

# FIELD TRIAL SUMMARY 2016 - 2017



#### SUL4R-PLUS®



#### IT'S ALL ABOUT The plus

#### Macronutrients

#### Micronutrients

Macrobenefits



Delivers Calcium, Sulfur, Zinc, Boron, and other nutrients

100% plant-available nutrients when crops need them

Every granule contains the nutrients Uniform particle size and density for consistent blending and spread

120' spread capability

More granules per square foot for even feeding Dust free handling

Low salt index

Phosphorus free Formulation flexibility

Lower operating costs

SUL4R PLUS.COM

SUL4R-PLUS FREE SAMPLE AT SUL4R-PLUS.COM

SUL4R-PLUS® Fertilizer:

Delivers Calcium, Sulfur with options for Zinc, Boron, and other nutrients

100% plant-available nutrients when crops need them

Every granule contains the nutrients

Uniform particle size and density for consistent blending and spread

120' spread capability

More granules per square foot for even feeding

**Dust free handling** 

Low salt index

Phosphorus free

Formulation flexibility

Lower operating costs

Freesample





# **SUL4R-PLUS® PREVAILS**

#### SUL4R-PLUS Illinois Corn Trial Average Yield By Hybrid Variety



#### 2016 SUL4R-PLUS ILLINOIS CORN TRIAL

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#### **Return on Investment Chart**

#### BURRIS CORN HYBRIDS

		6L45	2	V56	ļ	5K35	4	4J95	5	6C17	7	7A18
100 LB SUL4R-PLUS®	2	07.81	19	3.09	2	206.1	19	97.23	18	85.03	1	97.35
Untreated	1	89.16	1	79.2	1	97.77	16	59.53	1	71.7	1	73.88
# Bu More/Acre	1	8.65	13	3.89		8.33	1	27.7	1	3.33	2	3.47
Treatment Cost @												
\$250.00/ton	\$	12.50	\$ :	12.50	\$	12.50	\$	12.50	\$	12.50	\$	12.50
\$\$/Acre More @												
\$3.50 BU	\$	65.28	\$ /	48.62	\$	29.15	\$	96.95	\$	46.66	\$	82.15
\$\$ ROI	\$	52.78	\$ 3	36.12	\$	16.65	\$	84.45	\$	34.16	\$	69.65
% ROI	4	22%	2	89%	1	133%	6	76%	2	73%	5	57%





#### MICHIGAN 2016 CORN

		Gr	oss \$/AC	Trea	atment	Difference				
ROW#	Yield	@	\$3.50 BU	Cos	t/AC	Gross \$/AC	RO	\$	ROI	%
SUL4R-PLUS <sup>®</sup> 200 LB/AC	174.82	\$	611.87	\$	25.00					
SUL4R-PLUS® Zn 100 LB/AC	167.83	\$	587.41	\$	25.00					
SUL4R-PLUS® Zn 200 LB/AC	191.60	\$	670.60	\$	50.00					
SUL4R-PLUS® 100 LB + SUL4R-										
PLUS <sup>®</sup> Zn 100 LB/AC	191.62	\$	670.67	\$	37.50					
SUL4R-PLUS <sup>®</sup> 200 LB + SUL4R-				•						
PLUS <sup>®</sup> Zn 200 LB/AC	191.62	\$	670.67	\$	75.00					
SUL4R-PLUS® 100 LB + SUL4R-										
PLUS <sup>®</sup> Zn 100 LB/AC	187.49	\$	656.22	\$	37.50					
SUL4R-PLUS <sup>®</sup> 100 LB/AC	145.37	\$	508.80	\$	12.50	\$ 29.79	\$	17.29		172%
UNTREATED	136.86	\$	479.01	\$	-	\$ -	\$	-	\$	-

#### **ROI CHART**

- Irrigated Section:
  - 6 rows—no check was performed.
  - ✤ No way to calculate ROI.
  - Best Option is 50/50 blend of SUL4R-PLUS<sup>®</sup> and SUL4R-PLUS<sup>®</sup> Zn.
  - Best per acre value:
- Non-Irrigated Section:
  - ✤ 172% ROI
  - ✤ 8.51 Bushel Better





# MICHIGAN

June 26, 2016 Photos







#### MICHIGAN July 13, 2016 Photos









#### SUL4R-PLUS® ZINC Fertilizer – MerRouge, LA. July 2016



No yield data—picture demonstrates improved health.





