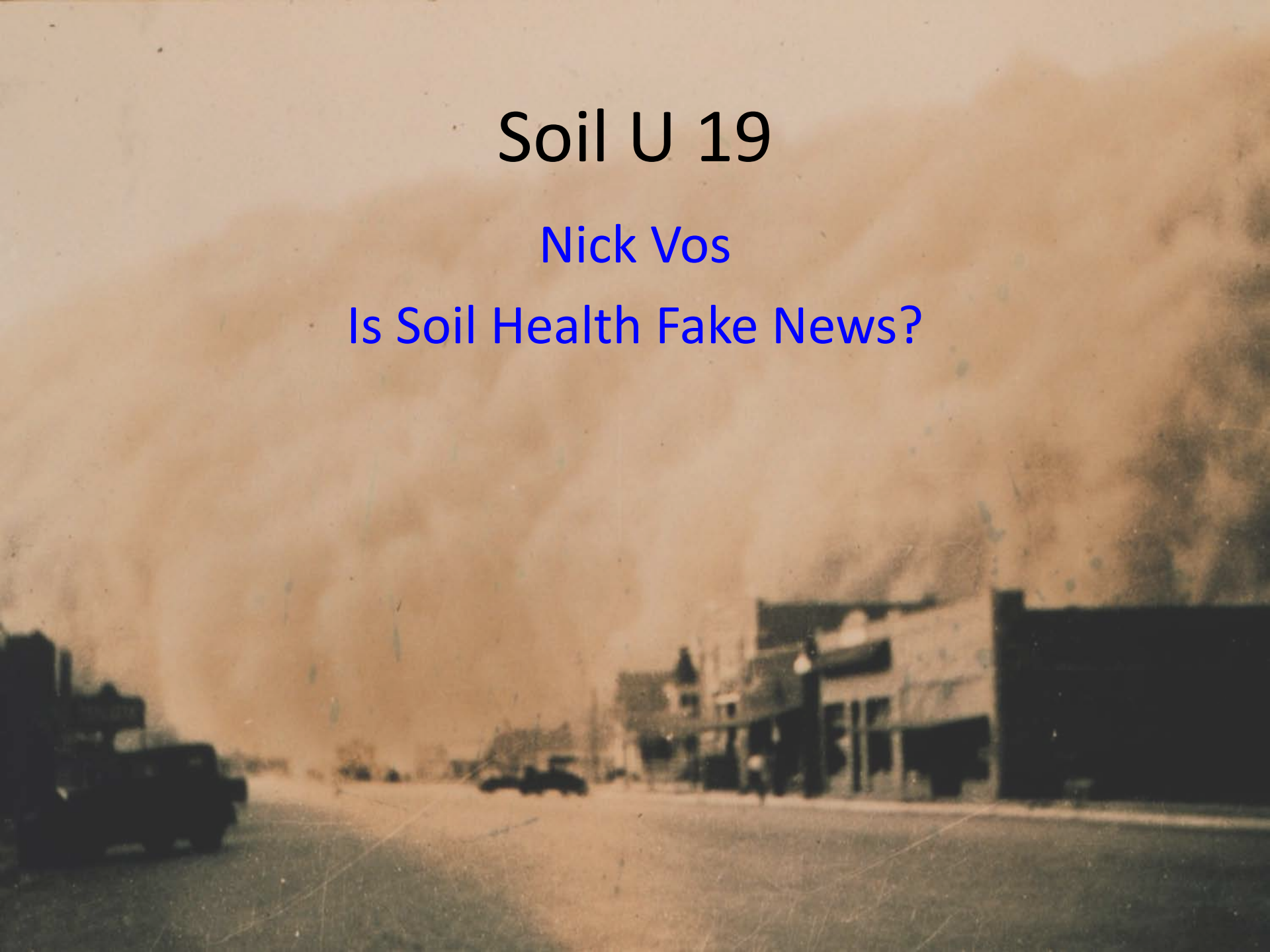


# Soil U 19

Nick Vos

Is Soil Health Fake News?



takes 600 years to create an inch of top soil. The goal on your farm should be profitability using responsible science and technology and doing it ethically. And that means not abusing farm programs as well. Successful farming can be done and done responsibly and profitably. Those that try to make farmers as the bad guys by not joining their cult do themselves no favor. And in fact there are those that have tried to follow that cult like belief and have soon found out it does not work and they cannot afford it. Just make sure in whatever information they put out show you the data and research. I referenced mine...cannot say I saw elsewhere.

2w Like Reply

Replying to [@Bkitch1Bodie](#) and [@covercroppal](#)

Im all for cover crops, just seems that all cc info is geared towards pushing an idea that isn't suited for everyone. If it works the guys that can utilize will adopt, the others wont. But when the idea

seems to paint  
g in a negstive

Replying to [@covercroppal](#)

Cover crops wont change the world (or work to speak of) in southwestern Minnesota. Girl scout cookies do work here, though.

5:49 AM · 1/4/18 · [Twitter for Android](#)





**Brian Sieker**  
@SiekerSales

@soilhealthguy

@swksfarmer how many lbs  
of magic radish seeds to  
smooth out combine ruts?

#askingforafriend



Clover doesn't give off N until it's dead. It's a common misconception by even the "expert" social media cover croppers. Stick to the science

1d Like Reply



I've tried it here  
without success. It  
seems we just don't  
have the right  
conditions.



8w Like Reply

Soybeans. Failed.  
Barley. Failed. Little  
ground cover. Had  
adequate rain on it  
all summer

# Why the disbelief?

- Not the norm (Change is hard & Scary)
- Moisture myth – We are too dry
- Why grow a crop you just gonna kill anyway?
- Industry Indoctrination
- Not a Yield driven model
- Not insurance supported - RMA



# How do we go against the flow?

- Be specific in your goals and needs
- Data is your friend, keep track of it
- Bugs are Cool
- Blowing is NOT Cool
- Nature can be cruel
- Healthy Soils are disease suppressive soils –

Graeme Sait



# How did the Soil Health journey start?

- 2010 - National No Till conference
- Ray Archuleta
- 60 acres Multi Specie
- Not all species are equal. Most did not work.
- 2011 - Jeff Rasewehr – Less is More
- C : N to avoid yield drag – Key in low precip areas – who knew 😊
- Need moisture to Cycle residue



# Vos Farms – Est 2014

## Diversity 2014-2017 (1000 / 196)

- Irrigated and dry land Corn
- Irrigated Soybeans
- Irrigated and dry land wheat
- Irrigated and dry land Milo
- Multi Specie Hay
- Livestock – Dorper Sheep
- Seed Sales & Consulting
- More acres



# Vos Farms

## 2018-2019 (600 / 356)

- Irrigated Corn
- Dry land corn
- Dry land wheat (Dual Purpose)
- Multi specie Summer mix (Hay/Graze)
- Dorper Sheep, C + R
- Seed Sales, Protein & Mineral tubs, Foliars & Starters, Biologicals, Biochar, Feed
- Consulting



# Cover Crops in the Dust Bowl

## Dry land debate continues

- Moisture vs Ground Cover vs Soil Health
- Can they co exist?
- Monoculture vs Polyculture
- Roots are 90% water...so why not?

