Five Forgotten Factors of Fertility

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February 13th, 2020
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Mosaic

WHO IS MOSAIC?

<u>Who We Are</u>: World's largest single source supplier of finished phosphates and potash.

<u>Mission</u>: Help the world grow the food it needs.

<u>Premium Products</u>:

MicroEssentials®

MicroEssentials S10: 12-40-0-10S
MicroEssentials SZ: 12-40-0-10S-1Zn

Both products: Sulfur is a 50:50 blend of sulfate and elemental sulfur

Aspire®

Same Analysis: 0-0-58-0.5B
New Formulation of B:
50:50 blend of fast and slow release

K-Mag®

Analysis: 0-0-21.5-10.5 Mg-21 S

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4R NUTIENT STEWARDSHIP: WHAT ARE THEY?

RIGHT SOURCE

Matches fertilizer type to crop needs.

RIGHT RATE

Matches amount of fertilizer to crop needs.

RIGHT TIME

Makes nutrients available when crops need them.

RIGHT PLACE

Keeps nutrients where crops can use them.

Today: Review the WHY from an agronomic perspective.

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FIVE FORGOTTEN FACTORS OF FERTILITY

Objective:

Describes five influential soil fertility and plant nutrition factors that growers/consultants/retailers have either forgotten or not yet learned.

Not Covered:

Soil fertility challenges related to pH, extraction method and interpretation, fertilizer application, and countless others are challenges based on regional soil type and production differences, and therefore, will not be reviewed.

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FIVE FORGOTTEN FACTORS OF FERTILITY

Sulfur	**Ensure adequate sulfur availability to all crops**

RELATIVE CONTRIBUTIONS OF SULFUR FOR CURRENT PRODUCTION SYSTEMS

Source of S	Relative Amount
Organic Matter	.
Atmospheric Deposition	.
Plant Remobilization	.
Fertilizer	.

Information expressed here is not based on actual data, and only represents the thoughts of Ross Bender.

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ORGANIC MATTER (OM) MINERALIZATION

Each 1% OM Contains…	Key factors influencing availability	Conditions for deficiency?
• 100 lbs/ac of organic S (unavailable) • 2.0-2.5 lbs/ac inorganic S (available)	• Moisture • Temperature	• Vegetative: cool/wet • Reproductive: hot/dry

Recommendations for Sulfur on Corn (Purdue University)

- **Low CEC soils: 25 lbs S/Ac annually**
- **Medium – High CEC Soils: 15 lbs S/Ac annually**
- **When using elemental sulfur only, combine with sulfate source**
- **More info:** https://www.agry.purdue.edu/ext/corn/news/timeless/SulfurDeficiency.pdf

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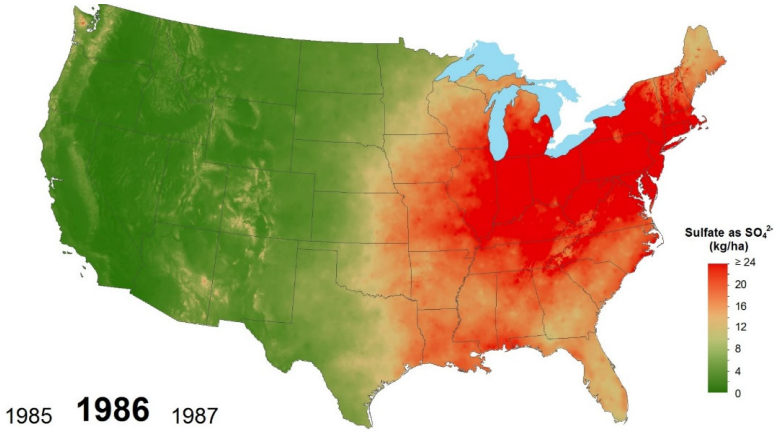
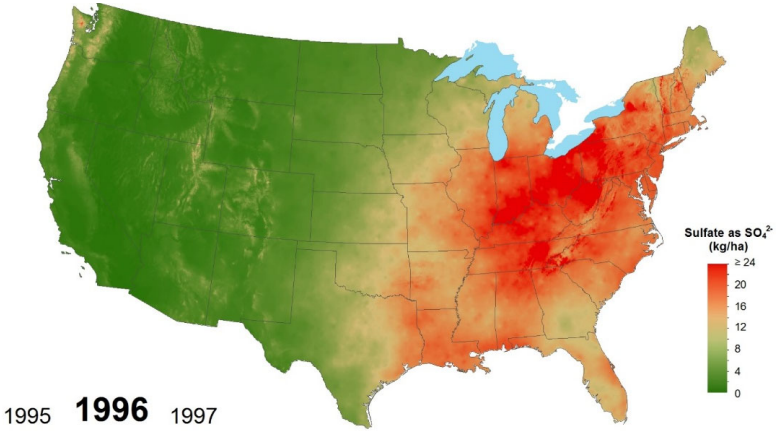
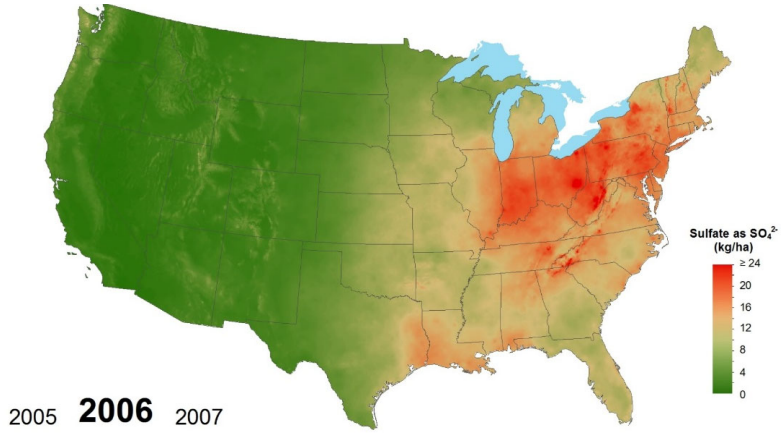
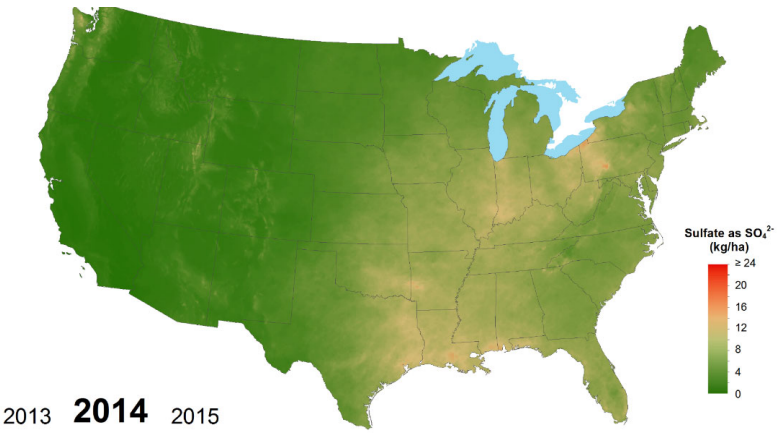
REDUCED ATMOSPHERIC DEPOSITION OF S









Data courtesy of National Atmospheric Deposition Program/National Trends Network (http://nadp.isws.illinois.edu)

Data represents annual content of sulfate deposition in precipitation (kg/ha).

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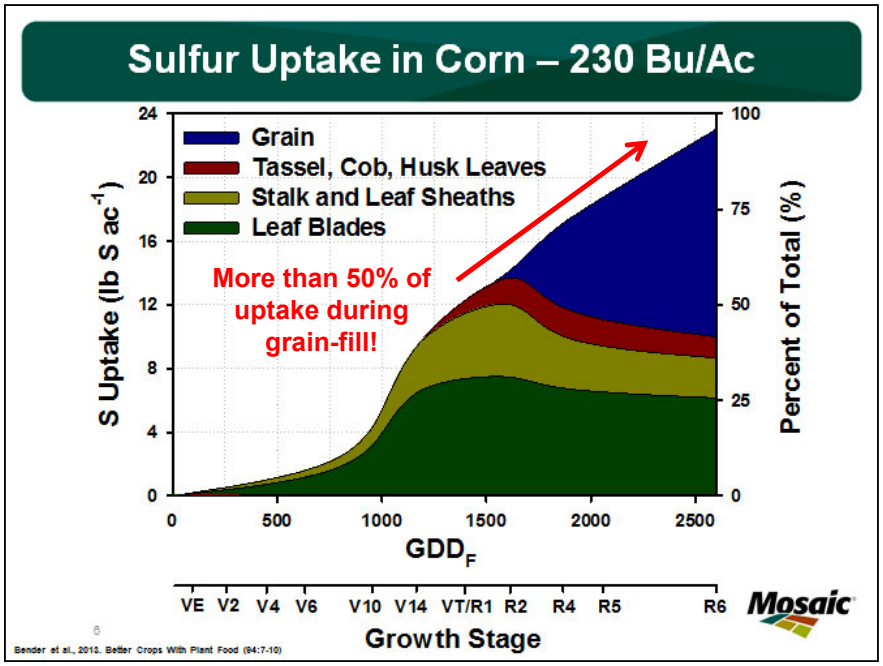
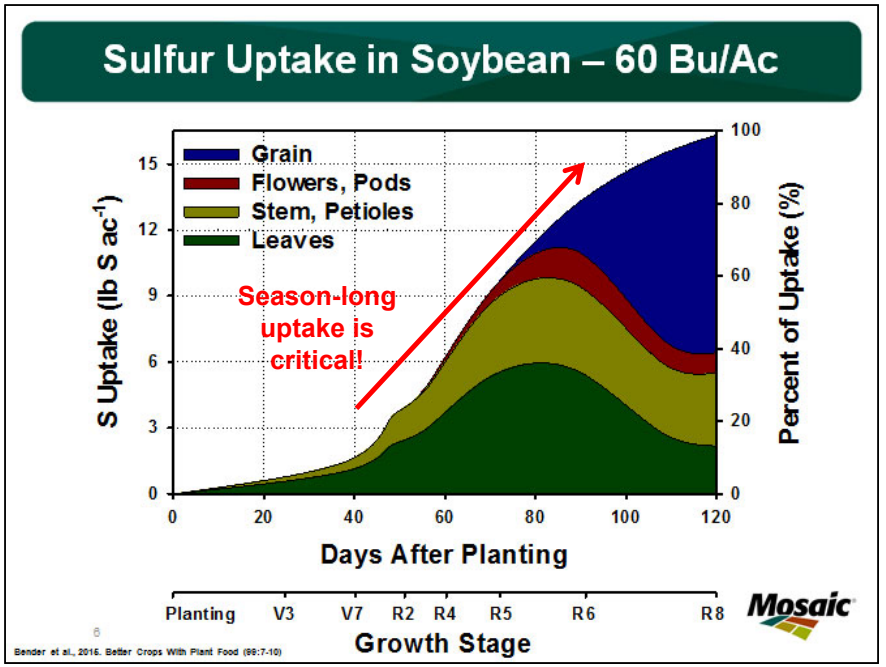
SULFUR IS LARGELY PLANT IMMOBILE

Maximum grain productivity requires season-long S availability, especially for corn and soybean:





Note the limited plant mobility of S in corn to supply intra-seasonal periods of plant stress.

