

1) Yellow Corn in 2014 Compared  
to 2013 and 2012

2) Time of Day Plant Tissue  
Project

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# Yellow Corn in 2014

Remember 2013? Lot of early yellow corn.

Remember 2012? Very little yellow corn.

Major factor in yellow corn in 2013 & 2014...

Early season **WEATHER** conditions!

Long cold winter

Excessive moisture in April, May & June

Delayed planting (wet)

Poor root/crop growth (cold & wet)

Lower rate of mineralization for N & S

# Yellow Corn in 2014

Indicator of Nitrogen and/or Sulfur deficiency

- Leaching of N & S below roots
- Denitrification:
  - Water logged soil lose N to atmosphere

Indicator of Oxygen deprived, water saturated soil

Example:

Benson had 22" of rain from April-June  
All time record rainfall in 2014

Example:

S MN and SE SD: Very wet April-June

# Corn in Waterlogged Soil



## NUTRIENT LEVEL IN CROP

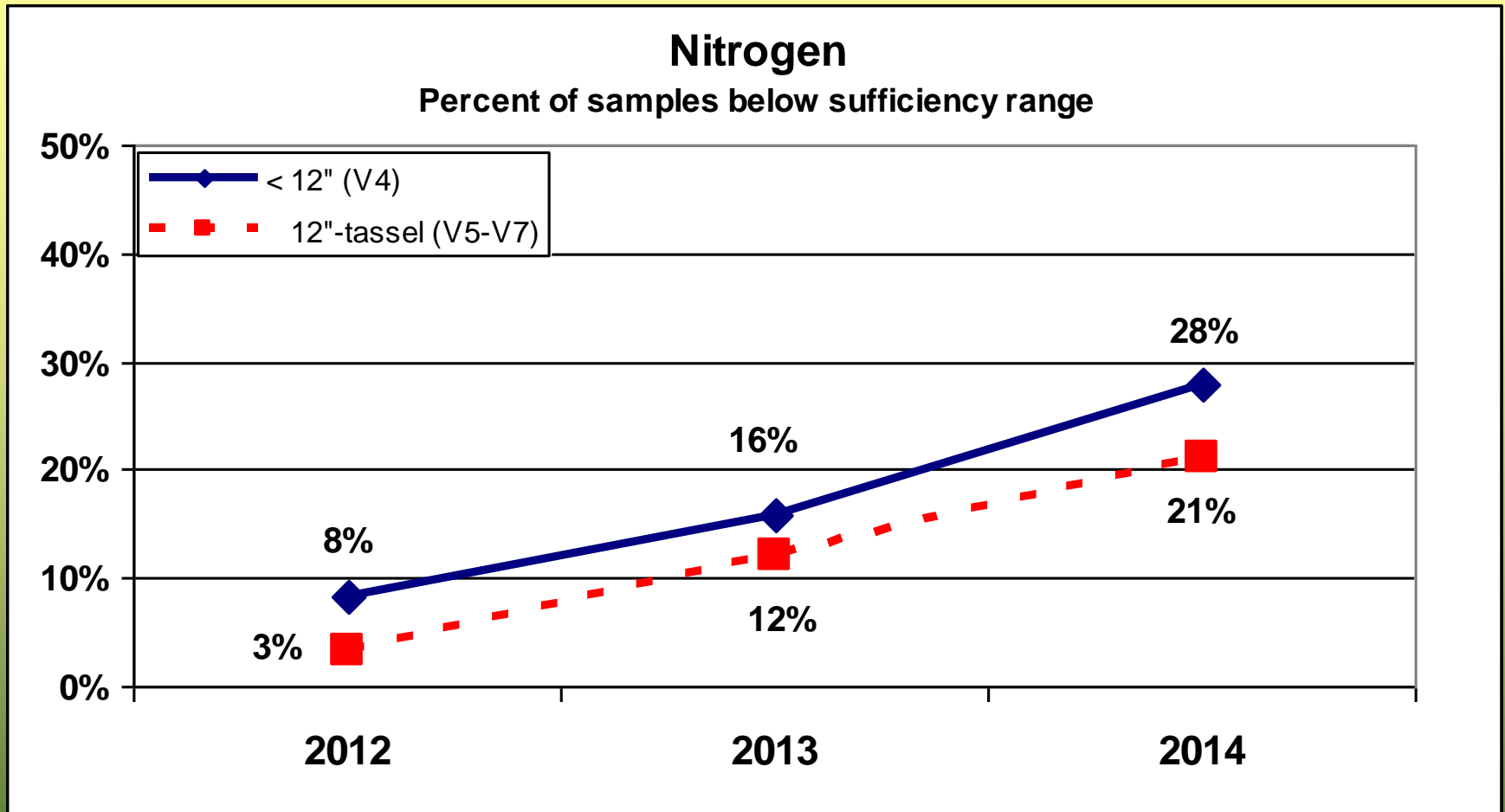
Analysis in Percent							Analysis in Parts Per Million				
N	P	K	S	Ca	Mg	Na	Zn	Fe	Mn	Cu	B
Nitrogen	Phosphorus	Potassium	Sulfur	Calcium	Magnesium	Sodium	Zinc	Iron	Manganese	Copper	Boron
2.8	.11	1.36	.18	.74	.46	.01	18	284	88	7	11
L	D	L	S	S	S	S	L	H	S	S	S

L = Low

S = Sufficient

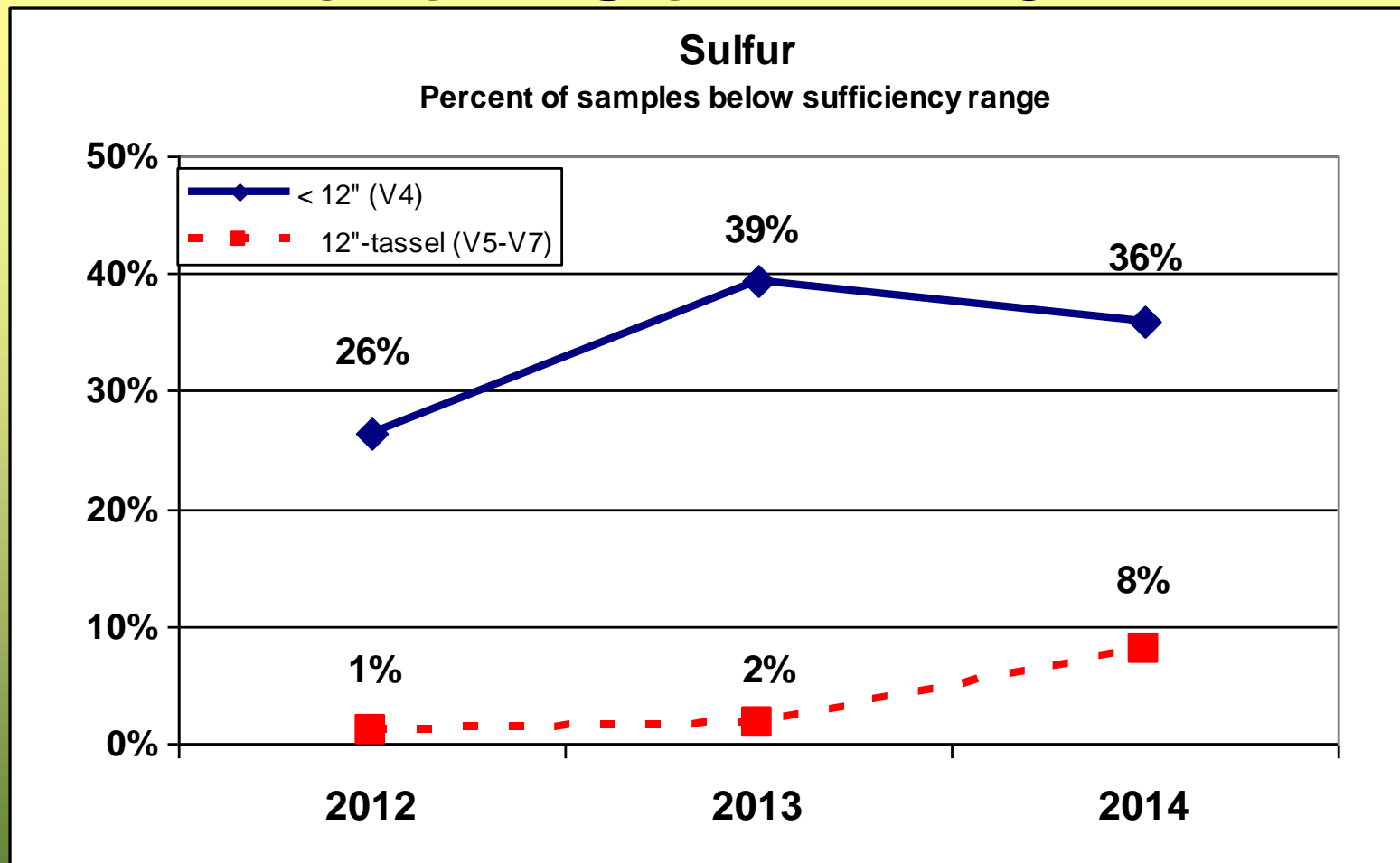
H = High

# Yellow Corn in 2014



First 1,000 samples: Less than 12" (V4)  
First 1,000 samples: 12" to tasseling (~V5 - V7)

# Yellow Corn in 2014



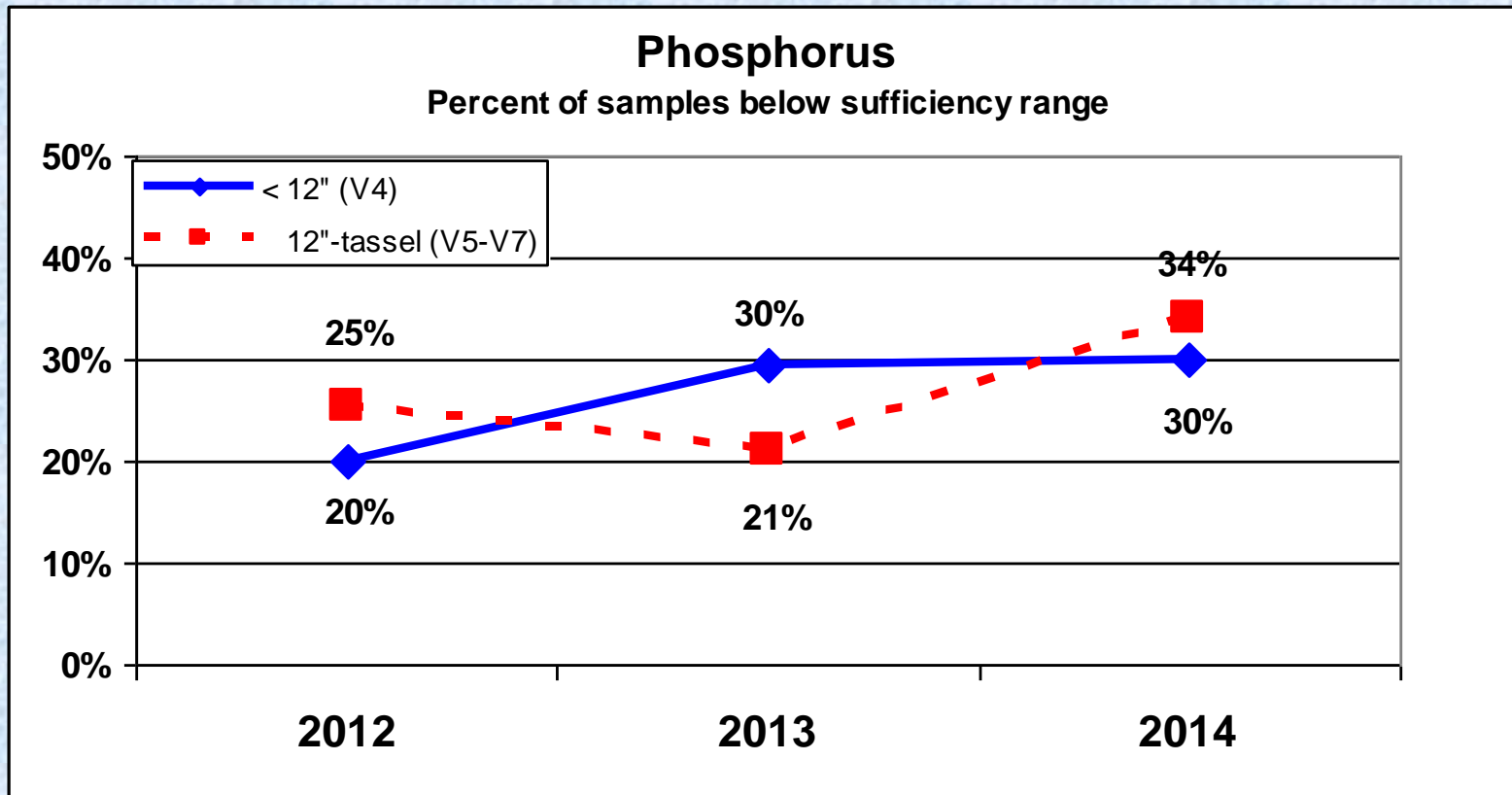
First 1,000 samples: Less than 12" (V4)

First 1,000 samples: 12" to tasseling (~V5 - V7)