# Status Quo Challenges

- Wheat – Sorghum – Fallow Rotation
- **Fallow is like a savings account with very low interest and high annual fees....**
- **Fallow kills Biology.**
- How much moisture are you REALLY banking?
- Have you ever compared?
- RMA – outdated policies



RMA Supported





RMA Supported





## Today

Areas of blowing dust between 9am and 3pm. Patchy fog before 8am. Otherwise, mostly cloudy, then gradual clearing during the afternoon, with a high near 52. Very windy, with a north wind 38 to 43 mph decreasing to 29 to 34 mph. Winds could gust as high as 60 mph.

# RMA Supported





NOT RMA Supported





# Multi species

- How much is too much?
- What can YOUR Soil handle?
- Be goal specific.
- Low Carbon
- High Carbon
- Moisture dictates cycling.





When  
Moisture  
dictates  
cycling, More  
is Less, and  
Less is More

JR





# Rotations and Opportunities

## Dry land and Irrigated

- Behind Wheat \*1 (Soil Health and/or Grazing)
- Flown into corn \*2 ( 2018 ? )
- Drilled before or after corn
- Drilled before or after cotton (New \*2)
- Drilled before or after soybeans (Least)
- Drilled after Milo (good grazing)



# Typical Mix for Wheat Stubble

- Millets, Brassicas, Summer legumes.
- Use Needs approach. (High C vs Low C)
- It is actually RMA approved 😊
- Enough time to recover over Winter? (Dr. Jason Warren, OSU, 2 year research)
- Best Suited mix for Sandy irrigated fields (Nematode, infiltration, Carbon, Leaching)



# Before and After – TX Panhandle

## Kelly Kettner





Flown into corn – Stevens County





# Residue and suppression





# What it looks like in the Spring





# At Planting time – Trash Farming





# After termination









# Structure





# Dry land corn right behind combine





4 weeks later





# Most Valued Covercrop

- **Daikon Radish**
- Works well in High PH and caliche soils
- Very cost effective
- Huge scavenger
- Deep Infiltration
- Acidic exudation – more nutrient availability
- Nematode suppression
- **Do Not Plant too thick!**



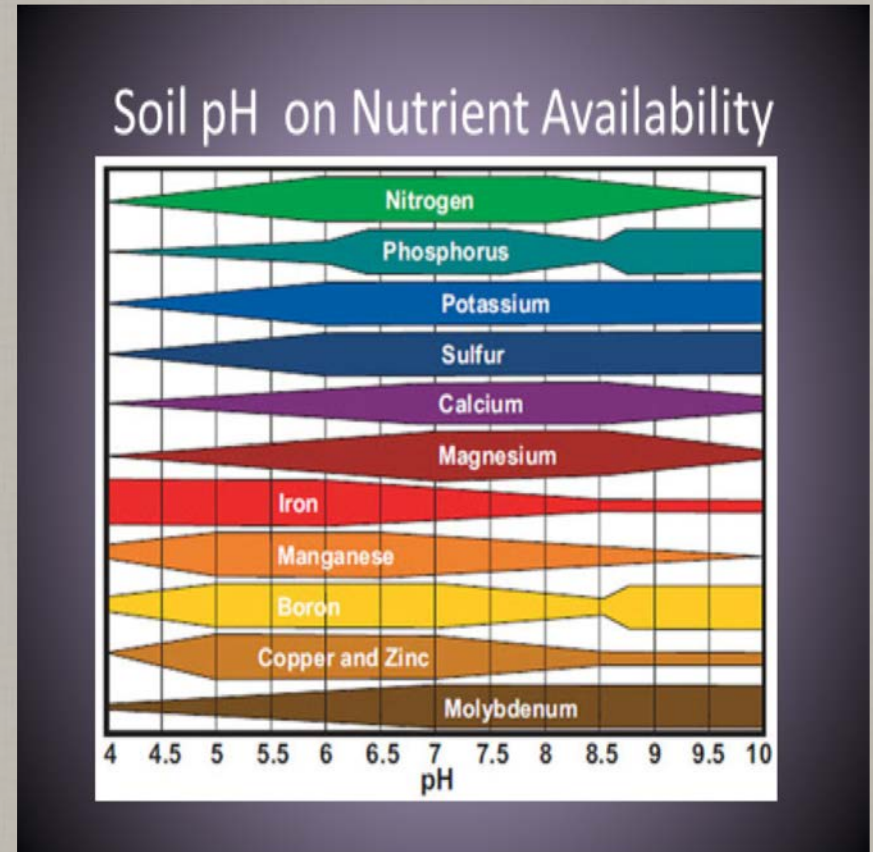
# Brassicas

- Mustards, radishes, Broccoli, kale etc.
  - **Do not associate with mycorrhizae.**
    - Why?
      - **They use acids to get minerals for themselves.**
  - Acid exudates from Brassicas free up P tied up with Ca.
  - Brassicas helps with mineralizing of bound up P.
  - Brassicas also stimulates the middle of the food web- the mites, earthworms and other recyclers that preys on bacteria and fungi.



# The pH Factor

- Rhizosphere pH
  - $\Delta$  pH is control by the plant
  - Rhizosphere pH can differ from bulk soil by 2 units
  - Plants are in the business of dealing of acids
    - Excretion and reabsorption of  $H^+$  &  $HCO_3^-$
    - Root exudates of organic acids & amino acids





# Total P

- Available P - Chemistry
- Non-available P – Biology
- Available = possibility of run off
- Non available = more stable



# The Soil Solution – ACRES USA

- “There is compelling research demonstrating the humus-building effect of no-till or minimum-till agriculture”
- “I favor minimum-till over no-till, as there is evidence of mineral stratification that occurs over time in completely untouched soils”
- Graeme Sait, ACRES USA, June 2015



# Stevens County, Ks Research

- No Till, Strip Till 2009-2014 (Corn/bean/milo)
- 2014 Fall Wheat (Tillage ☹️)
- 2015 Harvest Wheat – DC Soybeans
- 2016 Corn – Fly in Covers
- 2017 Corn – Fly in Covers
- 2018 Oats – Covers – Rye Mix
- 2019 Rye-Corn/Corn



# Efficiency results

- **2015 Corn** – 220 # N, 50 # P 1 Tissue sample
- Yield 216
- **2016 Corn** – 2.5 gallons 10-34-0, 2.5 gallons water. Radiate. Awaken. 168 # N 1 Tissue sample
- Yield 225
- **2017 Corn** – 2.5 gallons 10-34-0, 2.5 gallons water. Enzyme Max. Micropack. 158 # N 2 Tissue samples
- Yield 223
- **2018 Corn** – 2.5 gallons 10-34-0, 2.5 gallons water. Enzyme Max. Micropack. Biochar. 149 # N 2 TS
- Yield 264



# Leaf Tissue Results

- VE – V8. Very little to Zero N deficiency
- V8-VT. Getting N deficient quickly
- VT onwards – Late Nitrogen very efficient.
- In-Furrow Biologicals and V5 Foliars helping plant to stay balanced longer.
- Biochar in 2018 helped plant even more IMO
- Utilizing "tied up" P with Biology?



