# Tottenham CWFS Site - Pulse Trial

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## Key Points

- Field peas yielded significantly higher then both lupins and vetch.
- Field peas and undersown barley had significantly higher gross margins than lupin and vetch.
- It terms of gross margins there was no significant difference between field peas/undersown barley, undersown barley/vetch and lupins/vetch.
- When choosing to grow a pulse crop the following management issues are critical: time of sowing, paddock selection, species selection and disease and pest management.

## Introduction

The Tottenham regional site group, in association with the Top Woodlands Agricultural Bureau, in 2003 investigated the production, management and profitability of three different pulse crops. These pulse crops included narrow-leaf lupins, field peas and vetch, with lucerne undersown in barley used for comparison to a pasture phase.

The main reason for conducting the trial was to determine whether pulse crops could be grown successfully in the Tottenham district and subsequently to identify an alternative crop for the wheat cropping rotation, which usually includes barley, oats, lucerne and/or canola.

Pulse crops in the farming rotation need to be seen as not only a cash crop but also as a "health kick". Pulses reduce disease, spread frost, market and harvest risk, help with weed management and add nitrogen into the system. While they can be less profitable in their first year compared to cereals, they boost profits in the next wheat crop SQ that the overall rotation's profit is greater than continuous wheat, with or without applied nitrogen (Carpenter 2003). Subsquently, the second reason for conducting the trial was to measure and evaluate the follow-on effects of pulses on the following two years of wheat in the Tottenham district.

## Method

As the trial was investigating different pulse crops, at least two varieties were selected to represent each crop (Table 1). The lupin varieties were selected based on their shatter resistance and disease resistance, the field peas varieties were selected based on their ability to stand at maturity and their height, as an open front header was to be used for harvest. The lucerne and barley varieties were selected based on district experiences.

Crop, variety and sowing rate for the Tottenham regional site pulse trial

| p | variety | sowing rate (kg/ha) |
|---|---|---|
| | Jindalee | **80** |
| | Merrit | **80** |
| | Snowpeak | **90** |
| | Kaspa | **90** |
| | Excel | **90** |
| | Popany | **32** |
| | Haymaker | **32** |
| **cerne** | Schooner/L69 | 24/2 |
| cerne | Schooner/Hunterfield | 24/2 |

I was designed as a randomized, :d block with 2 replicates. The s on a local farmer's property nately 6 km north of Tottenham brown earth, with the plots 23 m i 6.3 m wide. As the management trial was a key indicator for the ance of these pulses the trial was nd managed by the local farmer. )ins, field peas and vetch were ith an international combine, on May 2003, with 80 kg/ha MAP (10:21.9:0:1.5), whilst the wn barley was sown on the 12th sing the same equipment, plus a eeds box and fertilizer. The pre-nt herbicide used was Roundup t 1 1/ha and the growing season can be seen in Figure 1.

Soil samples (o-60 cm) were taken prior to sowing the trial. These soil samples will be used to compare the nitrogen input over the growing season and summer period from the different pulse crops. On the 29th January 2004 each plot were soil sampled, with the samples being divided into the 0-10 cm and 10-60 cm layers. These samples were sent to Farmright with the 0-10cm layer being tested for Total Nitrogen, Ammonium, Colwell Phosphorous and Nitrate and the 10-60 cm layer binge tested for Nitrate, Ammonium and Colwell Phosphorous. The results from these soil tests have not been received.

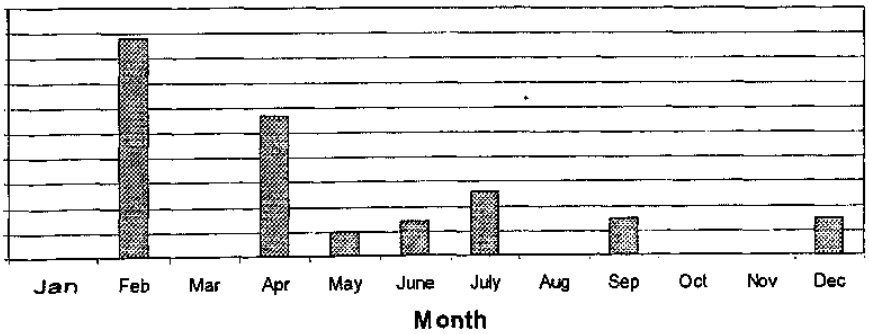


Figure 1. Rainfall at the Tottenham regional site pulse trial

## s & Diseases

the course of the trial three things ed that had an effect on the trial The first was pest damage from The lupins were eaten by emus soon after germination, with most plants losing their terminal growing point. As the lupins plants matured the emus moved onto green pasture and the lupins were left to pod up quite nicely, however

the plants severely lacked height and not all the pods could be harvested.

