

CWFS CHICKPEA RESPONSE TO ROW SPACING AND PLANT POPULATION

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Key Messages:

- Chickpea yields varied with variety, row spacing and seeding rate.
- Under the dry conditions of 2007, Genesis 509 sown at 35-45 seeds/m² in 44 cm or 66 cm row spacing's performed best.

Trial aim

To determine the interaction of row spacing and plant population on chickpea yield.

Background

Now that there are varieties on the market with good Ascochyta resistance, growers throughout central western NSW are beginning to grow chickpeas again. There is still plenty of discussion on the most profitable row spacing on which to plant chickpeas. Manning *et al* (2000) reported minimal differences in yield in northern NSW and Southern QLD when row spacings ranged from 25 to 70 cm. The optimal plant population for a chickpea crop in NSW is 35 plants/ m² (Manning *et al* 2000).

Method

Three replicated field trials were sown at Alectown, Gunning Gap, and Wirrinya. Two varieties of chickpeas (Flipper and Genesis 509) were sown at three row spacing's - 22 cm, 44 cm and 66 cm, and at three plant populations - 25, 35 and 45 plants per square metre (ppm²). Plant establishment and yield were measured. Buffer rows were left on each plot to minimize edge effect. Plot sizes varied due to the different row spacing's, plot size was 27 m² except for the 66 cm spacing which was 27.9 m². Of the trials sown only the Gunning Gap site was harvested. The other two sites were unable to be harvested due to drought.

Results

Establishment

Plant counts at establishment showed no significant differences between the two chickpea varieties.

Target populations were slightly lower than intended for the 22 and 66 cm row spacing and a bit higher for the 44 cm row spacing (see Table 1). There is no clear reason for this, but it may have been a result of the method used to alter the row spacing.

Table 1. Plant counts at establishment.

Sowing Rate (plants/m ²)	Plants Established (per m ²)		
	Row Spacing (cm)		
	22	44	66
25	28	34	27
35	32	42	30
45	42	48	42

Yields

Yields were very low, a result of the dry year, but there were still significant differences found between varieties, densities and row spacing's. Table 2 shows the mean yields for varieties and densities. The variety Genesis 509 yielded slightly higher than Flipper across all row spacing's and plant densities. Genesis 509 is an early to mid maturing variety compared with Flipper which is a mid to late maturing variety. Genesis 509 was also harvested 25 days earlier than Flipper due to the differences in maturity.

Bogan Gate CWFS Field Day 2007



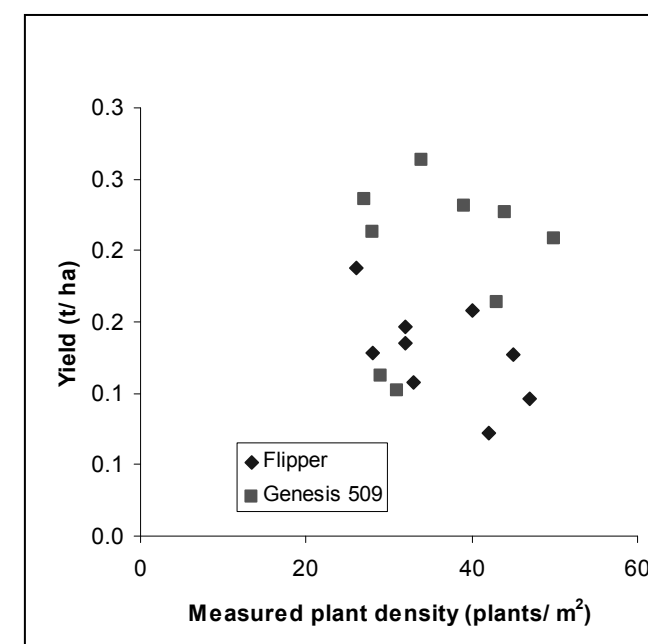
Table 2. Average chickpea seed yield for (a) variety and (b) plant density

(a)		(b)	
Variety		Yield	(t/ha)
Flipper			0.13
Genesis 509			0.20
LSD (0.05)			0.01
Seeding rate per m ²		Yield (t/ha)	
25			0.18
35			0.16
45			0.15
LSD (0.05)			0.02

LSD (0.05) = difference needed between varieties to be statistically different (with 95% confidence).

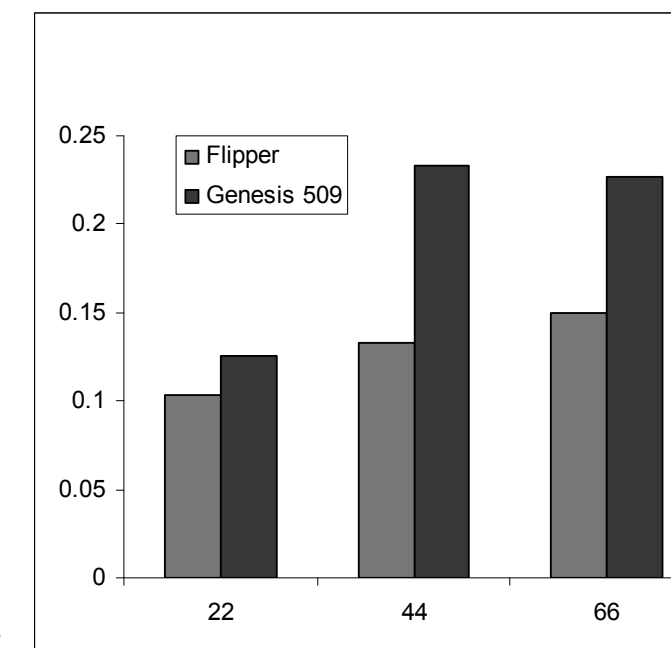
The yields were similar at the two higher seeding rates but significantly lower at 25 seeds/m² (Table 2b). As the target densities were not met, the relationship between established plant density and yield was examined (see Figure 1). For Flipper, yield decreased with increasing plant density, this was not evident for Genesis 509.

Figure 1: Grain yields of chickpea varieties Flipper and Genesis 509 versus the established plant densities



While yields were quite low, there was a significant effect of row spacing on yield. Figure 2 shows the yields at the three row spacing's. Genesis 509 yielded similarly at the 44 and the 66 cm spacing. The yield at 22 cm was considerably lower; the same effect was seen with Flipper but not to the same extent. The differences in yield could be due to the dry conditions experienced in 2007 with more competition for moisture at the narrower spacing.

Figure 2. Chickpea yields at three row spacings



Conclusion

Despite the low yields the results show that row spacing, plant density and the agronomic characteristics of the variety can all affect yield. In this dry year, the Genesis 509 variety chickpeas sown at higher seeding rates (35-45 seeds/m²) and wider row spacing's (44 and 66 cm) performed the best. This trial needs to be repeated over a range of conditions and years to accurately determine the most beneficial row spacing and density.

References

Manning, B., Ackland, S., Moore, K., Lucy, M. and Brinsmead B (2000). Best practice management for sustainable production: Chickpea. NSW Agriculture Agfact