# SOIL ANALYSIS REPORT

NEUTRAL AMMONIUM ACETATE (EXCHANGEABLE)														INFO SHEET: 1005299																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																										
LAB NUMBER	SAMPLE IDENTIFICATION	ORGANIC MATTER L.O.I. percent RATE	PHOSPHORUS			POTASSIUM	MAGNESIUM	CALCIUM	SODIUM	pH		CATION EXCHANGE CAPACITY C.E.C. meq/100g	PERCENT BASE SATURATION (COMPUTED)																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
			P (WEAK BRAY) 1:7 ppm RATE	P (STRONG BRAY) 1:7 ppm RATE	OLSEN BICARBONATE P ppm RATE	K	Mg	Ca	Na	SOIL pH 1:1	BUFFER INDEX		% K	% Mg	% Ca	% H	% Na																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
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Lab No. : 6465

Depth : 2 - 4

ID : 104 WEST

1:1 Soil pH	7.4
Soluble Salts 1:1, mmho/cm	0.21
Excess Lime Rating	NONE
Organic Matter LOI, %	2.1
Nitrate-N KCl, ppm N	5.1
Nitrate-N, lbs N / Acre	3
Phosphorus M3, ppm P	10
Potassium NH <sub>4</sub> OAc, ppm K	407
Sulfate M-3, ppm S	6.4
Zinc DTPA, ppm Zn	0.59
Iron DTPA, ppm Fe	11.6
Manganese DTPA, ppm Mn	14.3
Copper DTPA, ppm Cu	0.83
Calcium NH <sub>4</sub> OAc, ppm Ca	1834
Magnesium NH <sub>4</sub> OAc, ppm Mg	393
Sodium NH <sub>4</sub> OAc, ppm Na	26
Total P, ppm P	330

Sum of Cations, me/100g	% Saturation				
	H	K	Ca	Mg	Na
13.6	0	8	67	24	1

2018 : P1 = 12 = 24 #

2018 : P2 = 47 = 94 #

2019 : P1 = 10 = 18 #

2019 : TP = 330 = 660 #



# V8

**Growth Stage:** Prior to tasseling (V4-VT)

**Crop:** Corn

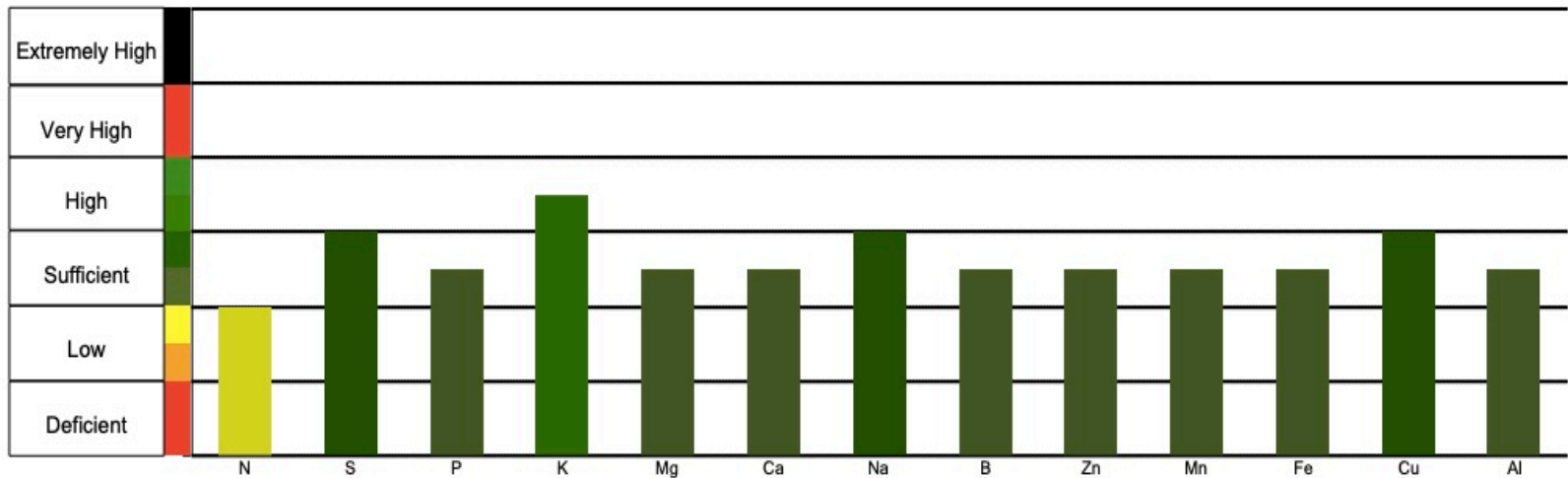
**Collection Date:** 06/17/2018

**Lab:** Tissue Lab

**Notes:** Post Foliar 1 at V5

	Nitrogen %	Sulfur %	Phosphorus %	Potassium %	Magnesium %	Calcium %	Sodium %	Boron ppm	Zinc ppm	Manganese ppm	Iron ppm	Copper ppm	Aluminum ppm
Analysis	3.05	0.33	0.36	3.43	0.19	0.36	0.03	11.00	35.00	58.00	99.00	16.00	75.00
Normal Range	3.30	0.16	0.32	2.20	0.16	0.27	0.00	5.50	22.00	22.00	33.00	5.50	5.50
Range	3.99	0.39	0.50	2.99	0.59	0.80	0.03	25.99	70.99	150.99	250.99	25.99	300.99

