



Response of chickpea to in-season application of nitrogen - Ridley

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Key Messages

- Chickpea seed yield responded to 25-50 kg N/ha applied 18 weeks after sowing at Ridely in 2020
- Yield responses were not large enough to pay for the cost on applied nitrogen.
- Kabuli variety Gen090 produced similar yields to desi variety CBA Captain

Background

Pulses have high demand for nitrogen during the reproductive stage when their growth rate increases and pods are set and filled. We wish to determine if applying nitrogen in-season will increase nitrogen supply, pod set and yield.

Aim

To determine if chickpea respond to applied nitrogen.

Trial	Details

Property	Kim and Abbie Jones, Mt Ridley, GPS - 33.399267S, 122.032196E				
Plot size & replication	2 m centres x 10 m sown x 4 reps				
Soil type	Sandy loam duplex				
Soil pH (CaCl ₂)	0-10 cm:5.8 10-20 cm: 7.7				
EC (dS/m)	0-10 cm: 0.101 10-20 cm: 0.27				
Sowing date	22/4/2020.				
Sowing rate	90 kg/ha				
Fertiliser	100 kg/ha Superphosphate at seeding plus treatments applied on 26 th August (18WAS early podding)				
Herbicides, insecticides & fungicides	22 nd April 1.5 L/ha Sprayseed + 1.1 L/ha Ultro ((900 g/kg carbetamide) + Terbyne Xtreme, 23 rd April 1 L/ha Pyrinex Super (400 g/L chlorpyrifos + 20 g/L bifenthrin),9 th June 100 mL/ha Factor + 500 mL/ha Clethodim + 0.01% Uptake + 0.01% Ammonium Sulphate, 7 th July 1.5 L/ha Mantrac Pro (50% Mn, 6.9% N) + 330 g/ha TwinZinc (70% Zn, 1.8%N), 25 th August 600 mL/ha Aviator Xpro, 4 th September 100 mL/ha Alpha Duo + 100 mL/ha Dominex Duo, 2 nd Oct 150 mL/ha Affirm + 00.02% BS1000, 15 th Oct 30 mL/ha Trojan (150 g/L gamma- cyhalothrin), 29 th Oct 3 L/ha Regione				
Harvested	18 th November – machine harvest				
Growing season rainfall	158 mm				

Treatments

4 nitrogen rates x 2 varieties

- 1. Nil
- 2. N25 25 kg N/ha applied as urea 18 weeks after sowing (18WAS) when chickpea was flowering and starting to set pods
- 3. N50 18WAS
- 4. N100 18WAS

Varieties - CBA Captain (desi) and Genesis 090 (small seeded kabuli)





N applied	CBA Captain	Gen090	Mean	Significance Nrate
0	523	555	539	а
25	642	583	613	b
50	600	622	611	b
100	519	523	521	а
Mean	571	571	571	
	Р	LSD		
Variety	0.980	46		
Ntreat	0.007	54		
Variety.Ntreat	0.651	81		
		96	same Variety	
		109	same Ntreat	

Table 1 Seed yield (kg/ha) of chickpea with applied N at Ridley in 2020 (20ES33)

Comments

Rainfall in 2020 was lower than average, with a particularly dry September. Fortunately, August had higher than average rainfall. Harvest was hampered by rainfall in November. Drier than normal conditions resulted in less transient waterlogging which is often seen on the sandy loams at Ridley during July and August. However, in the dry conditions we did see some necrosis on both lentil and chickpea which were possibly related to roots hitting the salt and boron layers at depth. The wet August helped crops to recover.

Chickpea yields were not high at 5-600 kg/ha, however at long term prices of \$550/t for desi and \$700/t for Kabuli most treatments would have been profitable.

Nitrogen treatments were applied as urea on August 26 approximately 18 weeks after sowing, when the chickpea were flowering and starting to set pods. Following the application of nitrogen it was not self-evident that the treatments had been applied, with Nil plots looking as good as high N treatments.

Plants from the CBA Captain 0N and 100N were sampled for assessment of nodulation in early October. Both treatments had adequate nodulation – rated 5.

Seed yield of chickpea responded to 25-50 kg N/ha, however the highest rate of 100N produced similar yields to Nil plots. We are not sure why this occurred. Factoring in the cost of the applied nitrogen resulted in no treatment outperforming the Nil treatment. Given 2020 was a relatively low rainfall season where yield potential was limited this is perhaps not an unexpected result.

Given the lack of a seed yield response to nitrogen we might have expected the N to boost seed protein levels. However, we did not find that to be the case with nitrogen having no effect on protein in the grain or seed size at harvest.

At Ridley in 2020 the Kabuli variety Gen090 produced similar yields to CBA Captain. Given the potential for Kabuli to achieve higher prices and Gen090's known tolerance to boron this is another example that may make us consider Kabuli as a chickpea variety choice in the Esperance mallee – albeit the marketing may be more difficult than Desi chickpea.





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Links

For other reports related to this trial visit GRDC's on-farm trial web site at https://www.farmtrials.com.au

For more information, contact

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