# Yellow Corn in 2014 Summary

- More yellow corn reported in 2013-14 than 2012
- Tissue summary data comparison confirms this
- 2013-14 corn was planted later, soil was colder and wetter weather than in 2012
- Saturated soil conditions, esp. in 2014
- N & S were leached below the root zone early in the growing season
- N was lost due to denitrification
- Colder soil means less N & S mineralization
- As corn grew taller and developed its root system, it was able to reach the N & S

# Corn Tissue Observations

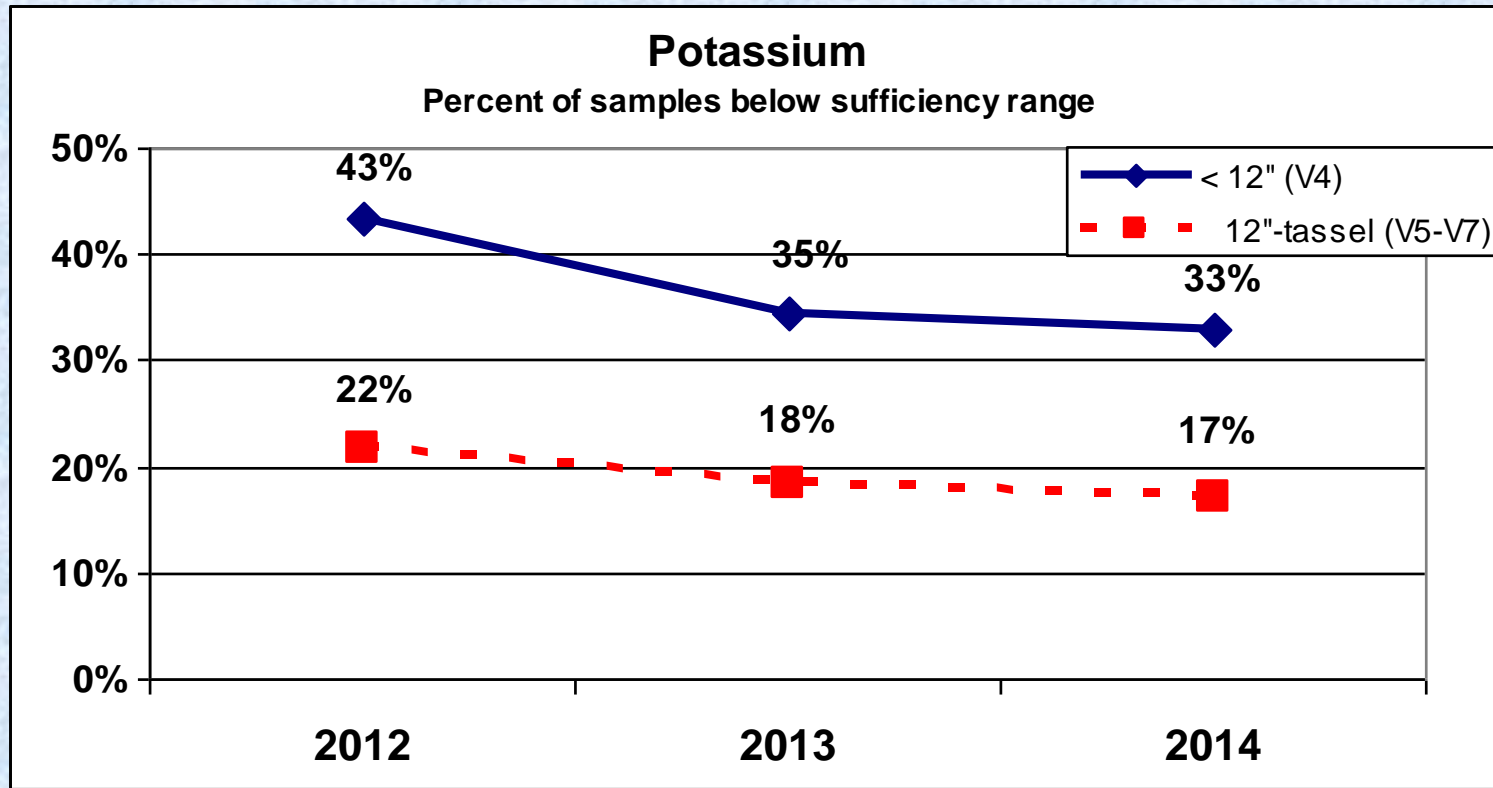


More corn tissue samples tested low in P during cool wet springs.  
(2012 warm spring – 2013 and 2014 cool wet springs)

First 1,000 samples: Less than 12" (V4)  
First 1,000 samples: 12" to tasseling (~V5 - V7)



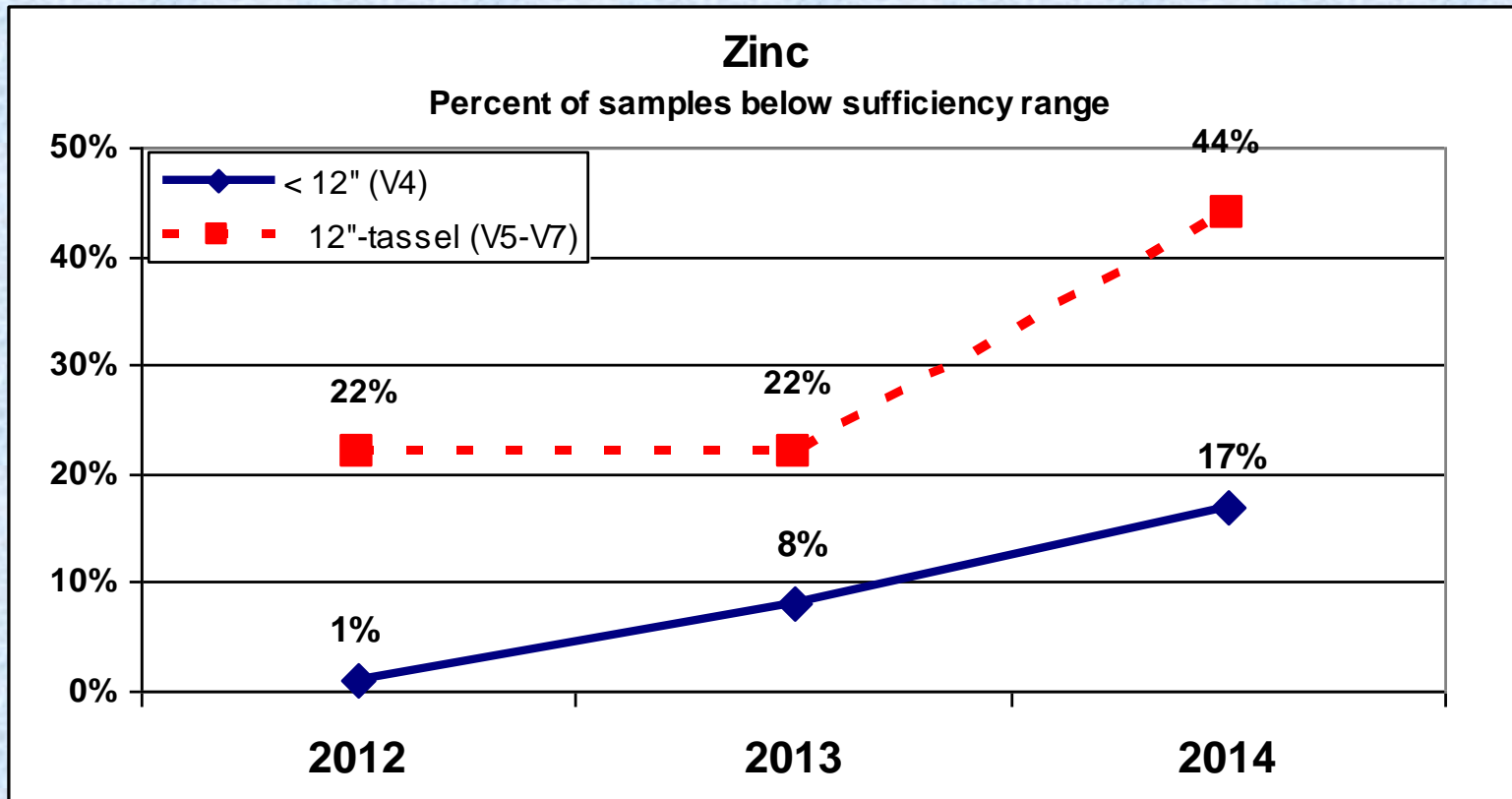
# Corn Tissue Observations



The % corn tissue samples testing low in K are not greatly affected by cool or warm years, but more samples low in 2012 due to dry conditions.  
(2012 warm dry spring – 2013 and 2014 cool wet springs)

First 1,000 samples: Less than 12" (V4)  
First 1,000 samples: 12" to tasseling (~V5 - V7)

# Corn Tissue Observations

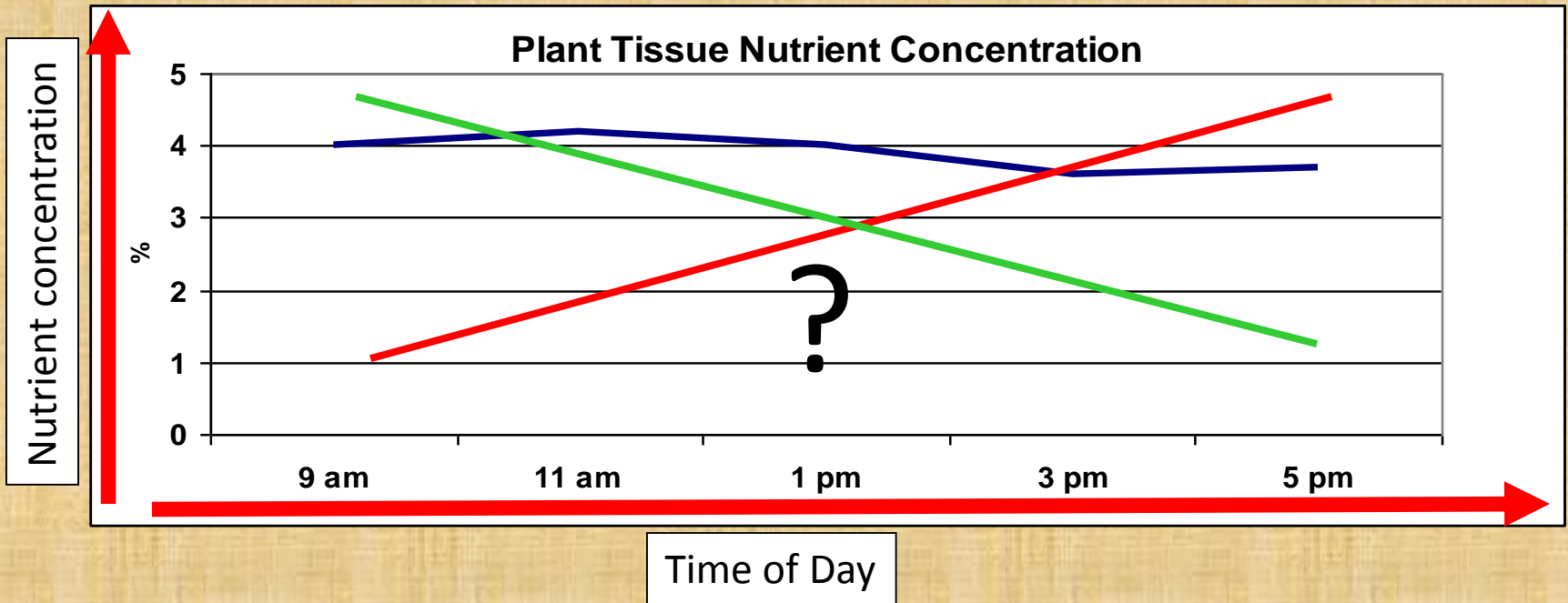


More corn tissue samples tested low in Zn during cool wet springs.  
(2012 warm spring – 2013 and 2014 cool wet springs)

First 1,000 samples: Less than 12" (V4)  
First 1,000 samples: 12" to tasseling (~V5 - V7)

# Time of Day Tissue Sampling Project

Do the nutrient levels in plant tissue samples change significantly, depending on the time of day samples are collected?



# What might cause nutrient levels in plant samples to change during the day?

- Cool or warm weather
- Dry or wet weather
- Early in season vs later in season
- Different crops
- Lab analysis limitations (+- 10%)

Replicated Research is very hard to find!