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RELATIVE CONTRIBUTIONS OF SULFUR FOR CURRENT PRODUCTION SYSTEMS

Source of S	Relative Amount
Organic Matter	
Atmospheric Deposition	
Plant Remobilization	
Fertilizer	

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MASS BALANCE OF SULFUR

	Corn (230 bu/Ac)	Soybean (60 bu/Ac)
Need:	lbs S/Ac	
Uptake	23	17
Removal	13	10
Supply:		
Atmospheric Deposition	6	6
Organic Matter (2% * 2.5 lbs S/Ac)	5	5
Previous ES or Manure Application	?	?
Deficit:	12	6
Suggested application rate (based on 60% recovery efficiency)	**20 lbs**	**10 lbs**

Hypothetical scenario only

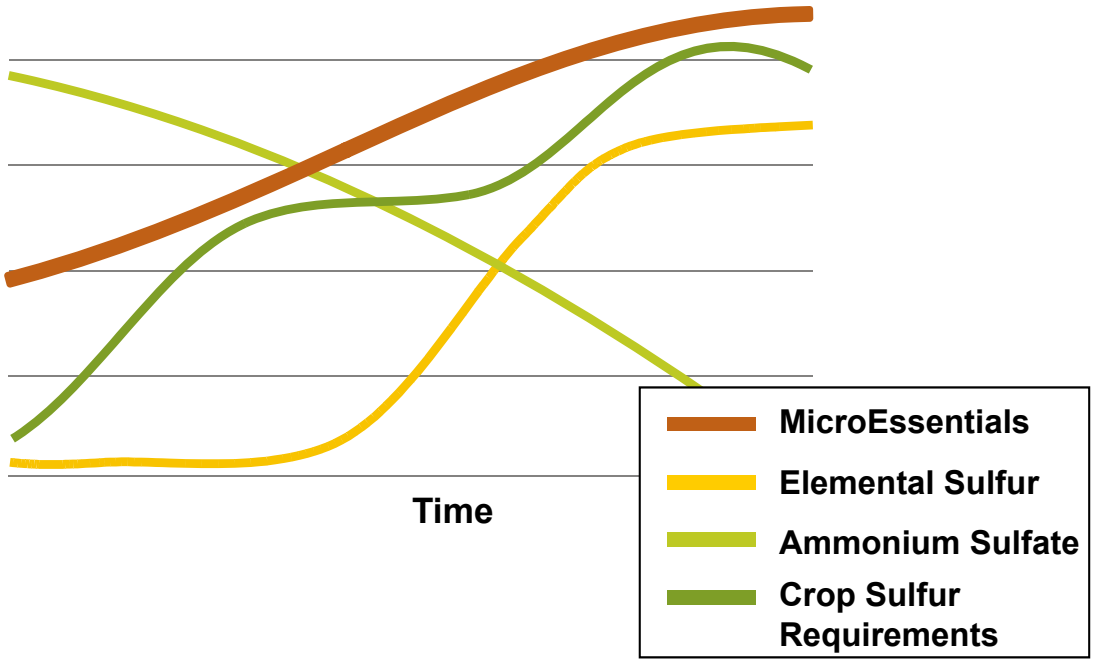
Higher yields and lower amounts of S from acidic rainfall continue to encourage S fertilization on corn and soybean!

DUAL SOURCES FOR MAXIMUM AVAILABILITY

MicroEssentials has both fast (Sulfate) and slow-release (Elemental S) sulfur sources for season-long S availability.

MicroEssentials S10 Analysis:

Total Nitrogen	12%
Total P_2O_5	40%
Total Sulfur	10%
Sulfate Sulfur	*(5%)*
Elemental Sulfur	*(5%)*



SULFUR ON CORN

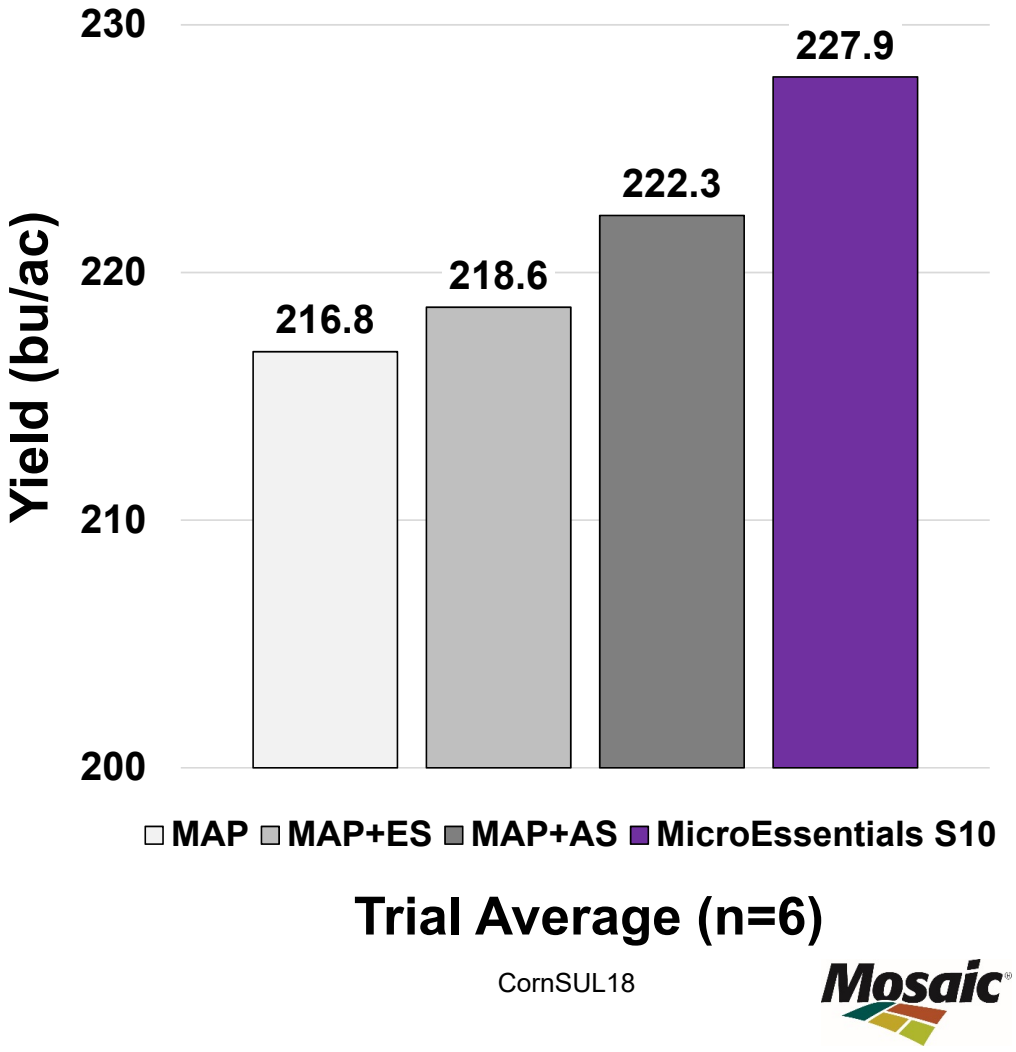
TRIAL OBJECTIVE

Evaluate corn yield response to various sulfur fertilizer sources including elemental sulfur (0-0-0-90S), ammonium sulfate (21-0-0-24S), and MicroEssentials S10 (12-40-0-10S).

TRIAL DETAILS

YEAR: 2018
LOCATIONS: 6 sites (IN, KS, MS, NE, SC)
DATA SOURCE: Small-plot (RCBD, 4 reps) trials conducted by independent, third-party researchers.
CROP MANAGEMENT: All trials conformed to local cropping practices

FERTILITY MANAGEMENT:
N Rate: Applied according to local recommendations and balanced across all treatments
P Rate: 80 lbs P_2O_5/ac either as MAP (11-52-0) or MicroEssentials S10 (12-40-0-10S)
K Rate: 60 lbs K_2O/ac as MOP applied to the whole trial
S Rate: 20 lbs S/ac as ES, AS, or MicroEssentials S10
App Method: All fertility was applied preplant broadcast



SULFUR ON SOYBEAN

TRIAL OBJECTIVE

Evaluate MicroEssentials S10 (12-40-0-10S) fertilizer vs. MAP (11-52-0) vs. MAP + AS (21-0-0-24S) with a base application of MOP (0-0-60).

TRIAL DETAILS

CROP: Soybean

YEAR: 2016

LOCATION: 8 trials (IL, IN, MI, IA, OH, ON, MO)

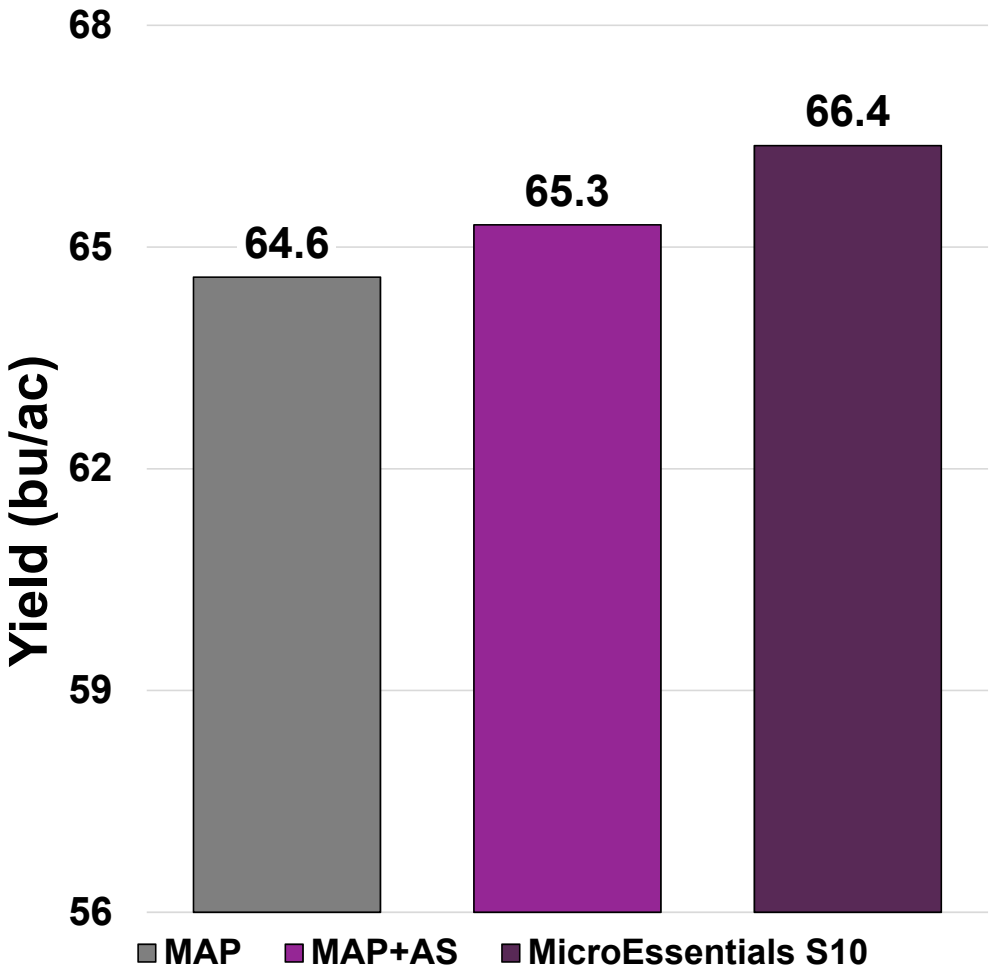
DATA SOURCE: Small-plot (RCBD) trials conducted by university and third-party contract researchers.

