

Trial Location- McGehee Arkansas
Grower- Miles Farms
Crop: Corn
Application method: Nachurs First Down @ 1 GPA
Replications: 3
Planting Date: 4/8/2022
Harvest Date: 8/20/2022
Soil Type: Silt Loam
Soil pH: 6.3

YIELD RESULTS		
TREATMENT	YIELD BPA	RETURN/ACRE
Control- Starter @ 1GPA	236	
Starter @ 1GPA + NutriCharge @ 3.2 oz/acre	240	+4 BPA

Research Facility- Rostov University
Crops- Corn
Replications: Three
Fertilizer- 10-26-26
Objective: To study the impact of NutriCharge® on fertilizer efficiency. The study was conducted with no other fertilizer inputs to isolate the effect of NutriCharge® on added N,P,K in the fertilizer 10-26-26. The hypothesis was that NutriCharge® impact on Phosphorus availability maintains yields with lower effective rates.

YIELD RESULTS		
TREATMENT	YIELD BPA	INCREASE
10-26-26 120 LB/ACRE	87.96	
10-26-26 120 LB/ACRE + NC	91.0	+3.14
10-26-26 76 LB/ACRE	84.5	
10-26-26 76 LB/ACRE + NC	93.5	+9

RESULTS				
TREATMENT	VT HEIGHT IN	VT MASS OZ	R3 HEIGHT IN	R3 MASS OZ
10-26-26 120 LB/ACRE	46.8	11	70.8	17.1
10-26-26 120 LB/ACRE + NC	48	11.53	78.8	18.8
10-26-26 76 LB/ACRE	43.3	10.76	66.9	15.8
10-26-26 76 LB/ACRE + NC	49.2	11.11	68.8	18.8

NUTRICHARGE CORN IN FURROW 2023

Trial Location- Alabama
Grower- Chad Henderson
Crop: Corn
Application method: Nachurs Impulse @ 2 GPA + Nutricharge @ 3.2 oz/acre
Trial Size: 20 Acres
Harvest Date: 10/10/2023

YIELD RESULTS		
TREATMENT	YIELD BPA	RETURN/ACRE
Control- Starter @ 2 GPA	186	
Starter @ 2 GPA + NC @ 3.2 oz/acre	194	+8 BPA

NUTRICHARGE CORN IN-FURROW + SIDEDRESS 2023

Trial Location- Alabama
Grower- Chad Henderson
Crop: Corn
Application method: Nachurs Impulse @ 2 GPA + Nutricharge @ 3.2 oz/acre + 30GPA 28-0-0-5 + NC @ 4.8oz/a
Trial Size: 20 Acres
Harvest Date: 10/10/2023

YIELD RESULTS		
TREATMENT	YIELD BPA	RETURN/ACRE
Control- Starter @ 2 GPA	187	
Starter @ 2 GPA + NC @ 3.2 oz/acre + 30GPA 28-0-0-5 + NC @ 4.8 oz/acre	198	+11 BPA

Research Facility- Real Farm Research, Replicated 4x
Collaborator- Josh Nachital
Locations: Aurora Nebraska
Plant Date: 4/13/2017
Soil Type: Silt Loam
Soil pH: 5
Crop- Corn, Previous Soybean
Fertilizer- 11-37-0 @ Planting

YIELD RESULTS		
TREATMENT	YIELD BPA	RETURN/ACRE
Check	251.21	
11-37-0- 2x2 @ 20 gal/acre	277.1	
11-37-0- 2x2 @ 20 gal/acre + NC	285.65	+8.55 BPA

Research Facility- Real Farm Research, Replicated 4x
Collaborator- Josh Nachital
Locations: Aurora Nebraska
Plant Date: 4/21/2015
Soil Type: Silt Loam
Soil pH: 5.5
Crop- Corn, Previous Soybean
Fertilizer- 9-24-3 @ Planting

YIELD RESULTS		
TREATMENT	YIELD BPA	RETURN/ACRE
Control	267.36	
9-24-3 @ 5 gal/acre	271.79	+4.41 BPA