# Time of Day - Tissue Sampling Project

## •Method

–Tissue samples collected in triplicate

–Samples collected at

•9 AM, 11 AM, 1 PM, 3 PM, 5 PM

–Crops

•Wheat (Northwood, ND)

– Tillering, Boot and Heading: 1 site

•Soybean (Northwood & Benson)

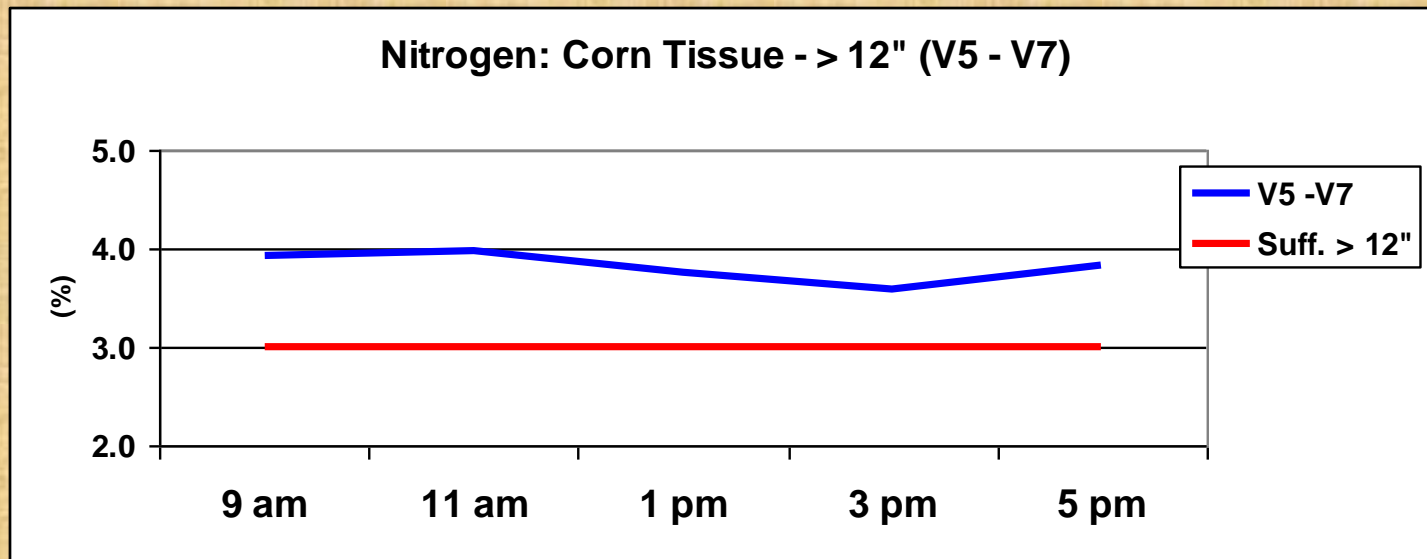
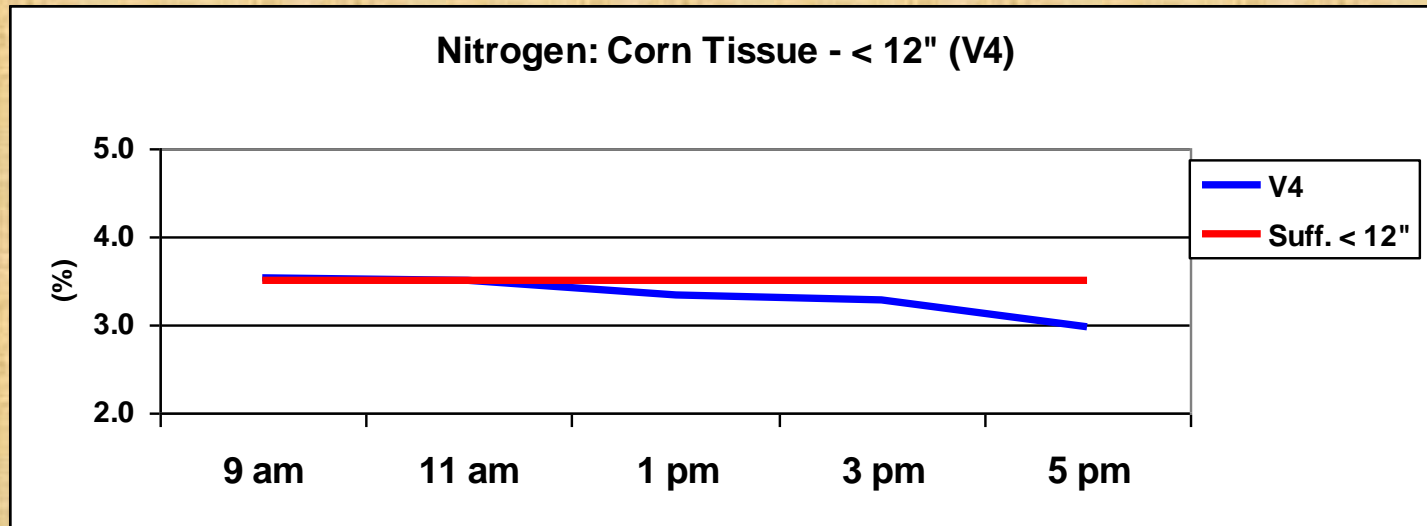
– Less than 6” and Early Bloom: 3 sites

•Corn (Northwood & Benson)

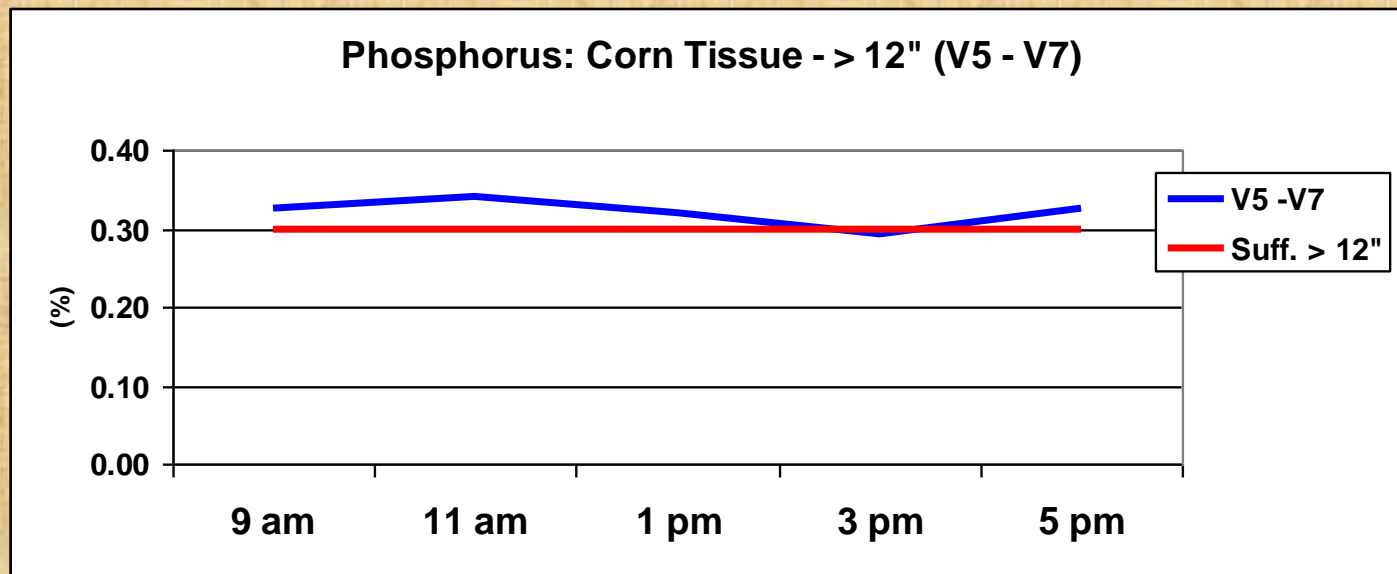
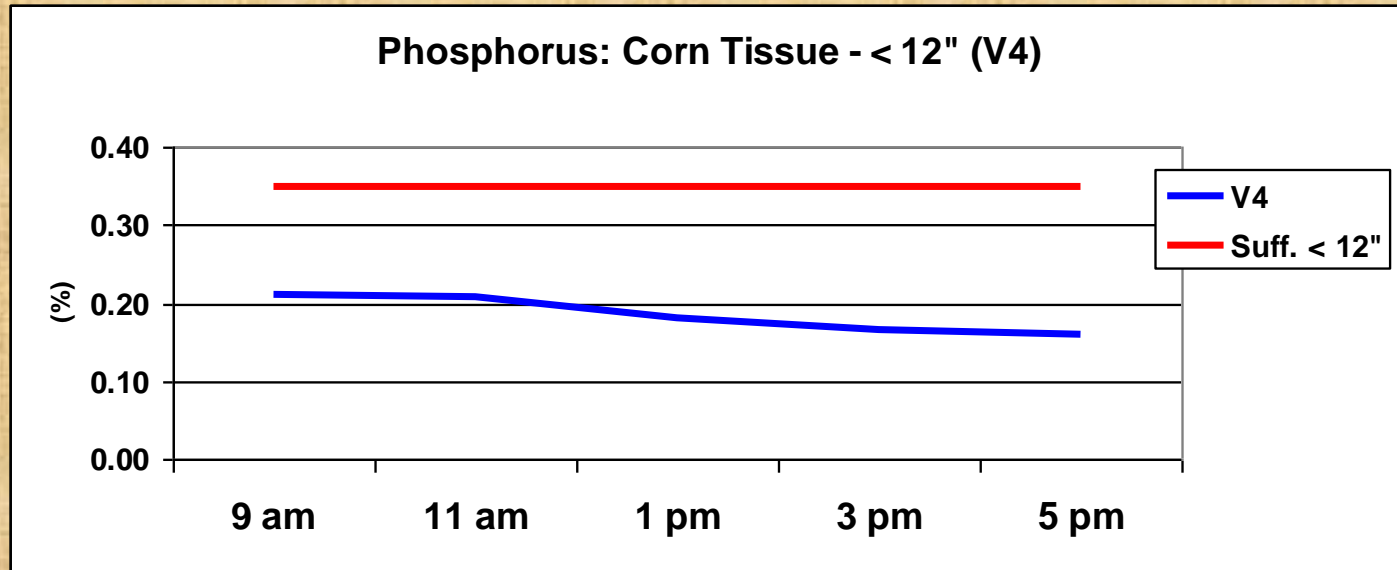
– <12” (V4): 1 site

– 12” to tasseling (V5 – V7): 3 sites

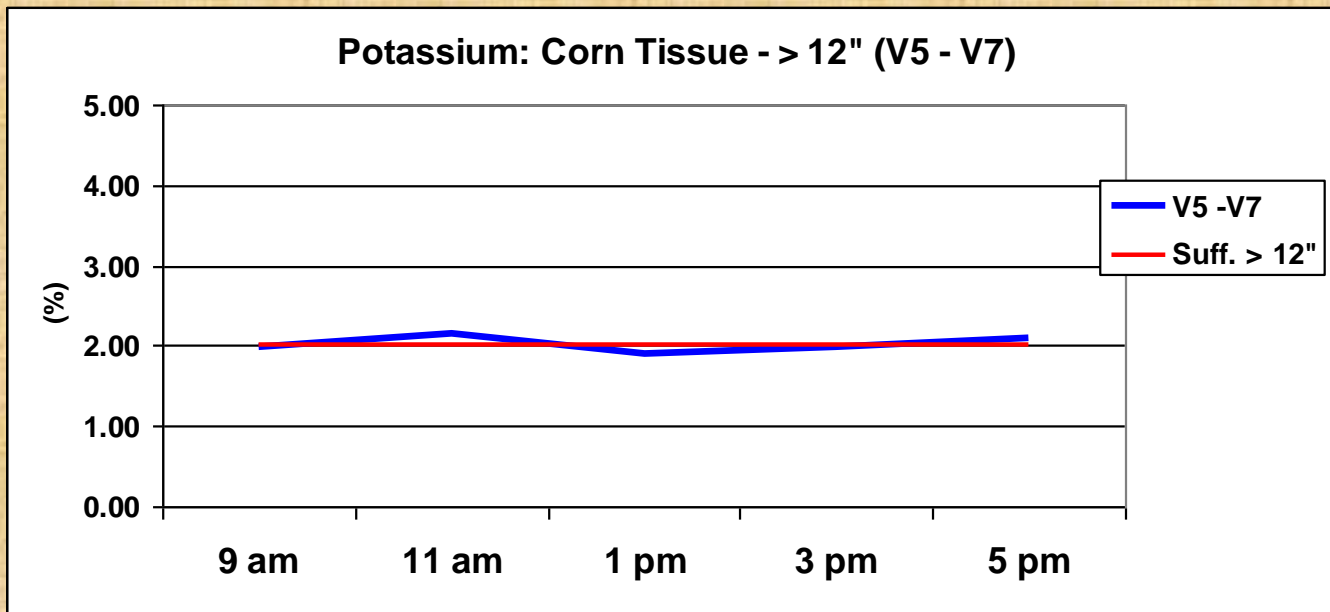
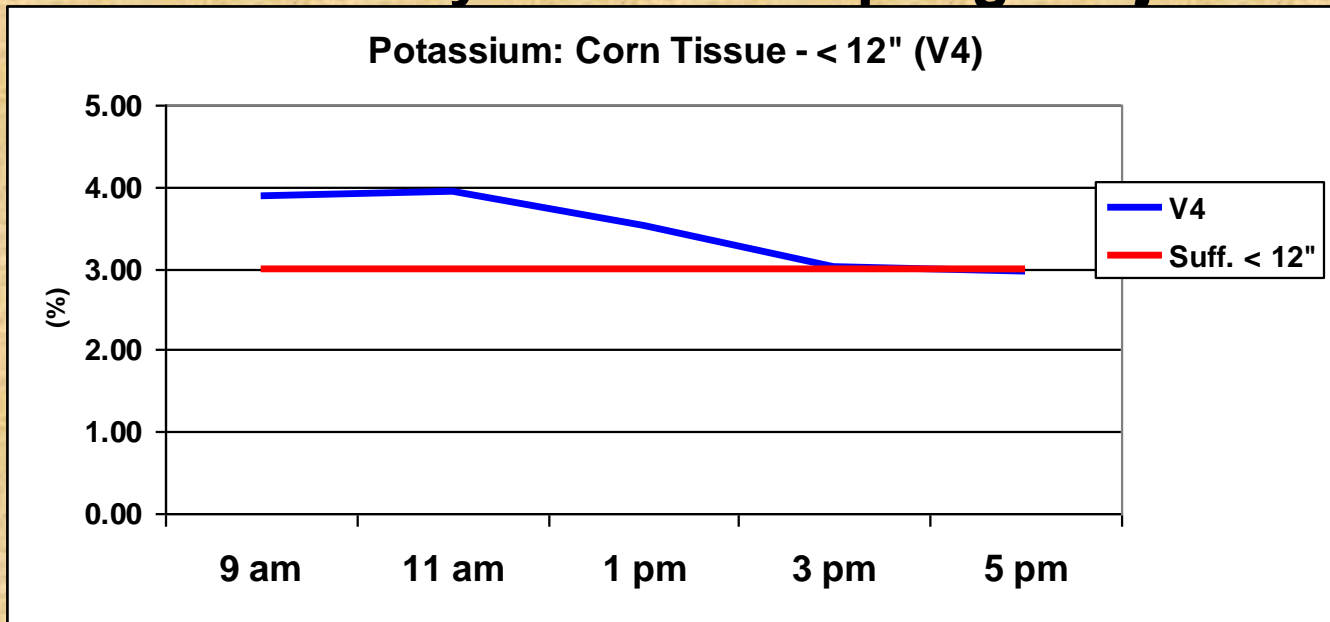
# Time of Day Tissue Sampling Project