## Plant Analysis





# VT

**Growth Stage:** Prior to tasseling (V4-VT)

**Crop:** Corn

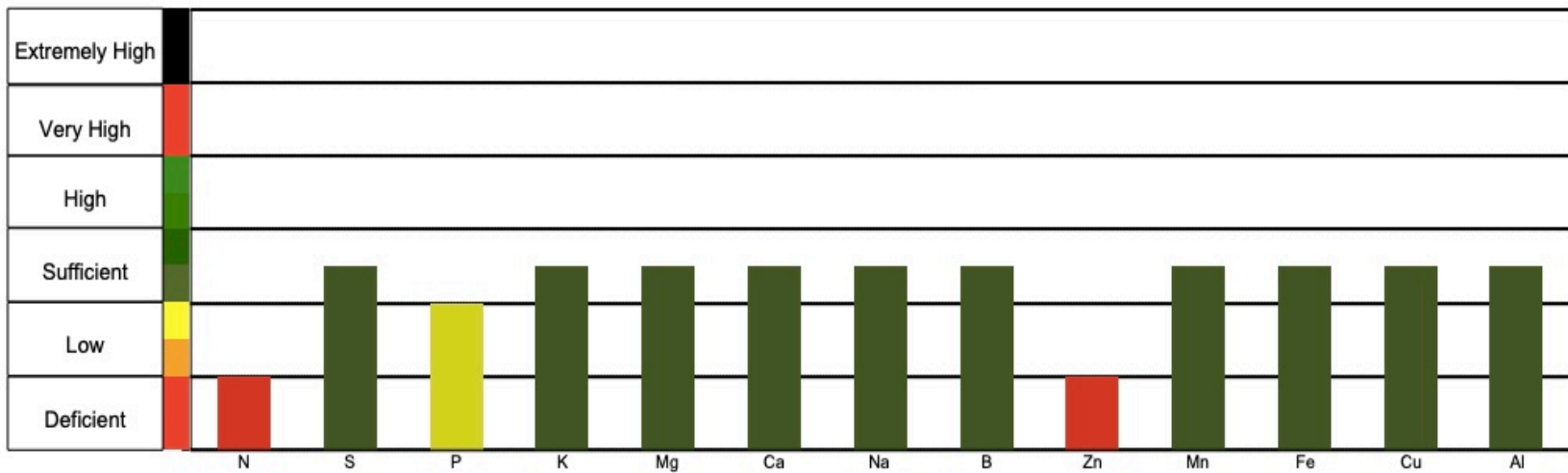
**Collection Date:** 07/16/2018

**Lab:** Tissue Lab

**Notes:** Just before VT

	Nitrogen %	Sulfur %	Phosphorus %	Potassium %	Magnesium %	Calcium %	Sodium %	Boron ppm	Zinc ppm	Manganese ppm	Iron ppm	Copper ppm	Aluminum ppm
Analysis	2.16	0.16	0.27	2.30	0.22	0.46	0.02	6.00	13.00	36.00	41.00	10.00	89.00
Normal	3.30	0.16	0.32	2.20	0.16	0.27	0.00	5.50	22.00	22.00	33.00	5.50	5.50
Range	3.99	0.39	0.50	2.99	0.59	0.80	0.03	25.99	70.99	150.99	250.99	25.99	300.99

## Plant Analysis





# Late Season Trivia

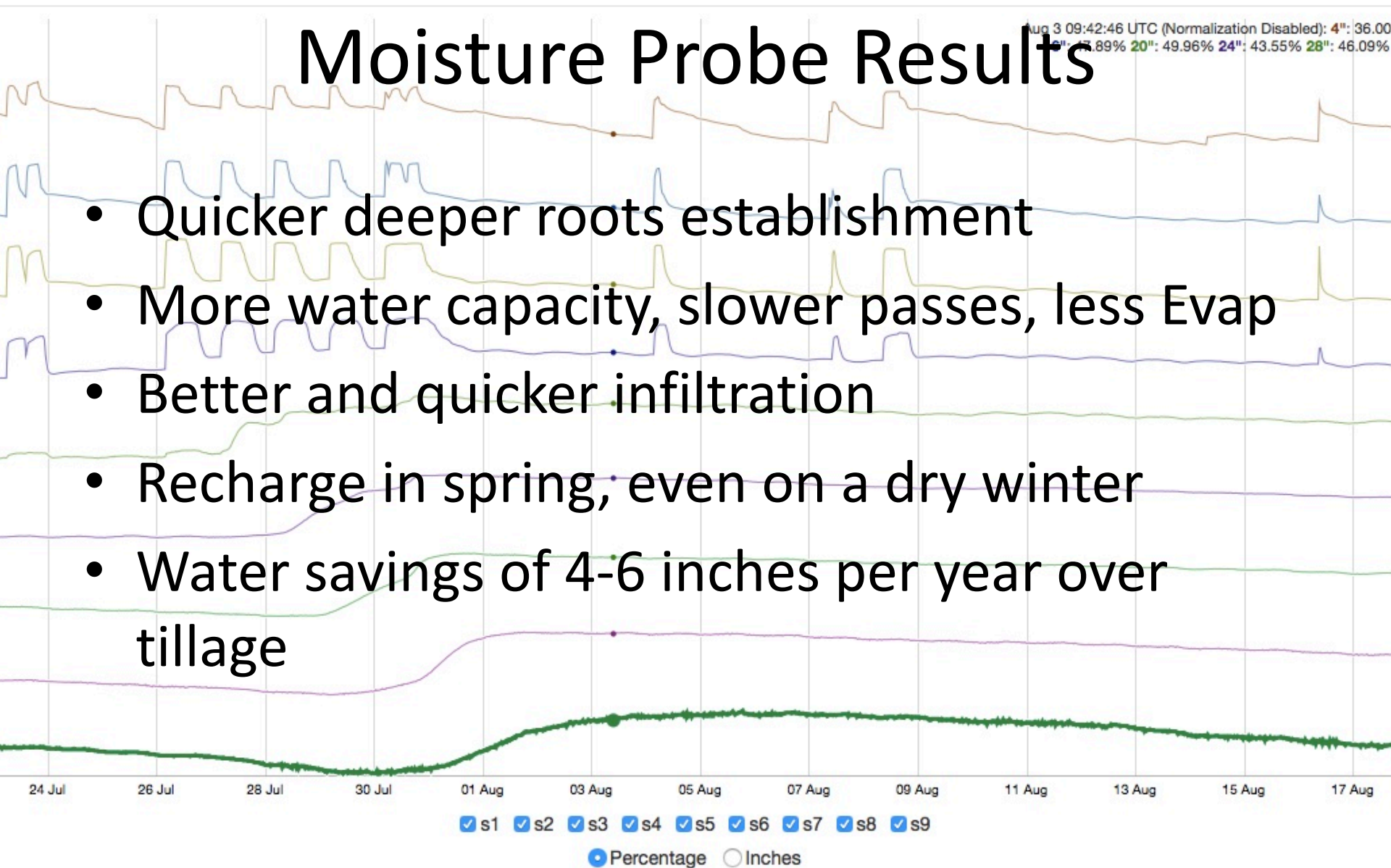
- Wet Summer & Fall = Anaerobic = less Fungi?
- Low P reason for low Zn?
- N post season 5.1 ppm, so we ended right. \*