Research Facility- CVA Innovation Sites
Repetitions- Three
Locations: Nebraska
Objective- Evaluate NutriCharge performance against starter fertilizer additives

YIELD RESULTS			
TREATMENT	AVERAGE INCREASE	RETURN/ACRE	ROI
Avail T5	7	$19.24	397.5
Exp Biological	5.3	$7.10	63.1
Exp Humid	9	$29.66	
NutriCharge	10.7	$31.85	658.1
CVA Elite PHP	4	$11.73	577.8
CVA Elite PHP + Ascend Pro	6	$8.34	67.9
CVA Elite PHP + Endo Prime	6.3	$10.46	92.3
CVA Elite PHP + Exp Fulvic	5	$11.45	199.1
CVA Elite PHP + Exp Humid	5.8	$16.45	494.0
CVA Elite PHP + TakeOff LS	2.5	$1.84	27.2
Zypro	2	$1.19	20.9

This trial was designed to further investigate stacking of in-furrow additives. It was intentionally placed on a tougher piece of ground to push the products to perform. We had three reps in this trial that allowed us to evaluate some products we did not have room for in our Innovation sites. The Avail and Nutri-charge both performed well. Also, some experimental products demonstrated their value. When we stacked products with the CVA Elite PHP, we were able to capture additional yield. Continuing trials like these will allow CVA to find more products in the future.

NUTRICHARGE CORN 2023

Trial Location-Guymon Oklahoma

Crop: Corn

Application method: Strip till applied 10-34-0 & 28-0-0-5 applied through center pivot

YIELD RESULTS		
TREATMENT	YIELD BPA	RETURN/ACRE
17 GPA 10-34-0 + 10 GPA 28-0-0-5	249	
17 GPA 10-34-0 + NC + 10 GPA 28-0-0-5 + NC	264.28	+15.2 BPA
17 GPA 10-34-0 + 10 GPA 28-0-0-5 + NC	256.44	+7.44 BPA
14 GPA 10-34-0 + NC + 10 GPA 28-0-0-5 + NC	272.5	+23.5 BPA

Research Facility- Bath, South Dakota
Locations: South Dakota
Objective- Evaluate NutriCharge and Ionize performance against starter fertilizer additives
Fertilizer- 50 lb/a Potash 150lb/a MAP, Liquid 2 gal/a KTS, 10-34-0 13 gal/a

YIELD RESULTS			
TREATMENT	MOISTURE %	YIELD	INCREASE
Potash 50 lb/a + MAP 150 lb/a	15.2	221.92	
Ionize (K 50 lb/a + MAP 150 lb/a	15.4	237.08	+ 15.16

YIELD RESULTS			
TREATMENT	MOISTURE %	YIELD	INCREASE
KTS + 10-34-0	15.1	222.18	
NutriCharge (KTS + 10-34-0)	15.4	229.81	+ 7.63

Trial Location- Western Illinois
Grower- Matt Swanson
Crop: SoyBean
Application method: In-furrow with Fulvic Acid, PGR, 3% Calcium, 9% Zinc

YIELD RESULTS		
TREATMENT	YIELD BPA	RETURN/ACRE
Control	58	
NutriCharge @ 3.2 oz/acre	61	+3 BPA

NUTRICHARGE

BARABOO, WI CORN/SOYBEAN

Research Facility- Baraboo, Wisconsin (USDA)
Crops- Corn, Soybean
Fertilizer- 6-24-6 Starter, 6-24-24 Starter

Objective:
To demonstrate yield benefits from NutriCharge treated phosphorus fertilizer applications applied to a popup fertilizer at planting on soybean and corn over successive years and crops.

Phosphorus is critical to early season growth, and it is common practice to use a popup fertilizer in-furrow. Cool soil temperatures and soil fixation impact phosphorus availability limiting starter fertilizer response.

YIELD RESULTS		
TREATMENT	YIELD BPA	RETURN/ACRE
2020 SOYBEAN 6-24-6 @ 5 GPA STARTER		
CONTROL	51	
NUTRICHARGE	60.7	+9.7 BPA
2021 CORN 6-24-24 @ 5 GPA STARTER		
CONTROL	210	
NUTRICHARGE	219	+9 BPA

Conclusion:
NutriCharge provided a significant yield response over successive years and different crops at Baraboo, Wisconsin.

