
AgriGold®
THE SOY FACTORY
Managing The System For Maximum Output

Info

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AgriGold Agronomy Since 2011
N. Central Missouri Native

Our Soybean Journey

- AgriGold's soybean journey began in 2016
- Our participation in NCGA contest & high yield corn strategies soon spilled over into soybean management
- Working with Yield Masters has inspired our thinking and pushed us to do our own testing as an agronomy team

Learning from Soybean Yield Masters

Nebraska Dryland - 148.81 bu.

The Soybean Factory

Simplify our Strategy

Factory Concept

Soybean – Raw Materials

4Q's of a soybean season

"Putting the plant into a position to win"

The Soybean Factory

Macronutrients

- Carbon (C)
- Oxygen (O)
- Hydrogen (H)
- Nitrogen (N)
- Phosphorous (P)
- Potassium (K)

Secondary

- Calcium (Ca)
- Magnesium (Mg)
- Sulfur (S)

Micronutrients

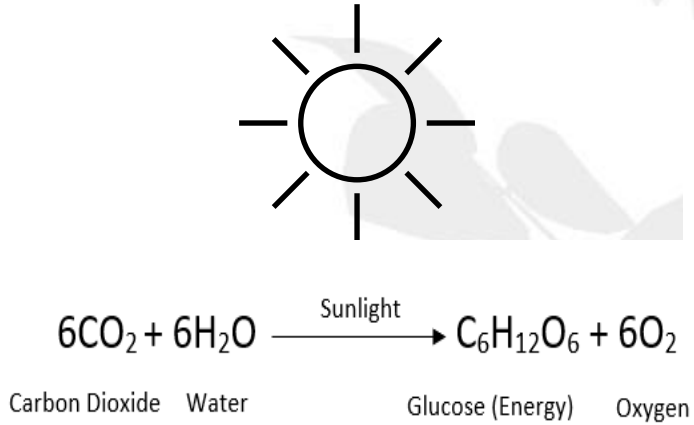
- Boron (B)
- Chlorine (Cl)
- Copper (Cu)
- Iron (Fe)
- Manganese (Mn)
- Molybdenum (Mo)
- Nickel (Ni)
- Zinc (Zn)

Seasonal Timeline	Stand Establishment	Vegetative Growth	Flowering	Pod Fill
	Q1	Q2	Q3	Q4

The Soybean Factory

Macronutrients

- Carbon (C) — Infrastructure & Energy
- Oxygen (O) — Energy
- Hydrogen (H) — Energy



THE SOYBEAN FACTORY

Not all plants are created equal when it comes to these nutrients.

Soybean & Carbon Fixation

- C3 pathway of photosynthesis - Soybean
  - Breathes in CO_2 through stomates and fixes 3 chain carbon molecule
  - Stomates must be open to fix carbon
  - Approximately 85% of the world's plants are C3

120,000 seeds to get 80 bushel

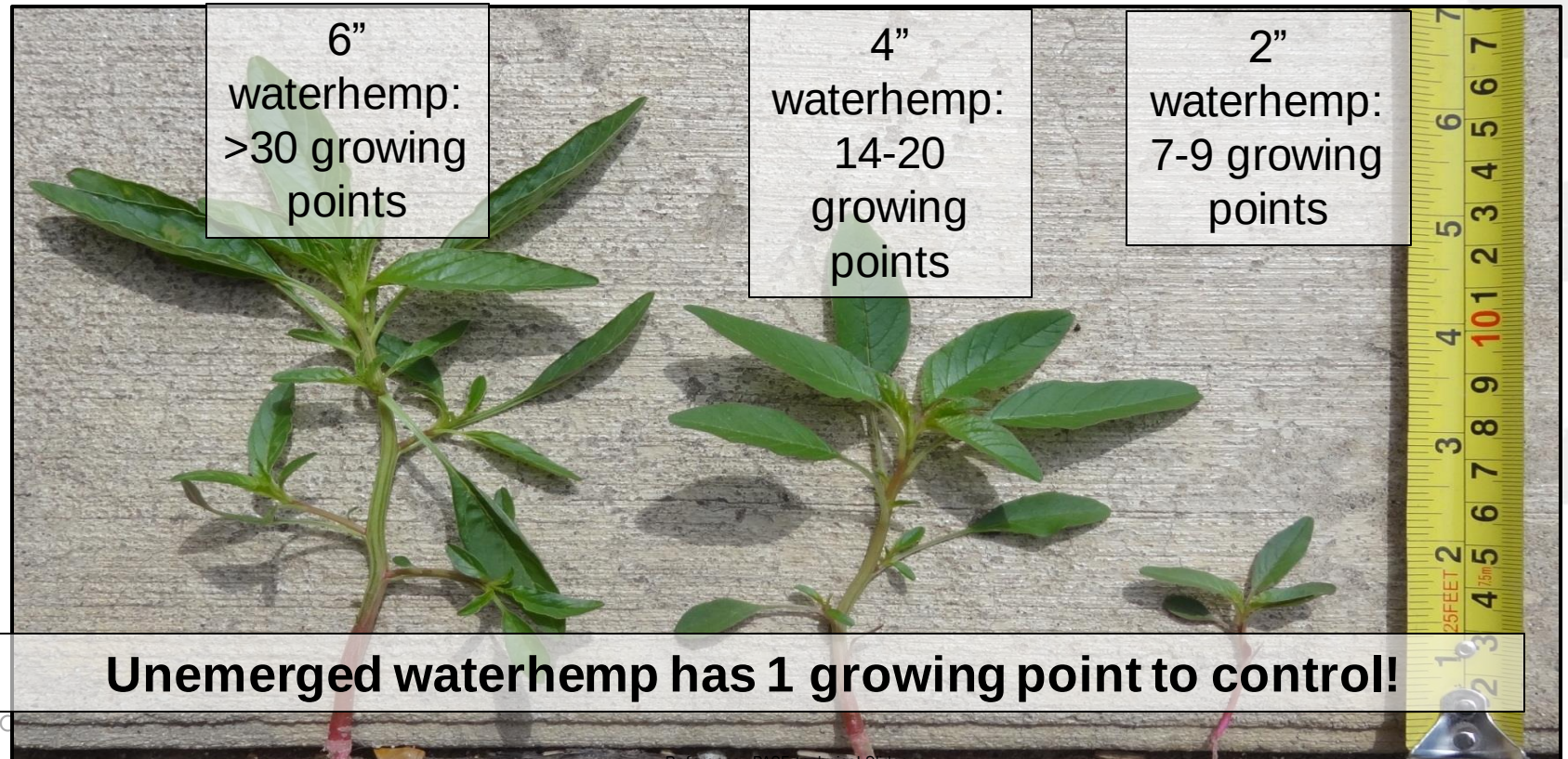
- C4 pathway of photosynthesis - Corn
  - Breaths in CO_2 through stomates and fixes 4 chain carbon molecule
  - Continue fixing carbon when stomates are closed
  - Tropical Background

30,000 seeds to get 250 bushel

- CAM pathway of photosynthesis - Cacti
  - Same as C3 but only operates only at night
  - Dry & Arid Background

Waterhemp is a C4 Plant!

The only way to truly be successful is with pre & post overlapping residuals before R1.



Unemerged waterhemp has 1 growing point to control!

