

Should I apply ESN to winter wheat instead of urea?

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The short and simple answer is “yes”! Because of relatively longer duration of winter wheat, readily available N fertilizers such as urea may not be able to sustain N supply throughout the crop growth unless applied in split doses. Therefore, we conducted an experiment during 2008-2011 at TBARS to evaluate urea, ESN (polymer coated urea), ammonium sulphate (AS) and their blends (1/3rd, ½ and 2/3rd N from urea and the rest from ESN and AS alone/and 50 % from each of the two fertilizers) along with a check (No N) for winter wheat (CDC Falcon) production for a total of 13 treatments. Nitrogen @ 120 kg/ha was applied in all fertilizer treatments. Entire ESN, in the treatments involving ESN, was applied at seeding, whereas in urea and AS treatments, 30 kg N/ha was applied at seeding and the rest in early spring. Averaged over three years, the results indicated that the grain yield increase with the application of N was in the order of ESN (1,088 kg/ha) > AS (732 kg/ha) > urea in single (501 kg/ha) or double (30:90) splits (450 kg/ha). Fertilizer blends that produced almost equal grain yield response (860 to 1,150 kg/ha) to ESN @ 120 kg/ha alone were urea @ 90 kg N/ha + AS @ 30 kg N/ha and all blends of urea, ESN and AS (30, 60 or 90 kg N/ha from urea and the rest contributed equally by ESN and AS). Grain N removal was highest with ESN (116 kg N/ha) and urea + ESN + AS in 30:45:45 N proportions (114 kg N/ha). This shows that the N use efficiency of urea was the lowest as compared to ESN/and its blends with urea and AS. In other words, losses of N from urea were more than that from ESN/or blends of ESN with urea and AS. ESN and AS, but not urea, increased the straw yield, as compared to the check (no application of N), by 645 kg/ha and ~1,000 kg/ha, respectively.

The big question though is will it be economical to apply ESN to winter wheat? Let us see. At wheat prices of \$250 per ton at Thunder Bay, the value of additional grain yield from ESN as compared to urea (1,088 kg – 501 kg = 587 kg) would be \$146.75/ha. The additional cost of N from ESN @ 120 kg N/ha as compared to urea at equivalent N rate would be \$54/ha (cost of N from ESN is up to 25 % higher as compared to N from urea; urea at the time of writing was sold @ \$830/t at Thunder Bay). The net gain from application of ESN to winter wheat as compared to urea would be \$92.75/ha (\$146.75/ha - \$54/ha = \$92.75/ha). Extra straw yield from ESN as compared to urea will be an added bonus! Was the grain protein content with ESN acceptable? The answer is “Yes”; it was 13 % against a minimum acceptable standard of 11 %!

To overcome the risk of sulphur deficiency, it would be advisable to apply 10 kg N/ha from AS and 110 kg N/ha from ESN. Effect of AS on improving straw yield was even greater than that of ESN. Thunder Bay Co-op had been procuring ESN for TBARS/and TBSCIA in the past and they could procure ESN for our area producers as well. Producers could also grow winter cereals for forage/silage. Averaged over the last two years, forage dry matter yields at soft dough stage from winter rye (Common # 1), winter triticale (Luoma) and winter wheat were 10.09 t/ha, 10.4 t/ha and 12.21 t/ha, respectively. On the contrary, forage dry matter yield from spring barley (Cyane) at soft dough stage, in the same experiment, was only 6.66 t/ha. This type of yield could be obtained from winter cereals at boot stage with much higher protein content (20-21 %). Feed quality from the winter cereals was comparable to that from spring barley when all crops were

harvested at soft dough stage. Direct seeding perennial forages or even soybean after harvesting winter cereals for forage could be an option; providing the soil with much needed coverage throughout the year(s)!

Published in Northwest Link, August 2012, Page 12!