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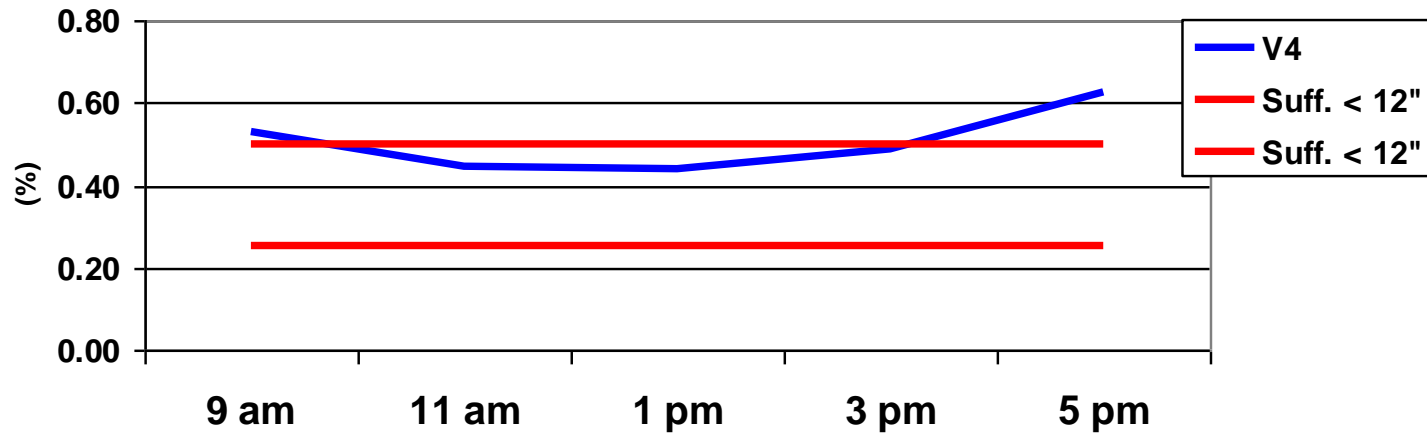
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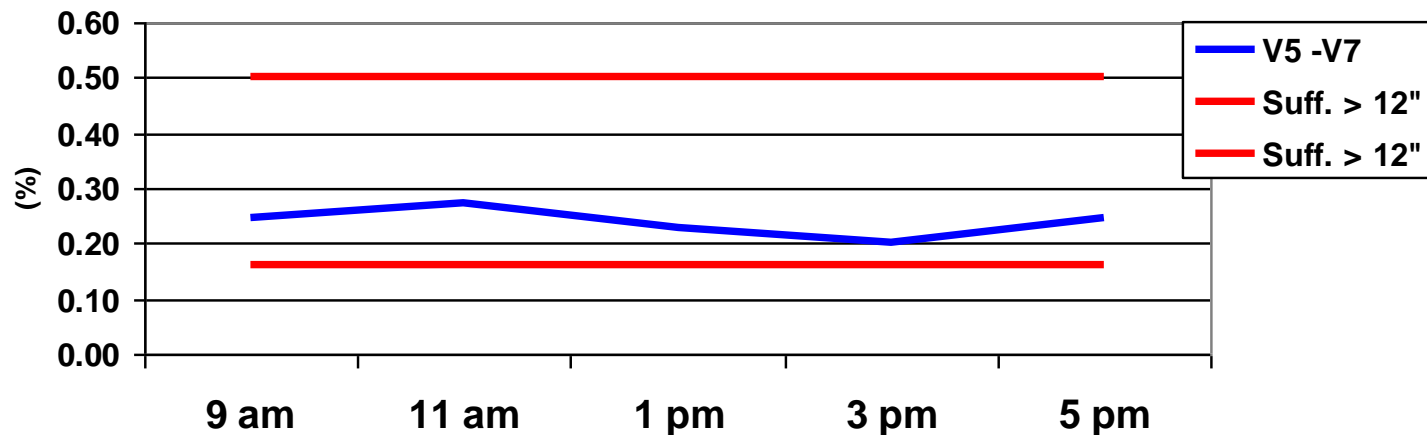


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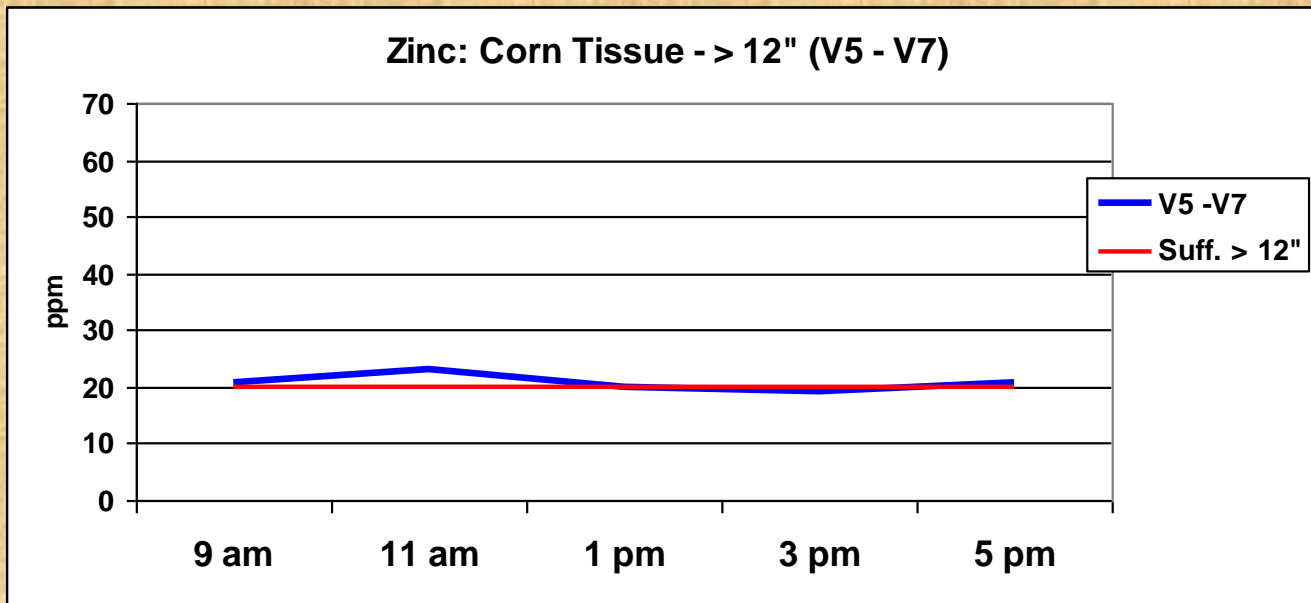
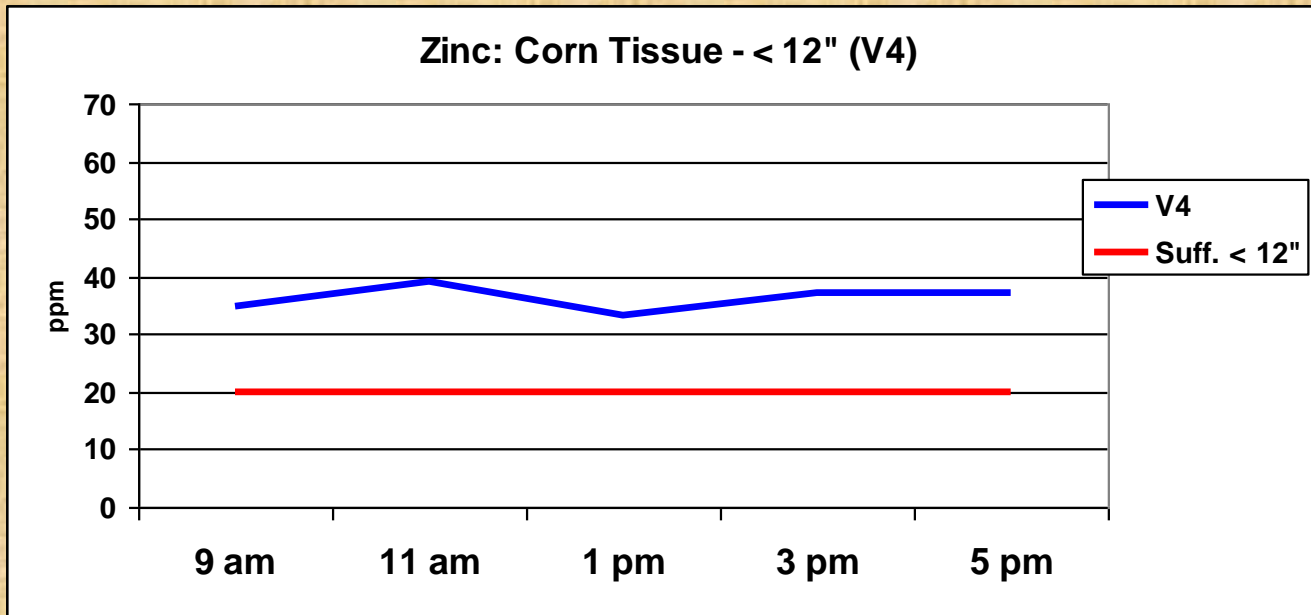
## Sulfur: Corn Tissue - < 12" (V4)



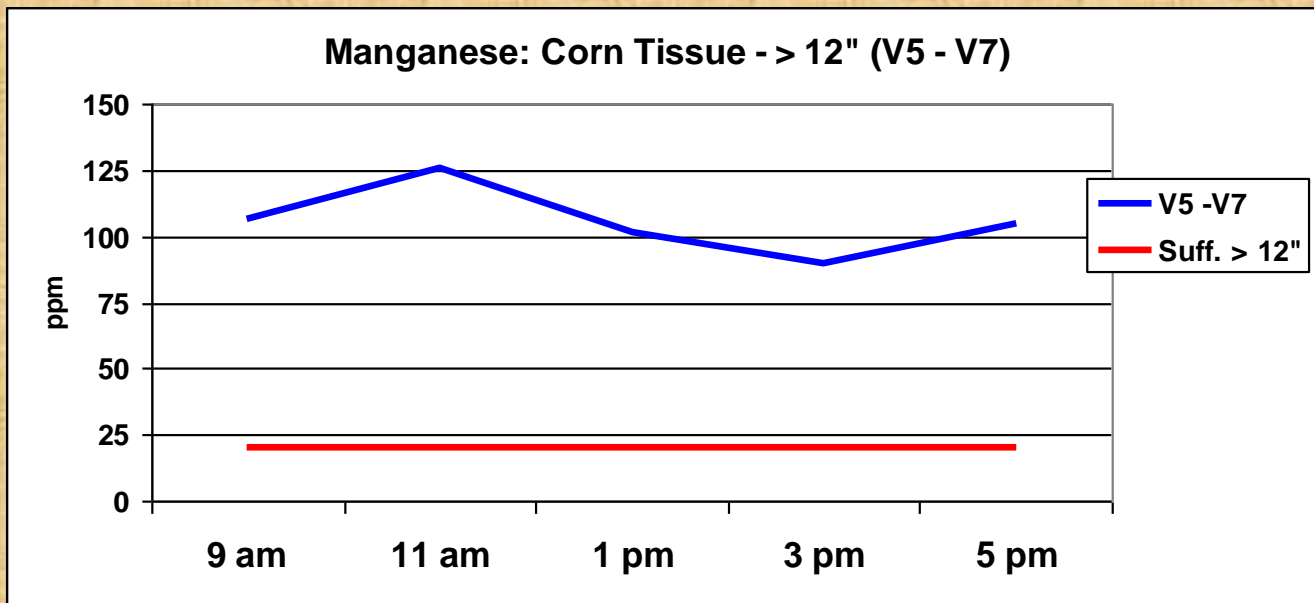
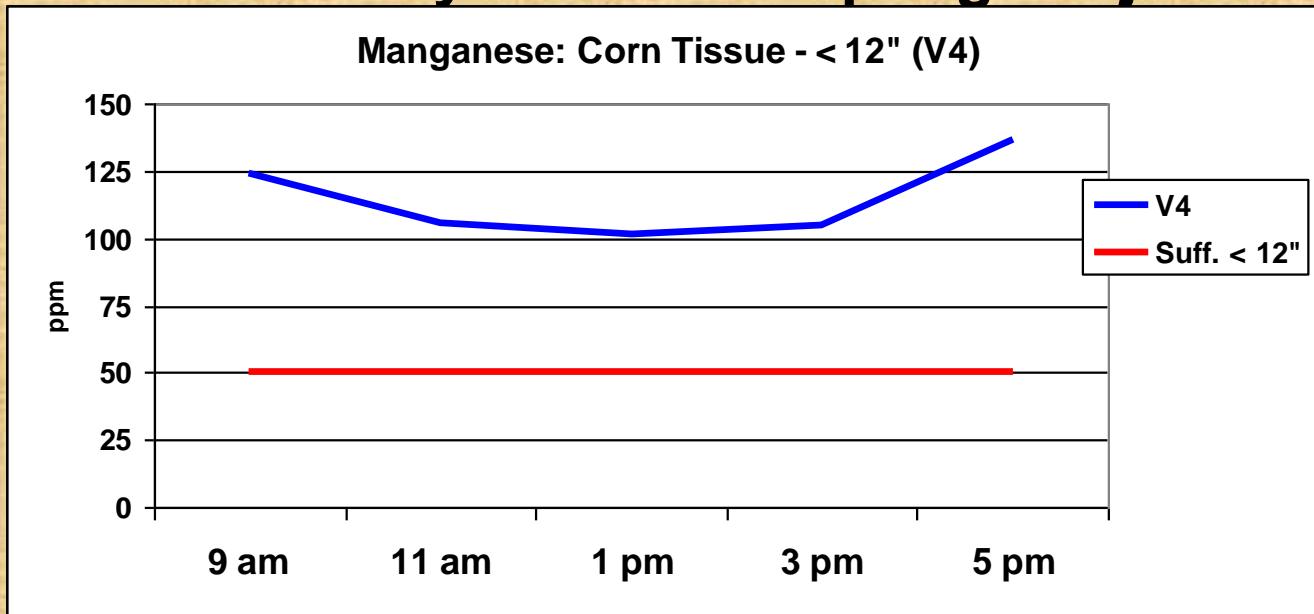
## Sulfur: Corn Tissue - > 12" (V5 - V7)



