# Liquid N strategies

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**Aim**

To evaluate the effectiveness of different, grower-chosen strategies to apply liquid Nitrogen.

**Background**

These demonstrations are on-farm demonstrations for the Liebe Group's FarmReady Project. The project is funded by the Federal Department of Agriculture, Fisheries and Forestry and aims to help industry and primary producers develop skills and strategies to respond to climate change.

Rising input costs and declining rainfall necessitate the constant trialing and re-evaluation of Nitrogen rates and the timing of these rates.

Three sites with annual rainfall varying from 120mm to 181mm in 2010 have been identified in Waddy Forest, West Buntine, and East Wubin.

The strategies chosen have been developed in consultation with the respective grower and demonstrate variations from the rates and timing used in each personal situation.

Varying nitrogen rates and timing is generally considered a valuable strategy in keeping flexibility in the farming system and managing climate risk. Flexible use of nitrogen allows for the farmer to 'play the season' and only apply nitrogen when the certainty surrounding rainfall in increased.

**Trial Details - Waddy Forest**

| | |
|---|---|
| **Property** | Wade Parker, Waddy Forest |
| **Plot size & replication** | 30m x 500m, non-replicated |
| **Soil type** | Sandy Loam over Gravel |
| **Soil pH** | 5.0 |
| **EC** | 0.04 ds/m |
| **Variety** | Wyalkatchem |
| **Sowing date** | 3/6/10 |
| **Seeding rate** | 70 kg/ha |
| **Fertiliser** | Agras Extra at 80 kg/ha at seeding, Cereal Plus 1.5 L/ha at seeding, Agriton at 0.3 L/ha at seeding, Flexi –N at 30 L/ha at seeding, Plus see treatments under results |
| **Paddock rotation** | 08 Wheat, 09 Canola |
| **Herbicides, Insecticides & Fungicides** | Jaguar at 0.7 L/ha<br>Logran at 0.01 kg/ha |
| **Growing Season Rainfall** | 155mm |

**Results**

**Table 1:** Yield and quality of wheat sown at Waddy Forest.

| Flexi-N rate (L/ha) | Yield (t/ha) | Protein (%) | Screenings (%) |
|---|---|---|---|
| 0 | 1.46 | 13.2 | 4.1 |
| 20 | 1.49 | 12.9 | 3.5 |
| 30 | 1.43 | 12.7 | 3.2 |
| 40 | 1.36 | 12.7 | 2.5 |

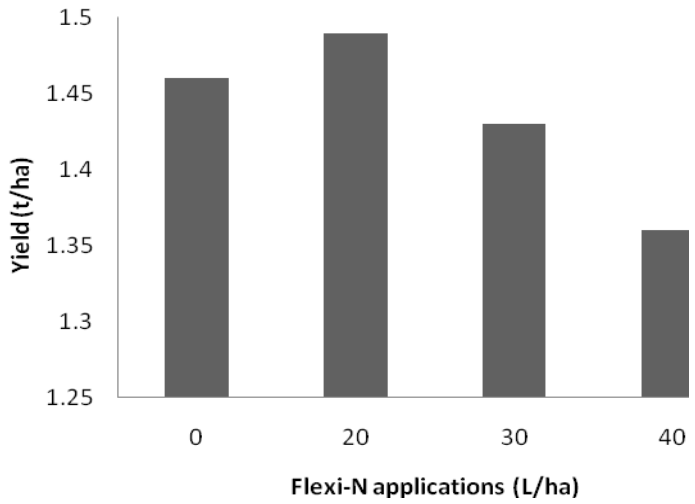


**Figure 1:** Yield of wheat sown in Waddy Forest.

## Trial Details – West Buntine

| | |
|---|---|
| **Property** | Stuart McAlpine, West Buntine |
| **Plot size & replication** | 2m x 18m x 3 replicates |
| **Soil type** | Sandy Loam |
| **Soil pH** | 6 |
| **EC** | 0.01 – 0.08 dS/m |
| **Variety** | Magenta |
| **Sowing date** | 8/6/10 |
| **Seeding rate** | 60 kg/ha |
| **Fertiliser** | see treatments |
| **Paddock rotation** | 08 Wheat, 09 Canola |
| **Herbicides, Insecticides & Fungicides** | 8/4/10: 0.8 L/ha PowerMax, 0.4 L/ha Ester 680, 8/6/10: 2.4 kg/ha Boxer Gold, 1.8 L/ha PowerMax, 0.2 L/ha TM 21, 0.1 L/ha TM21 (seed dressing), 19/7/10: 0.8 L/ha Jaguar, 0.2 L/ha TM 21, 28/8/10: 1 L/ha Ester 680 |
| **Growing Season Rainfall** | 181mm |

