Easy N Late Top-dressing Demonstration

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In the past, it has been commonly accepted that nitrogen fertiliser (urea) applied after GS30 (end of tillering) can boost protein levels. Later applications will increase grain protein with little, or no, addition to grain yield. Late top-dressing with urea, has also been avoided due to yield loss from driving over the crop at a critical time.

In 2005, the late spring rains not only provided benefits to yield but generated discussion amongst farmers and advisors as to the potential benefits, if any, from late applications of Easy N (UAN) fertiliser. When the cereal crops flowered and set grain there was concern at the prospect of many crops having low protein.

A common question put forward was “can we spray Easy N at the milky-dough stage, at what rates, and how?”

A demonstration (unreplicated) was conducted at the BCG, Marnoo site, in a crop of Yitpi wheat, to study these issues. Easy N was applied at 5 rates using 4 different spray nozzles at the milky-dough stage of crop development (24th October). Plots were 25m by 2m in size.

The boom spray nozzles used included: a 7 stream Streamer Jet (very coarse); a flat fan Coarse Tee (coarse); flat fan Turbo Tee Jet (intermediate/fine); and a flat fan Twin Jet 60 (very fine) (Table 1).

Easy N was applied at the 12.5kgN/ha, 25kgN/ha, 37.5kgN/ha, 50kgN/ha and 100kgN/ha rates.

Table 1: Treatments and Results

Group 1	Easy N applied L/ha	Cost $/ha	Yield t/ha	Grain Protein%	*Profit $/ha
Control (no N)	0	0	3.42	10.6	0
Streamer Jet @ 12.5kgN/ha	29.4	20	3.34	12.1	24
Streamer Jet @ 25kgN/ha	58.8	37	3.26	12.8	17
Streamer Jet @ 37.5kgN/ha	88.2	54	3.26	12.7	-3
Streamer Jet @ 50kgN/ha	117.6	71	3.23	12.5	-33
Streamer Jet @ 100kgN/ha	235.3	139	2.75	13.6	-161
Coarse Tee @ 12.5kgN/ha	29.4	20	3.06	11.7	-39
Coarse Tee @ 25kgN/ha	58.8	37	2.95	11.7	-75
Coarse Tee @ 37.5kgN/ha	88.2	54	3.05	11.5	-81
Coarse Tee @ 50kgN/ha	117.6	71	2.92	12.9	-78
Coarse Tee @ 100kgN/ha	235.3	139	2.76	13.7	-159
Group 2					
Control (no N)	0	0	3.01	10.5	0
Intermediate Turbo Tee Jet @ 12.5kgN /ha	29.4	20	3.04	11.8	30
Intermediate Turbo Tee Jet @ 25kgN /ha	58.8	37	3.05	12.2	27
Intermediate Turbo Tee Jet @ 37.5kgN /ha	88.2	54	2.84	12.4	-22
Intermediate Turbo Tee Jet @ 50kgN /ha	117.6	71	2.81	12.9	-29
Intermediate Turbo Tee Jet @ 100kgN /ha	235.3	139	2.85	13.6	-73
Very fine Twin jet 60 @ 12.5kgN/ha	29.4	20	3.15	10.9	10
Very fine Twin jet 60 @ 25kgN/ha	58.8	37	2.95	11.2	-25
Very fine Twin jet 60 @ 37.5kgN/ha	88.2	54	2.66	12.4	-55
Very fine Twin jet 60 @ 50kgN/ha	117.6	71	2.94	12.5	-17
Very fine Twin jet 60 @ 100kgN/ha	235.3	139	2.79	13.7	-84

* Easy N valued at $1.36/kgN/ha based on 2005 cost of Easy N delivered to the Wimmera and $3/ha application cost. Profit based on an average 3t/ha on all treatments with prices based on Graincorp pricing 17th Jan 2006. ASW @ $160 (flat rate), APW @ $147, H2 @ $161 and H1 @ $180/tonne. Incremental protein bonuses for each category have been accounted for. Profit was calculated as the difference between the control (no N) and the different treatments.

Observations:

The week following the application was warm and dry. Significant scorching of the upper leaves and heads began to appear on the 50 and 100kgN/ha treatments 3 days post spraying. This scorching was highly evident 1 week post spraying and occurred with all nozzle types. It was possible to observe some scorching on the 37.5kgN/ha, however, there was no scorching

evident with the 12.5 and 25kgN/ha treatments. This is possibly because both treatments were applied diluted with water (100L).

Observations 4 weeks post spraying revealed some scorching was still visible, however, because of significant rainfall events occurring in the previous 2 weeks the 37.5, 50 and 100kgN/ha treatments were considerably greener in appearance when compared to the other treatments and the bulk crop.

Results:

All yield results (Table 1) should be treated with caution as this was a demonstration only, conducted in farmers bulk crop. It should be noted though that the scorching of the higher treatments had a detrimental effect on yield across ALL nozzle types as compared to lower treatment rates.

Grain protein increased in relation to quantity of Easy N applied. The application of Easy N was only profitable at the lower rates but the return on $'s invested is questionable when considering the variation in yields.

It should be noted that this was **not** a low protein site as all treatments were at least APW standard.

Discussion:

Generally, 6-8kgN/ha applied at an earlier than milky dough growth stage is required to raise grain protein 1%. Therefore, this crop required 18-24kg to raise protein from 10.5 to 11.5%.

Easy N applied at 12.5 kgN/ha achieved an average 1% increase in protein applied at milky dough stage. This indicates that in this demonstration Easy N was more efficient in boosting protein levels when applied at later crop stages and is beneficial to crops when a low protein problem is perceived.

In a simple scenario (Table 2), it is most profitable raising an ASW crop to a hard category; i.e. by increasing the protein by more than 1%. Protein increases in the demonstration averaged 1% increase for the 12.5 and 25kg N/ha treatments

Table 2: Simple Scenario

	Yield t/ha	Protein %	Type	cost/ha	Profit $/ha
Wheat 1	3	9.5	ASW	0	480
Wheat 2	3	10.5	APW	20	466.75
Wheat 3	3	11.5	H2	20	500.5
Wheat 4	3	13	H1	20	557.5

Commercial Practice:

Ideally nitrogen as Easy N should be supplied to the crop at earlier than milky-dough growth stage. Although in situations where a benefit can be gained, ideally:

- The soil nitrogen level would not be greater than 80kgN/ha
- The crop variety must be APW with potential to rise to Hard
- Only apply between 20 and 40L/ha N
- Paddock have some sort of controlled traffic to reduce yield loss from crop knockdown