NUTRICHARGE CORN IN-FURROW 2023

Trial Location- Jackson, Tennessee
Grower- Verell Farms
Crop: Corn
Application method: PGR, Sugar, Humic, Zinc @ 5 GPA

YIELD RESULTS		
TREATMENT	YIELD BPA	RETURN/ACRE
Control- Starter @ 5GPA	263.2	
Starter @ 5 GPA + NutriCharge @ 3.2 oz/acre	267.7	+4.5 BPA

NUTRICHARGE SOYBEAN IN-FURROW 2023

Trial Location- Jackson, Tennessee
Grower- Verell Farms
Crop: Soybeans
Application method: 3.2 oz/acre NutriCharge with 5 GPA water

YIELD RESULTS		
TREATMENT	YIELD BPA	RETURN/ACRE
Control	61.1	
5 GPA Water + NutriCharge @ 3.2 oz/acre	61.7	+0.7 BPA

TRIAL DETAILS

Research Facility- North Dakota
Collaborator- Kevin Misek
Locations: Finley, North Dakota
Crop- SoyBeans, Replicated 3 times
Fertilizer- 6-24-6 IF

YIELD RESULTS		
TREATMENT	YIELD BPA	RETURN/ACRE
6-24-6 IF@ 4 GPA	41.1	
6-24-6 IF @ 4GPA + NC	44.8	+3.7 BPA

TRIAL DETAILS

Research Facility- North Carolina State University
Collaborator- Dr. Ron Heiniger
Locations: Plymouth, NC
Crop- Soybean, Replicated 4 times
Fertilizer- 3-18-18 in furrow
Objective- Evaluate NutriCharge treated 3-18-18 at planting.

YIELD RESULTS		
TREATMENT	YIELD BPA	RETURN/ACRE
NO STARTER	42.4	
3-18-18 2.5 GPA	46.5	
3-18-18 2.5 GPA + NC	48.4	+1.9 BPA
3-18-18 5 GPA	48.3	
3-18-18 5 GPA + NC	52.2	+3.9 BPA

NUTRICHARGE IN FURROW TRIAL

Trial Location- Dow City , Iowa
Grower- Kelly Garrett
Replicated: 3 Times
Crop: Corn
Application: In Furrow @ 3.2oz/acre

YIELD RESULTS		
TREATMENT	YIELD BPA	RETURN/ACRE
Control	225.04	
NutriCharge in Furrow @ 3.2oz	241.68	+16.64 BPA

Trial Location- Dow City , Iowa
Grower- Kelly Garrett
Crop: Soybean
Application: In Furrow @ 3.2 oz/acre

YIELD RESULTS		
TREATMENT	YIELD BPA	RETURN/ACRE
Control	56.13	
NutriCharge in Furrow @ 3.2oz	59.56	+ 3.43 BPA

CORN

Trial Location-Mount Morris , New York
Replicated: 2 Times
Crop: Corn
Application: In Furrow @ 3.2oz/acre,2x2 @ 3.2 oz/acre

YIELD RESULTS		
TREATMENT	YIELD BPA	RETURN/ACRE
Control	219.7	
NutriCharge in Furrow & 2x2	227.1	+7.4 BPA

SOYBEAN

Trial Location-Mount Morris , New York
Replicated: 2 Times
Crop: Soybean
Application: 2x2 @ 3.2oz/acre with 11-28-0

YIELD RESULTS		
TREATMENT	YIELD BPA	RETURN/ACRE
Control	51.4	
NutriCharge in Furrow @ 3.2oz	61.2	+9 BPA

GEORGIA REPLICATED COTTON

Trial Location- Millwood Georgia
Crop: Cotton
Replicated: 4 times
Application Method: 18-0-0-3 Sidedress @ pinhead square + NutriCharge @ 9.6 oz/acre