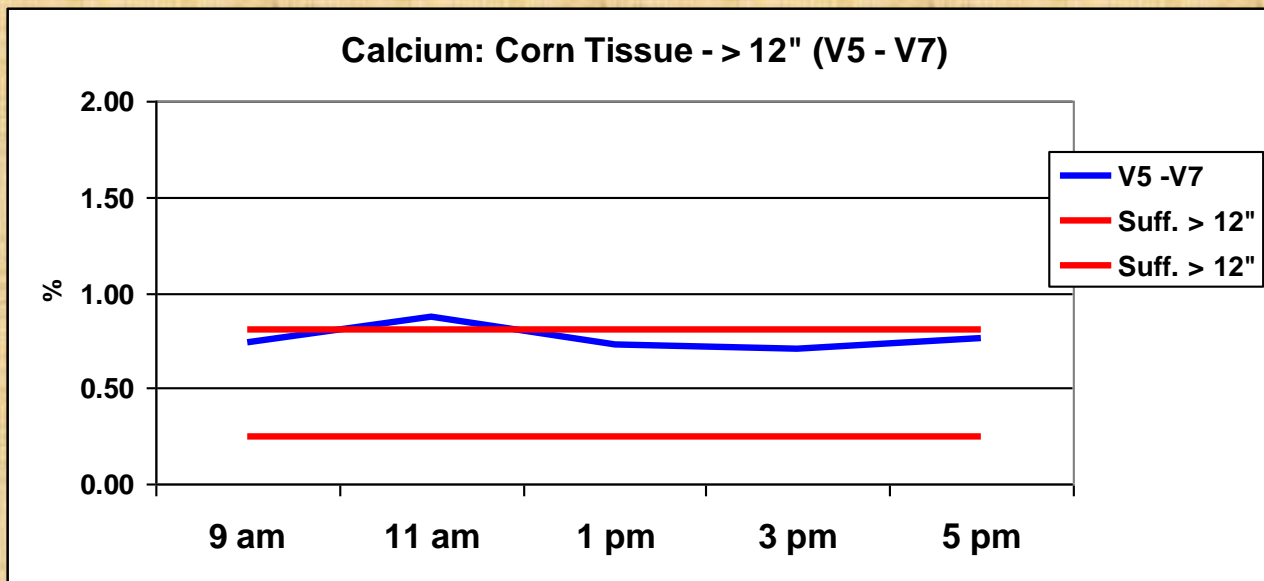
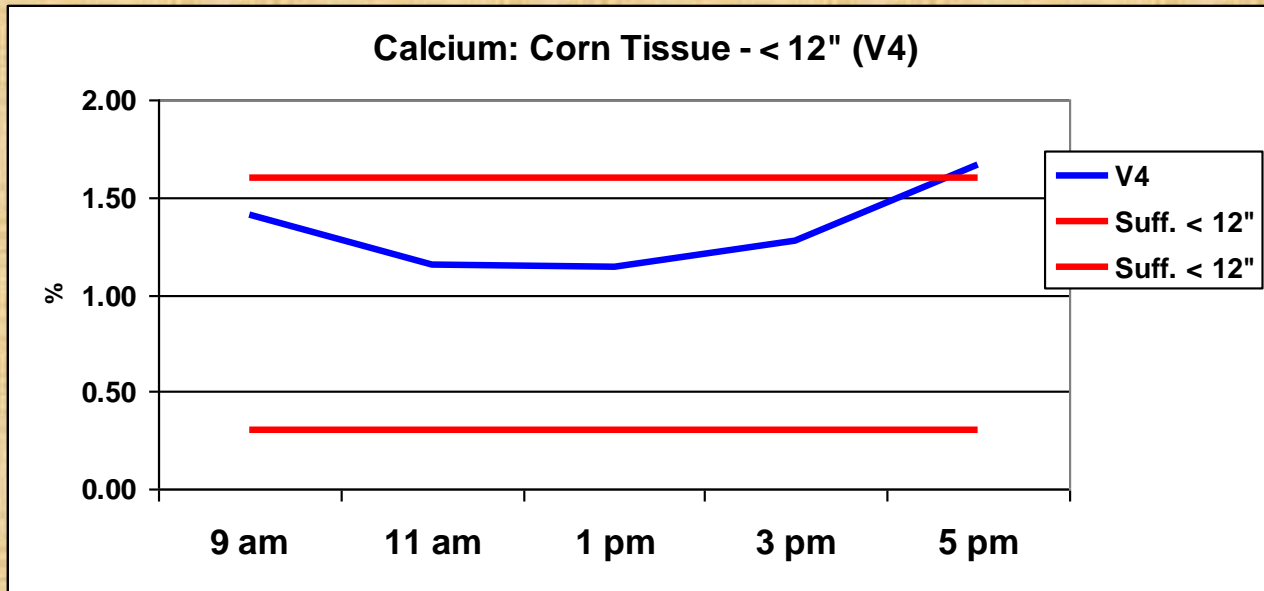
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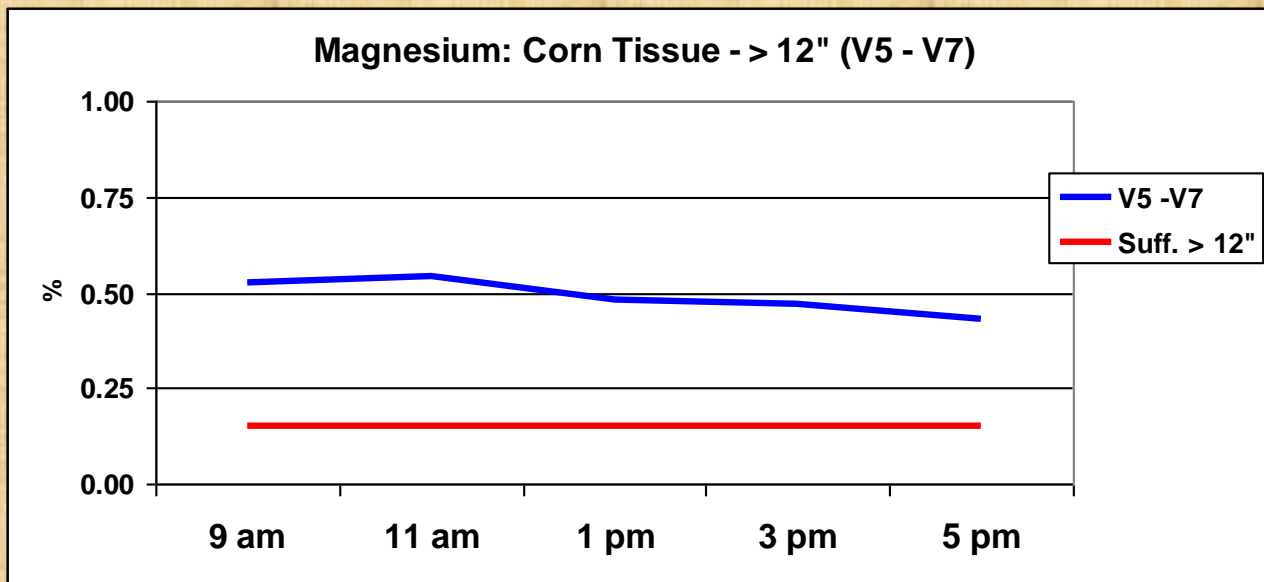
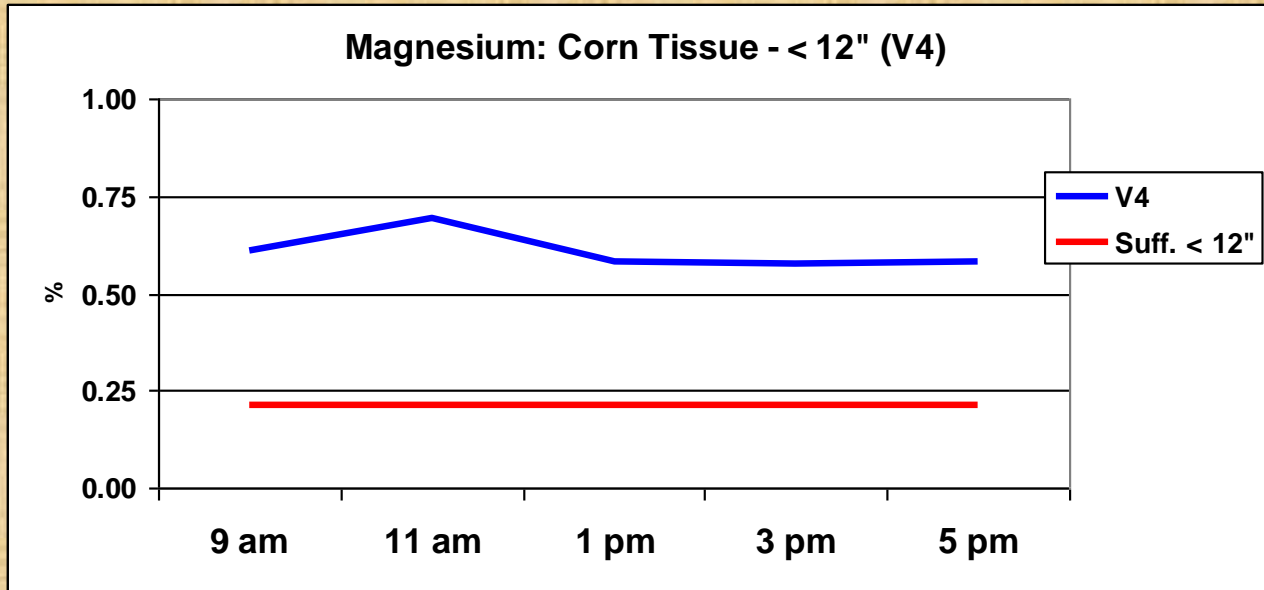
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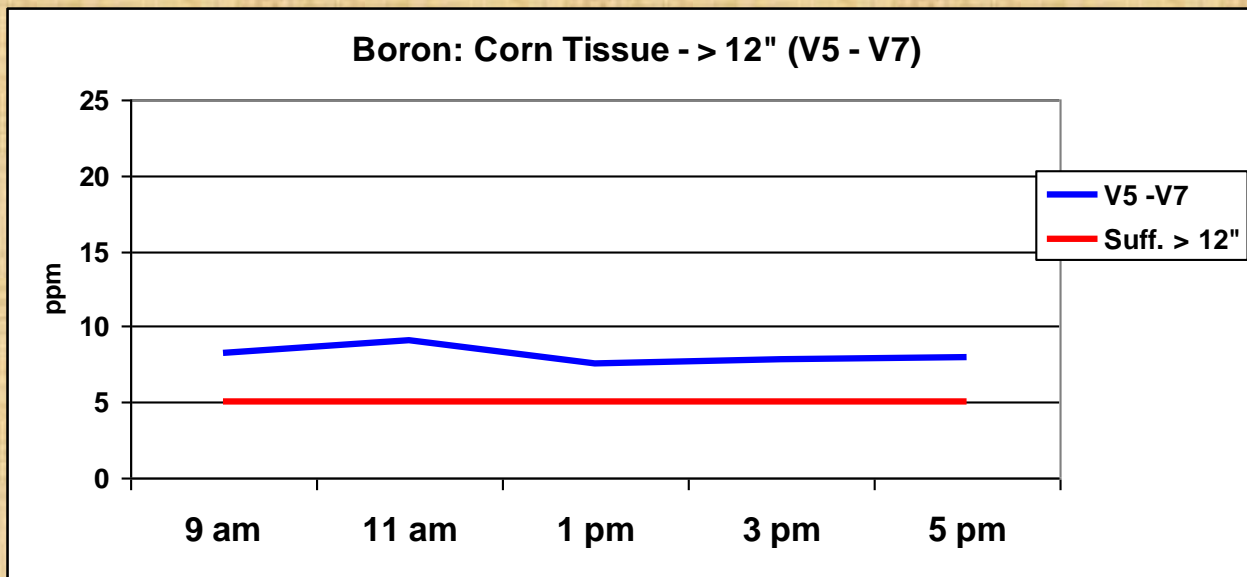
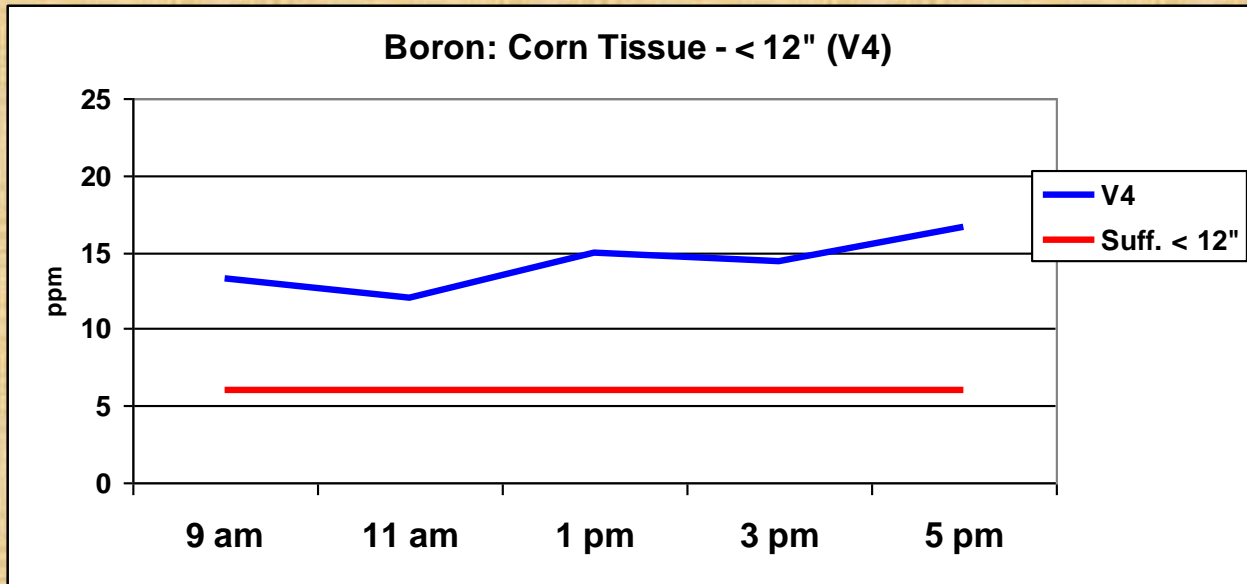