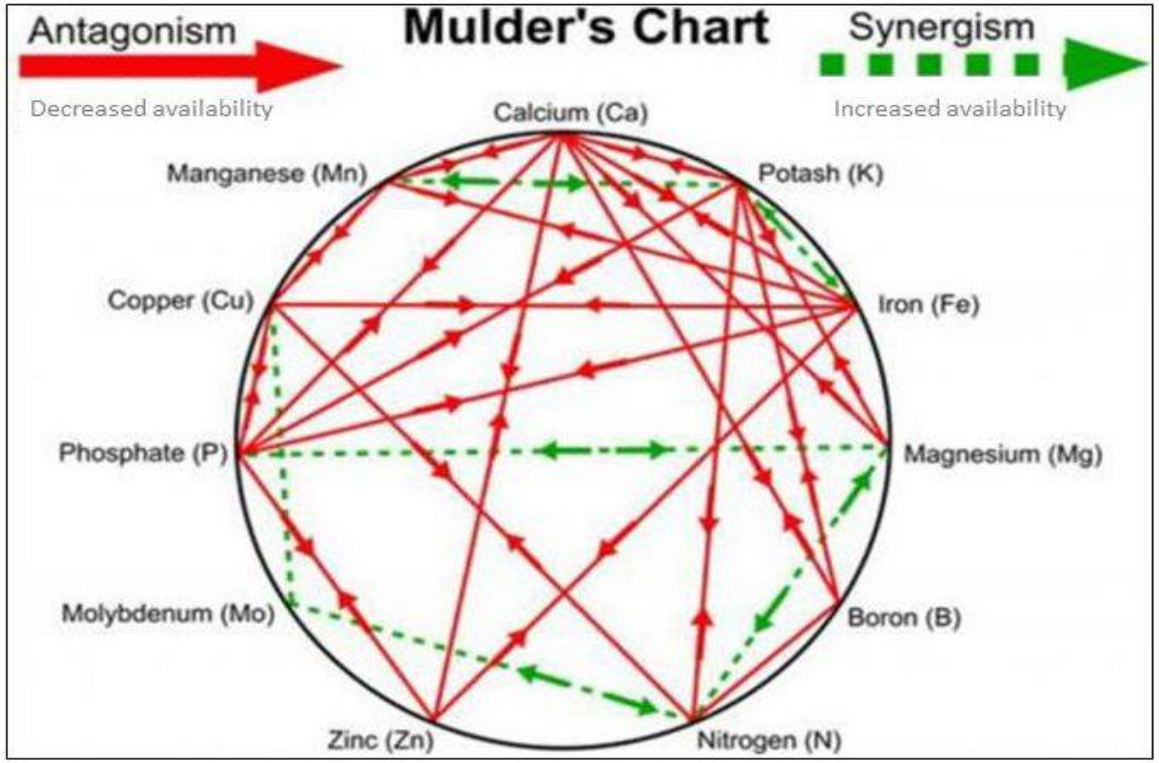
Waterhemp	C4 pathway
Corn	C4 pathway
Soybean	C3 pathway

Raw Materials vs Plant Processes

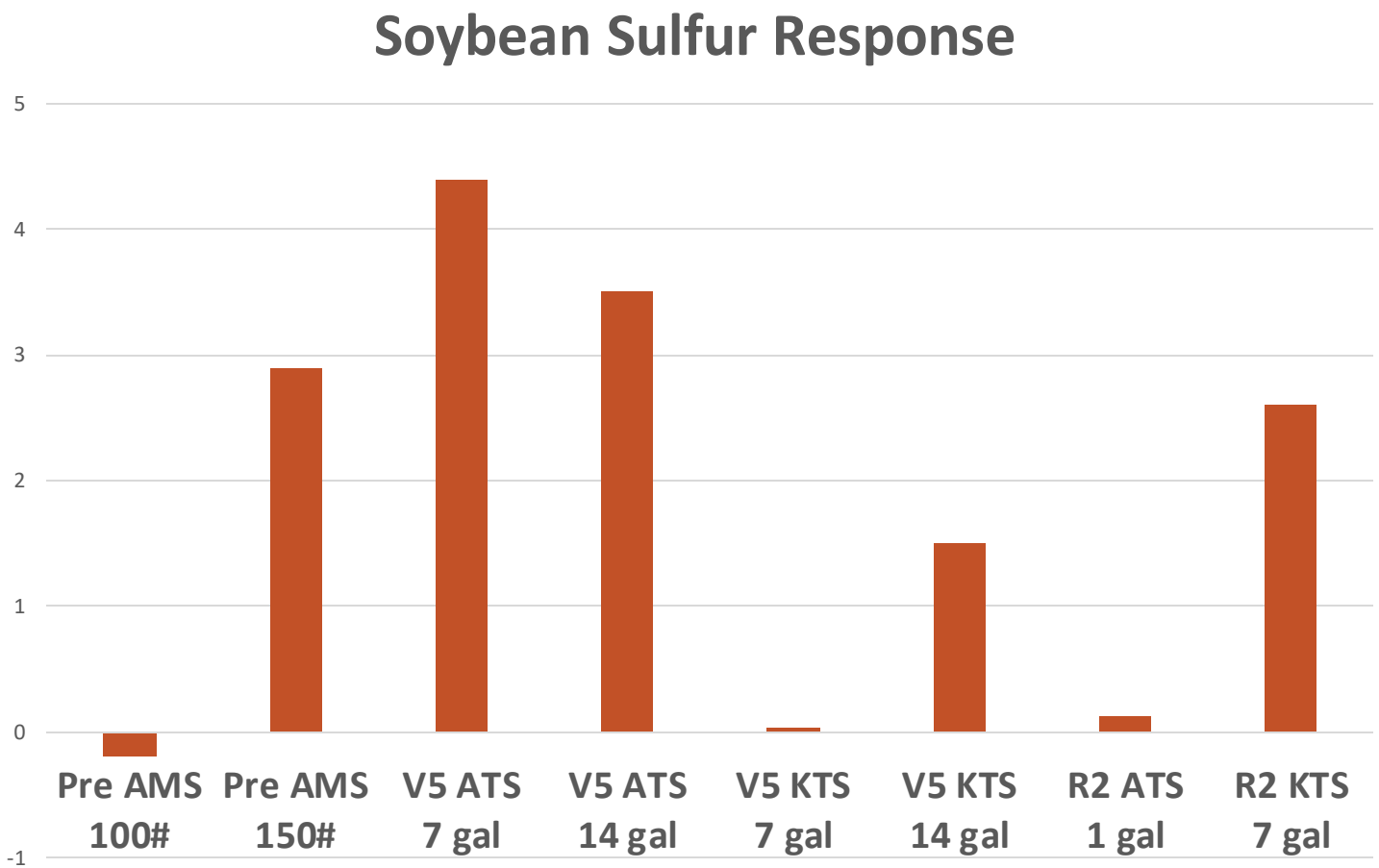
Nutrient	Grain	Stover	Total Removal (lbs)
Nitrogen(N)	325.00	110.00	435.00
Phosphate(P2O5)	73.00	24.00	97.00
Potassium(K2O)	120.00	100.00	220.00
Sulfur(S)	18.00	17.00	35.00
Magnesium(Mg)	15.00	35.00	50.00
Calcium(Ca)	4.05	39.00	43.05
Copper(Cu)	0.10	0.05	0.15
Manganese(Mn)	0.12	.88	1.0
Zinc(Zn)	0.10	0.52	0.62
Boron(B)	0.12	0.58	0.80
Iron(Fe)	1.00	2.0	1.21

