# Trundle and Wellington

## Trundle site attributes
### 2022

### Objectives

1. Evaluate the relative performance of major pulse crops (chickpeas, faba beans, field peas, lentils, lupins, vetch) compared with: canola, the alternate break crop, and a non-diverse rotation of wheat followed by wheat.
2. Determine best management practice for disease (cultivar choice and fungicide management) in a variable rainfall environment with subsoil constraints.
3. Provide a local validation site for growers to see the performance of pulses in their region

### Seasonal conditions in 2022
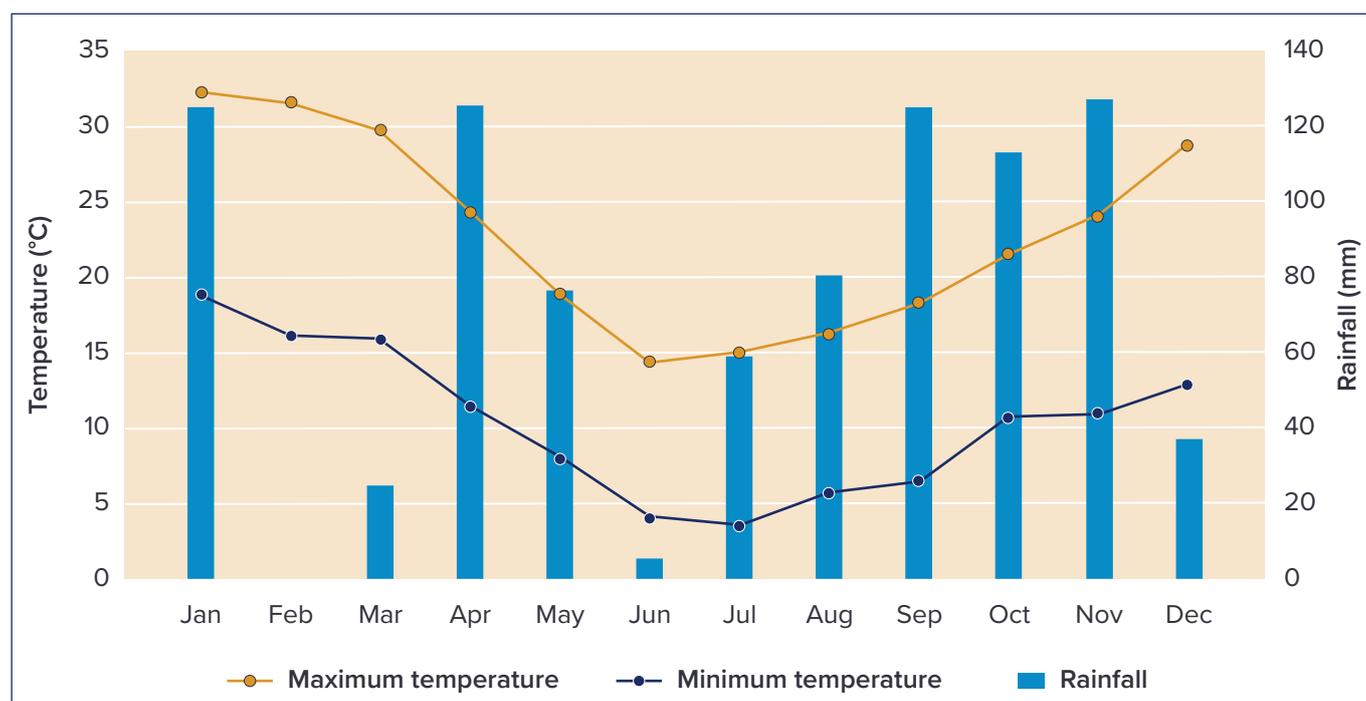


**Figure 13:** *Total monthly rainfall and mean minimum and maximum temperature at Trundle in 2022. Source: SILO.*

### Crop sequence and key management dates

| Crop sequence | | Site management | | |
|---|---|---|---|---|
| Year | Crop | Activity | Date | Comments |
| 2021 | Wheat | Sowing | 28 June | All varieties. Larger seeded species sown deeper than smaller seeded species |
| | | Cut for hay/brown manuring | 22 November | Vetch |
| | | Harvest | 5 January 2023 | Faba beans, lupins, field peas, canola and wheat |
| | | | 12 January 2023 | Lentils and chickpeas |

**Pulse species and variety comparison trial at Trundle in 2022**

## Soil characteristics

| Sampled 15 April 2022 | | Soil depth (cm) | | | |
|---|---|---|---|---|---|
| Characteristic | Unit | 0–10 cm | 10–30 cm | 30–60 cm | 60–90 cm |
| pH (1:5 CaCl$_2$) | | 5.6 | 6.5 | 6.7 | 6.9 |
| Organic carbon | % | 1.1 | 0.6 | | |
| Phosphorus (Colwell) | mg/kg | 19 | 7 | | |
| Pottasium (Amm-acet.) | cmol(+)/kg | 1.2 | 0.93 | | |
| Nitrate N | mg/kg | 13.0 | 7.5 | 6.3 | 6.4 |
| Ammonium N | mg/kg | 1.3 | 0.8 | 0.6 | 0.6 |
| Conductivity | dS/m | 0.4 | 0.2 | | |
| Cation exchange capacity | meq/100g | 7.9 | 7.0 | 9.5 | 10.8 |
| Exchangeable calcium | % | 74 | 72 | 75 | 71 |
| Exchangeable magnesium | % | 11 | 14 | 19 | 24 |
| Exchangeable potassium | % | 15 | 13 | 6.2 | 4.4 |
| Exchangeable sodium | % | <1 | <1 | <1 | 0.58 |
| Exchangeable aluminium | % | <1 | <1 | <1 | <1 |

# Chickpea phosphorus requirement
## Trundle 2022

### Key findings

- Despite a low background phosphorus (P) level, there was no yield response to the application of P in this trial.