- \* <https://www.genuity.com/corn/Documents/Norfolk-Dr.%20Ray%20Ward.pdf>



# Moisture Probe Results

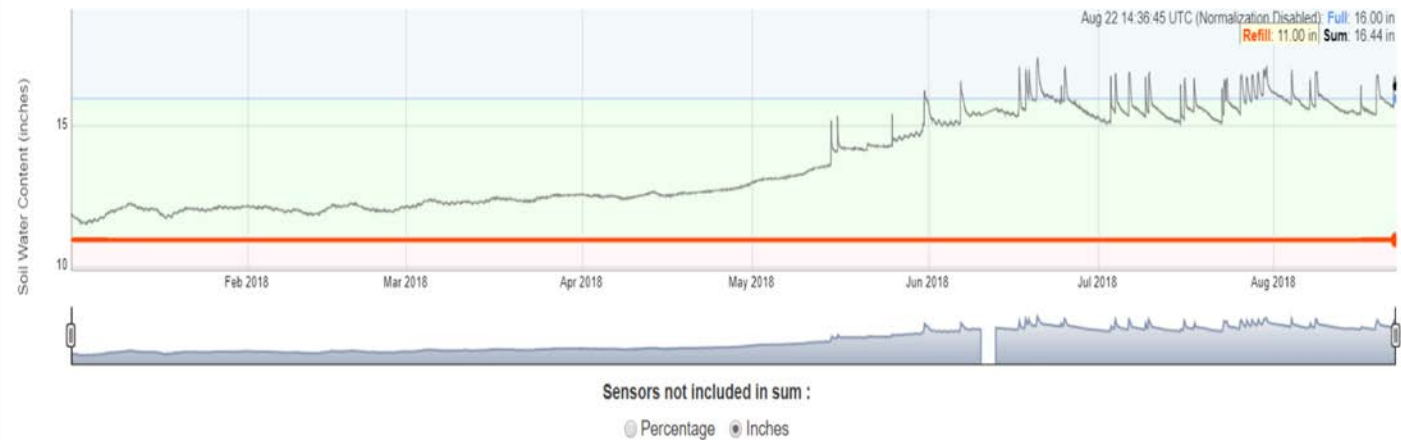
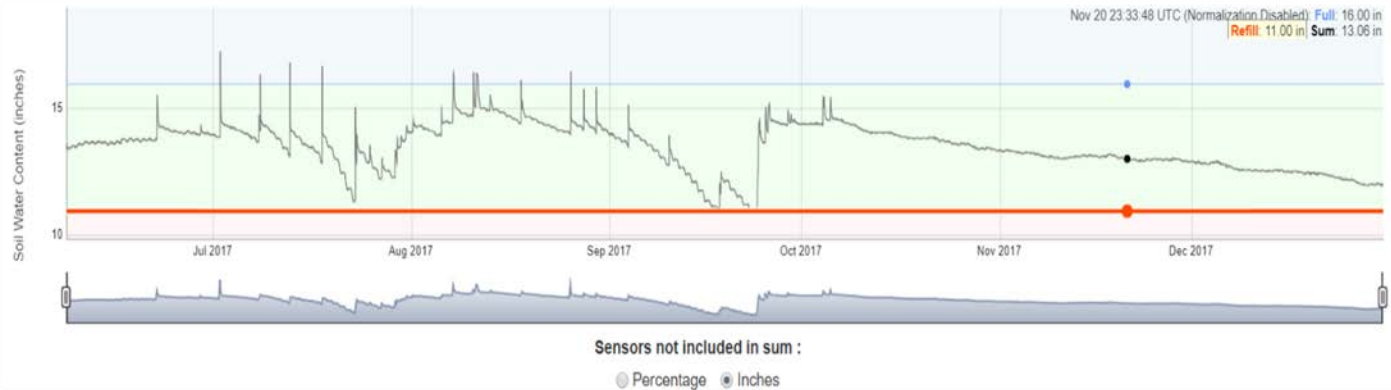
- Quicker deeper roots establishment
- More water capacity, slower passes, less Evap
- Better and quicker infiltration
- Recharge in spring, even on a dry winter
- Water savings of 4-6 inches per year over tillage