100 bu. Per Acre Soybean

Source: AgPhD Fert. Removal App

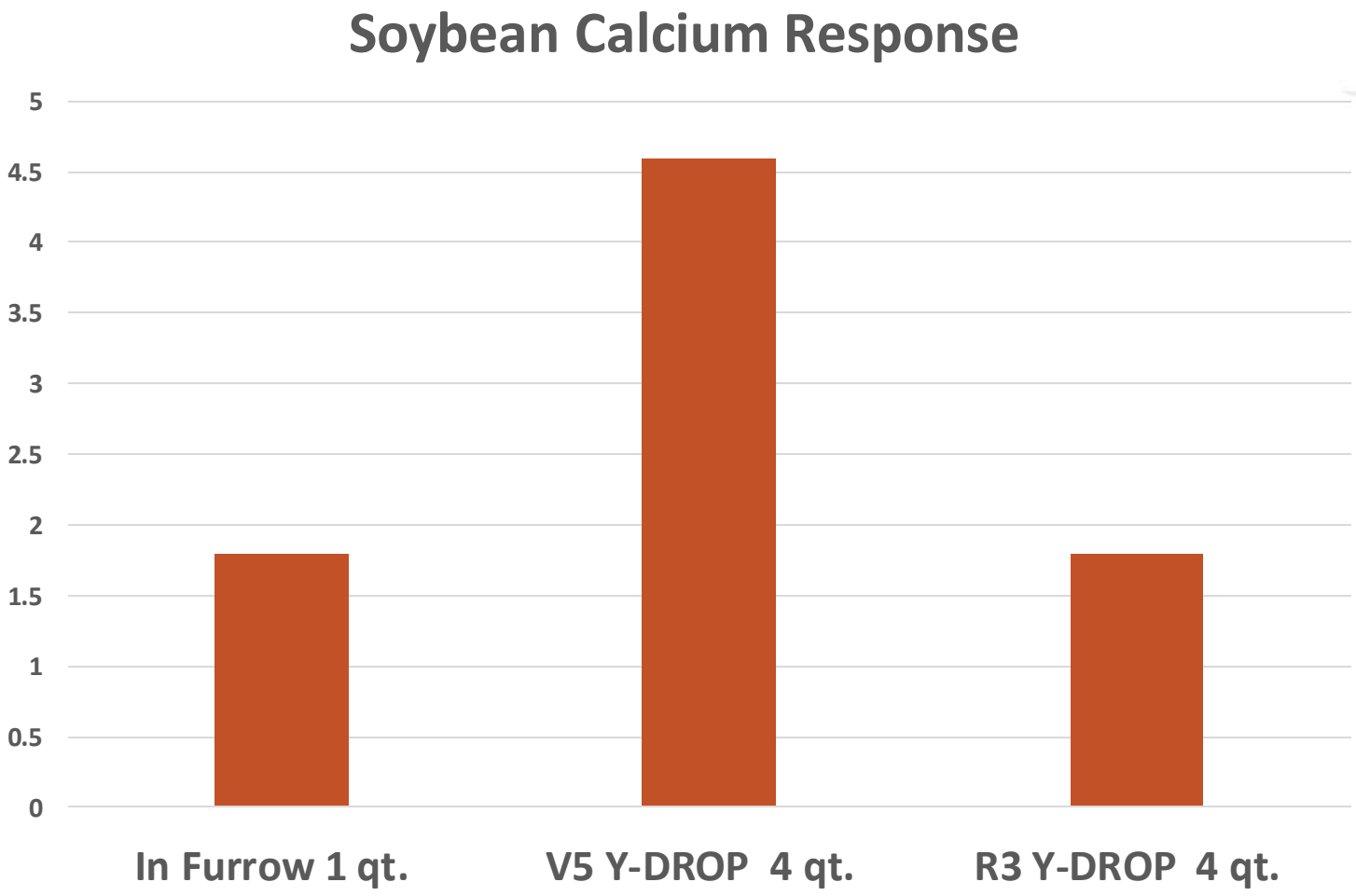


Soybean Secondary Nutrient Response



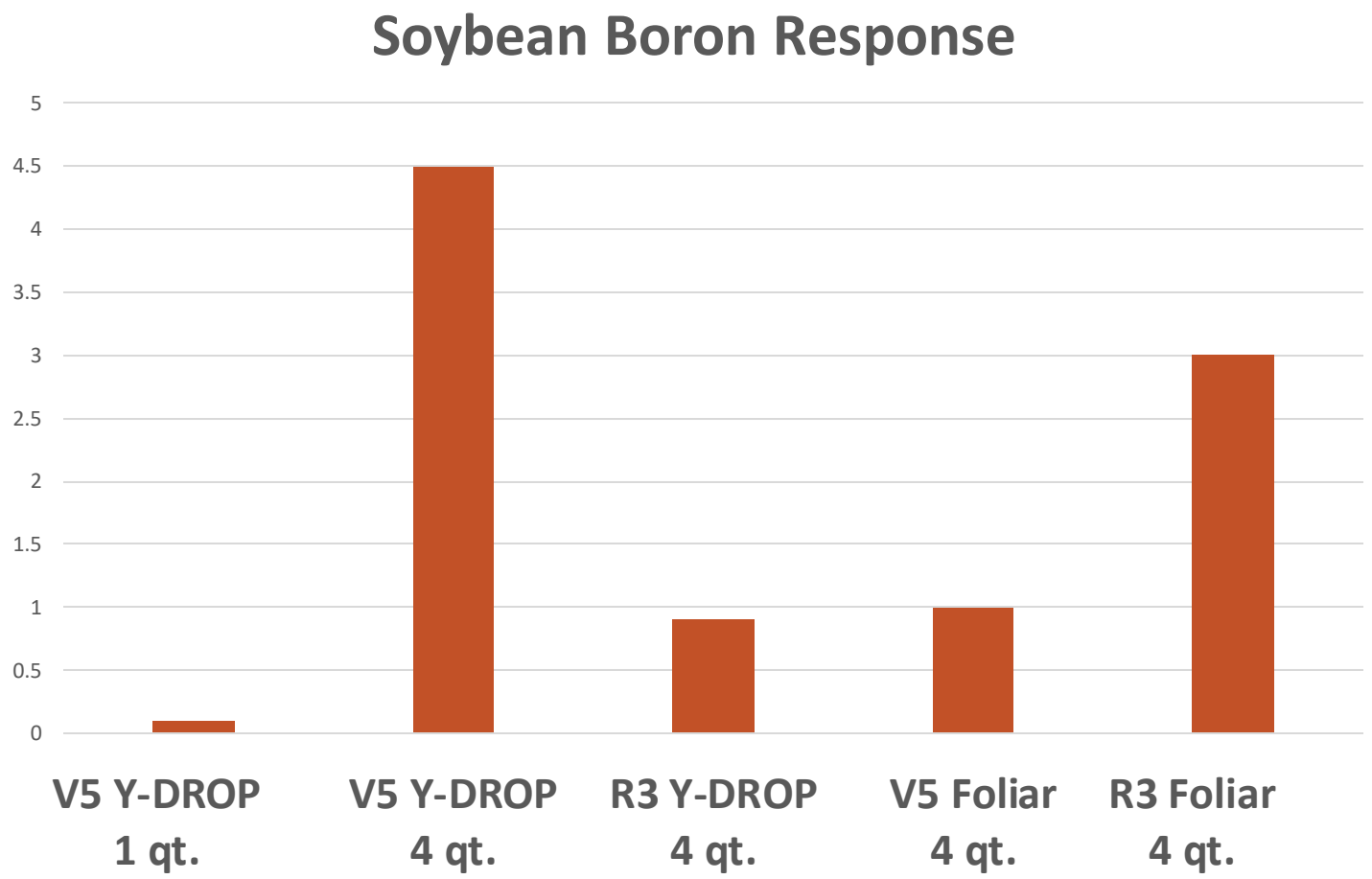
- 2018 AgiGold Agronomy Trials
- 6 locations, MO, IN, OH
- 2018-2020 Missouri ATS = +1.4 bu.
- 7 gal ATS = 9-0-0-20 per acre

Soybean Secondary Nutrient Response



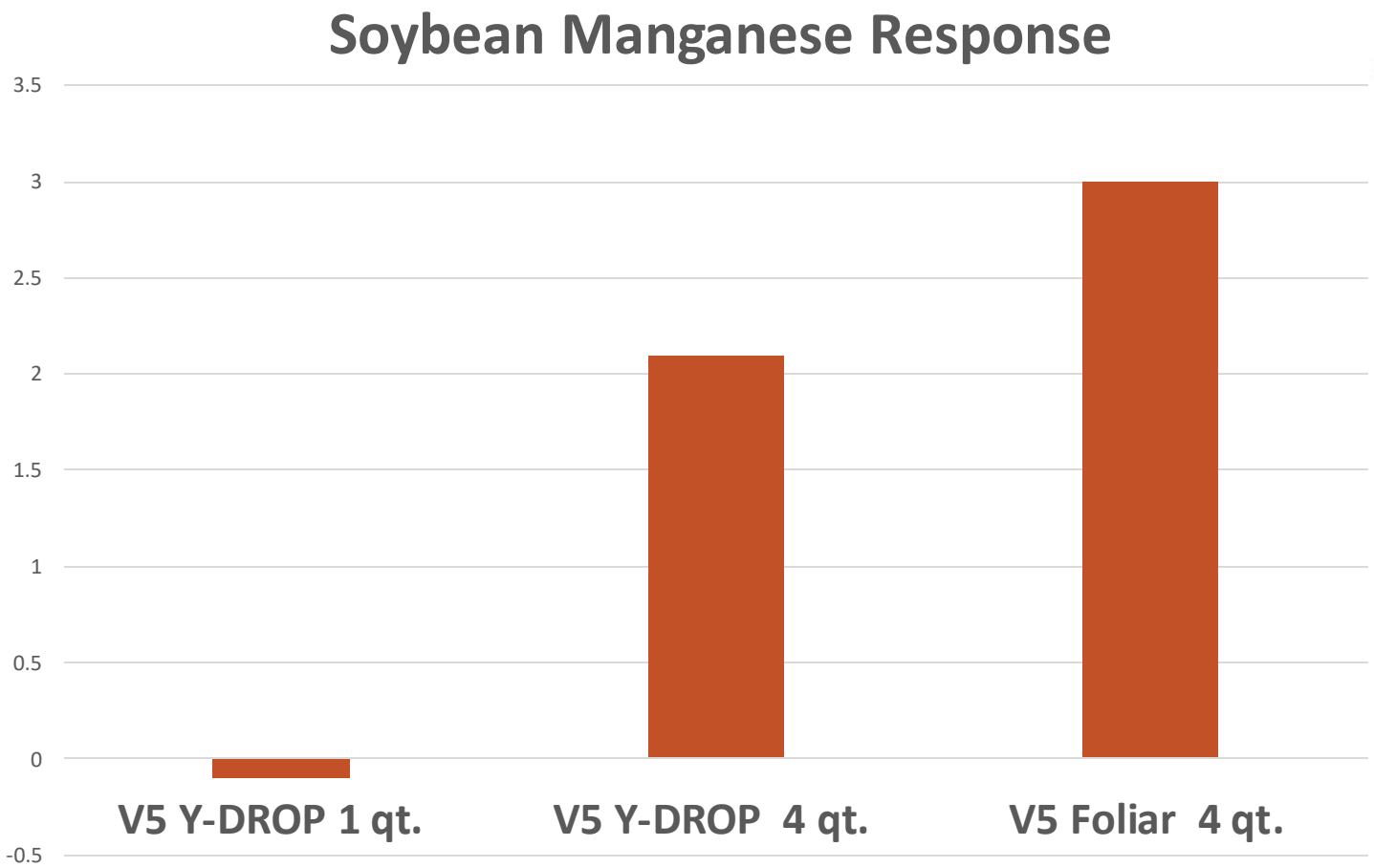
- 2018 AgiGold Agronomy Trials
- 6 locations, MO, IN, OH
- 3% calcium product

Soybean Micro-Nutrient Response



- 2018 AgiGold Agronomy Trials
- 6 locations, MO, IN, OH
- 2018-2019 MO Boron = +2.7 bu.