YIELD RESULTS		
TREATMENT	YIELD BPA	RETURN/ACRE
18-0-0-3	942	
18-0-0-3 + NutiCharge	1060	+118 lbs/acre

NUTRICHARGE COTTON TRIAL

Trial Location- Southeast Arkansas
Crop: Cotton
Replicated: 2 times, 60 Acres
Fertilizer Used: Starter 20-20, Micropak, Carbon RX

YIELD RESULTS		
TREATMENT	**YIELD BPA**	**RETURN/ACRE**
Control-Starter Program	1589	
NutriCharge In Furrow @ 3.2 oz + Y-drop @ 9.6 oz knifed in	1682	+93 lb/acre

Trial Location- Sunbelt, Moultrie, Georgia
Crop: Peanuts
Replicated: 4 times
Application Method: Liquid Calcium product (Topflow Ca RW Griffin) + NutriCharge @ 9.6 oz/acre

YIELD RESULTS		
TREATMENT	YIELD BPA	RETURN/ACRE
Control	4153	
Gypsum Treatment	5758	
Top Flow Calcium @ 15 GPA	6315	
Top Flow Calcium @ 15 GPA + NC	6690	+375 lbs/acre

Observations: Grade of sound mature kernels was better in NutriCharge treatment 68 VS 66 in the untreated top flow

Trial Location- Millwood Georgia
Crop: Peanuts
Replicated: 4 times
Application Method: Liquid Calcium product (Topflow Ca RW Griffin) + NutriCharge @ 9.6 oz/acre

YIELD RESULTS		
TREATMENT	YIELD BPA	RETURN/ACRE
Top Flow Calcium @ 15 GPA	3696.35	
Top Flow Calcium @ 15 GPA + NC	3978.68	+281 lbs/acre