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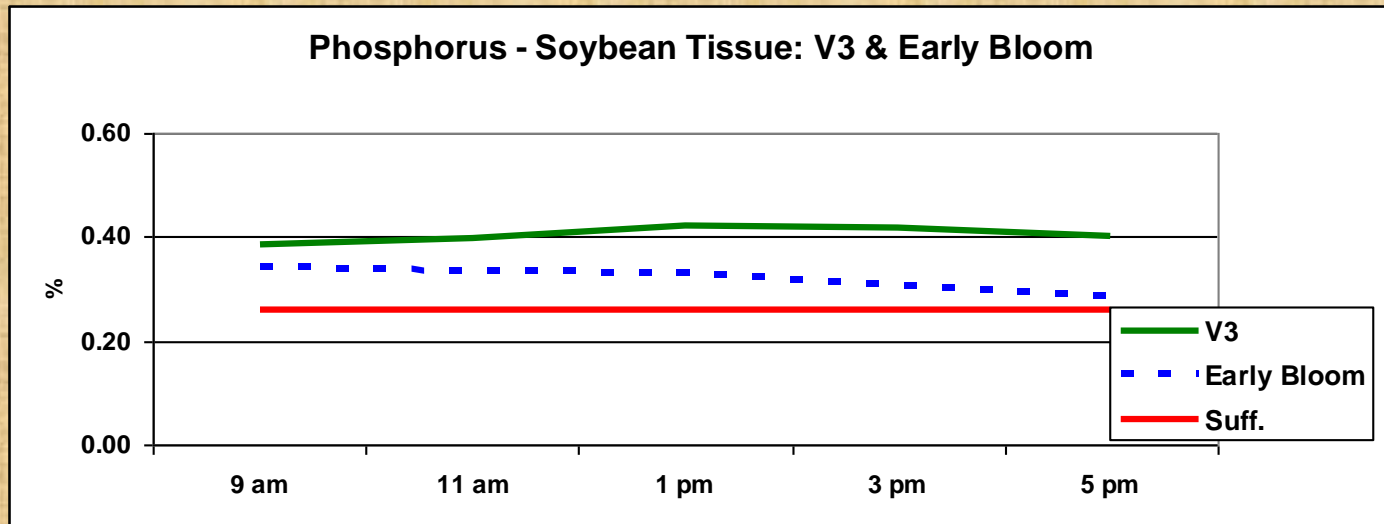
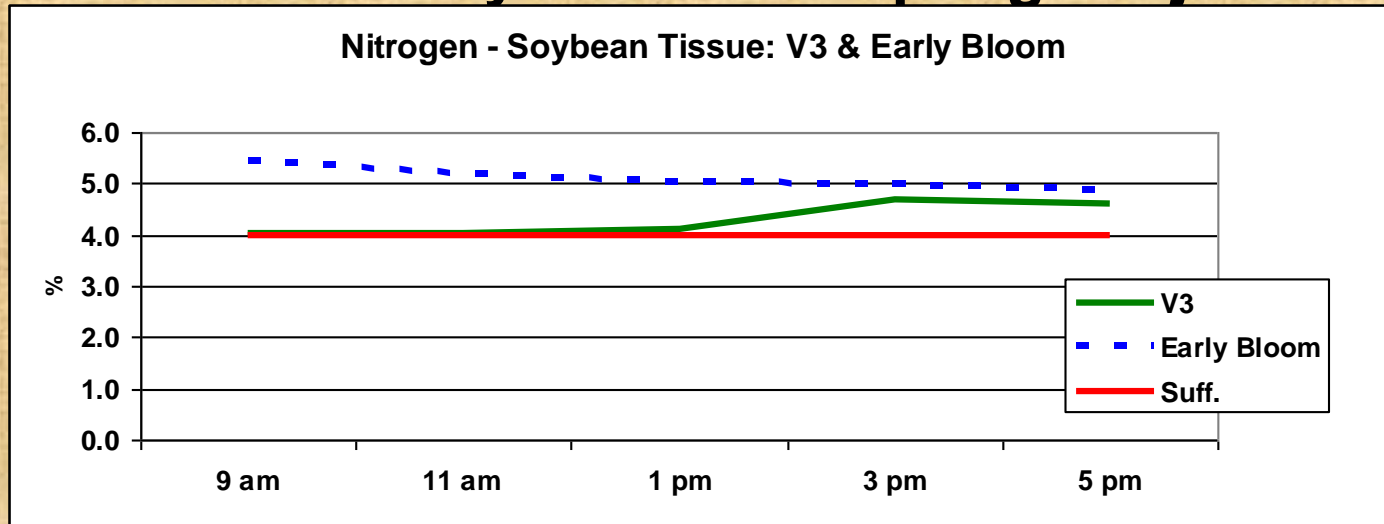
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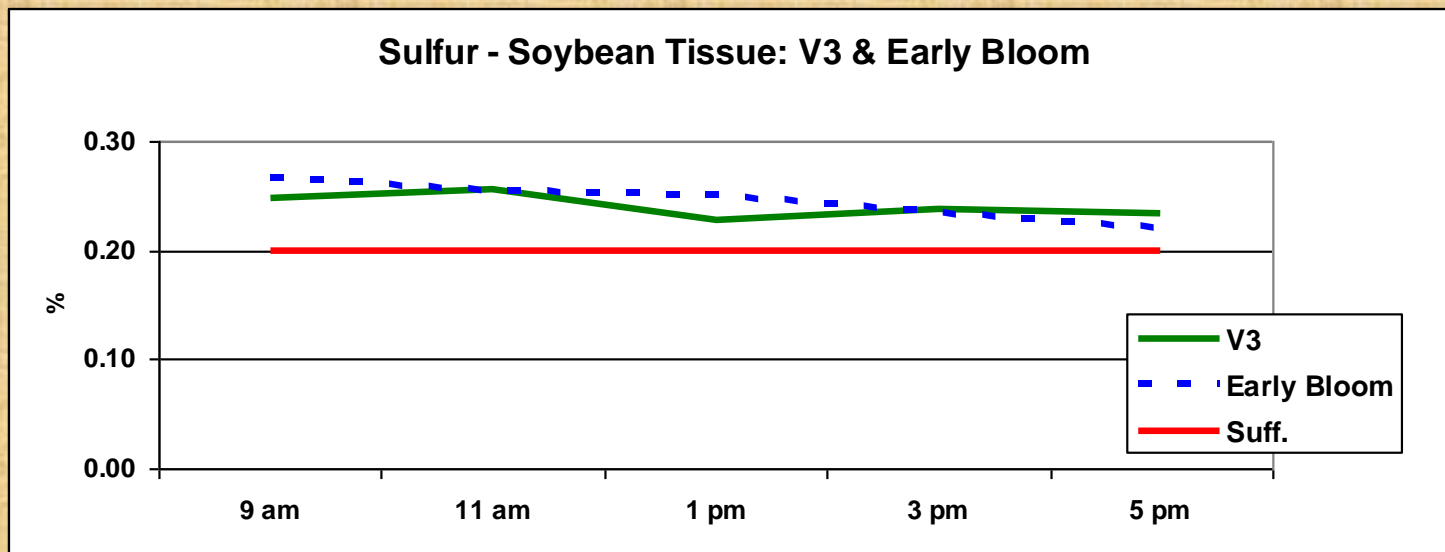
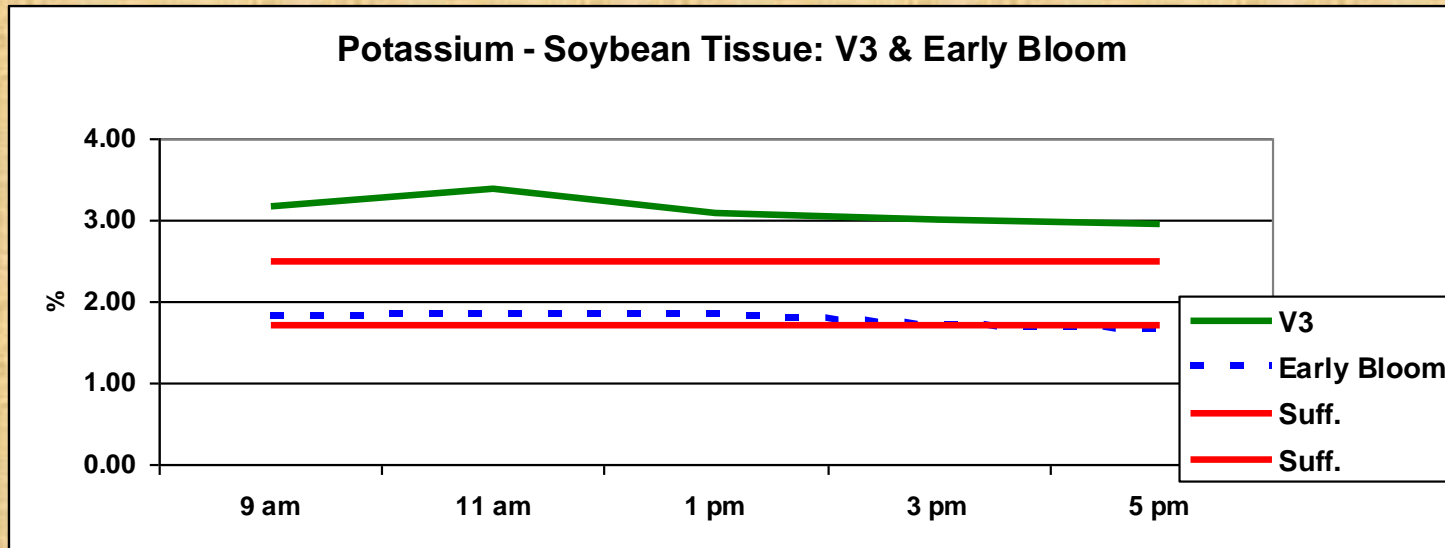
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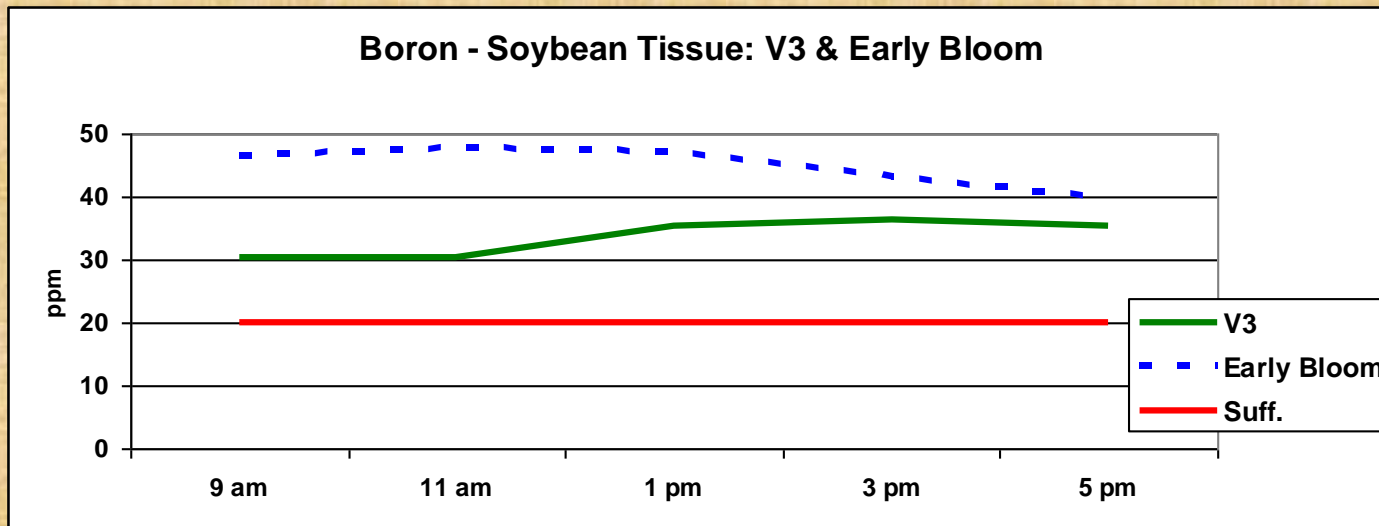
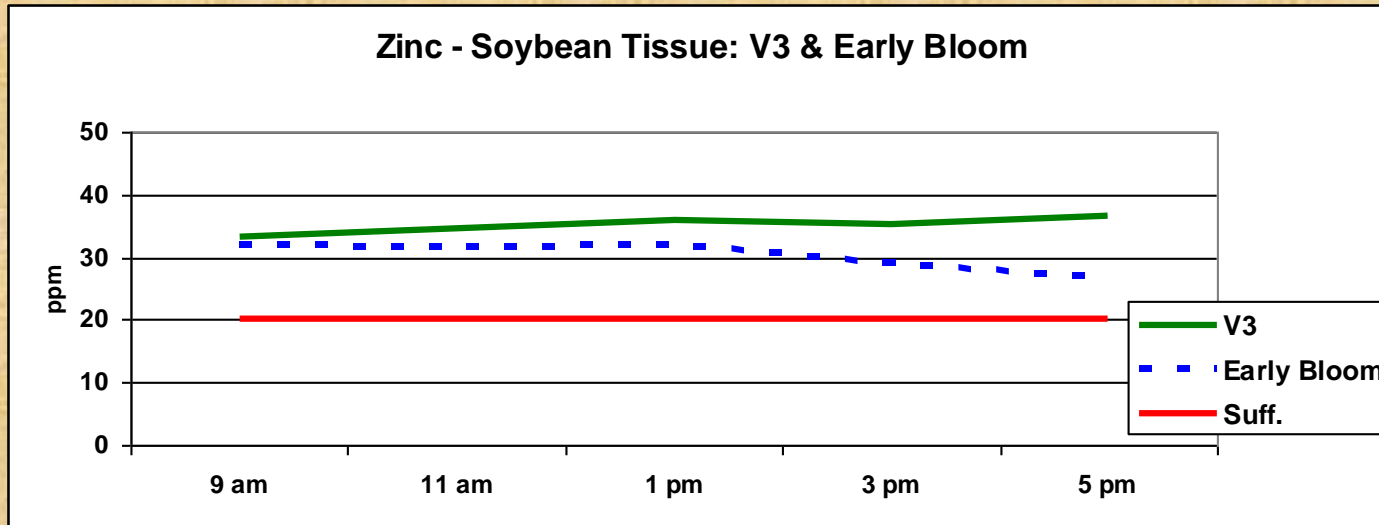