Soybean Micro-Nutrient Response



- 2018 AgiGold Agronomy Trials
- 6 locations, MO, IN, OH
- 6% Manganese product

Micro Mix – Corn Yield Environment (2YR)

32 oz/Acre **BRANDT Smart Quatro®**

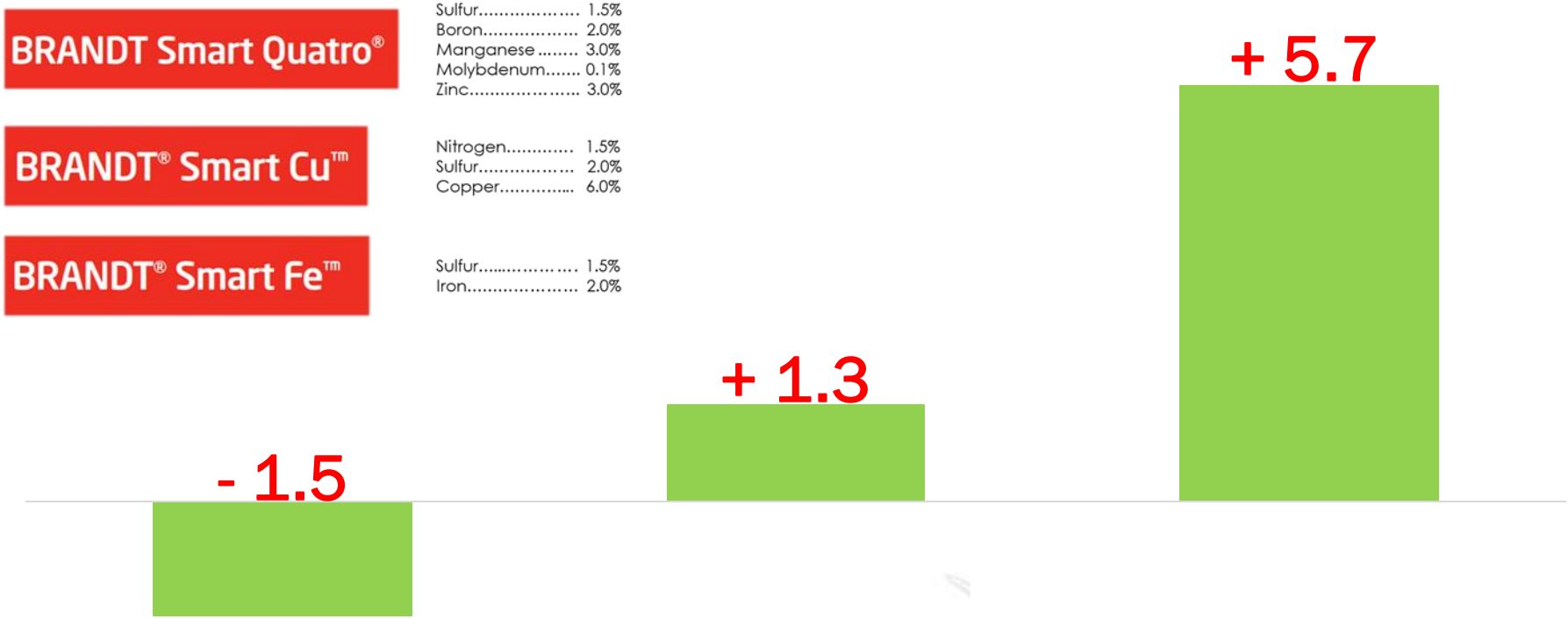
Sulfur..... 1.5%
Boron..... 2.0%
Manganese..... 3.0%
Molybdenum..... 0.1%
Zinc..... 3.0%

8 oz/Acre **BRANDT® Smart Cu™**

Nitrogen..... 1.5%
Sulfur..... 2.0%
Copper..... 6.0%

12 oz/Acre **BRANDT® Smart Fe™**

Sulfur..... 1.5%
Iron..... 2.0%



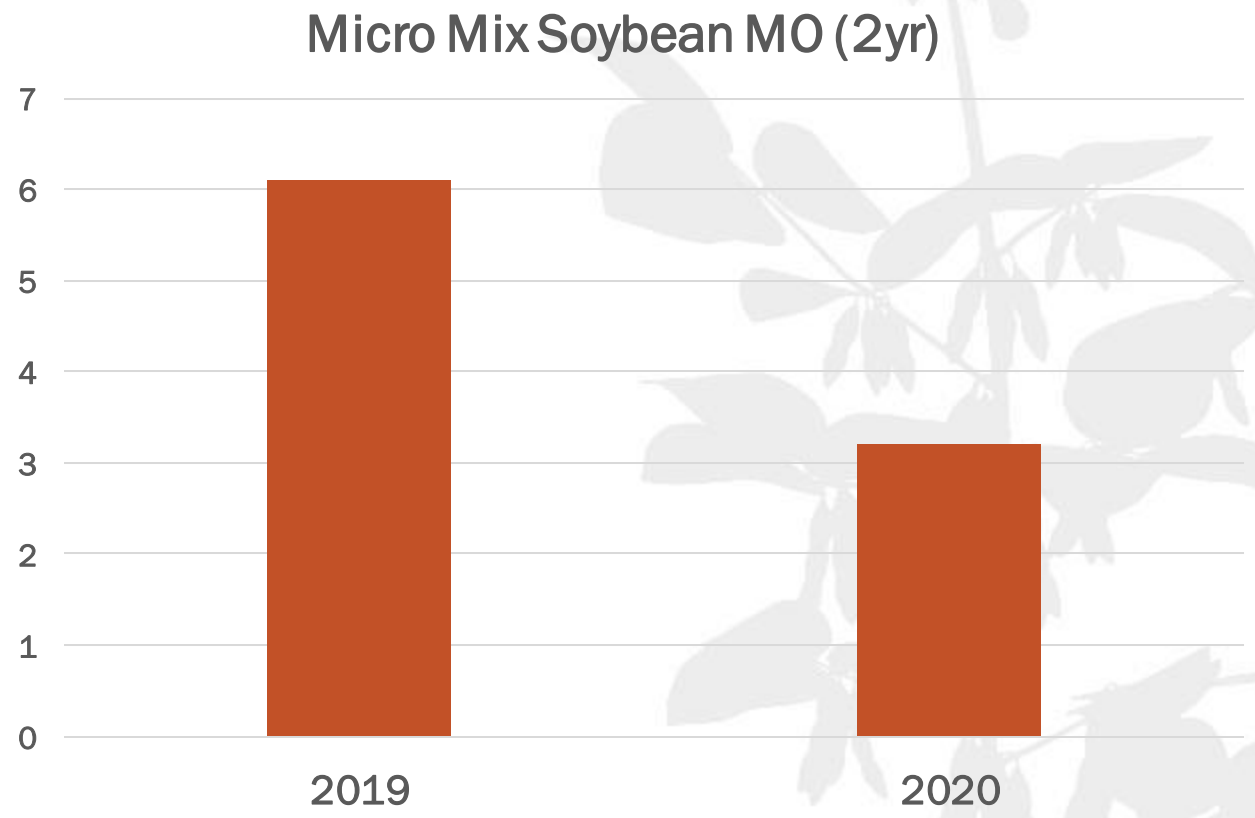
<200	200-225	>225
8 Locs	17 Locs	11 Locs

300 to 400 GDU Application Window

Soybean Micro-Nutrient Response

32 oz/Acre	BRANDT Smart Quatro®	Sulfur..... 1.5% Boron..... 2.0% Manganese ..... 3.0% Molybdenum..... 0.1% Zinc..... 3.0%
8 oz/Acre	BRANDT® Smart Cu™	Nitrogen..... 1.5% Sulfur..... 2.0% Copper..... 6.0%
12 oz/Acre	BRANDT® Smart Fe™	Sulfur..... 1.5% Iron..... 2.0%