# Corn and Cover crop, 17/18

## Profile Sum



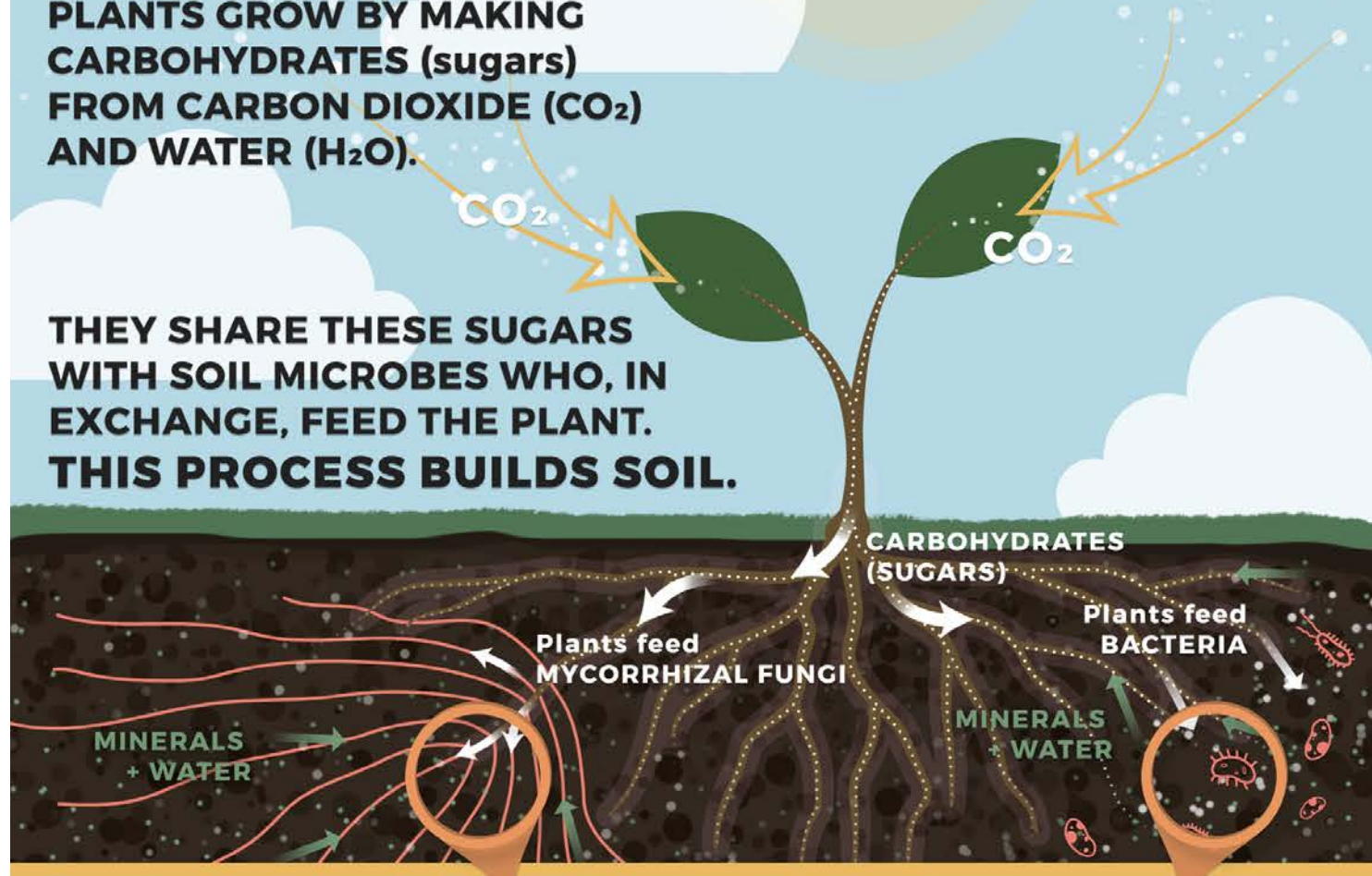


# Exudation

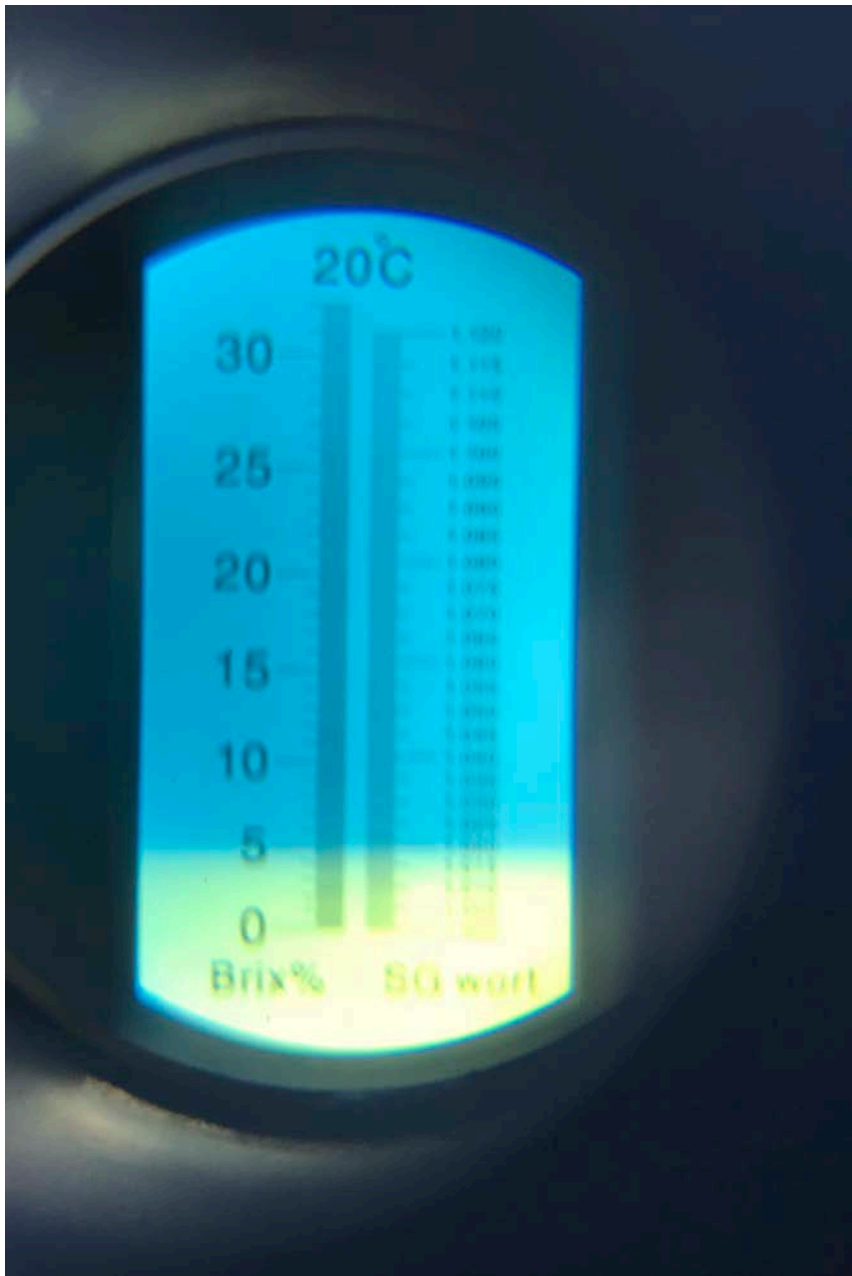
## BUILDING HEALTHY SOIL SOLVES EVERYTHING!

PLANTS GROW BY MAKING CARBOHYDRATES (sugars) FROM CARBON DIOXIDE ( $\text{CO}_2$ ) AND WATER ( $\text{H}_2\text{O}$ ).

THEY SHARE THESE SUGARS WITH SOIL MICROBES WHO, IN EXCHANGE, FEED THE PLANT. THIS PROCESS BUILDS SOIL.







# Plant Brix

What is Brix? “A measure of the carbohydrate level in plant juices

Excess Nitrogen is usually the biggest culprit in keeping brix low.

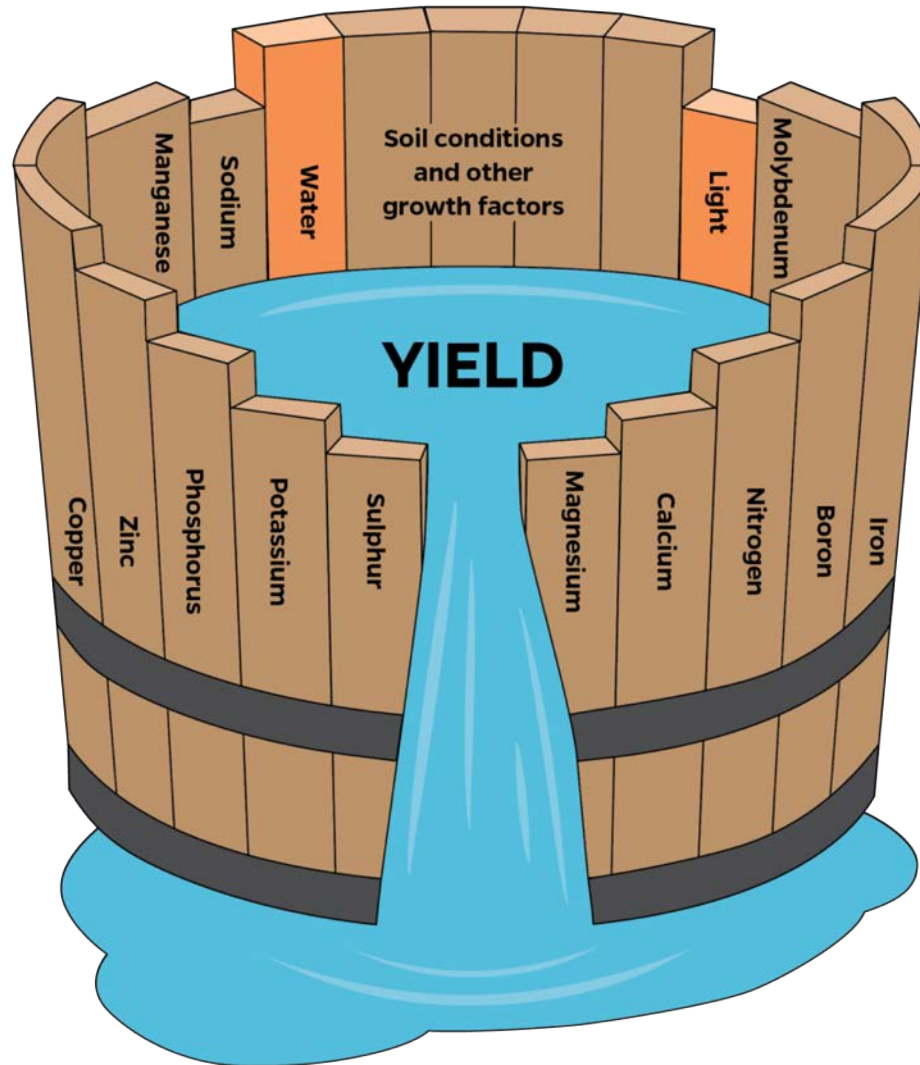


# Importance of Balance

- Calcium
- Boron
- Nitrogen
- Calcium is the trucker of all nutrients and Boron is the steering wheel – Graeme Sait, Nutrition Farming