#### 2016 Michigan State University Alfalfa ROI Chart

			14	7 # SUL4R-				
	C	Control		PLUS	104 # AMS			
Dry Matter LBS/Acre		2455		2973		2364		
Yield Improvement								
LBS/AC		0		518	-91			
Treatment Cost \$/AC	N/A		\$	18.38		15.6		
\$\$/Acre at\$240/ton	\$	294.60	\$	356.76	\$	283.68		
\$\$/Acre more @								
\$240/ton	\$	-	\$	62.16	\$	(10.92)		
\$ ROI		N/A	\$	43.79	\$	(26.52)		
% ROI		N/A		238%		-170%		

Significant ROI potential with SUL4R-PLUS on alfalfa in Michigan. Greater than 200% ROI.



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#### **2016 Wisconsin Potato Trial ROI Chart**

	Standard	Standard + 100# SUL4R- PLUS		Sta 200 PLL	ndard + )# SUL4R- JS	Sta 100 PLL	ndard + )# SUL4R- JS B	Standard + 100# SUL4R- PLUS Zn		
Yield CWT/AC	295		317		324		303		310	
Yield Improvement	0	22			29		7.8	15		
Treatment Cost/AC	0	\$	12.50	\$	25.00	\$	20.00	\$	20.00	
\$\$/Acre more										
@\$8.90 CWT	0	\$	195.80	\$	256.94	\$	68.98	\$	137.24	
\$\$ ROI	0	\$	183.30	\$	231.94	\$	48.98	\$	117.24	
% ROI	0		1466%		928%		245%		586%	





#### Kentucky:

**Soybeans**—CPS/Loveland Research; The study consisted of applying SUL4R-Plus and SUL4R-PLUS Boron fertilizer products at different rates in comparison with an untreated check, foliar application of boron and application of potash. All applications were done at the V3 growth stage. This study was done at the Research Farm in Owensboro, Kentucky; the soils at the farm are consistently high in nutrients. One interesting aspect was the level of boron in the leaf tissues at application as compared to 21 days after application, applying boron using SUL4R-PLUS Boron as opposed to applying NutriSync B as a foliar. Different products and application rates were applied. Please see attached graph demonstrating results.



ΞU





#### University of Missouri Fischer Delta Research 2016 Soybean Trial





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#### 2016 Missouri Rice-Fischer Delta Research Center



# 2016 Arkansas Cotton

- Official yield data not available. Harvest miscommunication.
- ~ 2 to 3 bales more acre.

#### SEE THE DIFFERENCE

- **COLOR & CANOPY** 1.
- **TALLER & HEALTHIER** 2.











# 2016 Texas A&M Leachate Study Purpose:

- 60-day study was conducted to evaluate the release patterns of SUL4R-PLUS<sup>®</sup> fertilizer as compared to two commonly available and widely applied Sulfur fertilizer sources.
- Study included a control with no application of Sulfur fertilizer.
- Study evaluated three different soil types.
- Leachate was collected to measure plant available-Sulfur as Sulfate.





# 2016 Texas A&M Leachate Study

#### Study analyzed sustained release of Sulfur from three products:

- SUL4R-PLUS<sup>®</sup> fertilizer --- 00-00-00-21Ca-17S
- Ammonium Sulfate (AMS) --- 21-00-00-24S
- Elemental Sulfur --- 00-00-00-90S
- No Sulfur applied --- Control

#### 3 Soil Series Evaluated: Clay, Silt Loam & Sandy Loam.

#### **Replicated 3 times.**

Low Rate of Sulfur (16 lb./ac) & High Rate of Sulfur (32 lb./ac)

## Leachate collected at following intervals:

– Initial (0); Day 5; Day10; Day 15; Day 20; Day 30; Day 40; Day 50; Day 60.



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# 2016 Texas A&M Leachate Study Summary of Study Results:

- Ammonium Sulfate released all applied fertilizer Sulfate-Sulfur as plant-available, but also potentially leachable, Sulfate-Sulfur within the first 5 days.
- Elemental Sulfur applied to the soils released no appreciable amounts of plant-available sulfur over the entire duration of the study.
- SUL4R-PLUS<sup>®</sup> fertilizer, however, released a moderate amount of Sulfate-Sulfur over the initial 10 days of the study, and continued to release between 2 to 5 lbs./acre, depending on the rate applied, of plant available sulfur every 10 days thereafter.
- SUL4R-PLUS<sup>®</sup> fertilizer best mimicked the sustained need of crop plants for Sulfur nutrition over the course of a growing season.
- SUL4R-PLUS<sup>®</sup> is a superior source Sulfate-Sulfur for fall applied nutrients to provide adequate to sufficient Sulfur nutrition for spring emergence; as compared other commonly used sulfur sources.





