

YIELDS AND ECONOMIC BENEFITS TO DIFFERENT FORMS OF NITROGEN APPLIED IN THE SPRING TO WINTER WHEAT

Research by Peter Johnson, OMAFRA, Ontario, Canada.

Replicated research from Ontario, Canada documents a yield benefit when applying liquid N to wheat, when compared to urea. This is possibly as a result of the staged release of the urea and ammonium nitrate which is dissolved in UAN 28% or 32%. Other university research also suggests UAN can slightly reduce volatility, which is frequently a concern when products such as urea are surface applied to moist soils and rainfall does not fall soon after application.

One group that has really taken the lead on N management is the OMAFRA group in Ontario. Peter Johnson is the leader of this project and an example of his sound research is included below in the tables.

Their work suggests that there has been a noticeable increase in the number of growers utilizing 28% liquid N as the primary source of N for wheat. This has been driven by both a continued frustration over achieving uniform distribution with urea as previously discussed, plus an increased number of farmer owned sprayers, which can apply their own 28% N, to reduce costs. The ability to apply 28% is further enhanced by new nozzle technology including "stream bars", which virtually eliminate any leaf burn potential previously associated with the use of 28%, and reduce drift potential to near zero. Farmer conducted field scale trials were initiated across Southwestern Ontario. Two replicate trials were encouraged, and 75% of the trials to date have been two replication tests. Applications of both the 28% and urea treatments were delivered with the same actual N rate per acre, at whatever rate the grower normally applied. The results are presented below.

Wheat Yields by Nitrogen Source

Year	Sites	28%	Urea	% Wins
2004	8	88.7	84.8	88
2005	11	85.8	83.4	73
Average	19	87.3	84.1	79

Yield Results:

Comparing 19 locations summarized to date, they have found a small but clear yield advantage to 28% liquid N, compared to urea. The table above shows a 3.2 bu./ac yield advantage, with the 28% winning in 80% of the tests. There is no good scientific explanation for this result, other than spread pattern accuracy. While there was a slightly greater chance of urea volatilization due to dry weather in the spring of 2005, the results are actually closer in 2005, indicating that N loss is unlikely to explain this result.

Economic Benefit (\$ Per Acre) by Nitrogen Source

Year	# of Sites	Economic Benefit (\$/ac)	
		28%	Urea
2004	8	469.20	450.30
2005	11	451.80	441.90
Average	19	460.50	446.10

Economic Results:

The above table shows the economic impact of yield x price less N cost, updated with prices of N at time of printing. Dollar figures were calculated using wheat at \$6.00/bu., urea at \$0.65/lb. N, and 28% at \$0.70/lb. N.

N rate was calculated at 90 pounds actual N/acre. These results show that despite the higher cost of 28%, there is still an \$14.40/acre advantage to 28% based on the increased yield. Many growers will add another +/- \$4.00/acre advantage for being able to do the application themselves, rather than having to hire a custom applicator. Whether this is a real advantage, or simply a perceived advantage, is definitely open to debate.