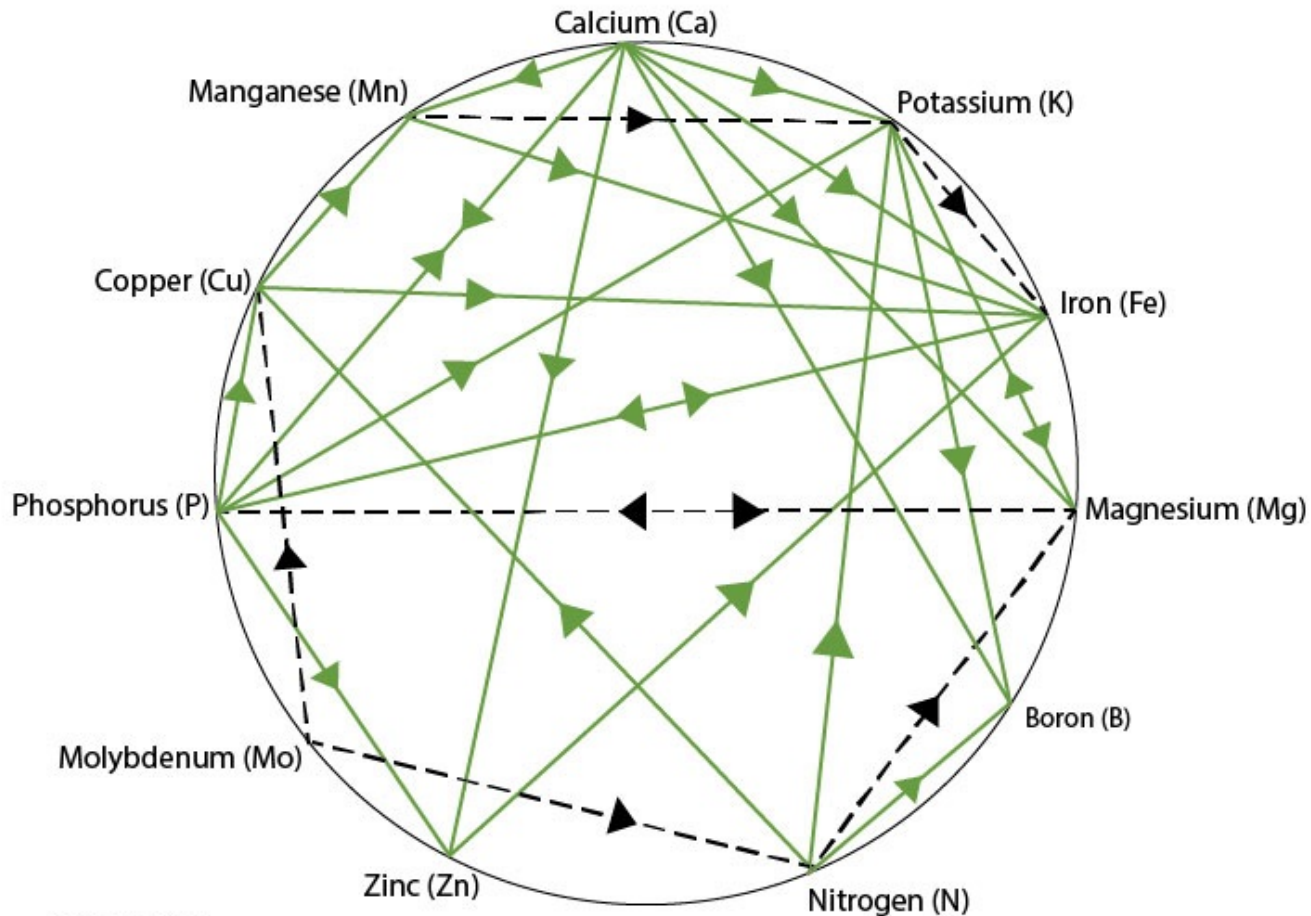


# Liebig's law - *Exudation*





# Mulder's Chart

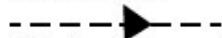


## Antagonism



Decreased availability of a nutrient to a plant due to the action of another nutrient

## Stimulation



High level of a nutrient increases the demand by the plant for another nutrient



# Interesting facts on Potassium

- Almost everything in a plant revolves around Biology and Balance.
- In hydrated form,  $\text{Na}^+$  and  $\text{K}^+$  are chemically and structurally very similar (Amtmann and Sanders, 1999)
- So if K is low plant will go after Na if deficient



