UAN Demonstrates Its Effectiveness In Western Australia

Advantages of fluids catching on in Western Australia where their use is expanding.

Between 1997 and 2003, Wesfarmers CSBP conducted a series of 40 wheat and canola field trials to compare the benefits of urea ammonium nitrate solutions (UAN 32%N) applied through a boomsprayer to conventional urea topdressings. In total there were 132 comparisons of UAN and urea at the same rate of nitrogen (N) and timing of application.

Seasonal conditions

Seasonal conditions varied considerably between years and locations. In general, rainfall was above average in 1999, mainly because of a large leaching rainfall event with most sites receiving 2.5 to 4.0 inches over two days at the end of May. Rainfall in 2003 was also above average and well distributed throughout the season such that plant growth and grain yields were large at most sites.

In contrast, 2000, 2001, and 2002 were very dry and among the 10 percent of driest years on record in many districts. Delayed rainfall in autumn and winter of these years resulted in late sowing at many sites. However, this was partially offset by mild spring weather in 2001. Late spring frosts limited yield potential at some sites in 1998, 1999, and 2001.

Yield comparisons

Across 132 comparisons where UAN and urea were applied at the same time and rate of N, seed yields ranged from 9.3 to 75 bu/A for wheat and 990 to 3,366 lbs/A for canola when fertilized with either N source. Yields typically increased with N application, indicating that the trial sites were responsive to N, thus proving that valid comparisons of UAN and urea could be made.

Figure 1 (a and b) shows how yield comparisons from crops fertilized with UAN and urea were highly correlated for wheat (r2 =0.98) and canola (r2 = 0.91) over the range of N applications. Of the 104 UAN and urea comparisons with wheat yields, 20 differed significantly and of these, 11 were positive (UAN yielding 4 to 17 percent greater than urea) and nine were negative (UAN yielding 4 to 16 percent less than urea). For the 28 canola comparisons, seed yield differed significantly on five occasions with three being positive responses (UAN yielding 6 to 23 percent greater than urea) and two being negative (UAN yielding 15 to 20 percent less than urea).

Protein/oil

Wheat protein. The percentage of protein in the wheat grain sampled over the seven-year trial period ranged from 8.3 to 15.2 percent. Protein responses from 104 wheat comparisons between UAN and urea were strongly correlated (r2 =0.90, Figure 2). Moreover, there were only two comparisons between UAN and urea where the protein content differed significantly, both in the wet 2003 season.

Canola oil. In the 28 treatments over two years where canola was evaluated, the percentage of oil in the seed produced varied from 38.7 to 45.6 percent. There were no statistical differences observed between the seed oil content (percent) of the UAN and urea comparisons, and oil content with UAN was highly correlated with that for urea (r2 = 0.83, Figure 3).

Implications

This comprehensive study demonstrated that for the majority of wheat or canola crops in Western Australia the agronomic benefits of UAN applied through a boomsprayer and granular urea topdressed are similar when applied at the same N rate and timing. This similarity, coupled with the other logistical advantages of UAN, has provided a strong foundation for the

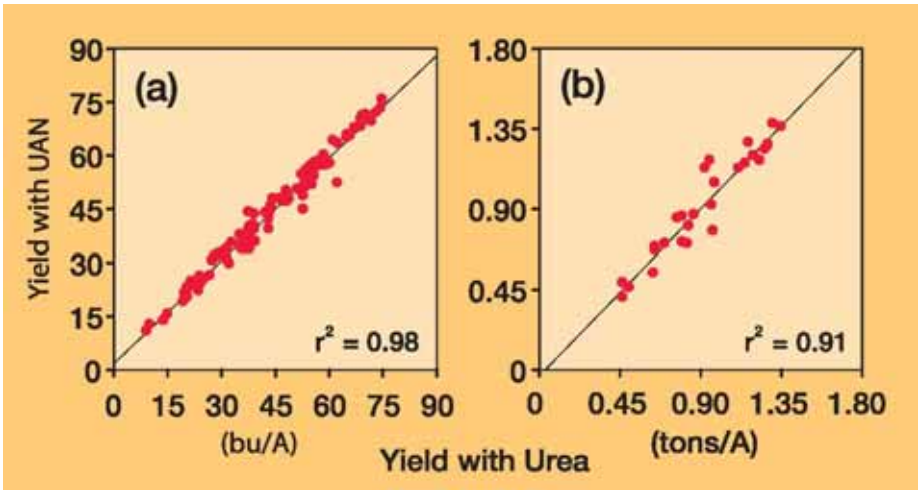

Figure 1. Grain yield of wheat (a) and canola (b) when using UAN compared with granular urea applied at the same N rate.

development of a UAN market in Western Australia.

Future promising

Since the commercialization of UAN in Western Australia in 2001 (marketed as Flexi-N), its early adoption has been rapid because of the advantages of storage, handling, and flexibility of application, more so than agronomic advantages. One of the practical advantages of UAN over urea is the uniformity of application with boomsprayer technology compared with topdressing urea with conventional dry spreading equipment. Boomsprayer applications of UAN are also considerably faster than topdressing urea. Most large boomsprayers are capable of covering a field in less than half (even maybe a quarter) of the time that it takes a dry fertilizer spreader to do the same job. In the past two years, adoption of UAN applications with seeding equipment has also grown rapidly and will be an increasingly important aspect of UAN use in the future. UAN use is expected to continue increasing and it is estimated that within a few years it will represent a significant proportion of the fertilizer N market in Western Australia.

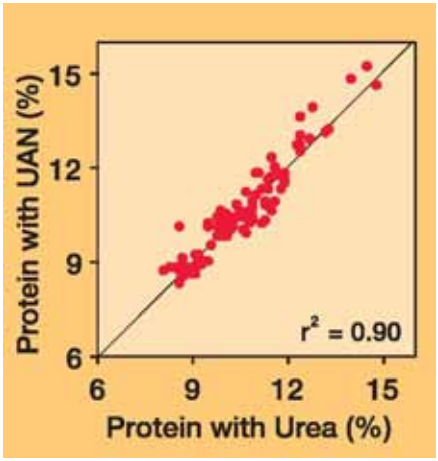

Figure 2. Grain protein of wheat fertilized using UAN compared with granular urea applied at the same N rate.

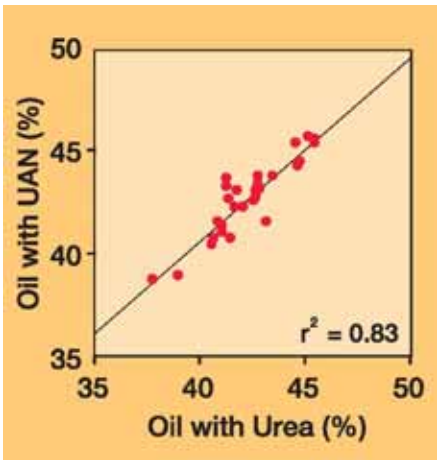

Figure 3. Seed oil percentage of canola fertilizer using UAN compared with granular urea applied at the same N rate.

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