NUTRICHARGE RICE BROADCAST

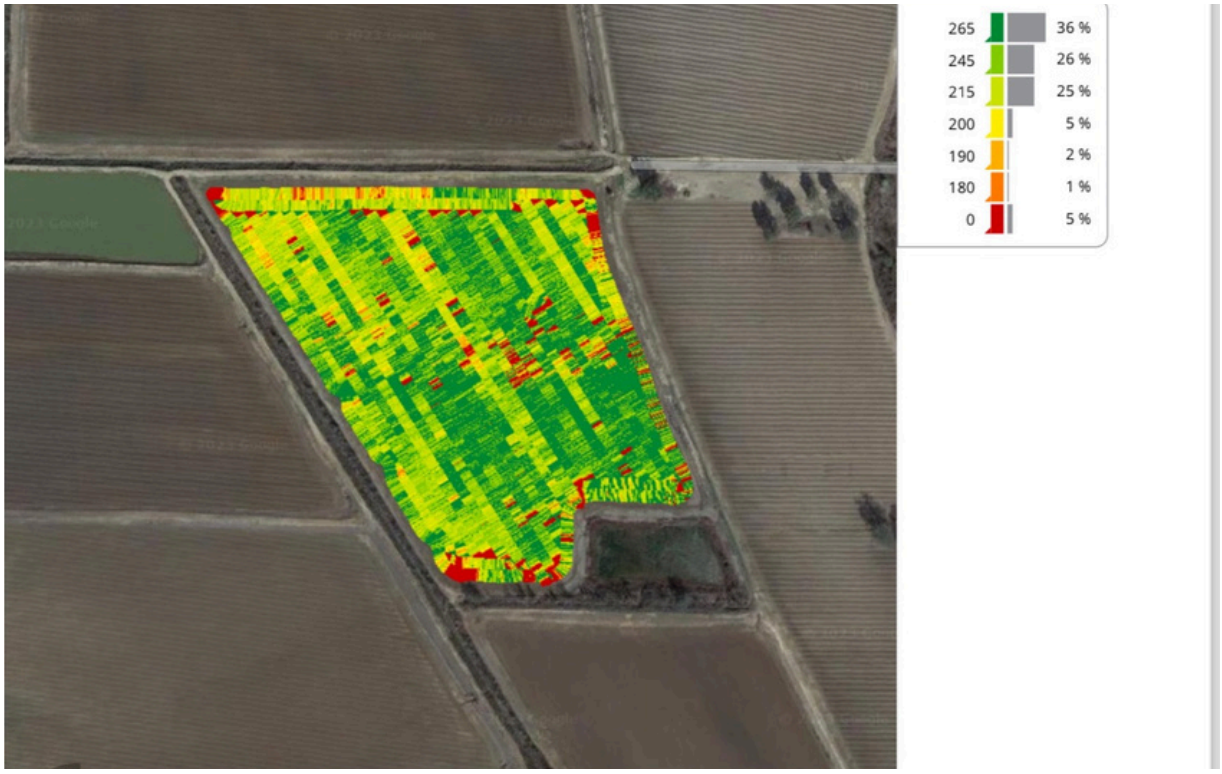
Trial Location- Southeast Arkansas

Grower- Miles Farms

Crop: Row Rice- Replicated 2X

Application method: Command broadcast application

YIELD RESULTS		
TREATMENT	**YIELD BPA**	**RETURN/ACRE**
Control	245	
Command @ 9.6 oz/acre	263	+18 BPA



NUTRICHARGE RICE 2022

Trial Location- Southeast Arkansas
Crop:Rice
Application method: 200lbs/acre pre-flood
Replications: 5

YIELD RESULTS		
TREATMENT	YIELD BPA	RETURN/ACRE
Control- 200lbs/acre Urea + NBPT	207.8	
200 Lbs/Acre Urea + NutriCharge	211.5	+3.7 BPA

NUTRICHARGE RICE 2023

Trial Location- Southeast Arkansas
Crop:Rice
Application method: 200lbs/acre pre-flood urea
Replications: 5

YIELD RESULTS		
TREATMENT	YIELD BPA	RETURN/ACRE
Control- 200lbs/acre Urea + NBPT	184.6	
200 Lbs/Acre Urea + NutriCharge	193.0	+8.4 BPA

NUTRICHARGE RICE 2023

Trial Location- Southeast Arkansas
Crop:Rice
Application method: 200lbs/acre pre-flood + 100 lbs/a MESZ @ 2 Leaf
Replications: 5

YIELD RESULTS		
TREATMENT	YIELD BPA	RETURN/ACRE
Control	202.6	
Nutricharge	210.3	+7.7 BPA

Crop- Rice
Fertilizer- Urea, 12-52-0
Replications-three
Plot size-1000 sq. ft.
Objective- To demonstrate the effect of agrotech nutrient use efficiency products on the growth of a rice crop.
Treatments- For all experiment variants, 90 lbs/acre of 12-52-0 was applied before sowing with 100 lb/acre of urea, and top dressing with airplane with urea 100 lb/acre was carried out in the tillering phase.

1. 12-52-0 90 lbs/acre + Urea 100 lbs/a broadcast
2. 12-52-0 90 lbs/acre+ **NutriCharge** (0.5 gal/ton) + Urea 100 lbs/acre + **NutriCharge** (0.25 gal/ton) broadcast
3. 12-52-0 90 lbs/acre+ Urea broadcast 100 lbs/acre + Urea top dress 100 lbs/acre
4. 12-52-0 90 lbs/acre + **NutriCharge** (0.5 gal/ton) + Urea broadcast 100 lbs/acre + Urea top dress 100 lbs/acre
5. 12-52-0 90 lbs/acre + **NutriCharge** (0.5 gal/ton)+ Urea broadcast 100 lbs/acre + **NutriCharge** (0.25 gal/ton) + Urea top dress + **NutriCharge** (0.25 gal/ton) 100 lbs/acre

YIELD RESULTS	
TREATMENT	YIELD BPA
1	131.50
2	139.2
3	139.8
4	147.3
5	151.33

NutriCharge applied to nitrogen and phosphorus fertilizers influenced the plant's supply of nitrogen and phosphorus nutrition, which affected the metabolic processes.

The removal of 100lbs per acre of nitrogen typically flown onto the crop at tillering phase in treatment two provided the same yield response as treatment three, the control. The increase in fertilizer efficiency saved the grower on fertilizer costs increasing profits.