P RATE: 40 lbs P_2O_5/ac

K RATE: 60 lbs K_2O/ac

S RATE: 10 lbs S/ac

CROPPING CONDITIONS: All trials conformed to local cropping practices.



(SoybFRP16)

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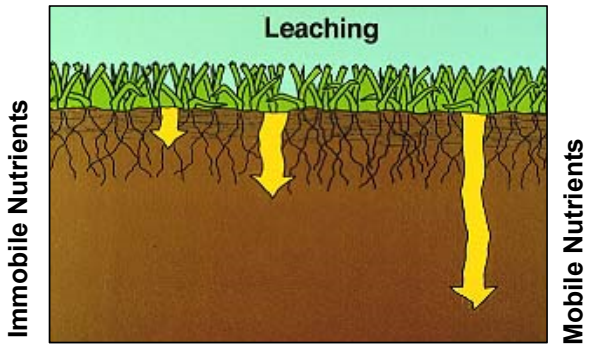
FIVE FORGOTTEN FACTORS OF FERTILITY

Sulfur	Ensure adequate sulfur availability to all crops
Mobility	**Design fertility practices that account for plant and soil nutrient mobility**

WHAT IS NUTRIENT MOBILITY?

Soil Mobility

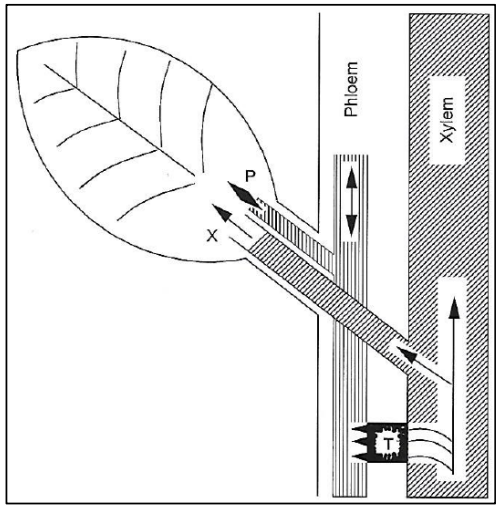
- The relative capacity for soil constituents to retain nutrients.
- Mobile (potentially lost via leaching):
  - NO_3^-, SO_4^{2-}, $H_2BO_3^-$
- Intermediate or low mobility:
  - NH_4^+, $H_2PO_4^-$ or HPO_4^{2-}, K^+, Ca^{2+}, Mg^{2+}, Mn^{2+}, Fe^{2+}, Cu^{2+}, Zn^{2+}



Source: personal.psu.edu

Plant Mobility

- The relative capacity for plants to reuse nutrients by transporting them from plant tissue to another.
- Species dependent
- High mobility:
  - N, P, K, Mg, S
- Intermediate or low mobility:
  - Ca, Zn, Mn, Fe, B, Cu, Mo



Source: Marschner, 2012. Pg. 62.

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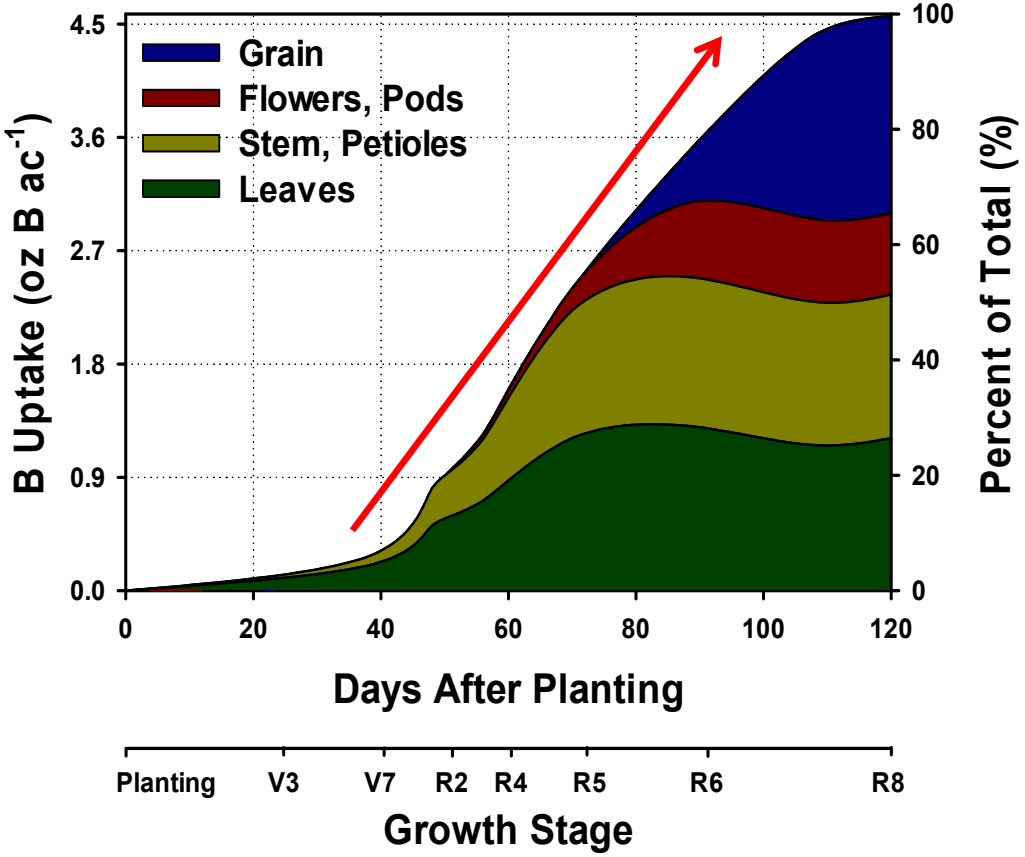
BORON NUTRIENT UPTAKE IN SOYBEAN



Key Points:

- Season-long uptake of B
- Important during flowering, early seed development
- Does not remobilize from leaves, must come from root uptake

Source: Bender et al., 2015. Better Crops With Plant Food (99:7-10)

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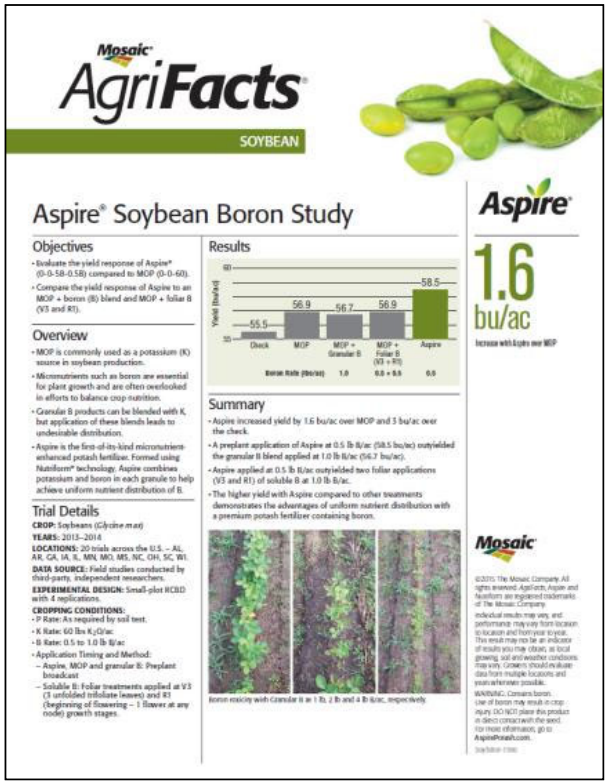
BORON ON SOYBEAN – WHEN WILL IT WORK?


Mosaic AgriFacts
SOYBEAN

Aspire® Soybean Boron Study

Objectives
- Evaluate the yield response of Aspire® (0-0.5B-0.5B) compared to MOP (0-0-60).
- Compare the yield response of Aspire to an MOP + boron (B) blend and MOP + foliar B (V3 and R1).

Overview
- MOP is commonly used as a potassium (K) source in soybean production.
- Micronutrients such as boron are essential for plant growth and are often overlooked in efforts to balance crop nutrition.
- Granular B products can be blended with K, but application of these blends leads to undesirable distribution.
- Aspire is the first-of-its-kind micronutrient-enhanced potash fertilizer. Formed using Nutriform® technology, Aspire combines potassium and boron in each granule to help achieve uniform nutrient distribution of B.

Trial Details
CROP: Soybeans (*Glycine max*)
YEARS: 2013–2014
LOCATIONS: 20 trials across the U.S. – AL, AR, GA, IA, IL, MN, MO, MS, NC, OH, SC, WI.
DATA SOURCE: Field studies conducted by third-party, independent researchers.
EXPERIMENTAL DESIGN: Small-plot RCBD with 4 replications.
CROPPING CONDITIONS:
- P Rate: As required by soil test.
- K Rate: 60 lbs K_2O/ac
- B Rate: 0.5 to 1.0 lb B/ac
- Application Timing and Method:
  - Aspire, MOP and granular B: Preplant broadcast
  - Soluble B: Foliar treatments applied at V3 (3 unfolded trifoliate leaves) and R1 (beginning of flowering – 1 flower at any node) growth stages.

Results

Summary
- Aspire increased yield by 1.6 bu/ac over MOP and 3 bu/ac over the check.
- A preplant application of Aspire at 0.5 lb B/ac (58.5 bu/ac) outyielded the granular B blend applied at 1.0 lb B/ac (56.7 bu/ac).
- Aspire applied at 0.5 lb B/ac outyielded two foliar applications (V3 and R1) of soluble B at 1.0 lb B/ac.
- The higher yield with Aspire compared to other treatments demonstrates the advantages of uniform nutrient distribution with a premium potash fertilizer containing boron.