## Results

**Table 2:** Yield and quality of wheat sown at West Buntine.

| Flexi-N treatments (L/ha) | Kg/ha N | Kg/ha P | Yield (t/ha) | | Protein (%) | | Screenings (%) | |
|---|---|---|---|---|---|---|---|---|
| 0 | 0 | 0 | 1.59 | a | 8.33 | ab | 8.57 | a |
| 10 + 5 | 4.8 | 0 | 1.59 | a | 8.50 | abc | 9.17 | a |
| 20 + 10 | 9.6 | 0 | 1.63 | a | 9.13 | bcd | 7.93 | a |
| 40 | 12.8 | 0 | 1.71 | a | 9.17 | cd | 8.67 | a |
| 40 + 20 | 19.2 | 0 | 1.70 | a | 9.77 | def | 8.70 | a |
| 40 + 40 | 25.6 | 0 | 1.70 | a | 10.40 | ef | 8.57 | a |
| K-Till Extra at 50 kg/ha + 0 | 5.0 | 6 | 1.90 | b | 8.17 | a | 8.67 | a |
| K-Till Extra at 50 kg/ha + 10 + 5 | 9.8 | 6 | 1.89 | b | 8.50 | abc | 8.80 | a |
| K-Till Extra at 50 kg/ha + 20 + 10 | 14.6 | 6 | 1.90 | b | 9.00 | bcd | 8.40 | a |
| K-Till Extra at 50 kg/ha + 40 | 17.8 | 6 | 2.00 | b | 8.63 | abc | 8.28 | a |
| K-Till Extra at 50 kg/ha + 40 + 20 | 24.2 | 6 | 1.87 | b | 9.73 | de | 8.60 | a |
| K-Till Extra at 50 kg/ha + 40 + 40 | 30.6 | 6 | 1.96 | b | 10.57 | f | 9.03 | a |
| LSD (5%) | | | 0.08 | | 0.47 | | 1.52 | |

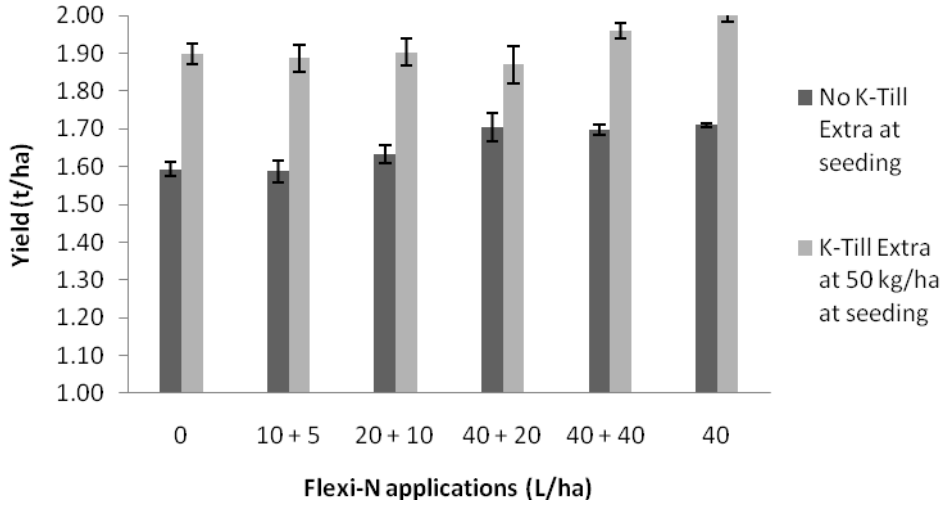


**Figure 2:** Yield of wheat sown in West Buntine

## Trial Details – East Wubin

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|---|---|
| **Property** | Keith & Boyd Carter, East Wubin |
| **Plot size & replication** | 42m x 200m x 3 replicates |
| **Soil type** | Red Loam |
| **Soil pH** | 5.5 |
| **Variety** | Wyalkatchem |
| **Sowing date** | 1/6/2010 |
| **Seeding rate** | 60 kg/ha |
| **Fertiliser** | Flexi-N at 40 L/ha at seeding, Flexi-N at 25 L/ha on 14/8/10, Plus see treatments under results |
| **Paddock rotation** | 08 Wheat, 09 Wheat |
| **Herbicides, Insecticides & Fungicides** | Sprayseed at 0.8 L/ha, Triflur X at 1.5 L/ha, Logran at 0.02 kg/ha |
| **Growing Season Rainfall** | 120mm |