The highest value (151.33 bushel/acre) was obtained using NutriCharge, together with growers' standard fertilizer practice. In this instance (treatment 5), the profitability was the highest for the farmer.

TRIAL DETAILS

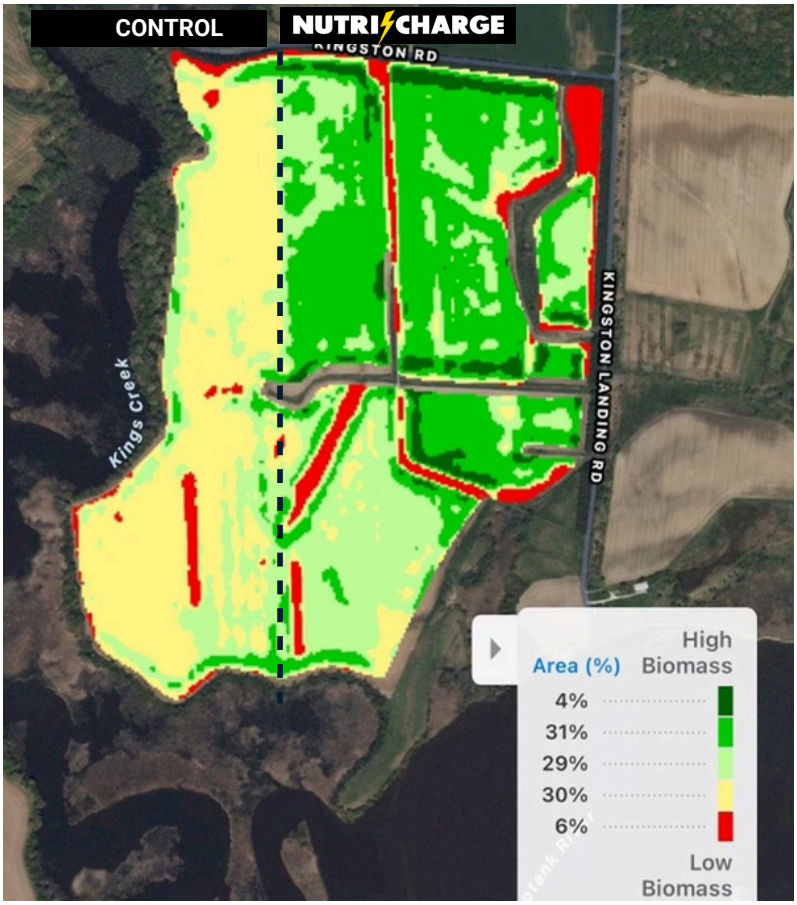
Research Facility- North Dakota State University
Collaborator- Dr. Mohamed Khan
Locations: Prosper, ND
Crop- Sugar Beets, Replicated 4 times
Fertilizer- 10-34-0 IF

YIELD RESULTS			
TREATMENT	YIELD T/A	SUCROSE %	SUCROSE LB/A
10-34-0 IF@ 3 GPA + Zn	35.25	16.40	10,487.5
10-34-0 IF@ 3 GPA + Zn + NC	36.13	16.58	10,973.8

NUTRICHARGE WHEAT TOPDRESS

Trial Location- Queenstown Maryland
Grower- Temple Rhodes
Crop: Winter Wheat
Application method: 28-0-0-5 Topdress @ 15GPA

YIELD RESULTS		
TREATMENT	YIELD BPA	RETURN/ACRE
Control	107	
NutriCharge @ 6.4oz/acre	128	+21 BPA



Year- 2019
Research Facility- Colorado State University, San Luis Valley Research Center
Crops- Russet Potato
Collaborator: Samuel YC Essah
Fertilizer- 11-37-0
Soil phosphorus level- Residual soil extractable phosphorus (P) was 120 ppm (240 lbs. P/acre).
Objective:
The objective of this study was to evaluate the effect of Nutricharge with phosphorus (P) fertilizer application on the performance of Russet potato. The trial is randomized and replicated four times