The second hurdle was the infestation of all plots with wild radish *(Raphanus raphanistrum L.).* The wild radish was controlled in the lupins and field peas using Brodal®Options, however, it could not be controlled in the vetch and undersown barley.

The third incident was the infection of one plot of Snowpeak field peas with Bacterial Blight. The bacteria which causes this disease is present in most pea-producing areas, however, severe crop damage only occurs sporadically, one in ten years. Bacterial Blight tends to occur with high rainfall, hail, strong winds and low temperatures (Armstrong *et al* 2001). This year at the trial site the seasonal conditions included strong winds and low temperatures with frequent frosts. The Bacterial Blight nearly halved the yields in Snowpeak with the effected plot yielding 0.62 t/ha compared with 1.1 t/ha in the unaffected plot.

## Results

The yield and gross margin results from the pulse trial are shown in Table 2. These results show a significant difference ($P<0.01$) between the yield of each crop with field pea yields significantly higher than lupins, vetch and undersown barley. There was no significant difference in yields between the varieties of each crop type.

The data also shows a significant difference ($P\leq0.05$) between the gross margins of certain crops. Field peas and undersown barley had significantly higher gross margins than lupin and vetch, whilst there was no significant difference between field peas/undersown barley, undersown barley/vetch and lupins/vetch. Again there was no significant difference in gross margins between the varieties of each crop.

**Table 2. Grain yield (t/ha) and gross margin ($/ha) of the Tottenham regional site pulse trial 2003.**

| Crop | Variety | Yield (t/ha) | Gross Margin (S/ha) |
|---|---|---|---|
| lupin | Jindalee | 0.38 b | 131 a |
| lupin | Merrit | 0.28 b | -135 a |
| field pea | Snowpeak | 0.86 a | **-18 bc** |
| field pea | Kaspa | 1.00 a | **8 bc** |
| field pea | Excel | 1.11 a | **28** c |
| vetch | Popany | 0.12b | -124 a |
| vetch | Haymaker | 0.32 b | **-77** a |
| barley/lucerne | Schooner/L69 | 0.51 b | **-42 b** |
| barley/lucerne | Schooner/Hunterfield | 0.49 b | **-35 bc** |
| *5% Isd between crop* | | *0.2867* | *68.66* |

Note: Numbers with the same letter are not significantly different

## Discussion

Given the season in 2003, what really stands out from these results is the yield performance of field peas compared to lupins, vetch and undersown barley. This could be attributed to management issues such as time of sowing and weed management/paddock selection. The ideal sowing times are lupins - April, vetch - May, undersown barley - May/June and field peas - May. Due to a lack of rainfall the lupins were sown later than optimum, which combined with early pest problems, resulted in a poor yield performance. The field peas, on the other hand, were sown at the optimum time (8th May) enabling them to grow and flower before the hot, dry finish in spring.

The yield performance of vetch and undersown barley was affected by wild radish. The wild radish was controlled in the lupins and field peas with Brodal®Options @ 0.2 1/ha. In vetch and undersown barley, however, no broad-leaf herbicides are registered for use and subsequently the wild radish competed vigorously against the vetch.

There was a noticeable variation between the gross margins of the different crops. The variable costs (e.g. seed, herbicide) and the income from each crop contributed significantly to these variations in gross margins.

The *key take home messages* to farmers and advisors when growing a pulse crop are:

- **Time of sowing** - In low rainfall environment the time of sowing is critical to optimize yield. Lupins need to be sown early, around mid-April.
- **Paddock selection** - Don't put broad-leaf crops in paddocks with a high broad-leaf weed population, as they are difficult to control. Pulses can be grown to control grass weeds and to rotate herbicides.
- **Species selection** - Identify the weed population and herbicide options for your paddock before choosing a pulse crop. Wild radish can be controlled in lupins and field peas but not in vetch.
- Disease/Pest management - Farm hygiene is important (i.e. purchasing "clean" certified seed and using seed treatments). Pulse diseases can be managed by species/variety selection, however, for some disease problems, such as bacterial blight in field peas, the cost of control in uneconomical. Pests need to be monitored throughout the season and they can be controlled with insecticides.

## Conclusion

In conclusion field peas were the highest yielding pulse crop, whilst field peas and undersown barley had the highest gross margins. When growing pulse crops the most important management issues to be considered are time of sowing, paddock selection, species selection and disease and pest management.

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