

Field Pea Nutrition Trials 2004

Ken Motley, NSW Dept of Primary Industries, Forbes

Karen Roberts, NSW Dept of Primary Industries, Parkes

David Harbison, D R Agriculture Pty Ltd (formerly of Hi Fert)

Andrew Rice, Ivey ATP

Key Points

- Significant grain yield responses to P fertiliser application occurred at the Goonumbla site.
- At Goonumbla, 25 kg P/ha significantly increased grain yield over 15 kg P/ha only when applied with starter N.
- Field peas proved very sensitive to heliothis damage at Gunning Gap and to harvest delays at Wirrinya.

Background

Field peas are a minor rotational crop in the Forbes and Parkes districts. However, farmers are showing increased interest in the crop because of the release of new improved field pea varieties, field peas' suitability to late sowing breaks and the disappointing performance of canola over the last 3 dry years.

Field pea nutrition trials were established at the Gunning Gap, Wirrinya and Alectown (Goonumbla location) CWFS Regional Sites in 2004 with the aim of investigating the potential for response to P rates above 15 kg/ha. The trial was also designed to measure the responsiveness of field peas to starter nitrogen (N) and sulphur (S).

The 2004 trials follow on from similar trials conducted in 2000 at Wirrinya (Motley *et al*, 2001).

Methods

Fertiliser mixes of single super phosphate (SSP), triple super phosphate (TSP), MAP and sulphur coated MAP (Super M) were made to achieve the desired nutrient rates. Each trial was arranged as a randomised block design with six replicates. Excell field peas were sown at a rate of 100 kg/ha using a cone seeder. Sowing occurred on the 1st June at Gunning Gap, 9th June at Goonumbla and 16th June at Wirrinya. Weeds and pests were controlled using herbicides and insecticides as required. Heliothis pressure was very high in 2004. Insecticide application at Gunning Gap occurred too late, with an estimated yield loss of greater than 50%.

Table 1: Rainfall at the field pea nutrition trial sites 2004

Location	Rainfall (mm)														Annual Total	Fallow (Nov-Mar)	Growing season (Apr to Oct)	Water limited yield potential ^a t/ha
	Nov	De	Ja	Fe	M	Ap	Ma	Jun	Ju	Au	Se	Oc	No	Da				
Goonumbla	26	34	61	45	21	4	46	52	27	52	44	38	31	82	503	191	259	28
Wirrinya	0	14	72	66	4	6	16	625	21	25	31	54	29	95	482	163	210	1.8
Gunning Gap	29	32	58	26	23	0	29	49	12	29	31	62	5	105	428	167	212	20

^aWater limited yield potential (t/ha) = ((Nov to Feb) X 30%+(Mar) X 50%)rTm+(Grafting season rainfall-130)mn) X 15(kg grain) / 1000

Table 2: Soil test summary of trials site in 2004

Location	pH	P (Bray)	S (KCl40)	Nitrate N	CEC	Ca:Mg	Al	Na
	CaCl2	ppm	ppm	ppm	meq/100g	ratio	% of cations	% of cations
Goonumbla	4.8	19	24	55	10.3	1.3	0.1	1.7
Wirrinya	6.8	6	22	9	16.2	3.3	0.0	1.3
Gunning Gap	5.0	38	8	9	6.4	1.4	0.2	1.6

Results and discussion

Seasonal conditions

A number of factors external to the trial design affected the results obtained at the Wurrinya and Gunning Gap sites. Harvest delays due to machinery break downs and 8 days of consecutive rain at the Wurrinya site meant that this site suffered high grain yield losses due to pod shattering. Yield figures obtained from a neighbouring field pea variety trial harvested before the rain had Excell yield at 1.2 t/ha. Excell only yielded an average of 0.5 t/ha in the Wurrinya nutrition trial, suggesting that the rain and delayed harvest caused approximately 60% yield loss due to shattering. Excell is well known to shatter badly if a delay in harvest occurs. Other field pea varieties such as Kaspa have good shattering tolerance.

The Gunning Gap site was abandoned due to poor yield potential (estimated at less than 0.3 t/ha) as a result of poor seasonal conditions and heliothis damage.

The field peas performed well at Goonumbla.

Yield results

All fertiliser treatments significantly increased yield over the Nil at Goonumbla (Table 3). 15 kg P/ha resulted in a yield increase of 19% above the Nil. Significant yield responses to P rates greater than 15 kg P/ha only occurred when the P fertiliser contained some N (i.e. starter N). N is most likely to be beneficial where N soil fertility is low or where nodulation conditions are poor. Neither of these conditions appeared to exist at Goonumbla. Generally a limit of 5-10 kg N/ha is recommended at sowing so as to reduce the risk of inhibition of nodulation and unnecessary biomass growth. A soil P concentration (Bray) of 19 ppm is not considered very low, but is considered lower than optimal. There was no evidence of S responses at Goonumbla. This was to be expected given that the S levels at Goonumbla were high.

No significant yield responses were recorded with any fertiliser treatment at Wurrinya.

Table 3: Field pea responses to fertiliser at Goonumbla and Wurrinya 2004.

Treatment Name	Products used	Nutrients applied (kg/ha)			Goonumbla			Wirrinya	
		N	p	S	t/ha	% Nil	t/ha	% Nil	
Nil	NilP	0	0	0	2.20	a	100%	0.46	100%
ON,15P, 15S	SSP/TSP	0	15	13	2.62	b	119%	0.52	113%
ON.25P, 15S	SSP/TSP	0	25	14	2.74	bc	125%	0.54	117%
ON.40P, 15S	SSP/TSP	0	40	15	2.78	bc	127%	0.52	114%
ON,25P, OS	TSP	0	25	0	2.65	be	121%	0.58	125%
11N, 25P, OS	MAP	11	25	0	2.85	c	130%	0.49	107%
11N.25P,15S	Super M	11	25	15	2.84	c	129%	0.56	120%
LSD (P<0.05)					0.20	9%		ns	ns

Results within columns that have different letters beside them are significantly different (P<0.05)

References

Motley, K., Harbison, D. and Rice, A. (2001). Phosphorus response in field peas. CWFS Research Compendium 2000-2001. pp. 104-109

Acknowledgements

Special thanks to Hi-Fert for their direct support of this trial series.

These trials were conducted as part of the CWFS Regional Site program. The trial sites were supported by the Grain Growers Association, GRDC and Hi-Fert fertilisers. Greg Gibson (NSW DPI) provided invaluable technical assistance. The data was analysed by Helen Nicol (consulting statistician). Thanks go to the trial co-operators; Geoff McCallum (Goonumbla), Kim and Wendy Muffett (Wurrinya) and Hodges Family (Gunning Gap).