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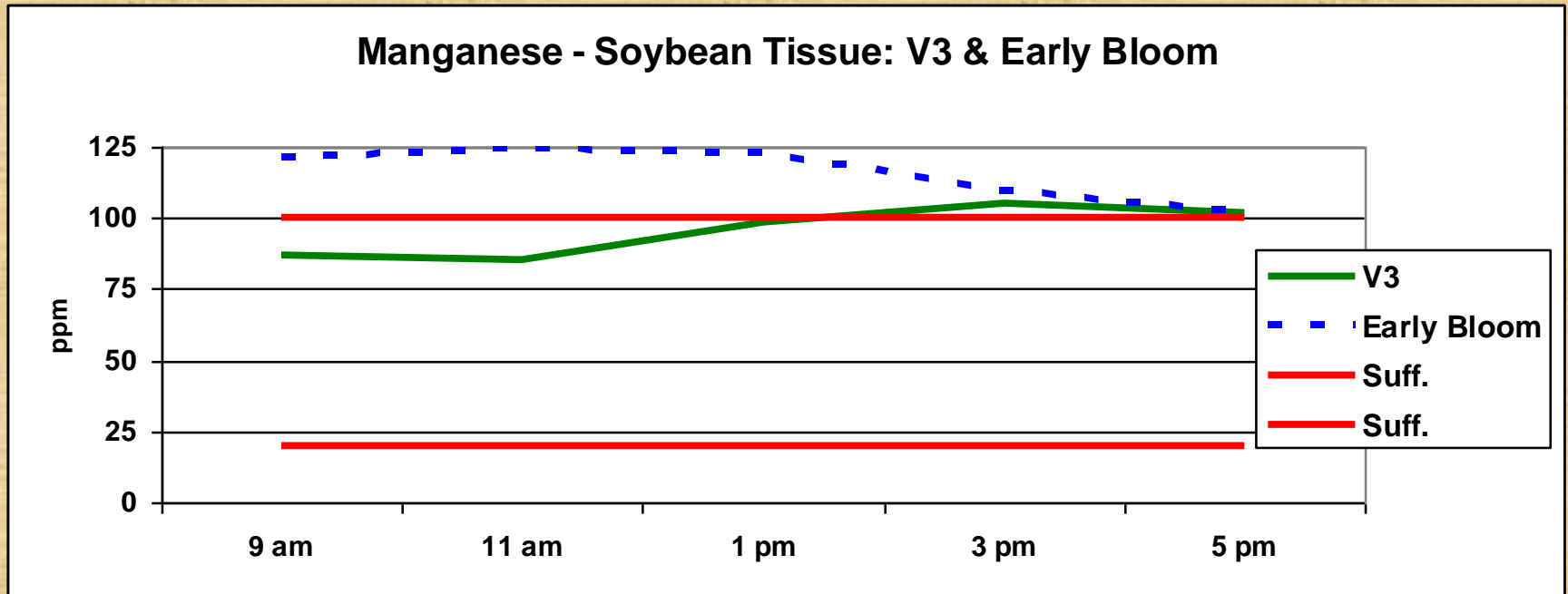




