

CONSORTIUM

EFFECT OF VARIOUS FORMS OF ENHANCED EFFICIENCY FERTILIZERS (EEF) IN DEVELOPMENTS AND YIELD OF DIFFERENT VARIETIES OF WHEAT

While yield production of spring wheat is improved by intensified agricultural strategies and novel genetic varieties, optimal soil N release and precise N uptake by crops is still an ambiguous question. At the Agriculture and Agri-food Canada in Lethbridge, Dr. Brian Beres has a research program evaluating different forms of fertilizers, designed to provide N availability to wheat crops better than N provided through banded Urea.

This experiment focuses on exploring N-enhanced efficiency fertilizers (EEF) set at different rates and banded at different development stages. The goal is to observe if a certain EEF can improve overall yield. This demonstration will be a stepping stone in opening a discussion about EEFs and even provide the opportunity for Dr. Beres to talk about the importance of his research at each of the Farm research stations. Enhanced efficiency fertilizers used for this experiment were Urea, ESN and SuperU. Fertilizer rates were set at 100% and 70% of the recommended rate and also adjusted to meet 1X and 1.5X of the grain target yield.

Out of all the parameters tested, only stand counts are impacted by fertilizer type (EEF), target yield and percentage of recommended fertilizer rate. In contrast emergence, height, lodging, yield, test weight and protein content are not impacted by any of the effect treatments. Thus any EEF, at any rate and regardless of how much yield is desired beyond the target yield, have the same effect and will produce the same grain yield and the same protein content.

The effect of various forms of N enhanced efficiency fertilizers (EEF) for yield and protein improvement of wheat						
Treatment #	Yield goal (bu/ac)	Nitrogen Rec - Actual (lbs N/ac) - To Apply	Nitrogen Rec- Product (lbs Urea/ac) - To Apply	Phosphorus - Actual Applied (lbs P2O5/ac)	Nitrogen - Actual Applied From Phosphorus Source (lbs N/ac)	Phosphorus Rec - Product (lbs S15/ac) - To apply
1	45	56.76	123	26	10.24	78.79
2	68	85.96	187	39	15.36	118.18
3	45	56.76	123	26	10.24	78.79
4	68	85.96	187	39	15.36	118.18
5	45	56.76	129	26	10.24	78.79
6	68	85.96	195	39	15.36	118.18
7	45	56.76	129	26	10.24	78.79
8	68	85.96	195	39	15.36	118.18
9	45	56.76	123	26	10.24	78.79
10	68	85.96	187	39	15.36	118.18
11	45	56.76	123	26	10.24	78.79
12	68	85.96	187	39	15.36	118.18

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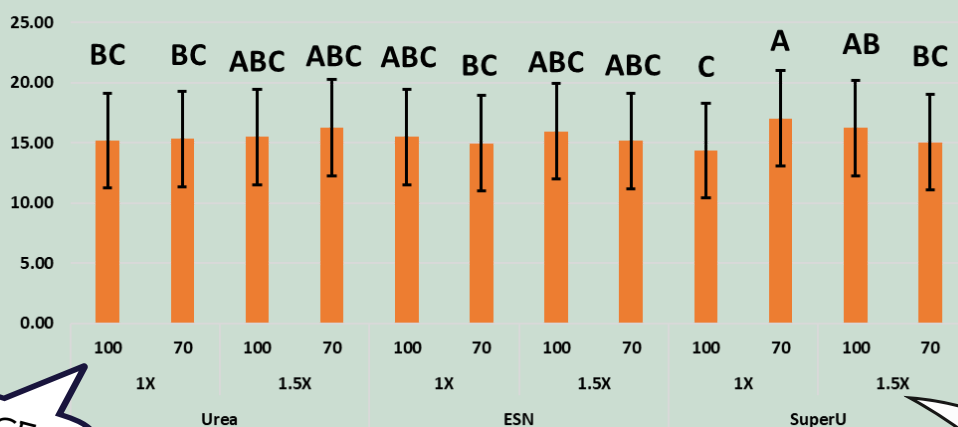
P-values obtained from different parameters evaluated to see differences in fertilizer type, fertilizer rate and adjusted fertilizer rate based on target yield in Fort Vermilion, Falher, Fairview and North Star, Alberta

Parameter	Emergence	Count	Height	Lodging	Yield	Test weight	Protein content
Effect							
Fertilizer type (EEF)	0.8181	0.9015	0.7151	0.6234	0.1749	0.9793	0.1850
Yield target	0.8342	0.6069	0.9438	0.1964	0.1255	0.8618	0.2009
Percent of recommended fertilizer rate	0.8354	0.6936	0.3013	0.9616	0.3129	0.2647	0.2894
Fertilizer type X Yield target	0.5767	0.681	0.7644	0.3563	0.7668	0.5555	0.8399
Fertilizer type X Percent of recommended fertilizer rate	0.4817	0.2087	0.7265	0.4686	0.7875	0.9546	0.5788
Yield target X Percent of recommended fertilizer rate	0.3029	0.2016	0.6049	0.7834	0.1476	0.2914	0.4046
Fertilizer type x Yield target X Percent of recommended fertilizer rate	0.6231	0.0179	0.8234	0.5167	0.5851	0.3171	0.7209

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Stand count of wheat subjected to different forms of N release at 100 and 70% of the recommended rate and adjusted to a yield target rate of 1X and 1.5X



PERCENTAGE OF
RECOMMENDED
RATE

Wheat stand counts are more numerous if subjected to SuperU at 70% of the recommended rate to achieve 1X of the target grain yield, compared to Urea at either percentage of recommended rate for 1X target yield, as well as ESN at 70% of the recommended rate to obtain 1X of target yield and SuperU at 70% of the recommended rate to achieve 1.5X of the target yield.

GRAIN
TARGET
YIELD

KEY POINTS:

- Urea, SuperU and ESN at any percentage of recommended rate, regardless of how much beyond the target yield is desired has the same effect
 - Yield, test weight and protein content will likely be the same