Boron toxicity with Granular B at 1 lb, 2 lb and 4 lb B/ac, respectively.

Aspire 1.6 bu/ac
Increase with Aspire over MOP

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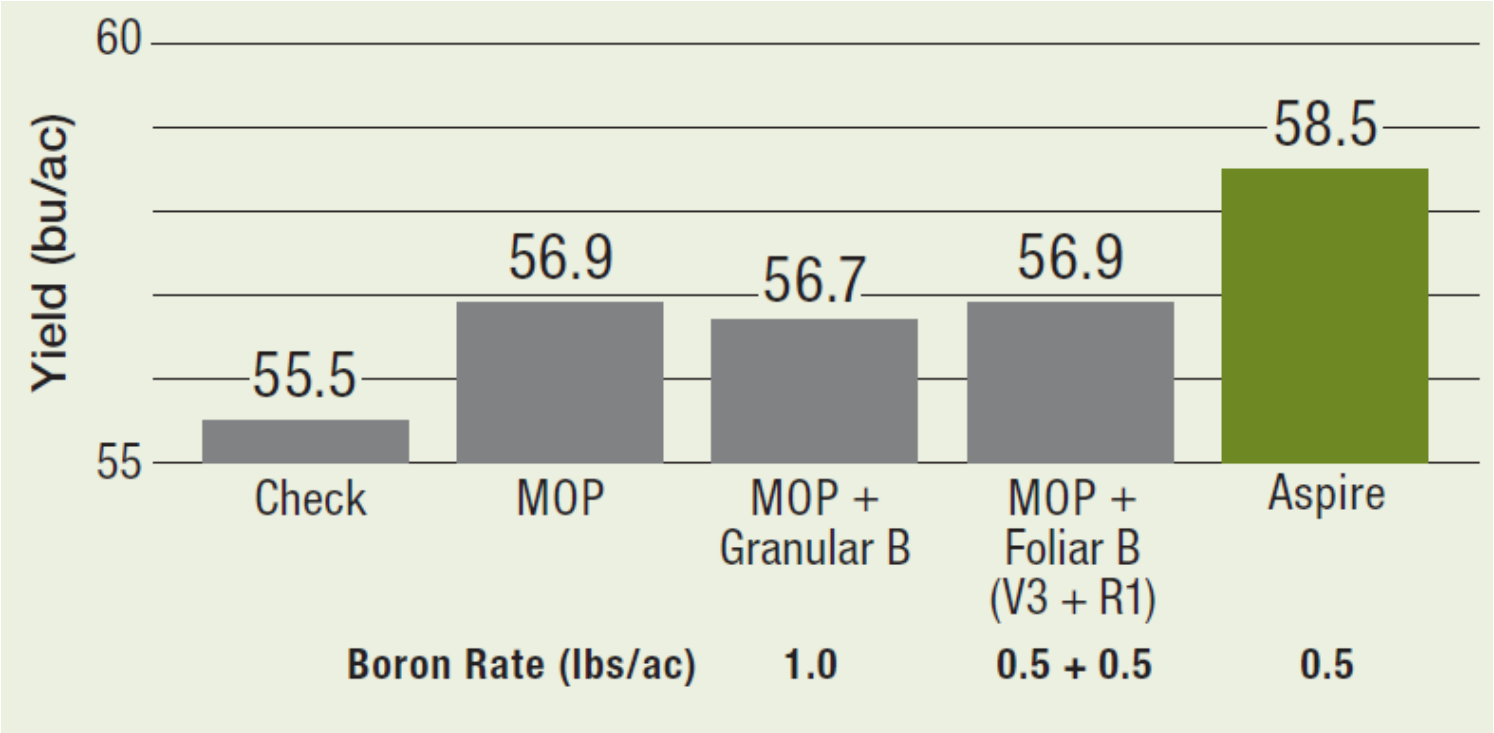
BORON ON SOYBEAN – WHEN WILL IT WORK?



Aspire®

1.6 bu/ac

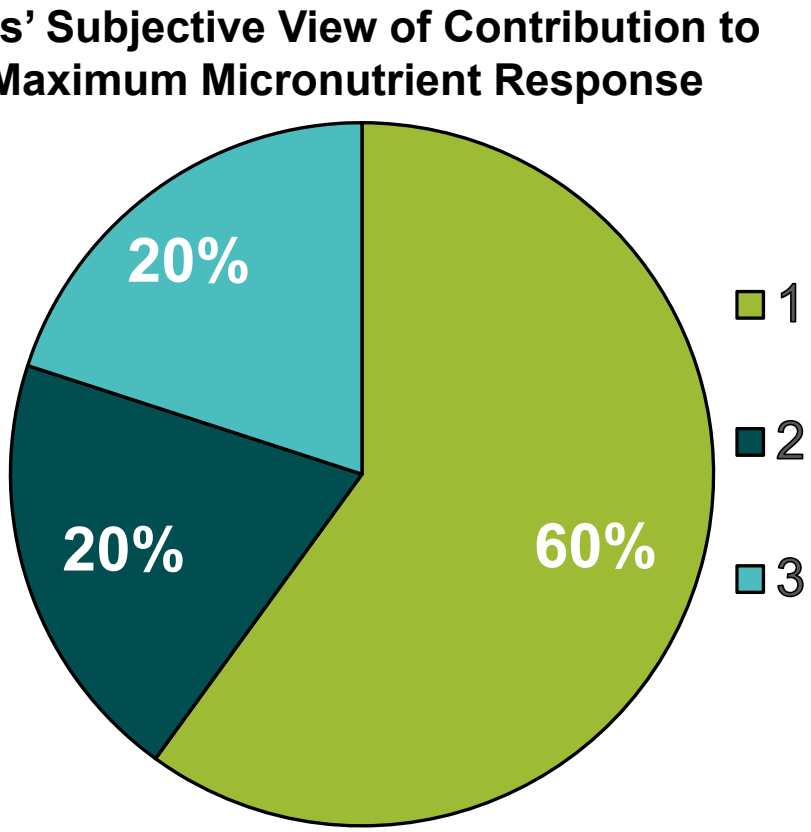
Increase with Aspire over MOP

Source: Data from 20 trials across two years by university and independent, third party researchers.

3 D'S OF MICRONUTRIENT MANAGEMENT

Delivery Method

1. Distribution
2. Duration of Availability
3. Daily Use



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ASPIRE ON SUGARCANE AT LSU

Table 1. Cane yield and sugar content of Plant and Ratoon crops averaged across two sites.

Years: 2013-2014; 2016-2017
Rates: 120 lbs K_2O/ac

	Plant Crop		Ratoon Crop	
	2 Sites	Average	2 Sites	Average
Treatment	Cane Yield (tons/ac)	Sugar Yield (tons/ac)	Cane Yield (tons/ac)	Sugar Yield (tons/ac)
Control	46.8	5.2	44.1	5.1
MOP	46.1	5.5	46.4	5.2
Aspire	49.2	5.7	49.8	5.8
Aspire over MOP (tons/ac)	3.1	0.2	3.4	0.6
Aspire over MOP (%)	6.7	4.0	7.3	11.5

WHAT DRIVES YIELD RESPONSE TO MICROS?

- **Impact of sound fertility is maximized with variety selection, comprehensive weed/pest control, drainage, pH management**
- **Micronutrients won't fix a macronutrient problem**
- **Most commonly deficient micronutrients: Zn, B**
- **Higher yields accelerate nutrient demand**

FIVE FORGOTTEN FACTORS OF FERTILITY

Sulfur	Ensure adequate sulfur availability to all crops
Mobility	Design fertility practices that account for plant and soil nutrient mobility
Accumulation	**Meet the changing patterns of nutrient accumulation in new varieties**

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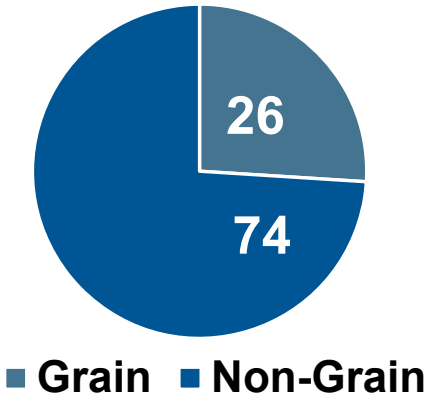
BIOMASS PRODUCTION AND YIELD POTENTIAL DRIVE NUTRIENT UPTAKE: SOYBEAN

Data below illustrates relative biomass partitioning between grain and non-grain tissues.

Borst (1931):
21 bu, 2.1 ton



* Borst and Tatcher, 1931. Bull. 494. Ohio Agric. Exp. Stn.
** Hammond et al. 1951. Res. Bull. 384. Iowa Agric. Exp. Stn.
*** Hanway and Weber. 1971. Agron. J. 63:227-230; 63:406-408.
**** Bender et al. 2015. Agron. J. 107:563-573.

Not only do today's varieties produce bigger yields (with more biomass), but they put more of it into the seed, rapidly increasing their nutrient demand.