# 2016 Texas A&M Leachate Study KEY TAKEAWAY

Nutritional Product Cost Per Day based on Availability to the Plant in the Soil Profile

Product	Dealer Cost per ton	Desired Margin	Retail Price per ton	Average application rate lbs. per acre	Grower Cost per acre	Plant / Soil availability in days*	Cost per acre per day
AMS	<u>\$290</u>	<u>8%</u>	\$313.20	<u>100</u>	\$15.66	10	\$1.57
SUL4R-PLUS®	<u>\$180</u>	<u>21%</u>	\$217.80	<u>100</u>	\$10.89	60	\$0.18
SUL4R-PLUS® Zn	<u>\$360</u>	<u>21%</u>	\$435.60	<u>100</u>	\$21.78	60	\$0.36
SUL4R-PLUS® B	<u>\$360</u>	<u>21%</u>	\$435.60	<u>100</u>	\$21.78	60	\$0.36
SUL4R-PLUS® BZ	<u>\$340</u>	<u>21%</u>	\$411.40	<u>100</u>	\$20.57	60	\$0.34
	Calc	ulation	s based	on result	s from	Texas A&N	M Leachate Study.





# 2016 Texas A&M Leachate Study KEY TAKEAWAY

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*Based on Texas A&M Sulfur Products Leaching Study														
			Gross Dolla	ar Comparisons	<u>s</u>									
	Margin in Dollars		Tons Sold Per		Annual Gross		<b>Revenue Gain or Loss</b>							
	per Ton		Year	-	Net Dollars	_	verses SUL4R-PLUS®							
AMS	\$23.20		1500		\$34,800.00		<u>-\$21.900.00</u>							
SUL4R-PLUS <sup>®</sup>	\$37.80		1500		\$56,700.00									



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#### 2016 Field Trial Conclusion:

- Intensive trial program initiated in 2016.
  - Academia, Independent Research and Retail/Grower cooperators.
  - Determine the efficacy of SUL4R-PLUS<sup>®</sup> fertilizer on specific crops.
  - Crops-corn, soybeans, wheat, rice, potatoes, alfalfa, cotton, peanuts, palm oil, tobacco, canola, spring wheat, lentils and leachate study.
  - Specified market area-Kentucky, Illinois, Indiana, Ohio, Louisiana, Michigan, Wisconsin, Georgia, Missouri, Arkansas, Texas, Canada and Dominican Republic.
  - ~ 50 different trials in specified market area.
- Remember yield limiting factors, the stave is not always the same every year. In the search for high yields, the need to manage a many factors that we can control.
- SUL4R-PLUS<sup>®</sup> fertilizer provides another option for growers looking to manage calcium, sulfur and micronutrients.
- Yield results were inconsistent across all crops; some regions showed improved results; while other regions showed a positive result.
- Ever improving technology and products like SUL4R-PLUS<sup>®</sup> offer us many options in how we feed the crop.





#### 2017 MICHIGAN ALFALFA MICHIGAN STATE UNIVERSITY

Control 300 lb/ac-3-14-42

Control + 147 lb/ac SUL4R-PLUS® BZ

Control + 147 lb/ac SUL4R-PLUS®



Grower Standard + SUL4R-PLUS® B @142 lb/ac

1.8

1.6

1.4

1.2

0.8

0.6

0.4

0.2

Grower Standard



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Treated Untreated

22



Evaluation of nutrient uptake and feed quality analysis: 14 acres of 28 acre established alfalfa treated mid-March provided increase in nutrient uptake which improved feed quality—higher Protein, Calcium & Phosphorous. Feed analysis sampled at 2<sup>nd</sup> & 4<sup>th</sup> cuttings. Yield measurement performed at 4<sup>th</sup> cutting—resulted in 0.56 ton more per acre—total of 7.84 ton per 14 acres.





2017 CORN TIFTON CO, GEORGIA Trial 5-Month Rainfall Totals(inches)



- Soil Type-Sandy Loam
- Soil Series-Tifton
- Planting Date: 04/03/17
- Harvest Date: 08/29/17
- 2 Replications



#### **2017 CORN TIFTON CO, GEORGIA**



#### 2017 Yield Data All Treatments

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- SUL4R-PLUS<sup>®</sup> BZ out performed all treatments.
- Adding Boron or Zinc micronutrients performed worse than check.
- Shows importance of having micronutrients in one granule.
- SUL4R-PLUS<sup>®</sup> or SUL4R-PLUS<sup>®</sup> BZ provided more gross dollars per acre than 3 other treatments.
- SUL4R-PLUS<sup>®</sup> BZ ROI is > 150%.