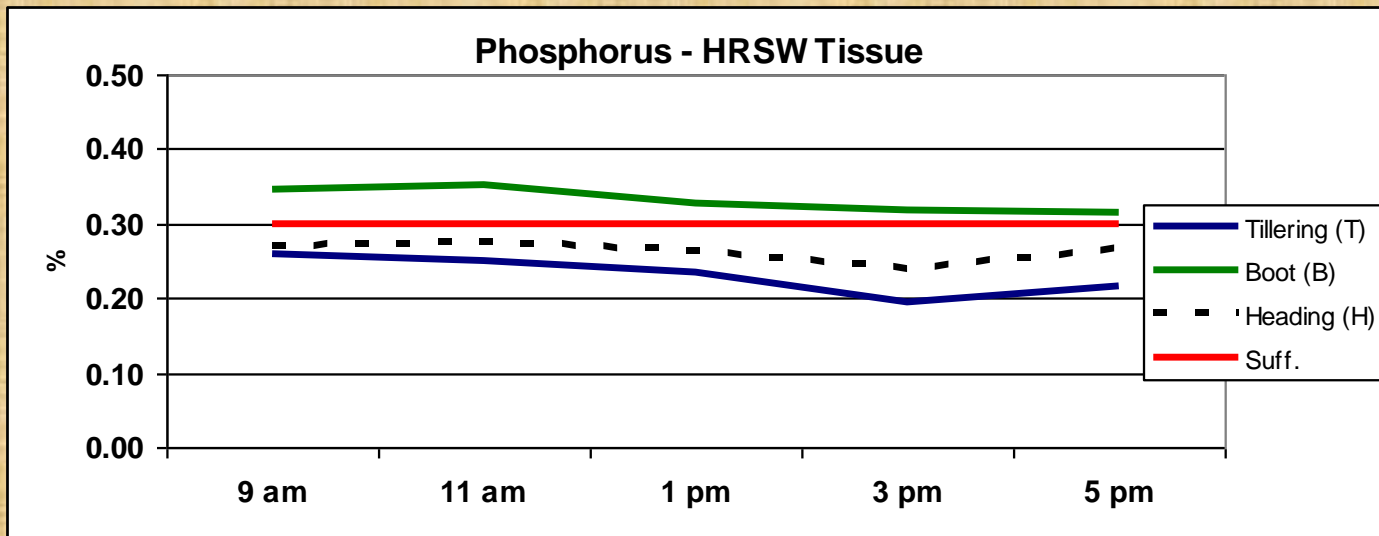
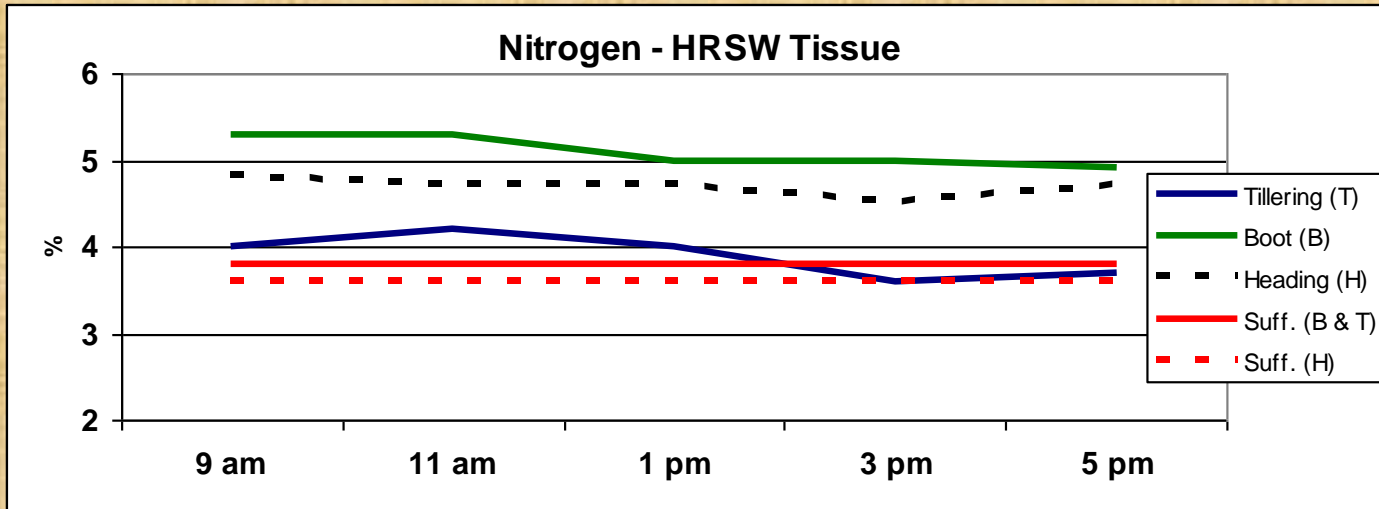
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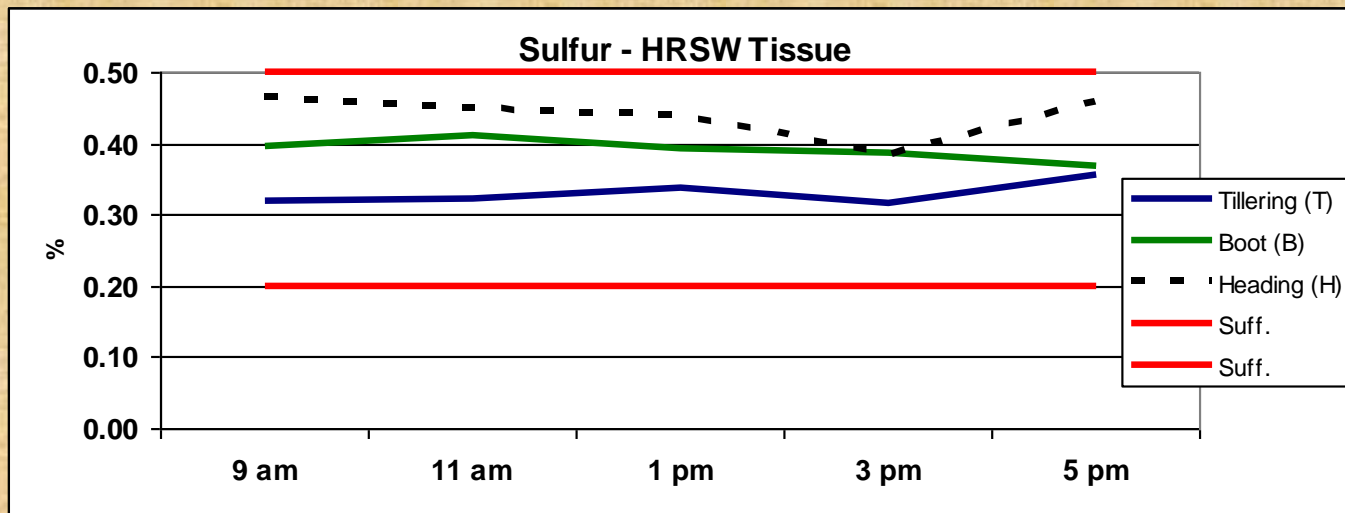
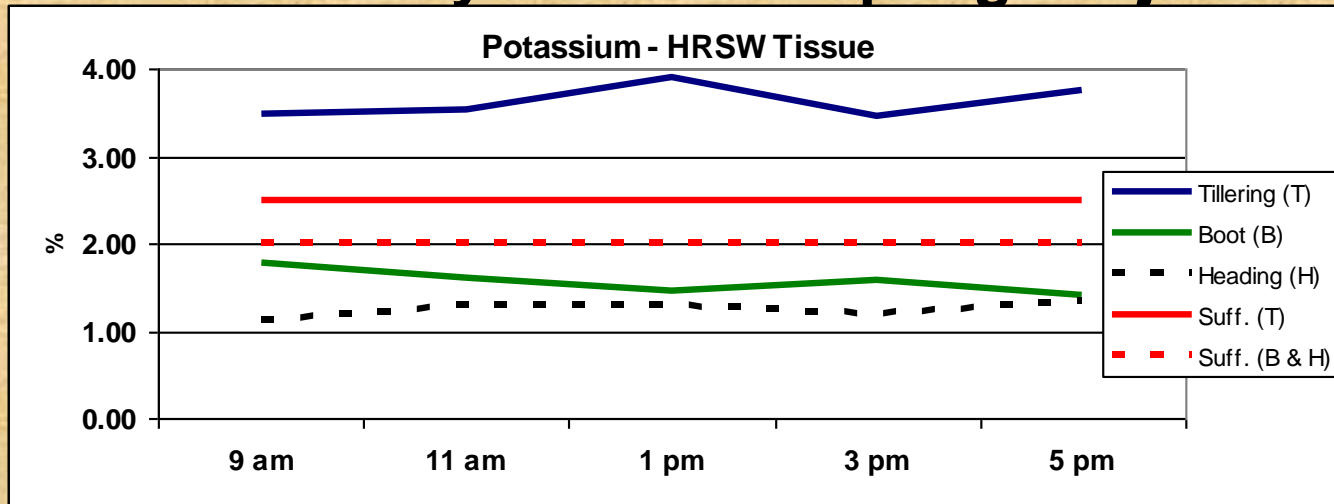
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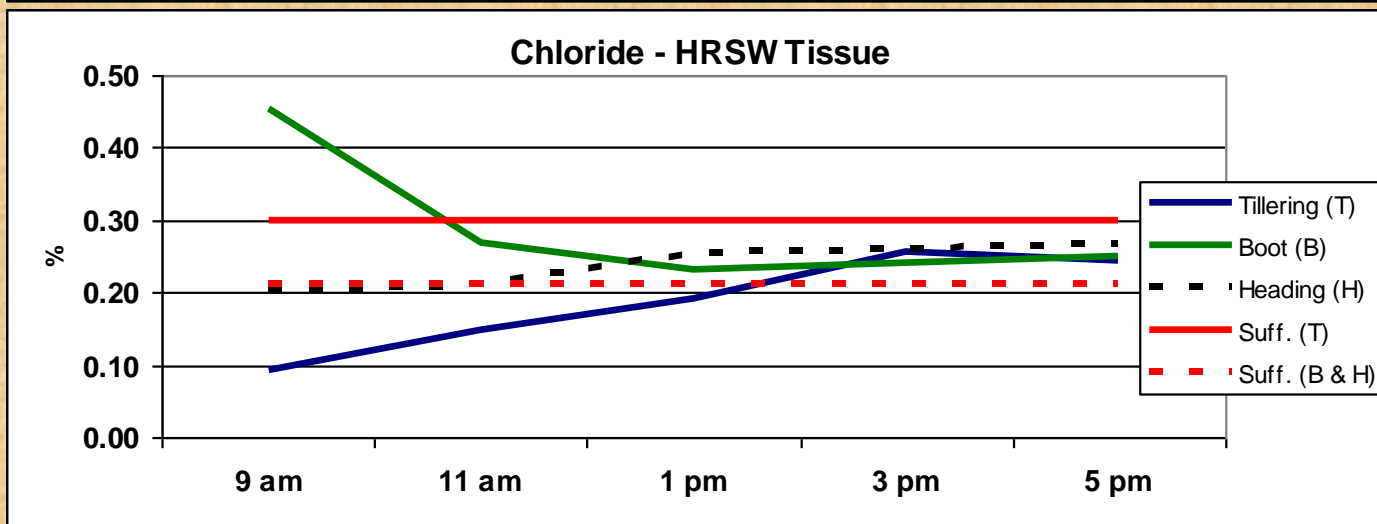
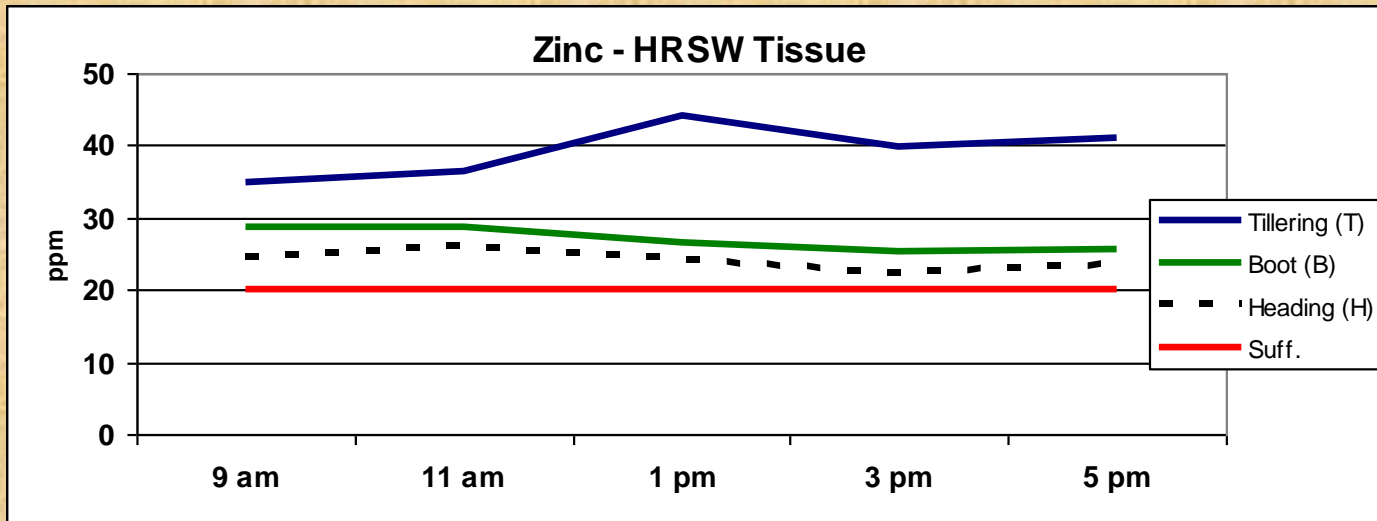
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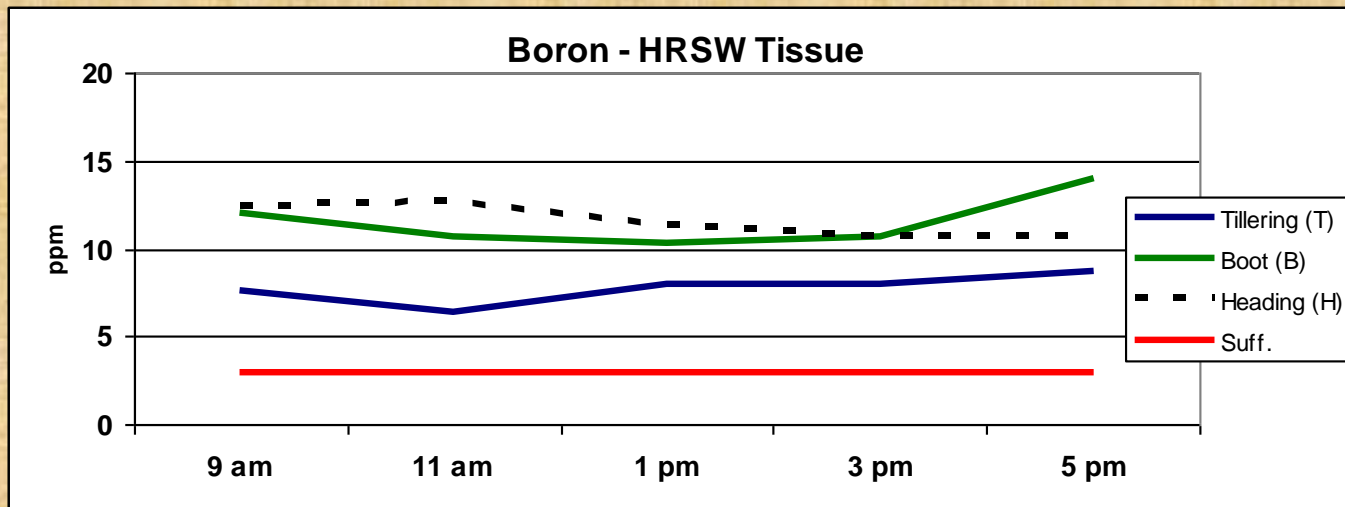
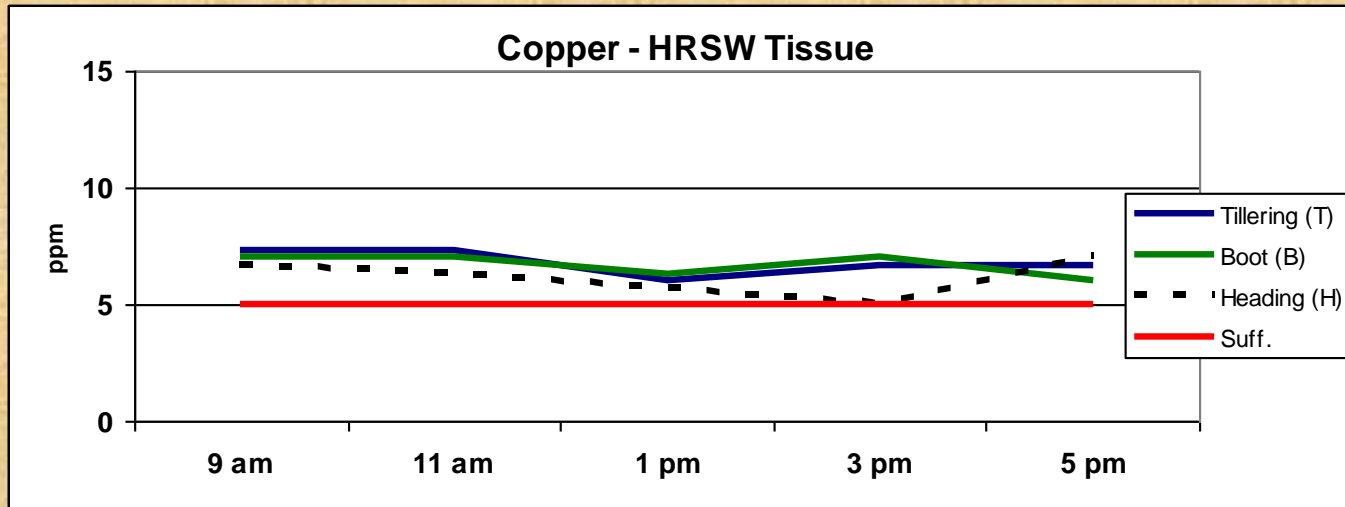
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## Summary and Conclusion

1. Time of day plant tissue sampling **does not show significant difference** in plant tissue nutrient concentrations for corn, soybeans or wheat.
2. Tissue sampling any time of day will provide useful information. While there may be minor changes in nutrient concentration through the day, the interpretation of nutrients being sufficient or deficient would be the same no matter what time of day the sample was collected.