- High rates of P applied with the seed at sowing reduced chickpea establishment compared with where no P was applied

## Trial details

*Table 46:*  *Key trial management details at Trundle in 2022.*

| Management | | | Trundle |
|---|---|---|---|
| Sowing date | | | 28 June |
| Soil Colwell phosphorus | 15 April 2022 | 0–10 cm | 19 ppm |
| | | 10–30 cm | 7 ppm |
| Variety | | | PBA Seamer[(]) |
| Harvest | | | 12 January 2023 |

*Table 47:*  *Phosphorus products and rates applied with seed to chickpea experiment at Trundle in 2022.*

| Fertiliser product | Phosphorus applied (kg P/ha) | Product rate applied (kg/ha) |
|---|---|---|
| Granulock Z | 5 | 23 |
| | 10 | 46 |
| | 15 | 69 |
| | 20 | 92 |
| MAP | 5 | 23 |
| | 10 | 46 |
| | 15 | 68 |
| | 20 | 91 |
| Single super | 5 | 57 |
| | 10 | 114 |
| | 15 | 170 |
| | 20 | 227 |
| TRIPHOS | 5 | 25 |
| | 10 | 50 |
| | 15 | 75 |
| | 20 | 100 |
| UTC (untreated control) | 0 | 0 |

Granulock® Z:  11.0% nitrogen, 21.8% phosphorus, 4.0% sulphur, 1.0% zinc
MAP:  10.0% nitrogen, 21.9% phosphorus
Single super:  8.8% phosphorus, 11% sulphur, 19% calcium
TRIPHOS: 46% phosphorus

# Results

## Plant establishment

Application of phosphorus with pulse seed can reduce plant establishment. In this experiment only three treatments resulted in plant populations lower than the UTC (Nil P): 20 kg P/ha supplied as Single super and the top two rates of Granulock Z (15 and 20 kg P/ha).
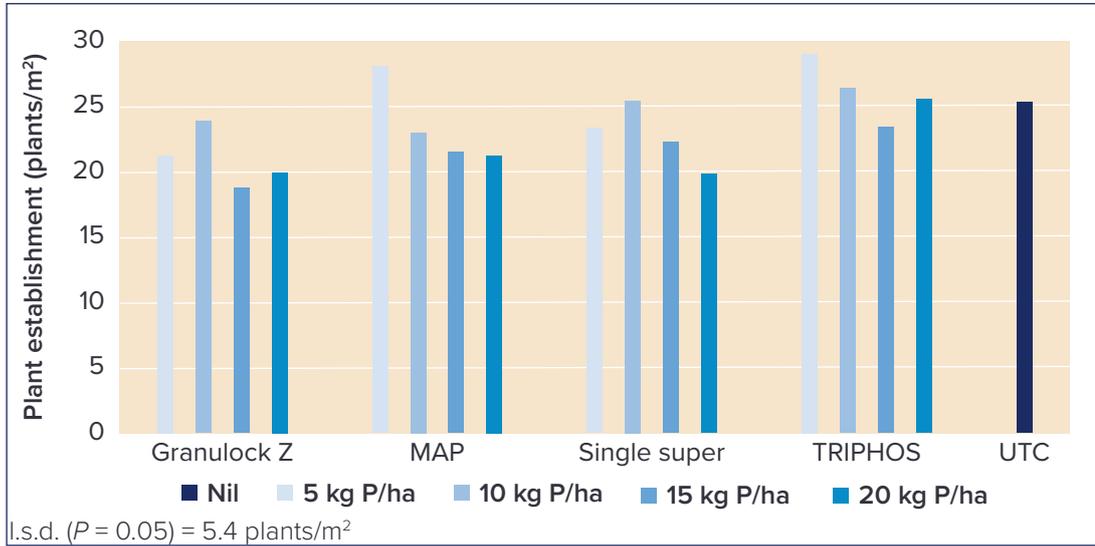


**Figure 19:** *The effect of phosphorus product and rate on chickpea establishment at Trundle in 2022.*

## Yield

Fertiliser product or rate had no impact on yield of PBA Seamer[Ⓟ] chickpea at Trundle when compared with the untreated control (UTC).

**Table 48:** *Grain yield of PBA Seamer[Ⓟ] chickpea with various phosphorous products and rates at Trundle in 2022.*

| Phosphorus applied (kg/ha) | Fertiliser product | Yield (t/ha)* |
|---|---|---|
| 0 | UTC | 2.1[ab] |
| 5 | Granulock_Z | 2.2[a] |
| | MAP | 2.2[ab] |
| | Single super | 2.4[a] |
| | TRIPHOS | 2.2[a] |
| 10 | Granulock_Z | 2.2[a] |
| | MAP | 2.2[a] |
| | Single super | 2.1[ab] |
| | TRIPHOS | 1.9[ab] |
| 15 | Granulock_Z | 1.8[ab] |
| | MAP | 2.0[ab] |
| | Single super | 2.0[ab] |
| | TRIPHOS | 2.0[ab] |
| 20 | Granulock_Z | 1.6[b] |
| | MAP | 2.3[a] |
| | Single super | 1.8[ab] |
| | TRIPHOS | 2.3[a] |
| l.s.d. (*P* = 0.05) | | 0.6 |

* data with the same letter are not significantly different