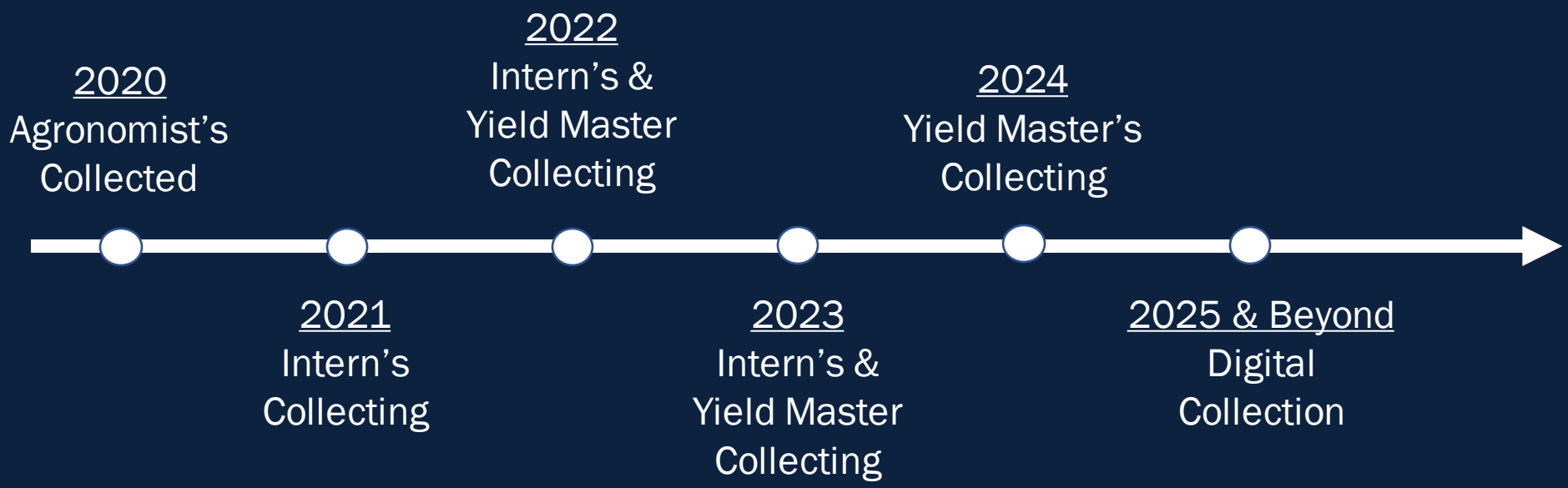
2 yr. avg. +4.7 bu. vs check
55-60 bu. average yields
Foliar applied @ R1



SOYBEAN TISSUE SAMPLING

Trial Run with AgriGold Agronomists in 2020

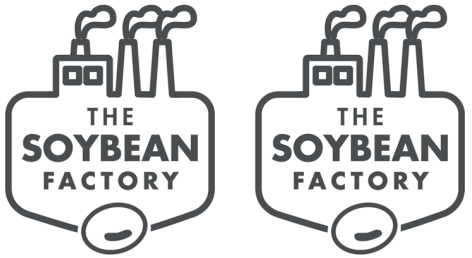
- Collected 71 samples
- Yields ranged from 45 – 105 bu/A



The Soybean Factory – Q1

- The most important part about stand establishment is when you start!
  - The size of the factory depends on timing

April 15th



May 15th

June 15th

Seasonal Timeline

Stand Establishment

Q1

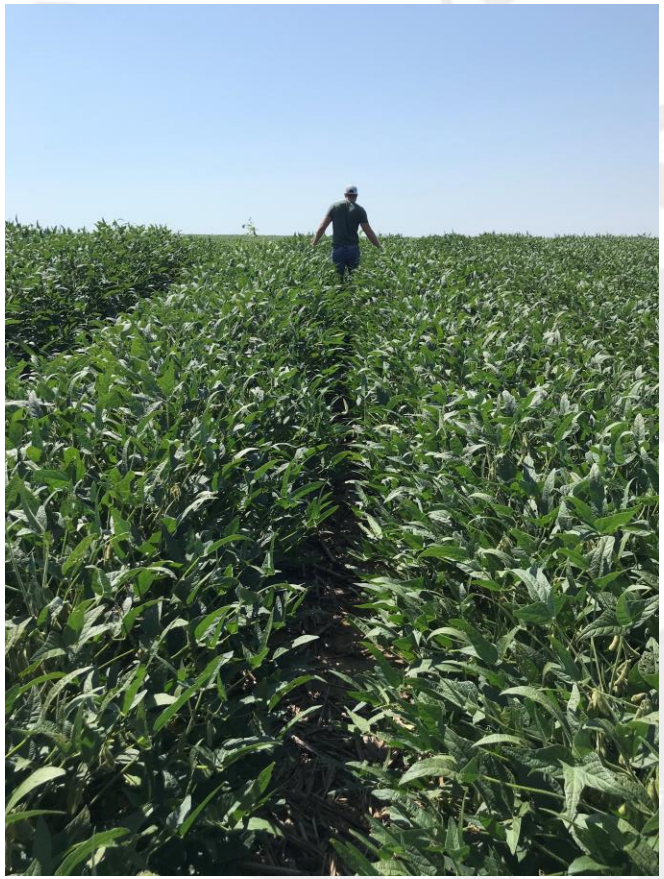
The Soybean Factory – Q1

- How big can the factory get?

Fall City, NEB
August 21, 2020

G3520RX
30 in rows
20K population

G3520RX
60 in rows Twin Row
50K population



The Soybean Factory – Q1

- Soybean cold tolerance is better than I thought
  - Chilling injury is usually the main concern early

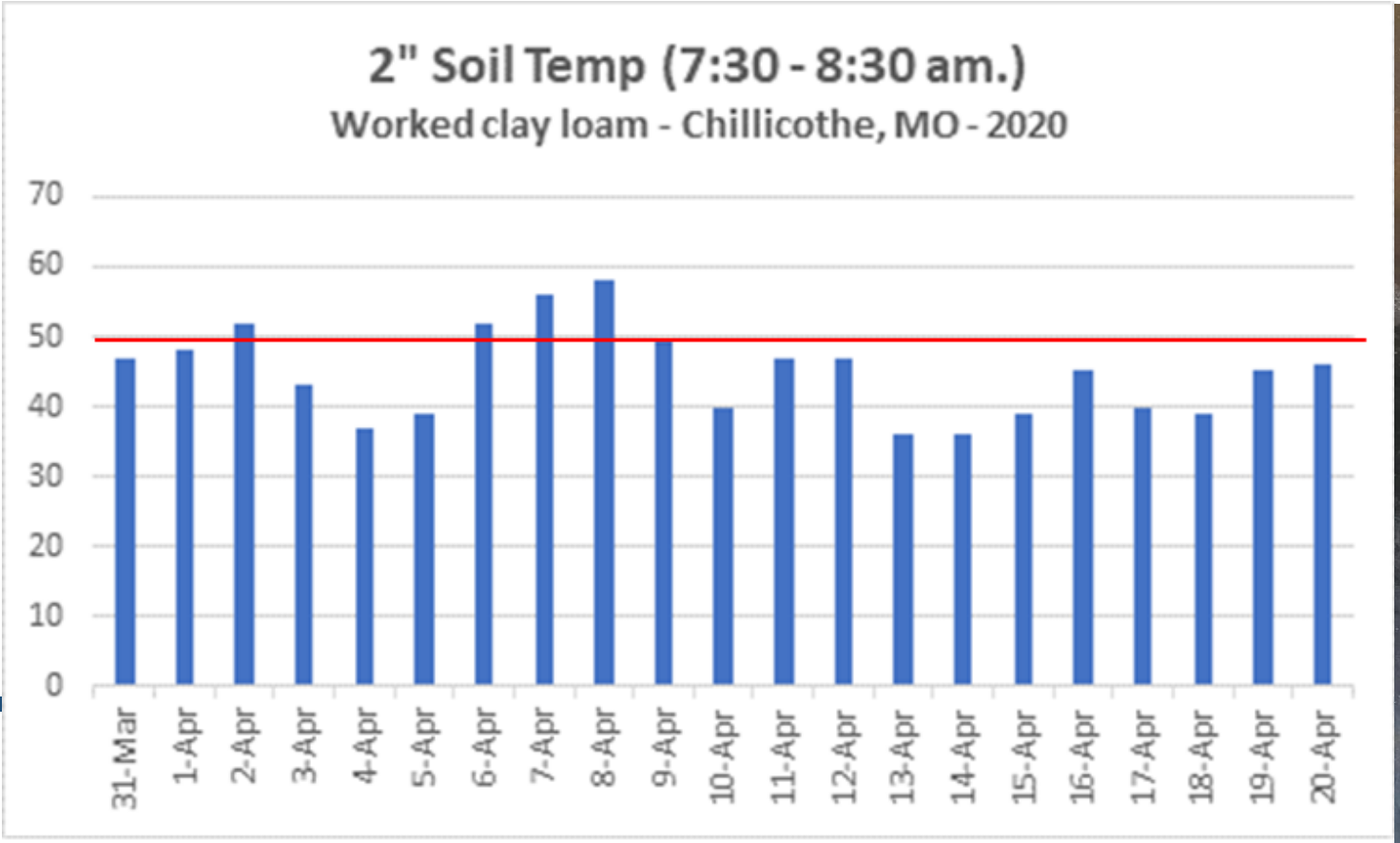
	Soybean	Corn
Imbibitional Phase	6 to 24 hours	48 hours
Min. soil temperature	50° F	50° F
The warmer the soil temperature the faster the water intake		