YIELD RESULTS			
TREATMENT	YIELD CWT	> 4 oz	> 6oz
CONTROL	357	310	204
100% GSP	391	318	209
100 % GSP + NC	415 +6%	365 +15%	249 +19%
75 % GSP + NC	415 +6%	349 +10%	232 +11%

AGRONOMIC PHOSPHORUS USE EFFICIENCY		
	TOTAL YIELD	4 oz
100 % GSP	6.5	5.3
100 % GSP + NC	9.2	7.8
75 % GSP + NC	6.9	6.1

Results:
Application of 100% grower standard phosphorus fertilizer with Nutricharge added increased total tuber yield, marketable size (> 4 oz.) tuber yield, and large marketable size (> 6 oz.) tuber yield, by 6%, 15%, and 19%
Application of 75% grower standard P fertilizer with Nutricharge added increased total yield, marketable size tuber yield, and large marketable size tuber yield by 6%, 10%, and 11%,
Phosphorus fertilizer use efficiency was higher for the production of total tuber yield and marketable size (> 4 oz.) tuber yield when Nutricharge was added to P fertilizer applied P use efficiency was increased by **42%** and **47%**, for total tuber yield and marketable size tuber yield, respectively, when 75% grower standard P fertilizer was applied with Nutricharge

Year- 2018
Research Facility- Rostov University
Crops- Potato, Red Market Variety, Rossanna By Germicopa
Replications: Three
Fertilizer- 10-26-26
Objective: To study the impact of NutriCharge® on fertilizer efficiency. The study was conducted with no other fertilizer inputs to isolate the effect of NutriCharge® on added N, P, and K in the fertilizer 10-26-26. The hypothesis was that NutriCharge® impact on Phosphorus availability maintains yields with lower effective rates.

YIELD RESULTS		
TREATMENT	TON/ACRE	INCREASE
10-26-26 340 LB/ACRE	10	
10-26-26 340 LB/ACRE + NC	13.9	+3.9
10-26-26 250 LB/ACRE	9.24	
10-26-26 250 LB/ACRE + NC	12.96	+3.72
10-26-26 170 LB/ACRE	8.61	
10-26-26 170 LB/ACRE + NC	9.84	+1.23

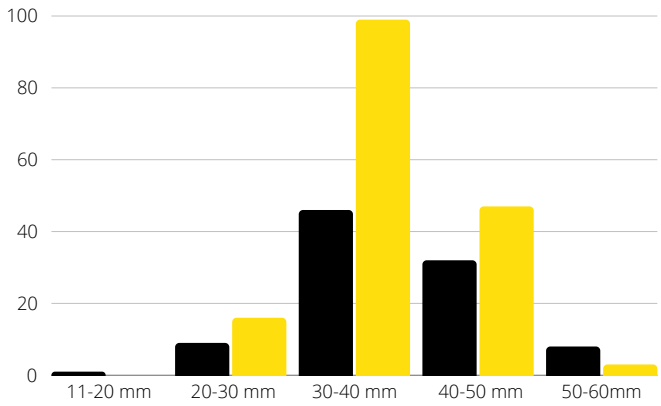
RESULTS			
TREATMENT	TUBER PER PLANT	TUBER WEIGHT	TUBER MASS
10-26-26 340 LB/ACRE	6	2.92	17.6
10-26-26 340 LB/ACRE + NC	7.2	3.42	24.5
10-26-26 250 LB/ACRE	5.1	3.17	16.2
10-26-26 250 LB/ACRE + NC	6.8	3.35	22.28
10-26-26 170 LB/ACRE	5.2	2.92	15.16
10-26-26 170 LB/ACRE + NC	5.6	3.10	17.31

There we no statistical differences in the Starch, Vitamin C, and the MPC for nitrates between the treated and the control.