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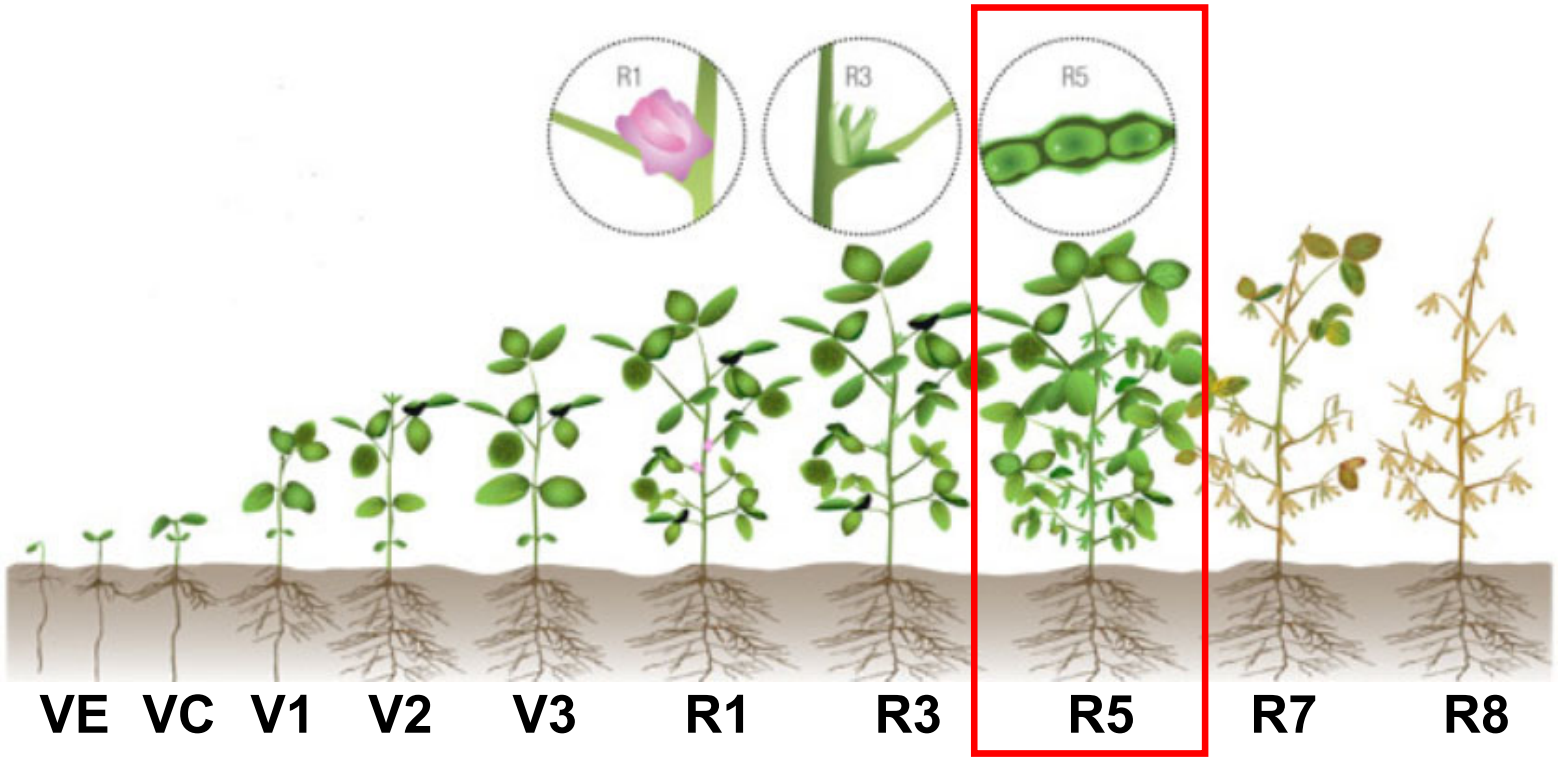
SOYBEAN GROWTH AND DEVELOPMENT

Seed filling (R5) is one of the last steps in plant development



Source: prairiecalifornian.com

PLANTS NEED NUTRIENTS AVAILABLE FOR LONGER: SOYBEAN

Parameter	Hammond (1951)**	Hanway (1971)***	Bender (2015)****
	Percent of Uptake During Seed Fill (%)		
Biomass	34	42	51
N			
P_2O_5			
K_2O			

Today's varieties produce more biomass and yield, which increases their nutrient requirement. Extending nutrient availability during grain or seed fill is critical!

** Hammond et al. 1951. Res. Bull. 384. Iowa Agric. Exp. Stn.
*** Hanway and Weber. 1971. Agron. J. 63:227-230; 63:406-408.
**** Bender et al. 2015. Agron. J. 107:563-573.

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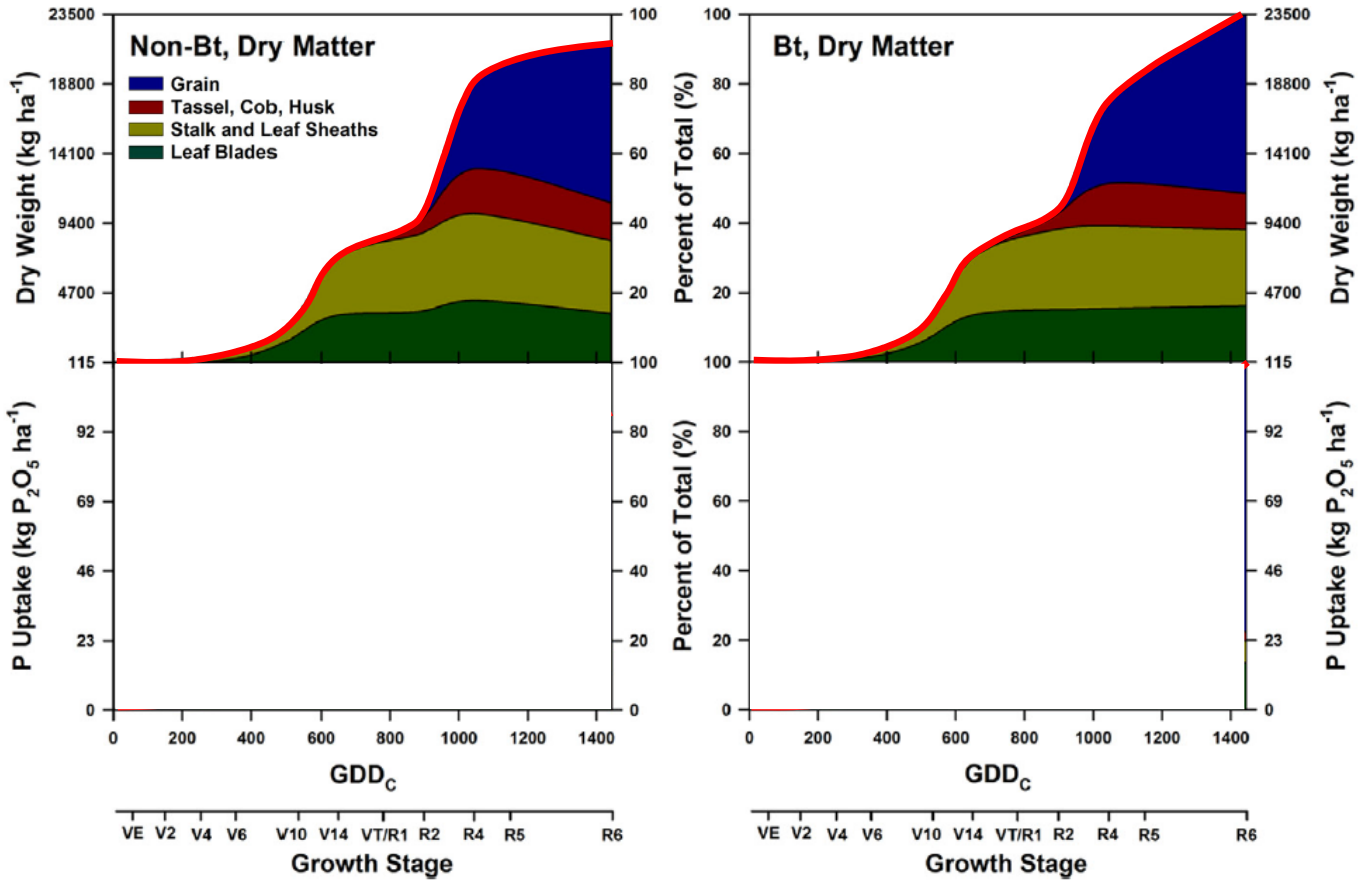
TRAITED INSECT PROTECTION ON CORN



Any factor that increases yield also increases late season biomass production and nutrient demand.

Bender et al. 2013. Agron. J. 105:1626-1634.

EXTENDING P AVAILABILITY ON CORN

- **Objective:** Understand the impact of season-long P availability on corn yield.
- **Site-Year:** Champaign, IL (2012)
- **Hybrids evaluated:** Two
- **P Source:** 10-34-0
- **P Rate:** 60 lbs P_2O_5 (Vegetative), 60 lbs P_2O_5 (Reproductive), 120 lbs P_2O_5 (season-long)
- **Application Method:** Injected into surface drip irrigation system
- Water and N balanced between treatments

Timing of P Application	Yield (bu/ac)	Kernel Rows (n)	Row Length (n)
None	190.5	13.6	26.5
Vegetative (V10 – V14)	+8.0	+0.1	+0.6
Reproductive (R1-R4)	+11.0	+0.0	+2.1
Season-Long	+23.5	+0.2	+3.1

Bender, Haegele, and Below, 2012. Unpublished.

Nutrients with a high grain demand require season-long availability for corn (P, S, Zn) and soybean (N, P, S, Cu) yield.

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FIVE FORGOTTEN FACTORS OF FERTILITY

Sulfur	Ensure adequate sulfur availability to all crops
Mobility	Design fertility practices that account for plant and soil nutrient mobility
Accumulation	Meet the changing patterns of nutrient accumulation in new varieties
Reduction	**Use the “4 R’s” to avoid further reduction of soil test nutrient levels**

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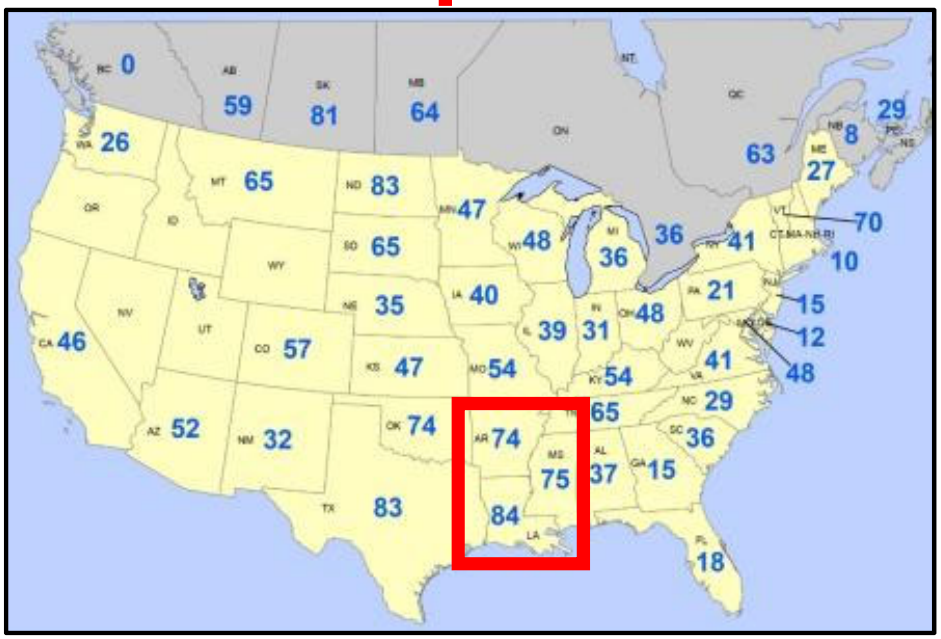
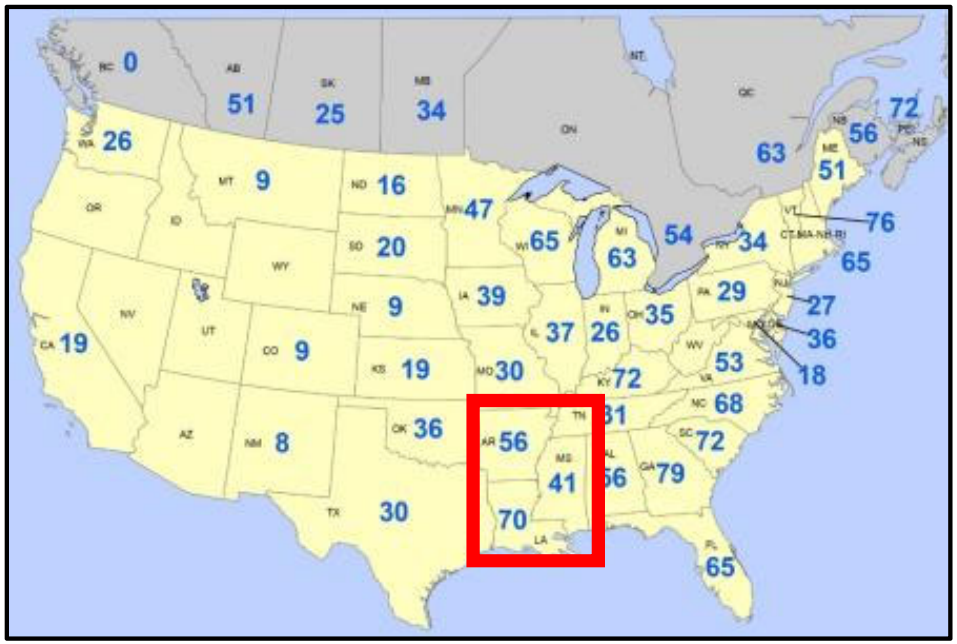
PERCENT OF SOILS TESTING BELOW STATE CRITICAL LEVELS