# SUL4R-PLUS<sup>®</sup> BZ:✤ 173 % ROI♣ 21 Bushel Better

#### \$731.22 800 \$656.25 700 600 500 400 208.92 300 187.5 173 200 \$74.97 100 \$47.47 \$27.50 21.42 0 Bushel Difference/AC Difference Gross \$/AC Cost/AC @ \$550/ton Yield Gross \$/Acre@ \$ ROI %ROI \$3.50/Bu

**2017 CORN GEORGIA** 

**TIFTON COUNTY** 

Check 100 LB/AC SUL4R-PLUS® BZ





1) Soil Type:		Sabir	na Silt Loam, 0-2%					
2) CEC:			10.7					
3) Soil OM%			2.00%					
4) Soil pH:		7.10						
5) Soil N Level:			not required					
6) Soil P Level (lbs/ac	re):		46					
7) Soil K Level (lbs/ac	re):		152					
8) Previous Crop:			SOYBEANS					
9) Seed Variety		Pic	oneer 1197 AMXT					
10) Planting Pop:			Approx 32,500					
11) Planting Date:		Re-planted on May 18, 2017						
12) Location:		(	Catlin, Illinois					
			Gross \$/AC @					
Treatment		Yield	\$3.50 Bu					
1		205.1	717.85					
2		196.9	689.15					
3		225.6	789.6					
2		203.1	710.85					
3		215.9	755.65					
1		182.9	640.15					
2		218.4	764.4					
3		213.9	748.65					
1		214.4	750.4					
3		197.0	689.5					
1		205.6	719.6					
-								

#### 2017 CORN Catlin, Illinois Trial Information

		Treatment
Treatment	Per Acre Analysis	Cost/AC
1 Standard	234-69-120	\$ 103.80
2 Standard + SUL4R-PLUS® Zn	234-69-120 18 Ca, 16 S, 3 Zn	\$ 121.80
3 Standard + SUL4R-PLUS® BZ	234-69-120 18 Ca, 16 S, 1.5 Zn, 0.5 B	\$ 118.50
Products Used	Rate per Acre	
DAP 18-46-00	150 lb./ac	
MOP 00-00-60	120 lb./ac	
Super U 46-00-00	207 lb./ac	
Products Used DAP 18-46-00 MOP 00-00-60 Super U 46-00-00	Rate per Acre 150 lb./ac 120 lb./ac 207 lb./ac	

Treatment	Average Yield	Gr @	oss \$/AC \$3.50 Bu	Yield Difference	Tre	eatment Cost
1-FS	202	\$	707.00	0	\$	103.80
2-SUL4R- PLUS® ZN	200	\$	700.26	-2	\$	121.80
3-SUL4R- PLUS® BZ	213	\$	745.85	11	\$	118.50





#### SUL4R-PLUS<sup>®</sup> BZ:

- ✤ 11 Bushel Better.
- **\$38.85** more per acre revenue.
- ✤ \$14.70 additional cost per acre.
- **\*** It pays for itself—Great ROI.



**2017 CORN** 

CATLIN, ILLINOIS





#### 2017 CORN WISCONSIN









UTC 50 LB PRO VALLEY MME 50 LB SUL4R-PLUS® BZ 50 LB AMS









#### 2017 MEADE COUNTY, KENTUCKY SOYBEANS



#### 2017 MEADE COUNTY, KENTUCKY SOYBEANS-Tissue Analysis

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■ Grower Standard ■ Grower Standard + SUL4R-PLUS® BZ @100 lb/ac



Grower Standard Grower Standard +SUL4R-PLUS BZ @100lb/ac



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#### **2017 UNION COUNTY, KENTUCKY** DOUBLE CROP SOYBEANS Tissue Analysis





#### **Trial Notes & Summary:**

- SUL4R-PLUS<sup>®</sup> & SUL4R-PLUS<sup>®</sup> BZ applied last week of March 2017-for wheat trial. No other application made. 92 acres divided equally.
- Soybeans planted June 2, 2017—after wheat harvested for grain.
- Tissue analysis performed in July—to validate the availability of Calcium, Sulfur, Boron and Zinc to plant 4 months after application.
- ➢ Field average yield—80 bushels/acre.
  - ➢ 92 acre field.