## Results

**Table 3:** Yield and quality of wheat sown at East Wubin.

| Flexi-N treatment | Yield (t/ha) | Protein (%) | Screenings (%) |
|---|---|---|---|
| 40 L/ha (seeding) + 25 L/ha (14/8/10) + 30 L/ha (31/8/10) | 1.49 | 10.1 | 3.77 |
| 40 L/ha (seeding) + 25 L/ha (14/8/10) + 30 L/ha (12/9/10) | 1.48 | 10.07 | 2.81 |
| 40 L/ha (seeding) + 25 L/ha (14/8/10) | 1.50 | 9.97 | 2.43 |
| LSD (5%) | 0.21 | 0.46 | 2.98 |

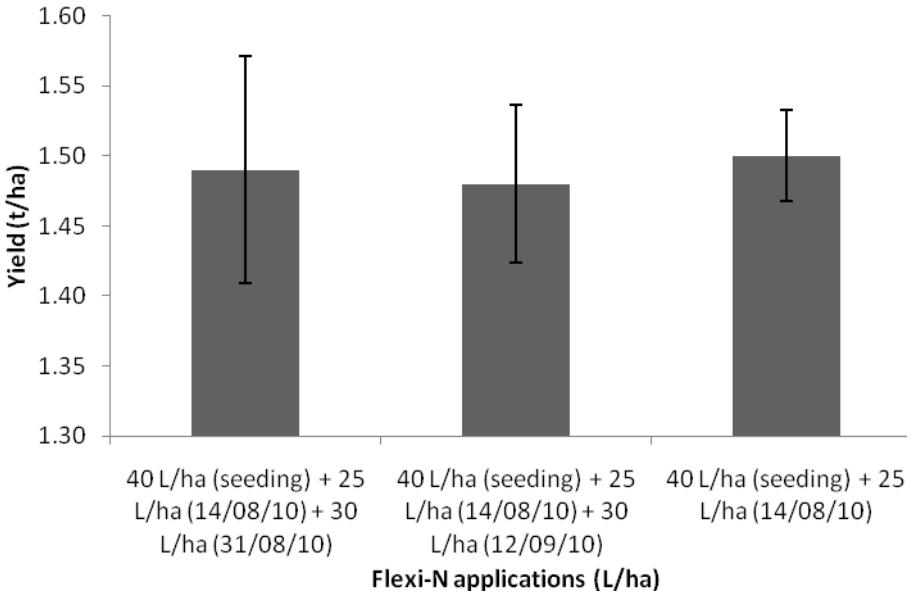


**Figure 3:** Yield of wheat sown in East Wubin

**Comments**

In all three trials there was no statistically significant yield response to additional post-emergent liquid nitrogen. Given the below average rainfall experienced in the district in this season, this result is probably not unexpected.

In the West Buntine trial, there was a significant response to the addition of K-Till Extra. It is important to note that several tramlines were going through the zero-compound section of the trial which may have reduced the yield, due to the small plot size. Additional phosphorus and other nutrients in the compound might also have influenced the yield response.

There was also an increasing trend in protein levels in the West Buntine trial to additional applied nitrogen.

As when making any decisions about soil and plant nutrient, the best strategy is to know what is in your soil and make decisions from there. This trial may indicate no response to applied nitrogen, however it is more than likely that there was adequate background N for the yield potential of this particular crop in this particular season. Background levels vary with soil type, fertilizer history, crop rotation and the yield of the previous crop, so soil testing, nutrient budgeting and a general understanding of where your fertilizer is going is highly important when making decisions about nutrition.

**Acknowledgements** Stuart McAlpine, Boyd and Keith Carter and Wade Parker for hosting and implementing the trials.

**Paper reviewed by** Chris O'Callaghan, Liebe Group

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