Research Summary

Control Wheat

Treated Wheat
1 pint/acre

Wheat Farm in Southwest Kansas

All wheat was treated with standard fertilizer and chemical program

Portion of the field was treated with 1 pint/acre InGrained

Photos are approximately 2 weeks after application of InGrained and taken in the same field, same time

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Product was applied via self-propelled sprayer

Boom line can be seen in photos below (highlighted for ease of viewing)

Samples were manually collected in 8 locations of the field (4 Control and 4 Previously Treated with InGrained at label dosing).

Samples were pulled from the ground with root matter intact (as much as possible), photographed, processed, and sent to lab for testing.

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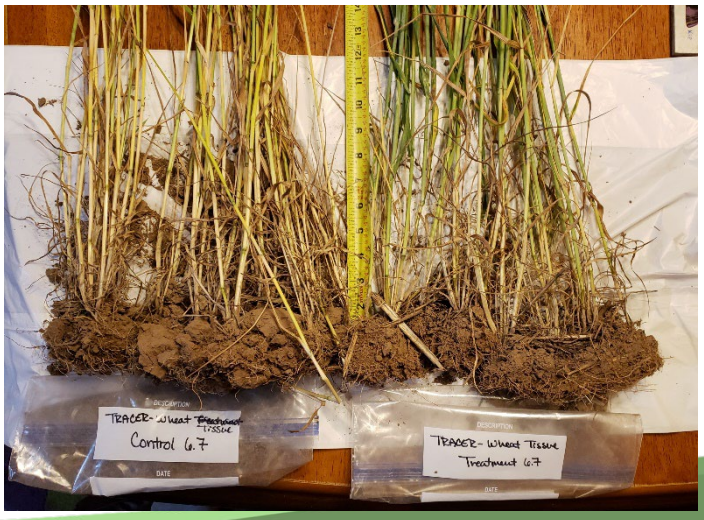
Head Height

Control: 22-31”

InGrained: 27-35”



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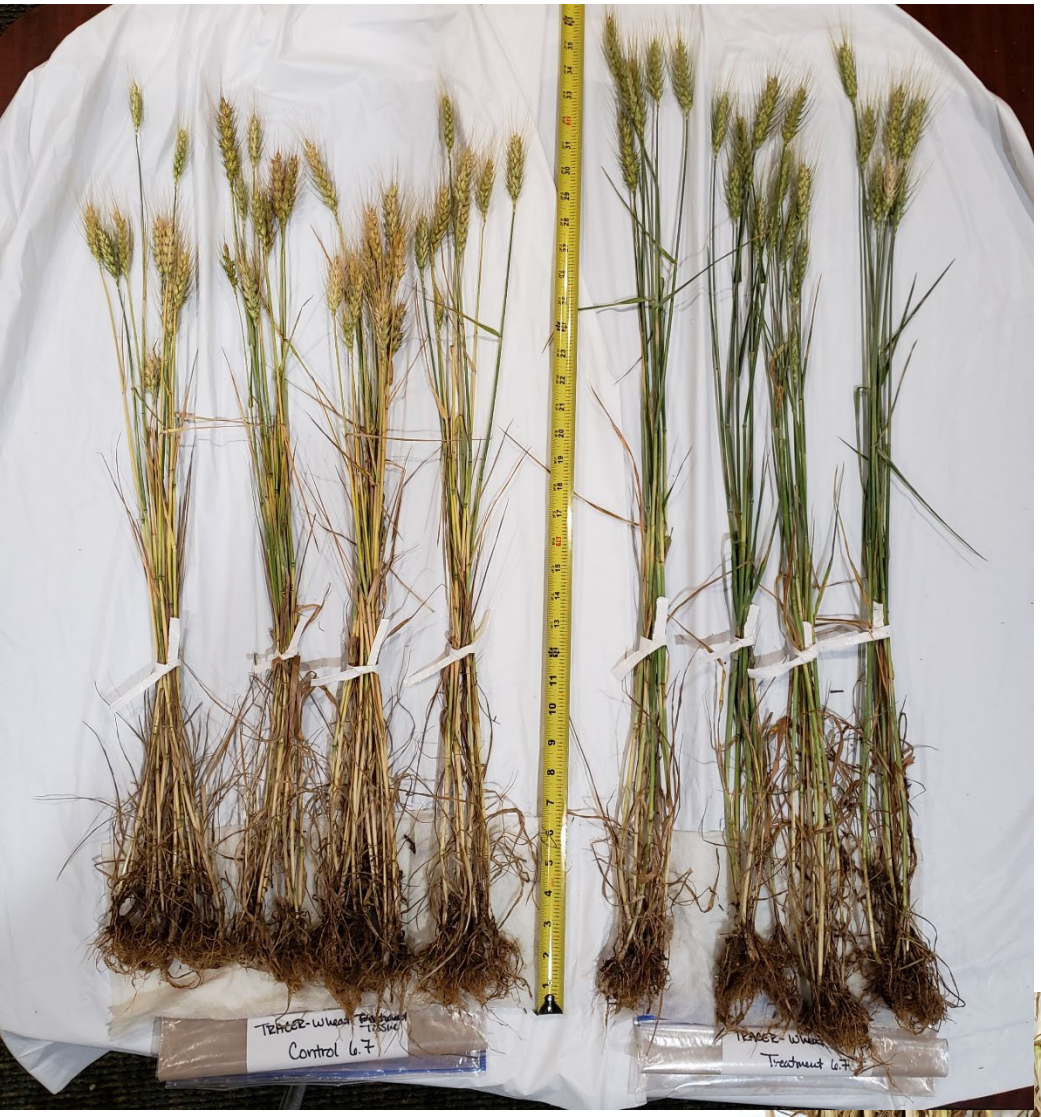