Phosphorus

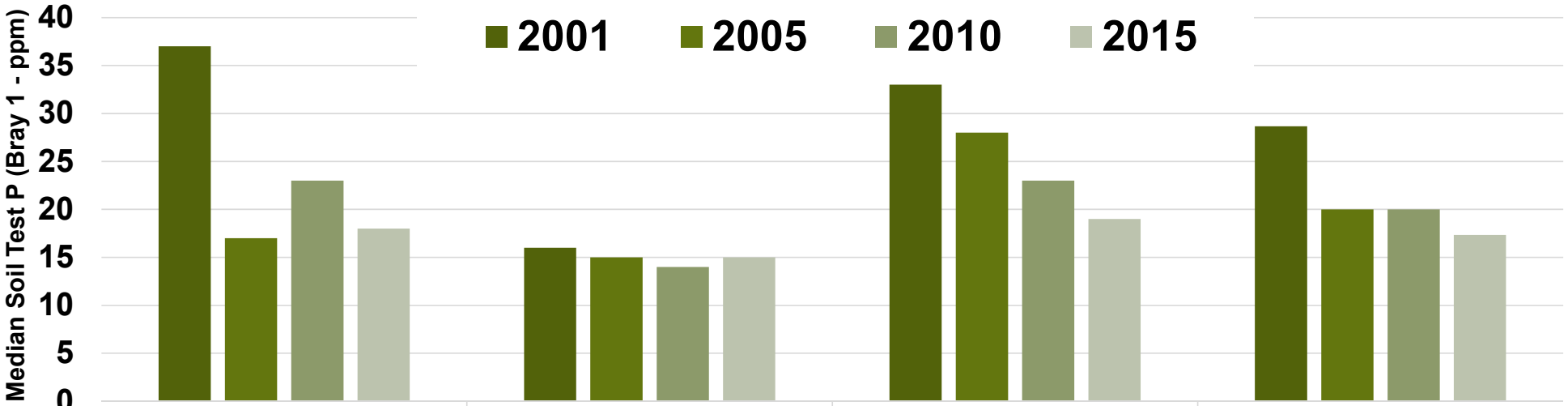


Potassium



Source: 2015 IPNI Soil Test Summary

SOIL TEST P DECLINE SINCE 2001

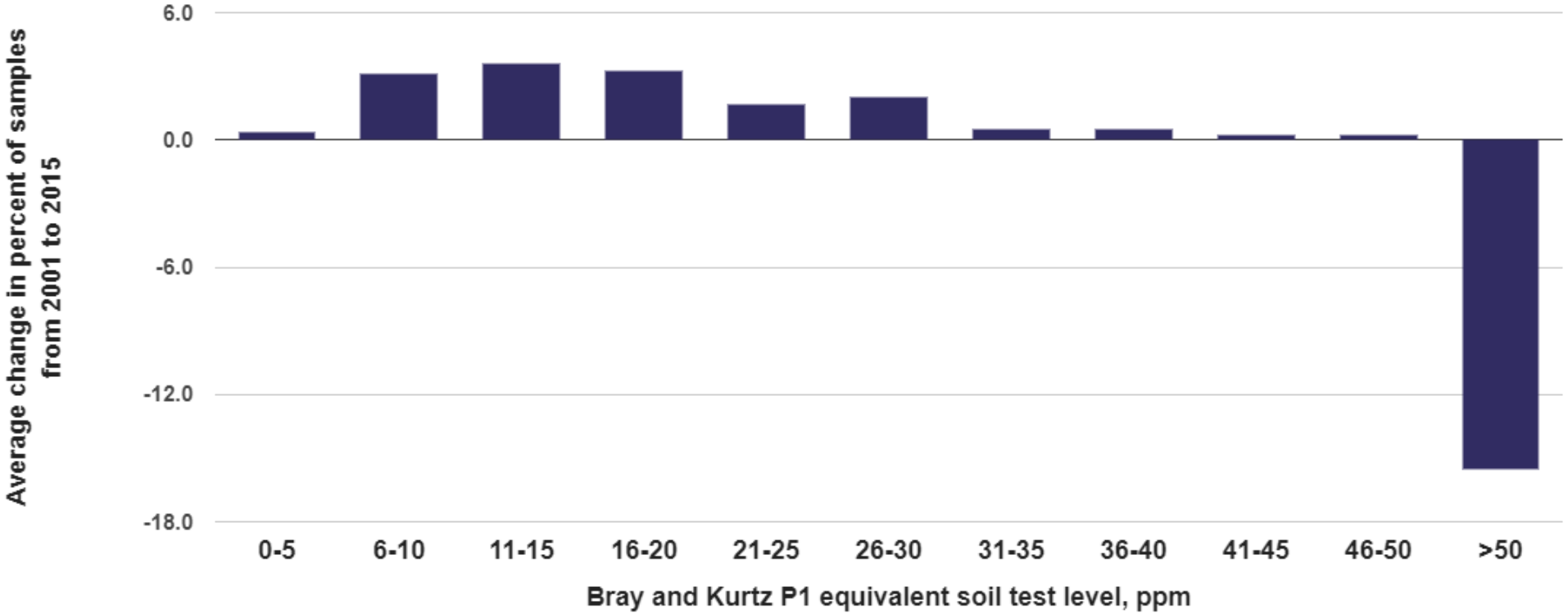


	Arkansas	Louisiana	Mississippi	Average
2001	37	16	33	29
2005	17	15	28	20
2010	23	14	23	20
2015	18	15	19	17

Significant reduction in soil test P

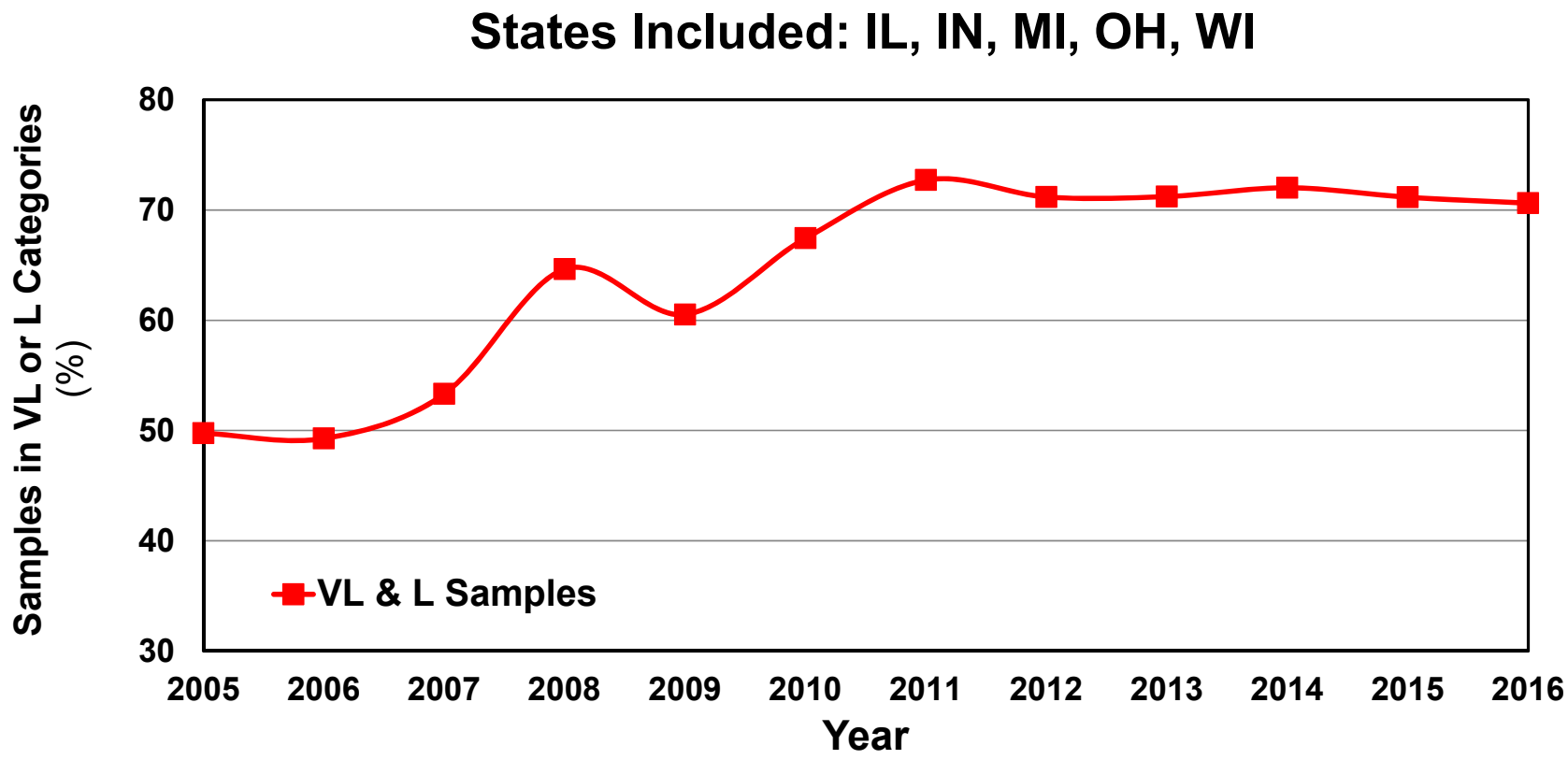
Source: 2015 IPNI Soil Test Summary

CHANGE IN SOIL TEST P FROM 2001 TO 2015:



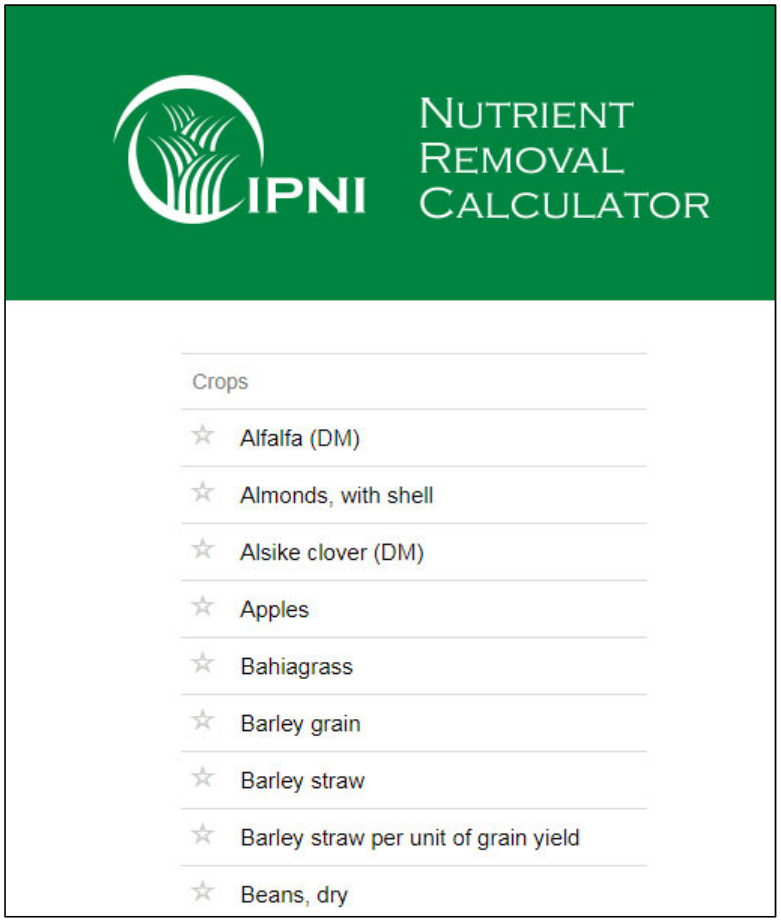
Source: IPNI, 2015. Data above represents North America.

B DEFICIENT SOIL SAMPLES: MIDWEST



- Data from A & L Soil Test Summaries: http://algreatlakes.com/pages/soil-test-summaries.
- "Samples in VL or L Categories" includes results from Very Low (<0.4) and Low (0.4-0.5) categories.
- Critical Level defined as 0.5 ppm B.

HOW TO CALCULATE NUTRIENT REMOVAL?



Search:

“IPNI Nutrient Removal”

https://www.ipni.net

PLEASE FERTILIZE RESPONSIBLY

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FIVE FORGOTTEN FACTORS OF FERTILITY

Sulfur	Ensure adequate sulfur availability to all crops
Mobility	Design fertility practices that account for plant and soil nutrient mobility
Accumulation	Meet the changing patterns of nutrient accumulation in new varieties
Reduction	Use the “4 R’s” to avoid further reduction of soil test nutrient levels
Team	**Team/system’s approach is needed to maximize the value of fertility**

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LONG-TERM RESPONSES IN CORN AND SOYBEAN OMISSION PLOTS

Standard Practice vs High Technology System 2013-15	
Fertility	None, or fall P or K based on soil test Balanced Crop Nutrition 30 N,100 P_2O_5, 25 S, 2.5 Zn banded and 75 K_2O and 0.6 B broadcast at planting
Nitrogen	160-180 lbs pre-plant as UAN or urea Extra N (60-80 lbs) sidedress with a urease inhibitor for 240 lbs of total N
Population	32,000 plants/acre vs 44,000 plants/acre
Fungicide	No Fungicide Headline-Amp or Quilt-Xcel @ R1
Row Space	30 inch row spacing 20 inch row spacing

Crop Physiology

Courtesy of Dr. Fred Below and CPL Team (U of I).

- **What we know today:** Maximum yield and profit for corn and soybean is a system's approach. There are additive and synergistic effects on yield when balanced crop nutrition is present.
- **Study Question:** From a long-term perspective, what have the Omission Plot studies shown?

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LONG-TERM RESPONSE OF VARIOUS MANAGEMENT FACTORS ON CORN YIELD

Factor	Standard	
	Yield (Δ)	Win Rate
	bu Ac^{-1}	Ratio
None or All	187	.
MicroEssentials SZ (100 lbs P_2O_5)	(+8)	3/8
MicroEssentials SZ + Aspire	(+11)	2/3
Sidedress Nitrogen	(+7)	4/8
Population: 44 or 32k	(-7)	3/8
Foliar Protection @ VT/R1	(+6)	3/8
Row Spacing: 20" or 30"	(+8)	2/4

29 Trials over 8 yrs: 2 trials in 2009 & 2010, 11 trials in 2011, 2 trials in 2012, 3 trials in 2013, 2014, 2015 & 2016

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LONG-TERM RESPONSE OF VARIOUS MANAGEMENT FACTORS ON SOYBEAN YIELD

Factor	Standard	
	Yield (Δ)	Win Rate
	bu Ac^{-1}	Ratio
None or All	63.4	.
MicroEssentials SZ (75 lbs P_2O_5)	(+3.4)	4/4
Foliar Protection @ R3	(+2.0)	3/5
Seed Treatment	(+0.7)	0/5
Row Spacing: 20" or 30"	(+3.4)	4/5

28 Trials over 5 yrs: 6 trials in 2012, 8 trials in 2013, 3 trials 2014, 7 trials in 2015 & 4 trials in 2016.

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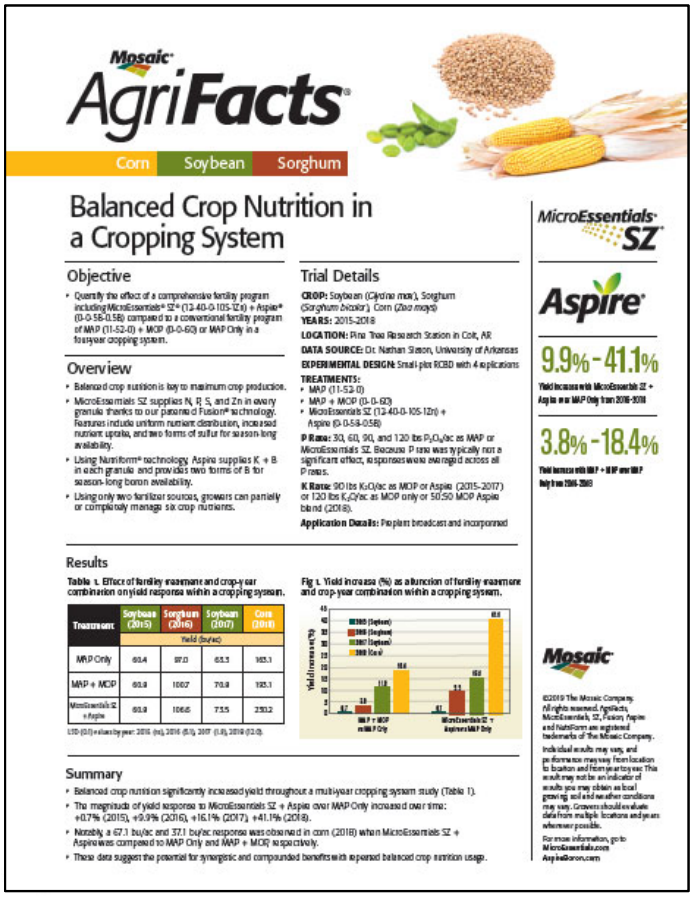
DR. SLATON (U OF ARKANSAS): RESEARCH ON BALANCED CROP NUTRITION



Mosaic AgriFacts

Corn | Soybean | Sorghum

Balanced Crop Nutrition in a Cropping System

Objective

- Quantify the effect of a comprehensive fertility program including MicroEssentials® SZ® (12-40-0-10S-1Zn) + Aspire® (0-0-58-0.5B) compared to a conventional fertility program of MAP (11-52-0) + MOP (0-0-60) or MAP Only in a four-year cropping system.

Overview

- Balanced crop nutrition is key to maximum crop production.
- MicroEssentials SZ supplies N, P, S, and Zn in every granule thanks to our patented Fusion® technology. Features include uniform nutrient distribution, increased nutrient uptake, and two forms of sulfur for season-long availability.
- Using Nutriform® technology, Aspire supplies K + B in each granule and provides two forms of B for season-long boron availability.
- Using only two fertilizer sources, growers can partially or completely manage six crop nutrients.

Trial Details

CROP: Soybean (*Glycine max*), Sorghum (*Sorghum bicolor*), Corn (*Zea mays*)

YEARS: 2015-2018

LOCATION: Pine Tree Research Station in Colt, AR

DATA SOURCE: Dr. Nathan Slaton, University of Arkansas

EXPERIMENTAL DESIGN: Small-plot RCBD with 4 replications

TREATMENTS:

- MAP (11-52-0)
- MAP + MOP (0-0-60)
- MicroEssentials SZ (12-40-0-10S-1Zn) + Aspire (0-0-58-0.5B)

P Rate: 30, 60, 90, and 120 lbs P_2O_5/ac as MAP or MicroEssentials SZ. Because P rate was typically not a significant effect, responses were averaged across all P rates.

K Rate: 90 lbs K_2O/ac as MOP or Aspire (2015–2017) or 120 lbs K_2O/ac as MOP only or 50:50 MOP:Aspire blend (2018).

Application Details: Pre-plant broadcast and incorporated

MicroEssentials SZ

Aspire

9.9% - 41.1%

Yield increase with MicroEssentials SZ + Aspire over MAP Only from 2016-2018

3.8% - 18.4%

Yield increase with MAP + MOP over MAP Only from 2016-2018

Results

Table 1. Effect of fertility treatment and crop-year combination on yield response within a cropping system.

Treatment	Soybean (2015)	Sorghum (2016)	Soybean (2017)	Corn (2018)
	Yield (bu/ac)			
MAP Only	60.4	97.0	63.3	163.1
MAP + MOP	60.8	100.7	70.8	193.1
MicroEssentials SZ + Aspire	60.8	106.6	73.5	230.2

LSD (0.1) values by year: 2015: ns), 2016 (5.1), 2017 (1.8), 2018 (12.3).

Fig 1. Yield increase (%) as a function of fertility treatment and crop-year combination within a cropping system.