Variety	Planting Date	Yield
G3722RX	April 8, 2020	47.2
G3722RX	April 21, 2020	47.1

Planting Date Study - Chillicothe, MO

The Soybean Factory – Q1

- Soybean cold tolerance is better than I thought
  - Planting date & seed treatment studies



The Soybean Factory – Q1

- Soybean early planting & seed treatments
  - Planting date & seed treatment studies

Variety	Treatment	Yield
G3620RX	AgriShield Plus	45.2
G3620RX	AgriShield Max	48.7
G3620RX	AgriShield Max w/Saltro	52.2

Chillicothe, MO Planted 4-8-20

+7.0 bu. w/Saltro

AgriShield® PLUS AgriShield® MAX

Seasonal Timeline

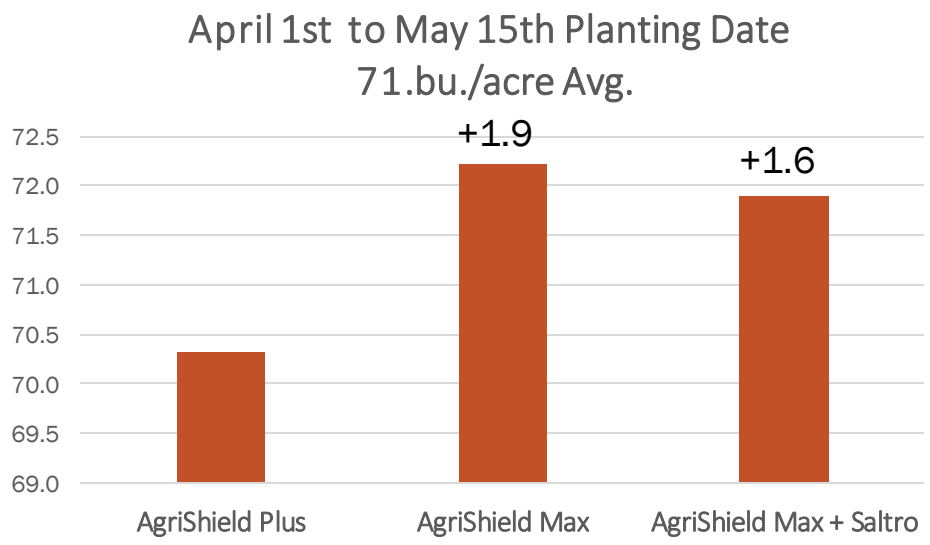
Stand Establishment

Q1

, 2020

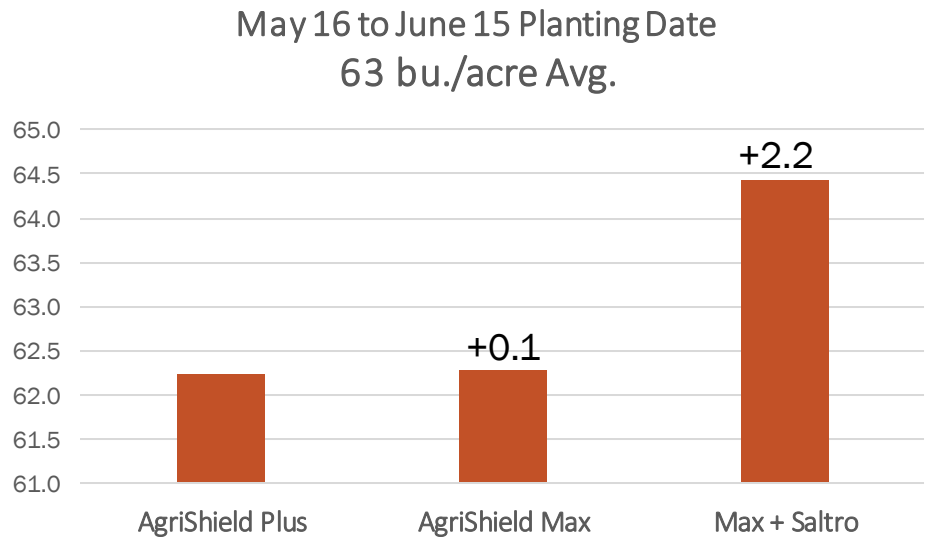
The Soybean Factory – Q1

2020 Seed Treatment Breakdown by Planting Dates



National Data 2020 – 33 locations

+ 8 bu.



