Grain Crops

Proprietary - Effect of NuEarth Soil Products on Wheat Development & Yield

NuEarth products, applications and measurements occurred during the growing season of 2025 in plots of 5.75m in width by 12.2m in length. Crop used for this experiment was AAC Wheatland Canadian Western Red Spring (CWRS) wheat with 99% germination rate and a TKW of 40.8g. Seeding was performed with a No-till hoe Fabro seeder with side banding and liquid kit (2008) attached to ford tractor 1720 (1998). Side banding fertilization was calculated to attain a yield goal of 65 lb/acre. BRIX after application, leaf extraction for macro and micronutrient analysis, plant height, yield, test weight, moisture, protein content and thousand kernel weight (TKW) were taken from each plot.

Treatments consisted of the following:

- Treatment 1, growing standard: Seed treated with Vibrance Quatro, Urea and MAP for N and P respectively
- Treatment 2: NuEarth seed dressing, N reduced to 90% and fertilizer coated with OMEX TNT starter at 4.5 gal/acre and liquid side banding with 1:3 residue digestor:distilled water dilution
- Treatment 3: same as treatment 2 seed, N dressing minus the residue digestor
- Treatment 4: similar to treatment 2 but instead of the residue digestor, OMEX TNT starter mixed with NuEarth HDI were applied as liquid side banding. Mixture was diluted at the same ratio as the residue digestor.
- Wheat plants seeded in treatment 2 and 3 underwent a B and a Ca blend foliar application before flowering stage.
- An extra treatment was added (Treatment 5), where wheat seed was coated with NuEarth seed dressing. No fertilizers or extra amendments were added to this treatment.

The experiment was set as a complete random block design with three replicates. An analysis of variance was conducted. Each treatment was considered a fixed effect whereas replicates were stated as random. Variables were number of emergent plants per m, BRIX readings before and after foliar application and its difference; content of macronutrients such as N, P, K, Ca, S, and Mg and micronutrients such as Al, B, Cu, Fe, Mn, Na and Zn; plant height, yield, test weight, moisture, protein content and TKW. All analyses of variance were performed in SAS 9.4 (SAS Institute, 2008) using PROC MIXED. Significance was assessed at a confidence level of 0.05. LSD analysis was used to compare means for each parameter among treatments. No transformations were done as values were statistically normal (Anderson-Darling $P>0.05$).

Number of emergent plants ($P<0.0001$), height ($P<0.0001$), and N content ($P=0.0099$) differed among treatments (Table 2A-1). Number of emergent plants was significantly greater in wheat under treatments 3 and 4 compared to wheat plants grown under standard practices (treatment 1) and wheat side banded with residue digestor dilution (treatment 2).

It is possible the residue digestor may be having an influence in reducing emergence as wheat that was side banded with either OMEX TNT (treatment 3) or OMEX TNT plus liquid HDI (treatment 4) had greater number of emergent plants. All treatments had greater emergence than wheat grown to only NuEarth seed dressing (treatment 5).

Despite height in wheat there was no lodging found in any plots. This is likely attributed to the variety itself since AAC Wheatland lodging rating is categorized as very good. Further experiments may be required to gain a most robust perspective on lodging.
Taller plants were observed in wheat seeded to applications outlined for treatment 3 compared to plants sown in treatments 2 and 4 plots (Table 2A-2).

Mean height in wheat from treatment 3 plots were statistically the same as height averaged from wheat plants sown to grower standards (Table 2A-2). Plant heights were the same in treatment 2 and 4 meaning that despite a foliar application in treatment 2, plants did not gain any height advantage in comparison to wheat plants left unsprayed in treatment 4.

N content in leaves was greater in wheat grown in treatment 3 plots. However, content was statistically the same as that found in leaves from wheat planted in plots from treatment 2 and plots sown to growing standards. This shows that NuEarth and OMEX TNT starter coatings for seed and fertilizer respectively may be contributing for wheat to accumulate more N in their leaves and thus increase photosynthesis.