Summary

- Balanced crop nutrition significantly increased yield throughout a multi-year cropping system study (Table 1).
- The magnitude of yield response to MicroEssentials SZ + Aspire over MAP Only increased over time: +0.7% (2015), +9.9% (2016), +16.1% (2017), +41.1% (2018).
- Notably, a 67.1 bu/ac and 37.1 bu/ac response was observed in corn (2018) when MicroEssentials SZ + Aspire was compared to MAP Only and MAP + MOP, respectively.
- These data suggest the potential for synergistic and compounded benefits with repeated balanced crop nutrition usage.

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Individual results may vary, and performance may vary from location to location and from year to year. This result may not be an indicator of results you may obtain as local growing, soil and weather conditions may vary. Growers should evaluate data from multiple locations and years wherever possible.

For more information, go to MicroEssentials.com AspireBoron.com

Treatment	Soybean (2015)	Sorghum (2016)	Soybean (2017)	Corn (2018)
	Yield (bu/ac)			
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MAP + MOP	60.8	100.7	70.8	193.1
MicroEssentials SZ + Aspire	60.8	106.6	73.5	230.2

- **Improved yield across a comprehensive cropping system**
- **Synergies realized with repeated balanced crop nutrition usage**

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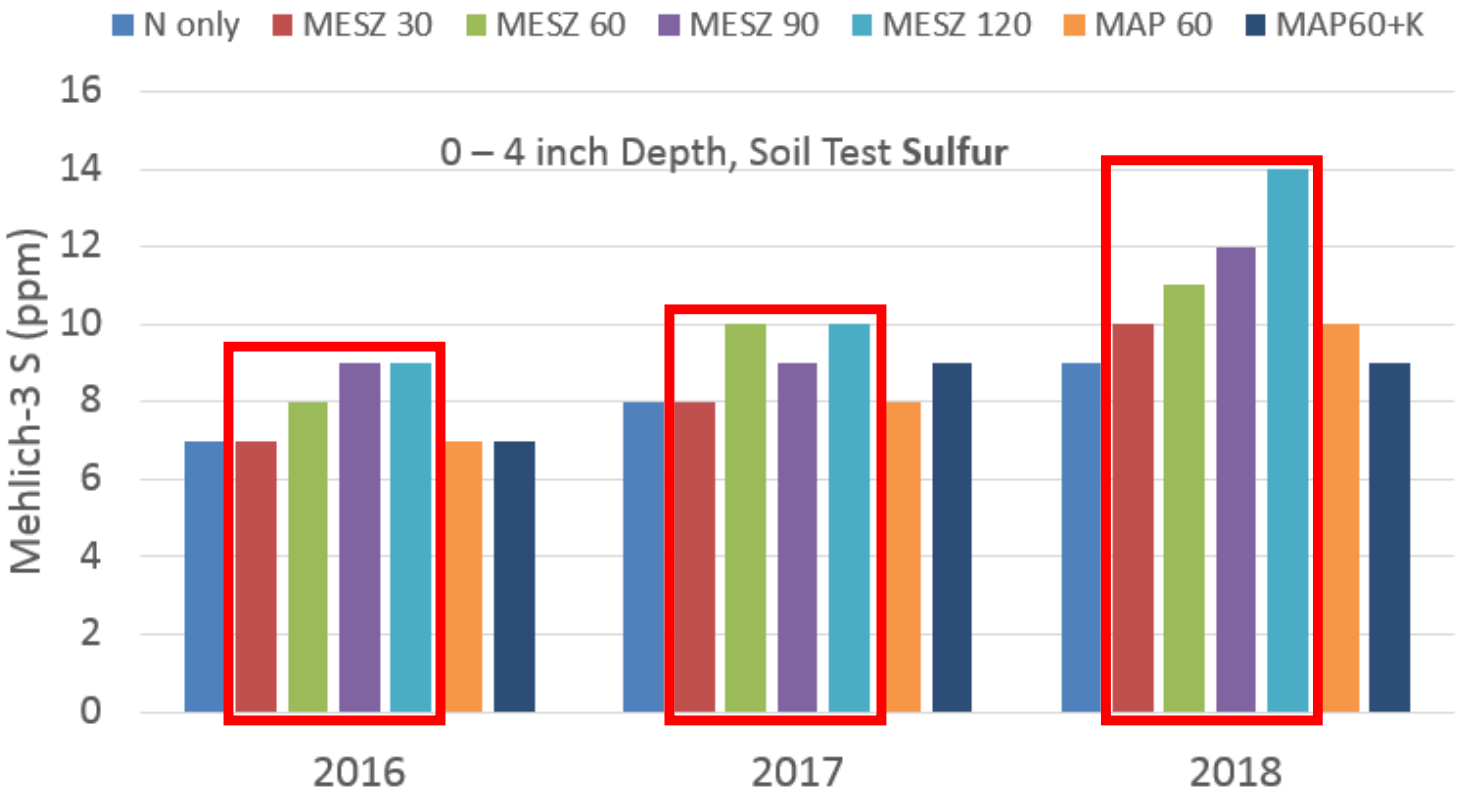
DR. SLATON (U OF ARKANSAS): SOIL TEST S



Calloway silt loam, Pine Tree Station
Experiment started in 2013, K treatments started in 2015

Courtesy of Dr. Nathan Slaton

Aspire

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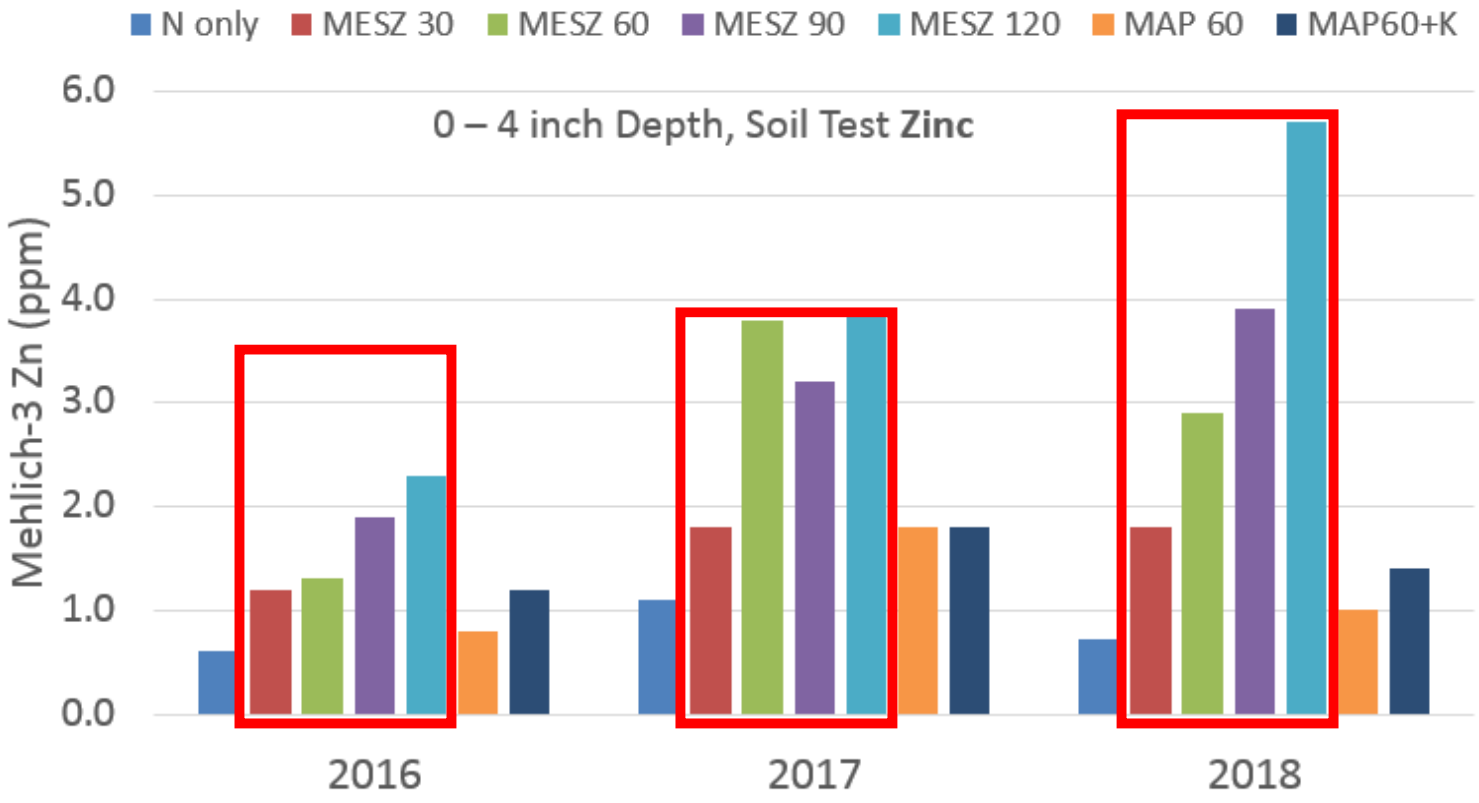
DR. SLATON (U OF ARKANSAS): SOIL TEST ZN



Calloway silt loam, Pine Tree Station
Experiment started in 2013, K treatments started in 2015

Courtesy of Dr. Nathan Slaton

Aspire

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FIVE FORGOTTEN FACTORS OF FERTILITY

Sulfur	**Ensure adequate sulfur availability to all crops**
Mobility	**Design fertility practices based on nutrient mobility in plant**
Accumulation	**Meet the changing patterns of nutrient accumulation in new varieties**
Reduction	**Use the “4 R’s” to avoid further reduction of soil test nutrient levels**
Team	**Team/system’s approach is needed to maximize the value of fertility**

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CONCLUSIONS

- **Sulfur is important for all crops, even soybean. Any sulfur will help, but maximum value will be achieved from agronomic practices or sources which ensure season-long availability.**
- **Mobility of nutrients in the soil and plant are different concepts and therefore, influence response to fertilizer. It's critical that we understand the opportunities and limitations of different application methods.**
- **Biomass production and yield level are the driving factors behind nutrient accumulation. Higher yield levels are not only increasing the demand for nutrients, but necessitate a longer duration of availability.**

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CONCLUSIONS

- **Reductions in soil test values are inevitable with higher yields and inadequate replacement. Strive to understand and achieve soil test levels near the 'Critical Value' in your operation.**

- **The key to maximum yield and profit is knowing a systems approach is needed. Any practices which improve your yield potential, increase the need for better fertility management.**

- **If you haven't done so already, try out some...**
  Aspire, MicroEssentials, K-Mag!

Mosaic®

SINCERE THANK YOU!

For more information, please visit…

Twitter: @RossRBender
K-Mag: www.KMag.com
Aspire: www.AspireBoron.com
MicroEssentials: www.MicroEssentials.com
University of Illinois: cropphysiology.cropsci.illinois.edu

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MICRONUTRIENTS: BROADCAST VS FOLIAR?