National Data 2020 – 23 locations

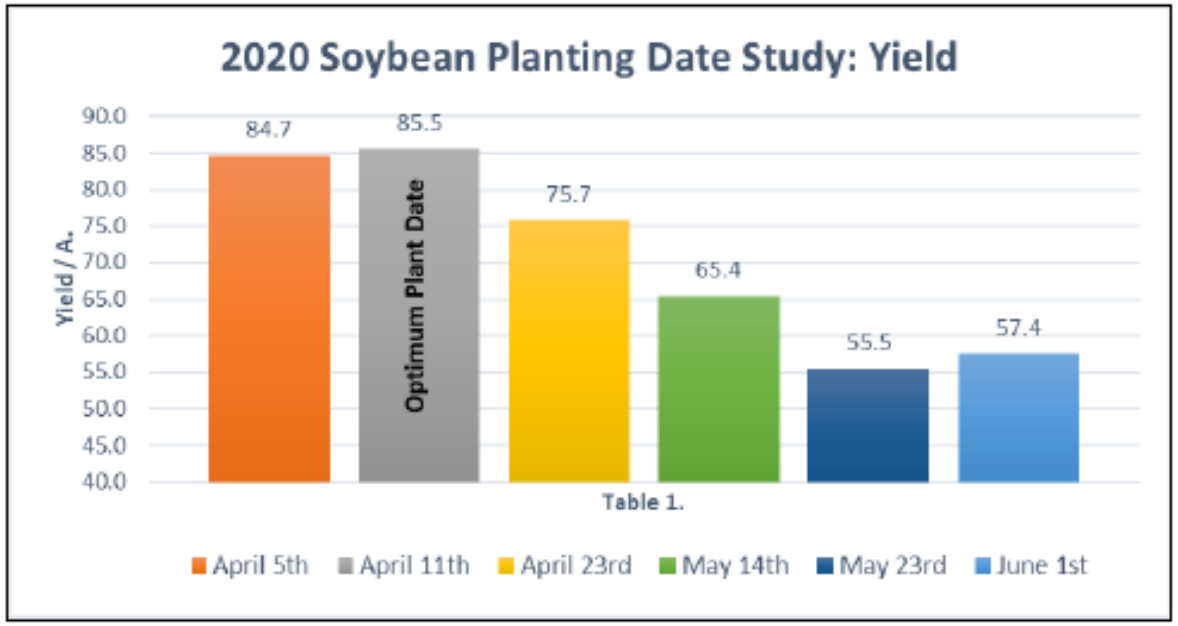
AgriShield® PLUS

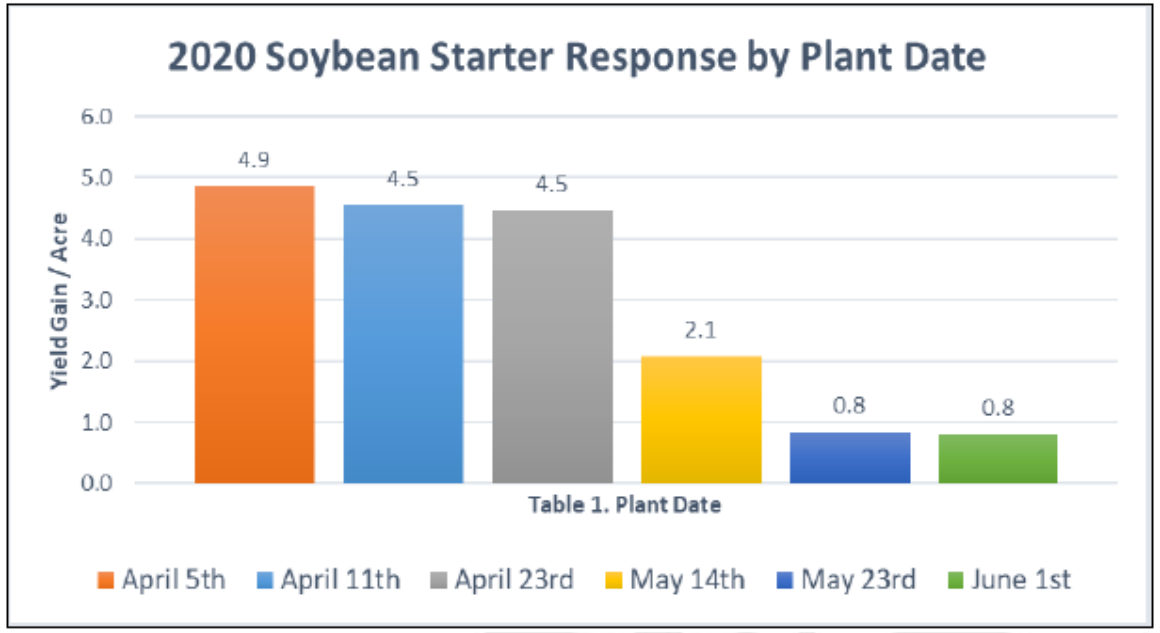
AgriShield® MAX

AgriShield® MAX with Saltro

The Soybean Factory – Q1

Early start & response to fertility





- 2020 Precision Planting PTI Yield Summary
- 130,000 population
- 20” row spacing

The Soybean Factory – Q2

- The most forgiving quarter of growth
  - Focus on herbicide program completion
  - Avoid damage below cotyledons
  - Relatively low nutrient needs

Nutrient Uptake per Day for Various Growth Periods of soybean ---Yield 101 bu/A

Sampling Stage	Days in Period	Nutrient Uptake per Day (lb/A)			Total Uptake (lb/A)		
		N	P2O5	K2O	N	P2O5	K2O
3rd Trifoliate	40	0.75	0.25	0.68	30	10	27
6th Trifoliate	11	1.45	0.55	2.72	16	6	30
Full Bloom	16	7.81	1.75	5.75	125	28	92

Reference: Flannery, Roy. Rutgers University. 1986 Better Crops with Plant Food, 6-7 Tisdale, et al. 1993. Soil Fertility and Fertilizers, Chapter 7.

Auxiliary buds emerge after May 9th frost

Seasonal Timeline

Stand Establishment

Vegetative Growth

Q1

Q2

The Soybean Factory – Q3

- (R1) flowering marks the beginning of Q3
  - Nutrient demands skyrocket
  - Plant starts reproductive processes
  - Plant still needs to achieve two thirds of its plant height
- Maximizing photosynthesis, water, & sunlight directly correlate with yield gains

Seasonal Timeline

Stand Establishment

Vegetative Growth

Flowering

Q1

Q2

Q3

The Soybean Factory – Q3 & Q4

- Nutrient demands skyrocket

Nutrient Uptake for 101 bu. Yield

Sampling Stage	Days in Period	Nutrient Uptake per Day (lb/A)			Total Uptake (lb/A)		
		N	P2O5	K2O	N	P2O5	K2O
3rd Trifoliate	40	0.75	0.25	0.68	30	10	27
6th Trifoliate	11	1.45	0.55	2.72	16	6	30
Full Bloom	16	7.81	1.75	5.75	125	28	92
Early pod	15	9.13	2.27	9.6	137	34	144
Soft Seed	21	11.43	2.76	2.43	240	58	51
Near mature	16	-3.38	-1.25	-2.25	-5.4	-20	-36
Total (lb/A)	119				494	116	308
				lb/bu	4.89	1.15	3.05

Reference: Flannery, Roy. Rutgers University. 1986 Better Crops with Plant Food, 6-7 Tisdale, et al. 1993. Soil Fertility and Fertilizers, Chapter 7.

Seasonal Timeline

Stand Establishment

Vegetative Growth

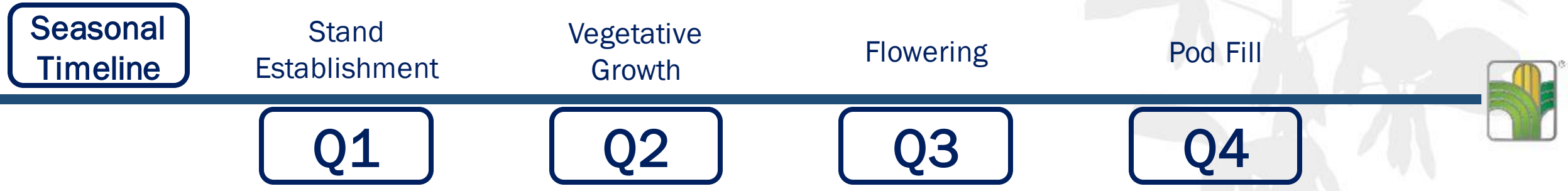
Flowering

Pod Fill

Q1 Q2 Q3 Q4

The Soybean Factory – Q4

- (R3) Pod formation marks the beginning of Q4
  - Source to Sink relationship begins to change
    - All available nutrients begin to move to the seed
  - Foliar feed opportunities
  - Water usage peaks during grain fill
  - Extending the grain fill period is key
    - Fungicide applications, etc.



The Soybean Factory – Q4

- (R3) Pod formation marks the beginning of Q4
  - Water usage peaks

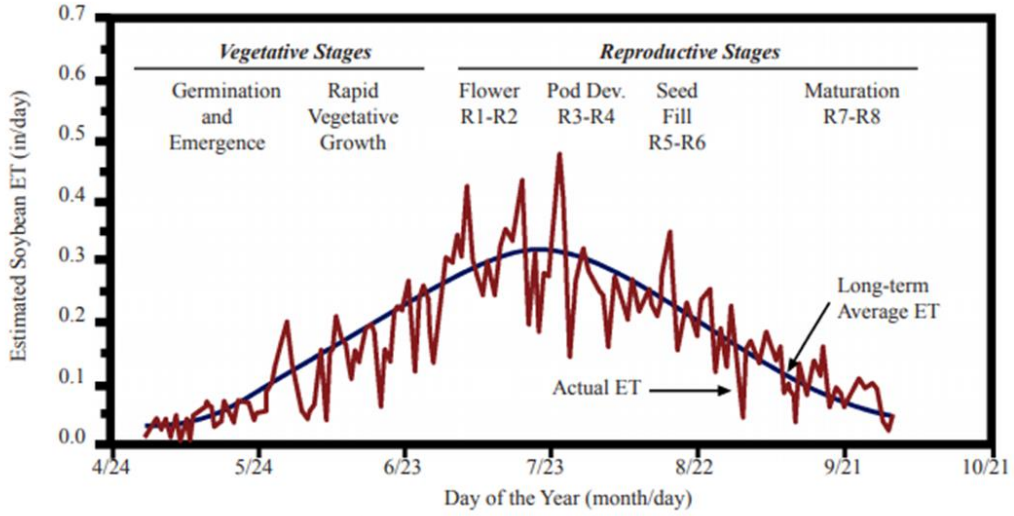
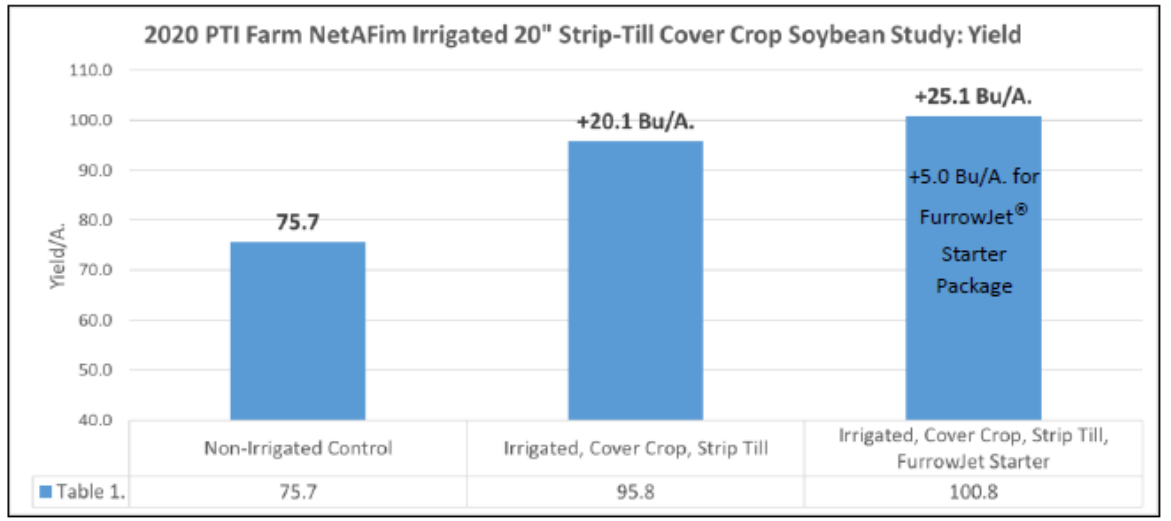