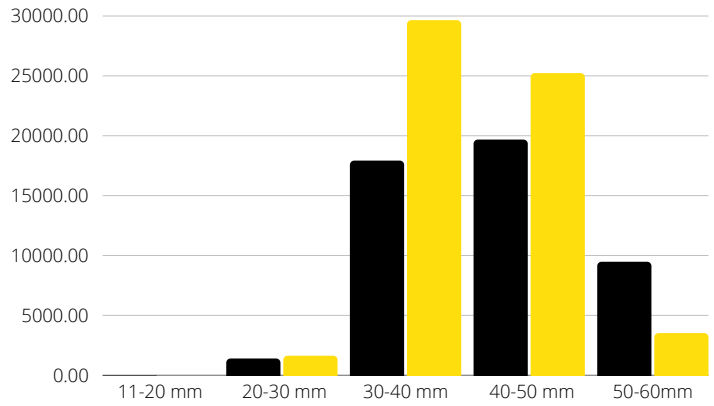
NUTRICHARGE

CARROTS

SUMMARY: This study aimed to evaluate the effect of Nutricharge on phosphorus fertilizer application and their performance on carrots. The results indicated that adding Nutricharge to phosphorus fertilizer enhanced all measurable parameters of carrot production. Phosphorus use efficiency was significantly increased when Nutricharge was added to the phosphorus fertilizer applied.



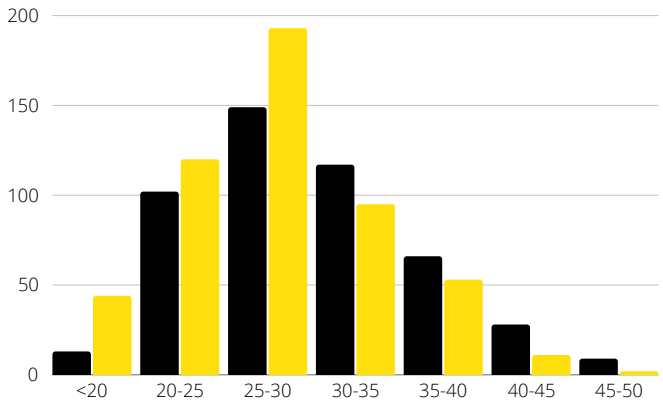
Numbers per 10 Sq.Ft



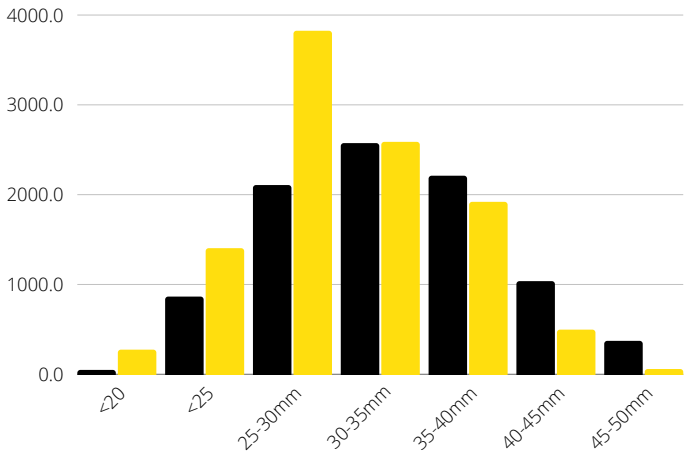
LBS PER ACRE

TOTAL	NUTRICHARGE	CONTROL	INCREASE
YIELD T/ACRE	35.85	35.27	580 LBS/ACRE
MARKETABLE	22.46	14.4	8.06 TON/ACRE
NUMBERS 10 SQ/FT	71.3	58.1	22.7% MORE

Numbers per 10 Sq.Ft



WEIGHTS PER 10 Sq.Ft



TOTAL	NUTRICHARGE	CONTROL	INCREASE
YIELD T/ACRE	47.06	41.03	6.03 TON/ACRE
NUMBERS 10 SQ/FT	86.2	80.5	6.7% MORE

INDEPENDANT TRIAL-SGS

SUMMARY: The purpose of this study was to evaluate the effect of Nutricharge on phosphorus fertilizer application and their performance on field-grown tomatoes. The results indicated that the addition of Nutricharge to phosphorus fertilizer enhanced all measurable parameters of tomato production. Phosphorus use efficiency was significantly increased when Nutricharge was added to phosphorus fertilizer applied.