

Wheat response to post-anthesis foliar application of N for protein enhancement, Langdon 2010-2011

Bryan Hanson and Richard Wilhelmi

The objective of these studies was to measure hard red spring wheat protein response with two nitrogen sources applied immediately after anthesis on the variety 'Faller'. Two trial sites in 2010 and one in 2011 were established at the Langdon Research Extension Center with a previous crop of soybeans. The trials followed state recommendations for land preparation, seeding rate, and weed control.

2010

Both trials were designed as randomized complete blocks. Trial A had three replications and trial B had four replications. Plot size was 3.5 ft x 16 ft long. Available soil N for Trial A included a soil test of 24 lbs/a, a soybean N credit of 40 lbs/a and spring applied urea at a rate of 85 lbs/a for a total of 150 lbs/a. Available soil N for Trial B was a 40 lb/a soybean credit and 90 lbs/a of 28-0-0 applied in the fall of 2009. No soil test was taken on this particular trial area but we are assuming residual N of 20 lbs/a which would give a total of 150 lb/a. Planting dates were April 22 and May 14 for Trial A and Trial B, respectively. On July 9 Trial B received an application of Prosaro fungicide. A CO₂ pressurized backpack style sprayer with 8002 flat fan nozzles spaced at 20 inches was used to apply a 20 GPA solution at 40 psi for all treatments. N sources included UAN (liquid 28% at 3 lb N/gal) and NDemand (liquid 30% at 3.15 N/gal, 60% is slow release form). Trial A was sprayed on July 9 and Trial B on July 16. Growth stage at time of applications was Feekes 10.5.4, flowering complete, kernels watery-ripe.

Flag leaf burn ranged from 25-43% for the UAN treatment across trials when visually evaluated one week after N applications. NDemand, at the high rate, had a very low level of leaf burn. No significant differences in test weight, protein or yield were observed for either trial. When averaged across trials, the three nitrogen treatments were numerically 0.2% higher than the untreated check.

| Treatment | Product Rate gal/a | N rate lbs/a | 2010-Trial A | | | | 2010-Trial B | | | |
|-----------|-----------------------|-----------------|----------------|-----------------------|--------------|---------------|----------------|-----------------------|--------------|---------------|
| | | | Leaf Burn % | Test Weight lbs/bu | Protein % | Yield bu/a | Leaf Burn % | Test Weight lbs/bu | Protein % | Yield bu/a |
| UAN | 10 | 30 | 43 | 59.6 | 13.2 | 94.2 | 25 | 58.8 | 14.5 | 94.2 |
| NDemand | 9.5 | 30 | 3 | 59.9 | 13.2 | 96.1 | 3 | 58.4 | 14.6 | 89.5 |
| NDemand | 3 | 9.5 | 0 | 60.5 | 13.3 | 98.7 | 0 | 58.6 | 14.5 | 93.5 |
| Untreated | -- | -- | 0 | 60.7 | 13.1 | 94.8 | 0 | 58.7 | 14.3 | 93.8 |
| Mean | | | 12 | 60.2 | 13.2 | 96.0 | 7 | 58.6 | 14.5 | 92.7 |
| C.V.% | | | 24 | 0.8 | 2.4 | 4.9 | 33 | 0.4 | 1.4 | 4.0 |
| LSD 5% | | | 5.5 | NS | NS | NS | 3.6 | NS | NS | NS |

2011

The trial was designed as randomized complete block with six replications. Plot size was 3.5 ft x 16 ft long with borders between each treatment plot. Available soil N included a soil test of 46 lbs/a, a soybean N credit of 40 lbs/a and spring applied urea at a rate of 65 lbs/a for a total of 151 lbs/a. Planting date was May 17 with harvest date of September 6. On July 22, a CO₂ pressurized backpack style sprayer with 8002 flat fan nozzles spaced at 20 inches was used to apply a 20 GPA solution at 40 psi for all treatments. N sources included UAN (liquid 28% at 3 lb N/gal) and NDemand (liquid 30% at 3.15 N/gal, 60% is slow release form). Growth stage at time of applications was Feekes 10.5.4, flowering complete, kernels watery-ripe.

Flag leaf burn was 23% for the UAN treatment when visually evaluated one week after N applications and was significantly higher than other treatments. NDemand, at the high rate, had a very low level of leaf burn. No significant differences in test weight or yield were observed. UAN and NDemand protein levels, with N rates of 30 lbs/a, were significantly higher than the untreated check and NDemand at the low rate.

| Treatment | Product | | 2011 | | | |
|-----------|---------------|-----------------|-------------------|--------------------------|--------------|---------------|
| | Rate gal/a | N rate lbs/a | Leaf Burn % | Test Weight lbs/bu | Protein % | Yield bu/a |
| UAN | 10 | 30 | 23 | 60.9 | 15.2 | 78.5 |
| NDemand | 9.5 | 30 | 4 | 61.0 | 15.4 | 77.7 |
| NDemand | 3 | 9.5 | 0 | 60.9 | 14.7 | 77.3 |
| Untreated | -- | -- | 0 | 61.1 | 14.7 | 80.1 |
| Mean | | | 7 | 61.0 | 15.0 | 78.4 |
| C.V.% | | | 21 | 0.5 | 2.8 | 2.8 |
| LSD 5% | | | 1.7 | NS | 0.5 | NS |