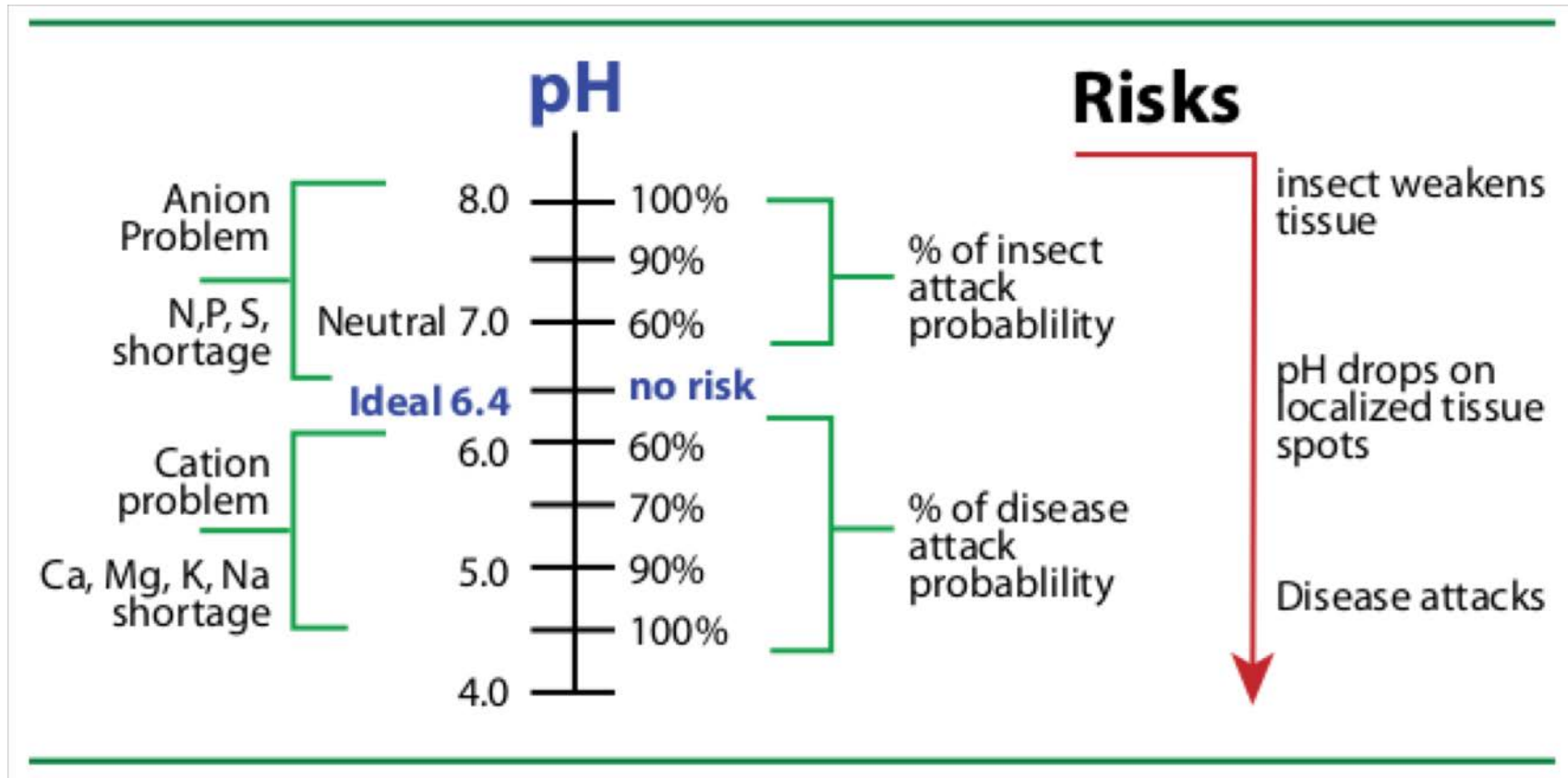
# Balancing the Ratios \*

\* Graeme Sait – Nutrition Farming

- Ca : Mg
- Na : K
- Mg : K
- P : S
- P : Zn
- Fe : Mn



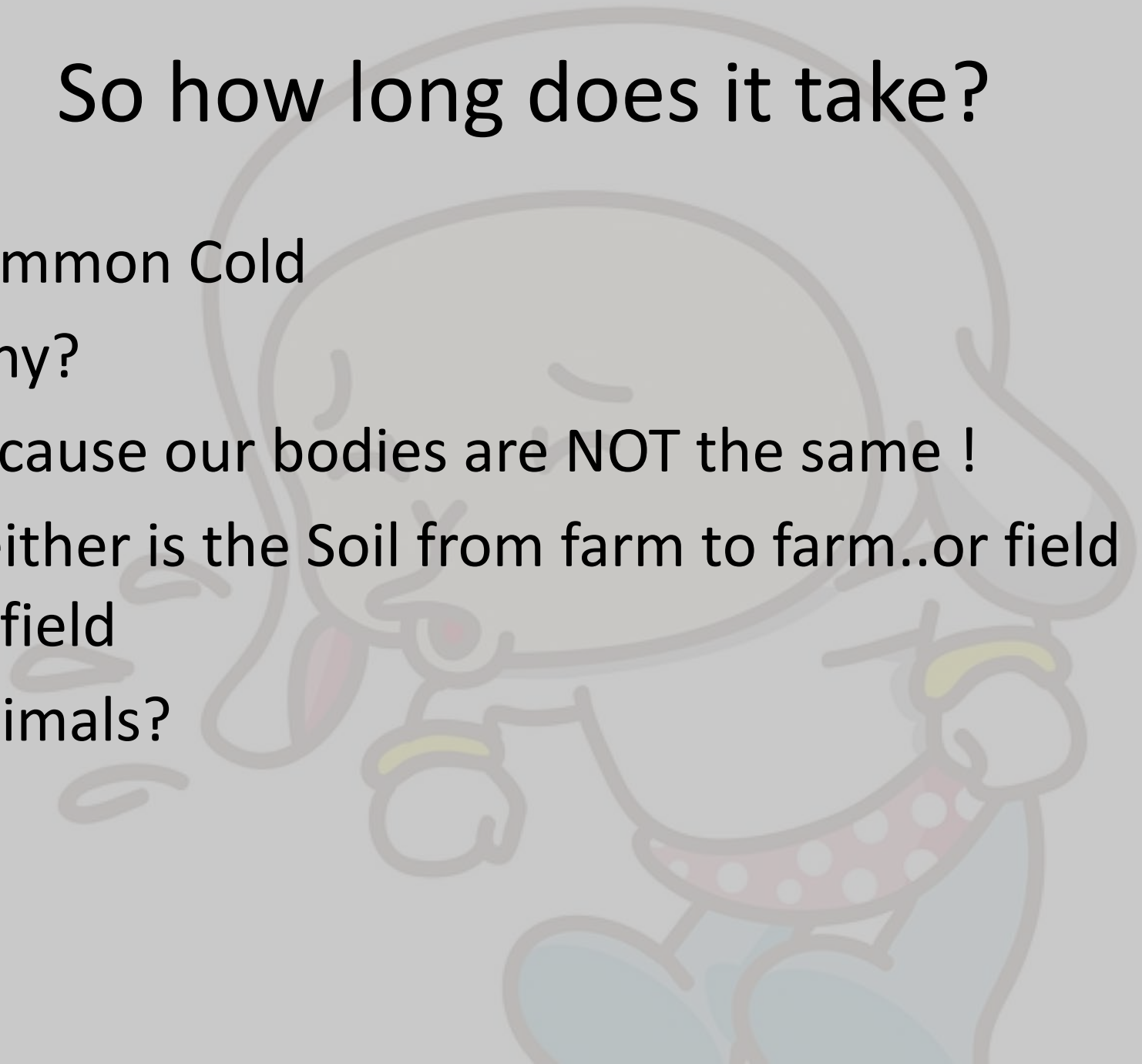
# Plant Sap PH





# So how long does it take?

- Common Cold
- Why?
- Because our bodies are NOT the same !
- Neither is the Soil from farm to farm..or field to field
- Animals?





# Animals





# Compaction?





# Dorper Sheep





# Free Cycling and Manure





# Manure

- 100 pound lamb, 4 pounds per day
- 1 lamb, 1 acre, 365 days = 1460 pounds
- 20.5 # N
- 7.3 # P
- 17.5 # K (Sheep 201, Nutrient management, [sheep101.info](http://sheep101.info))
- In summer, on multi specie grazing, 10 head per acre for avg 4 months a year on multi specie mix
- 68 # N, 24 # P, 58 # K

# So what benefits do we get?

- Better infiltration rates
- Higher fertilizer efficiency
- Less water used to raise same crop
- Less fertilizer to raise same crop
- Less evaporation from between rows
- Better plant health quicker (living roots)
- Higher margins – animals, less chemicals, less fertilizer
- Better root surface area, up to 1000 – MF
- MF is most destructive Nematicide.



# Conclusion

- Diversify your farm.
- Be a price Maker, not a price Taker
- Think Polyculture, multi species
- Think lower Inputs 😊
- Give Nature a chance....try and work with her
- **Soil Health is the only addiction that you will never try to quit from 😊**











# Be The Change – Challenge Yourself





# Facebook : Everything Cover Crops


 Everything Cover Crops 

 Hannes Home Create     






## Everything Cover Crops


Public group




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








Description 

Discussing cover crops, soil health, etc.. Challenges, success stories and questions. No advertising of any kind.


Group Type

Study Group


Members · 6,828




### HISTORY


 Group created on September 13, 2015

[See More](#)

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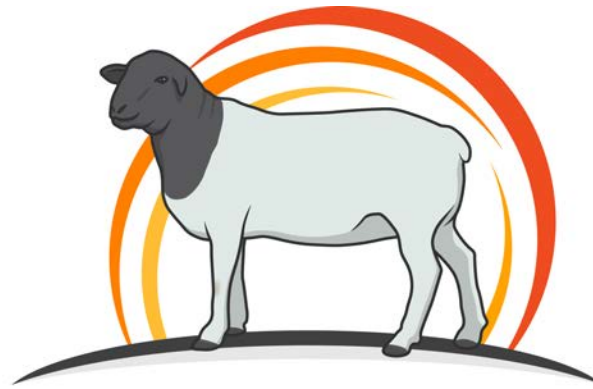
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#AgTwitter  
#SoilHealth  
#CoverCrops  
#DorperRevolution  
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#PolyCulture  
#RootsNotIron





**Vos Dorpers**  
Hugoton, KS



**Prairie Seeds**

**Dustbowl Mix**  
**COVER CROPS**