4 different sample locations in the field for each treatment

Washed roots

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Note the difference in dry down and head size/kernel number between the two groups

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Note on the controls there are black spots forming at tips

Wheat Samples- Whole Plant Including Heads				
		Control	InGrained	% Diff over Control
Total Nitrogen	%	1.14	1.24	8.8%
Phosphorus	%	0.1	0.18	80.0%
Potassium	%	1.08	1.16	7.4%
Calcium	%	0.11	0.12	9.1%
Magnesium	%	0.08	0.1	25.0%
Sulfur	%	0.07	0.1	42.9%
Zinc	mg/kg	7	14	100.0%
Iron	mg/kg	137	201	46.7%
Manganese	mg/kg	62	92	48.4%
Copper	mg/kg	3	4	33.3%
Boron	mg/kg	3	3	0.0%
Sodium	%	<0.01	<0.011	
Nitrogen:Sulfur	N:S	15.7	13	
Nitrogen:Potassium	N:K	1.1	1.1	

InGrained Treated wheat plants were higher in every level except that of Boron in which it was equal. This shows that InGrained was better able to move those minerals in and throughout the plant.

Mineral Uses	
Calcium	Nitrogen Metabolism, Detox Agent, Growth Points, Grain Quality
Magnesium	Chloroplast Stability, Energy Production, Enzymes, Protein Synthesis
Zinc	Cell Division, Protein Synthesis, Nitrogen Metabolism, Grain Quantity
Iron	Nitrogen Utilization, Protein Metabolism, Enzyme Function, Photosynthesis
Manganese	Lignin Synthesis, Membrane Maintenance, Heat Tolerance, Vertical Growth
Copper	Seed Formation, Yield, Immunity, Protein Synthesis
Boron	Energy Utilization, Nutrient Transfer, Pollination

Wheat- Leaves and Stems				
		Control	InGrained	% Diff over Control
Total Nitrogen	%	0.51	0.73	43.1%
Phosphorus	%	<0.05	0.11	120% (min)
Potassium	%	1.25	1.59	27.2%
Calcium	%	0.19	0.19	0.0%
Magnesium	%	0.1	0.08	-20%
Sulfur	%	0.07	0.07	0.0%
Zinc	mg/kg	4	11	175%
Iron	mg/kg	114	105	-7.9%
Manganese	mg/kg	96	112	16.7%
Copper	mg/kg	3	11	266.7%
Boron	mg/kg	3	5	66.7%
Sodium	%	<0.010	<0.010	
Nitrogen:Sulfur	N:S	7	10	
Nitrogen:Potassium	N:K	0.4	0.5	

Control Plants were lower than InGrained plants in every mineral except for Magnesium and Iron, and with the same levels for Calcium and Sulfur.

		InGrained		Control	
		Whole Plant	Leaves/ Stems	Whole Plant	Leaves/ Stems
Total Nitrogen	%	1.24	0.73	1.14	0.51
Phosphorus	%	0.18	0.11	0.1	<0.05
Potassium	%	1.16	1.59	1.08	1.25
Calcium	%	0.12	0.19	0.11	0.19
Magnesium	%	0.1	0.08	0.08	0.1
Sulfur	%	0.1	0.07	0.07	0.07
Zinc	mg/kg	14	11	7	4
Iron	mg/kg	201	105	137	114
Manganese	mg/kg	92	112	62	96
Copper	mg/kg	4	11	3	3
Boron	mg/kg	3	5	3	3

When comparing the results of the stems and leaves to that of the entire plant, it is seen that there are certain metals that are more heavily distributed to the head of the plant, instead of being contained within just the structural components of the plant. Leaf and Stems have higher quantities of Potassium, Calcium, Manganese, Copper, and Boron. Elements like Magnesium, Sulfur, Zinc, and Iron were more concentrated in the heads.

This shows the synergistic effects of having a proper mineral balance throughout the plant to ensure genetic potential is reached.

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