It also shows that HDI side banding applied in treatment 4 plots may have impacted N content in wheat leaves. N content in wheat sown in treatment 4 plots was lower compared to N content extracted from plants sown in treatment 3.

In contrast to emergent plant number, height and N content; BRIX difference before and after foliar application, yield, test weight, TKW, protein content, macronutrient content such as Ca, K, Mg, P, and S as well as micronutrients such as Al, B, Cu, Fe, Mn, Na, and Zn were statistically the same across treatments (Table 2A-2)

In conclusion, the nuEarth products used for each treatment did have an influence in emergent plants, height and nitrogen storage in plant leaves, but more data needs to be gathered in order to observe differences in yield. Moreover, other factors such as drought and seeding later in the season may have influenced yield and thus may explain lower yield values compared to the expected 65 bu/acre target. Moreover, other factors such as drought and seeding later in the season may have influenced yield and thus may explain lower yield values compared to the expected 65 bu/acre target

Table 2A-1. Plants per m (N=45), height (N=300) and N content (N=15) mean values taken from CWRS wheat AAC Wheatland subjected to different NuEarth product formulations for development and yield

Treatment	Emergence		Height		N	
	Plants m^{-1}		cm		%	
1	37.78	BC	76.14	AB	6.13	AB
2	31.44	CD	74.97	B	6.14	AB
3	48.56	AB	77.73	A	6.17	A
4	57.78	A	74.77	B	5.97	BC
5	19.89	D	72.26	C	5.80	C
Standard Error	4.1		1.7		0.01	

[a]Analysis of variance in yield as bu/acre shows difference between treatment 5 and the other treatments (p=0.0018). however, since treatment 5 was an unfertilized treatment and all other treatments were statistically the same, this analysis was not included in the table.

Table 2A-2. Mean values for yield, BRIX, test weight, thousand kernel weight (TKW), protein, macronutrient and micronutrient content taken from CWRS wheat AAC Wheatland subjected to different NuEarth product formulations for development and yield (N=15).

Parameter	Treatment	1	2	3	4	5	Standard error	P-value
Yield[a]	Bu $acre^{-1}$	36.99	37.78	44.37	38.15	26.44	3.9	0.13
BRIX								
before foliar application		20.67	18.44	21.06	19.72	19.11	1.3	0.11
after foliar application		12.89	12.22	12.67	12.78	12.78	0.6	0.94
Difference (after-before)		-7.78	-6.22	-8.39	-6.94	-6.33	1.3	0.54
Test weight	lb/bu	62.49	62.31	63.16	62.29	62.37	0.4	0.48
TKW	g	37.18	36.28	36.81	36.45	39.71	1.0	0.10
Protein		15.57	15.02	15.14	15.47	14.45	0.4	0.26
Macronutrients								
Ca		0.47	0.48	0.45	0.49	0.52	1.8×10^{-2}	0.18
K		5.54	5.72	5.57	5.20	5.59	0.20	0.29
Mg		0.25	0.27	0.25	0.25	0.26	1.1×10^{-2}	0.52
P		0.70	0.67	0.60	0.59	0.60	1.9×10^{-2}	0.33
S	%	0.39	0.39	0.38	0.37	0.36	8.8×10^{-3}	0.15
Micronutrients								
Al		175.67	214.33	179	205	229.67	30.7	0.69
B		7.82	8.77	7.95	10.11	7.83	0.7	0.24
Cu		8.23	8.02	7.26	8.37	9.01	0.8	0.54
Fe		375.00	441.67	359.33	440.33	478.67	68	0.71
Mn		85.33	99.33	91.67	97.33	94.33	10.9	0.72
Na		1.67×10^{-2}	1.33×10^{-2}	1.00×10^{-2}	1.33×10^{-2}	1.00×10^{-2}	2.6×10^{-3}	0.39
Zn		59.33	57.33	51.33	56.67	65.33	7.3	0.15