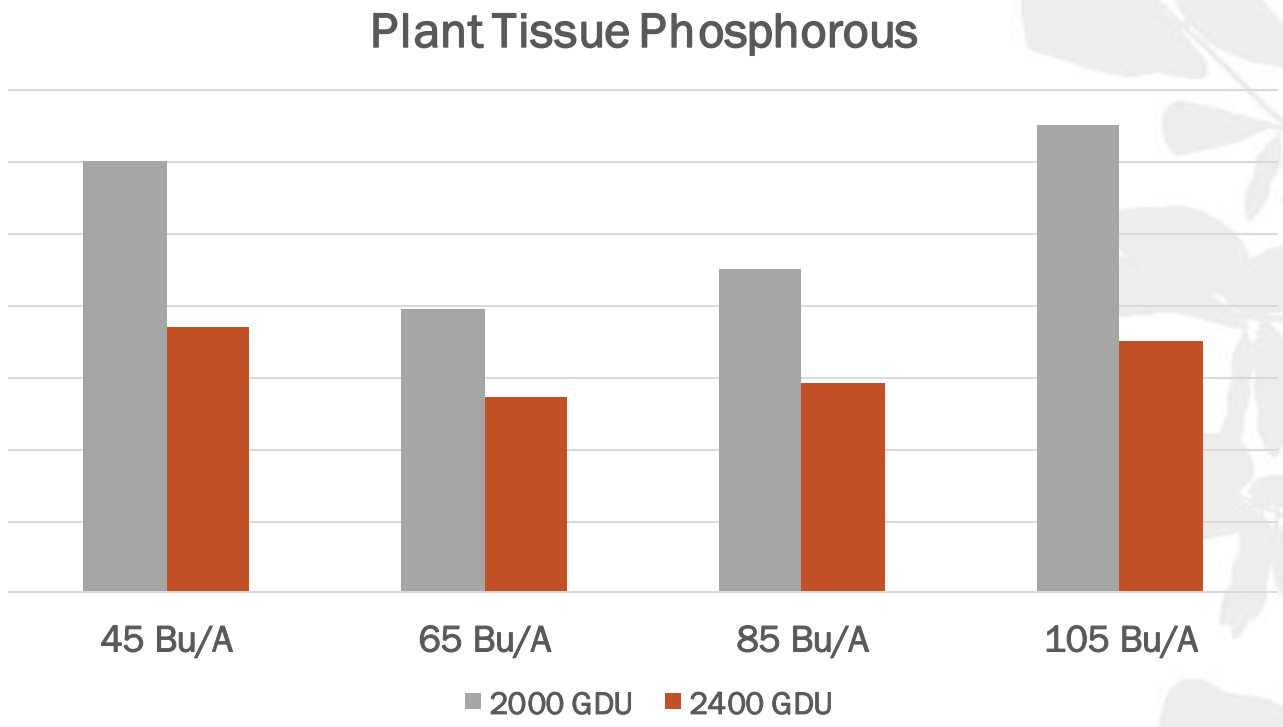
Figure 1. Soybean crop water use or daily evapotranspiration (ET) from a well-watered crop. The blue line depicts the expected ET based on historical data, whereas the red line depicts the daily ET for a specific growing season. Source: High Plains Regional Climate Center Data Archives



2020 PTI Yield Summary – 9” of water applied via drip tape

The Soybean Factory – Q4

- (R3) Pod formation marks the beginning of Q4
  - Water & Sunlight = Nutrient Movement to the seed



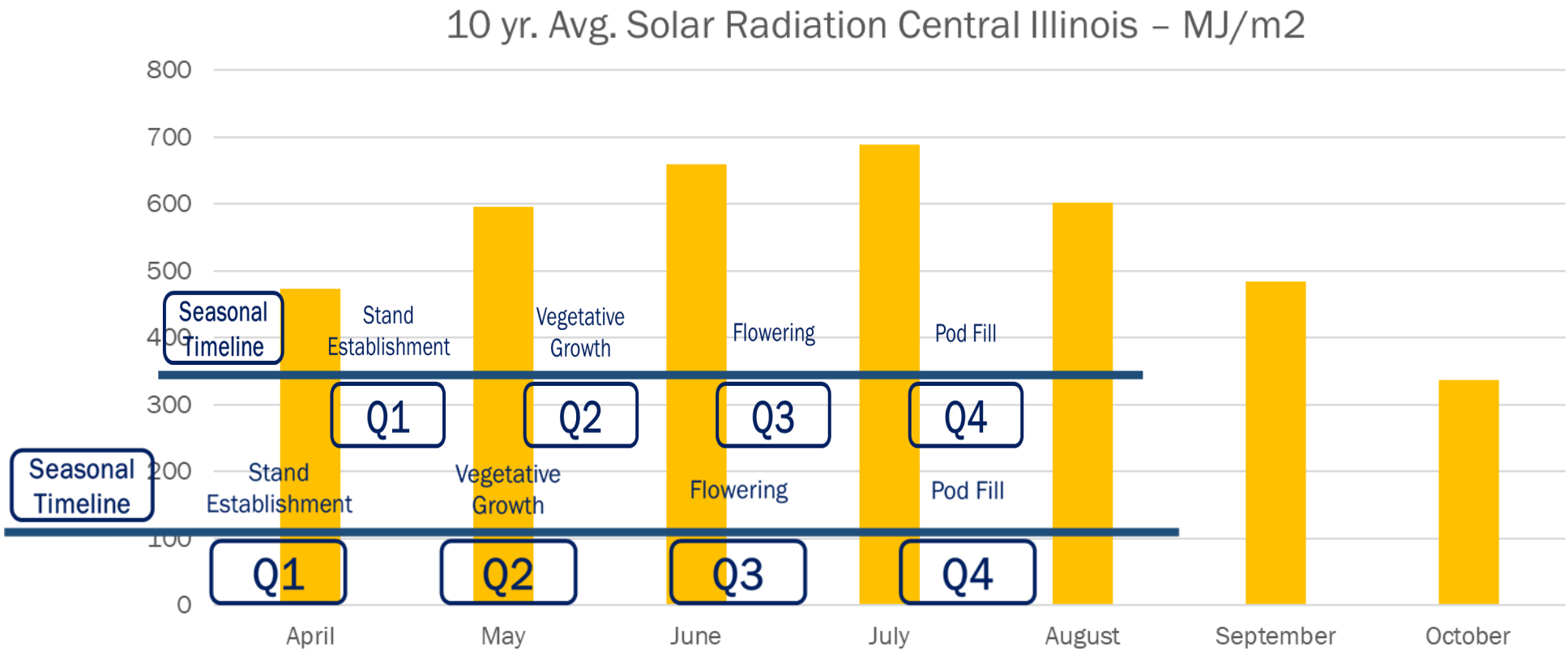
The Soybean Factory – Q4

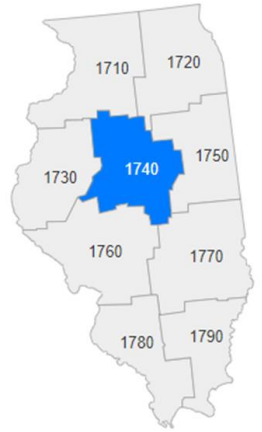
- September is key for strong finish
  - If water & sunlight are available, heat will drive more grain fill
  - Explains RM limitations in some areas
  - Explains movement to earlier RM's in areas adopting earlier planting dates

Seasonal Timeline

Stand Establishment	Vegetative Growth	Flowering	Pod Fill
Q1	Q2	Q3	Q4

Maximizing Power to the Factory





https://crops.extension.iastate.edu/facts/weather-tool

The Soybean Factory Summary

Simplify our Strategy

- Soybeans were made for an early start
- Building a better factory with fertility
- 4Q's of a soybean season
- Water & Sunlight in second half are key

"Putting the plant into a position to win"

THANK YOU!

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