

Wheat phosphorus experiment

WRITTEN BY

John Sykes John Sykes Rural Consulting

Location: Balldale

Growing season rainfall:

Annual: 355mm (avg 504mm)

GSR: 135mm (avg 319mm)

Stored moisture: 72mm

Soil:

Type: Red chromosol

pH (CaCl₂): 5.1

Colwell P: 82mg/kg

S (KCl): 10.2mg/kg

Deep soil nitrogen: 72kg/ha

Sowing information:

Sowing date: 23 May 2008

Fertiliser: Double super

Variety: Ventura

Row spacing: 18cm

Paddock history:

2007 — wheat

2006 — canola (gypsum applied)

Plot size: 1.5 x 16m

Replicates: 3

KEY POINTS

- Wheat responded significantly to up to 12 kilogram per hectare of phosphorus (P) without added nitrogen (N) and to 6kg/ha of phosphorus with added nitrogen.
- Higher fertiliser rates did not improve yield or tiller numbers.

Aim

To assess the level of phosphorus required to optimise the yield of wheat grown after wheat in a high phosphorus soil.

Method

A replicated experiment was established using different rates of phosphorus (as double super) with and without added post-emergent nitrogen.

Results

See Table 1.

Observations and comments

Significant responses occurred to the addition of 6kg/ha and 12kg/ha of phosphorus (without additional nitrogen), even on this high phosphorus status soil. The addition of 20kg/ha of phosphorus did not cause a response.

The addition of post-emergent nitrogen, altered the phosphorus response making 6kg/ha of phosphorus the optimal rate. No significant yield increases occurred at higher rates of phosphorus.

The best gross margin was produced from 12kg/ha of phosphorus and 20kg/ha of nitrogen but 6kg/ha of phosphorus and 20kg/ha of nitrogen was not included as a treatment.

Sponsors

GRDC, Mr C Cay, Mrs S Cay. ✓

CONTACT

John Sykes John Sykes Rural Consulting

T: (02) 6023 1666

E: johnsykes3@bigpond.com

TABLE 1 Summary of tiller number, yield and gross margin results for 2008*

| Treatment — units of P and N applied (kg/ha) | Tillers (t/m ²) | Yield (t/ha) | Gross margin (\$/ha) |
|--|-----------------------------|--------------|----------------------|
| 0P 0N | 322 | 0.8 | 34 |
| 0P 40N | 325 | 0.8 | -1 |
| 6P 0N | 389 | 1.3 | 154 |
| 6P 40N | 412 | 1.6 | 190 |
| 12P 0N | 447 | 1.7 | 265 |
| 12P 40N | 435 | 1.8 | 274 |
| 20P 0N | 459 | 1.1 | 123 |
| 20P 40N | 461 | 1.3 | 137 |
| 25P 0N | 414 | 1.0 | 87 |
| 25P 40N | 439 | 1.4 | 159 |
| 12P 20N | 414 | 1.9 | 331 |
| 12P 80N | 476 | 1.3 | 137 |
| 12P 120N | 449 | 1.2 | 132 |
| 20P 20N | 431 | 1.8 | 137 |
| 20P 80N | 447 | 1.2 | 145 |
| 20P 120N | 437 | 1.2 | 101 |
| Average | 422 | 1.3 | |
| LSD | 52 | 0.32 | |
| CV | 11.40% | 14.80% | |

* Phosphorus applied as double super at sowing. Nitrogen applied as urea at Z31.



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Graeme Talarico 0427 215 744 – Goulburn Valley

David Verhulst 0417 420 073 – North East/Murray Valley GRAIN TRADING – Peter Baldi – 0438 215 744

Shepparton – 5821 5744 Wangaratta – 5722 2262 Echuca – 5482 1618 Tatura – 5824 6246
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