#### 2017 GRAYSON COUNTY, KENTUCKY SOYBEANS



Grower Standard Grower Standard + SUL4R-PLUS® B @100/lb/ac

#### Yield & Nutrient Uptake Evaluation:

- Average 4 bushels more per acre.
- Increased Calcium, Sulfur & Boron-result:
- Yield increase and improved plant health.

#### 2017 GRAYSON COUNTY, KENTUCKY Soybean Tissue Analysis Calcium & Sulfur %



#### 2017 GRAYSON COUNTY, KENTUCKY Soybean Tissue Analysis-Boron ppm







#### 2017 HARDIN COUNTY, KENTUCKY SOYBEAN YIELD



#### 2017 HARDIN COUNTY, KENTUCKY SOYBEAN Tissue Analysis-Boron ppm



2017 HARDIN COUNTY, KENTUCKY SOYBEAN Tissue Analysis-Calcium & Sulfur %



#### Yield & Nutrient Uptake Evaluation:

- Average 3 bushels more per acre.
- Increased Calcium, Sulfur & Boron-result:
- Yield increase and improved plant health





#### 2017 CORN KENTUCKY UNION COUNTY







The grower felt like no matter where we harvested on the 20 acres treated area of the 38 acre field that

there truly was a 4.5 to 5 bushel per acre difference between treated and untreated.

#### 2017 SOYBEANS KENTUCKY GRAYSON, COUNTY





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#### 2017 SOYBEANS MISSISSIPPI MISSISSIPPI STATE UNIVERSITY







	V4	R1	R3					V4 Gross	R1 Gross	R3 Gross						
	Application	Application	Application		V4 Yield	R1 Yield	R3 Yield	\$/AC	\$/AC	\$/AC	V4 Gain	R1 Gain	R3 Gain			
Treatment	Yield BU/AC	Yield BU/AC	Yield BU/AC	Cost/AC	Difference	Difference	Difference	@\$9.15	@\$9.15	@\$9.15	\$/AC	\$/AC	\$/AC	V4 ROI %	R1 ROI %	R3 ROI %
Check	78.34	78.34	78.34					\$ 716.81	\$ 716.81	\$ 716.81						
Ammonium Sulfate 15 lb ai/ac63 LB	83.5	82.77	82.51	\$ 10.24	5.16	4.43	4.17	\$ 764.03	\$ 757.35	\$ 754.97	\$ 47.21	\$ 40.53	\$ 38.16	361	296	273
SUL4R-PLUS <sup>®</sup> 15 lb ai/ac88 LB	84.39	82.72	83.23	\$ 11.00	6.05	4.38	4.89	\$ 772.17	\$ 756.89	\$ 761.55	\$ 55.36	\$ 40.08	\$ 44.74	403	264	307
K-Mag Granular 15 lb ai/ac68 LB	84.26	83.96	81.99	\$ 22.10	5.92	5.62	3.65	\$ 770.98	\$ 768.23	\$ 750.21	\$ 54.17	\$ 51.42	\$ 33.40	145	133	51



MISSISSIPPI STATE UNIVERSITY



- SUL4R-PLUS® \$250/ton \*
- AMS \$325/ton \*
- K-Mag \$650/ton \*\*





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2017 Wheat Trial Union County, KY

# 150 lbs./acre SUL4R-PLUS®

\* 9 bushel better than check.
\* 1. 09 % better protein.
\* 2 pound/bushel better test weight.

\$5.00/bushel wheat equals \$45.00 more per acre. Grower investment for 150 lbs./acre of SUL4R-PLUS® = \$18.75/acre. 140 % ROI.





# 2017 Field Trial Conclusion:

- 2017 Alfalfa, Wheat, Corn and Soybean data demonstrated promising results; either in yield, quality or overall improved plant health.
- ➢ Still more to learn about the advantages of SUL4R-PLUS<sup>®</sup>.



#### SUL4R-PLUS<sup>®</sup> Product Engineered to maximize the value of your crop.

New SUL4R-PLUS product is an innovative, in-demand pelletized sulfate proven to enhance soil quality and increase crop yields.

- High solubility for immediate impact
- Maximizes nutrient uptake for stronger crops
- Spreads evenly in one pass, saving time and money
- Market leader in quality and consistency

Growers everywhere are talking about the next big thing in nutrient optimization-SUL4R-PLUS product.

Proven to increase crop yields

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