

## The Effect of Sowing Rate on the Performance of H45 and Diamondbird Wheat

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### Trial Outcomes

- Plant population is poorly correlated with sowing rate. Farmers should focus more on plant populations rather than just sowing rate.
- High plant populations increased yield without affecting grain quality in these two trials.
- Dry land wheat farmers in the Parkes and Forbes areas should target a plant population of 100-120 plants / m<sup>2</sup>.
- Sowing rates should vary depending on seed size, germination and sowing conditions to achieve the target plant density.

### Background

Dry land wheat sowing rates in the Forbes district appear to differ dramatically, generally ranging from 35 to 70 kg/ha. Under sown crops will sometimes be sown as low as 20 kg/ha.

Opinions seem to vary on the effect of sowing rate on wheat performance. Some farmers believe that high sowing rates will result in more tillers and high screenings. In contrast, others suggest that higher sowing rates reduce secondary tiller and will actually reduce screenings.

The introduction of the lower tillering variety H45 also has farmers asking should they increase their sowing rate with H45 because it tillers less?

Wheat sowing rate trials were conducted in 2001 at the Gunning Gap and Wirrinya CWFS Regional Sites to provide further information regarding sowing rates and optimum plant densities.

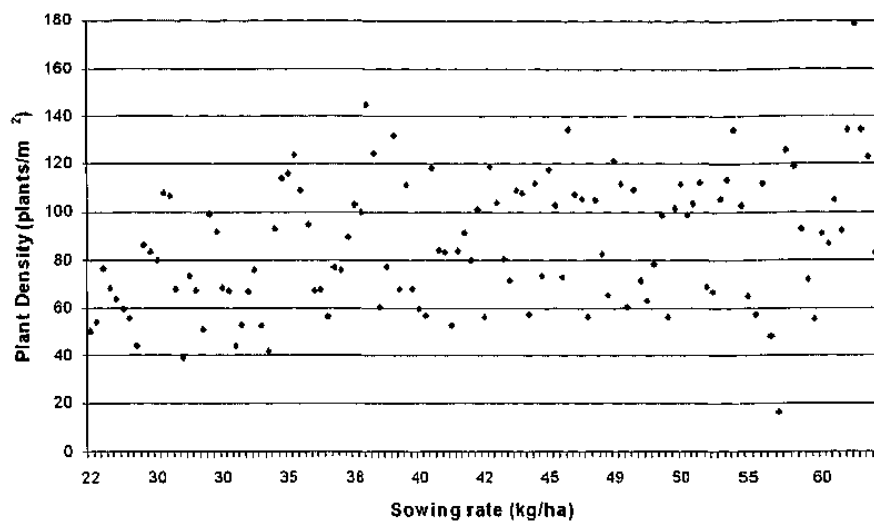
### Discussion

#### *Sowing rate and plant population*

The sowing rates used resulted in dramatically different plant populations with changes in variety and location. This is probably due to seed size, germination and vigour differences between the two varieties. The Wirrinya site was sown late and into a very wet seedbed that could have resulted in more seedling mortality and thus the lower plant population.

Results from the CWFS crop monitoring project indicate a very poor correlation between wheat sowing rate and plants established. The graph below shows that for a given sowing rate such as 45 kg/ha, the wheat plants established range from 60 plants/m<sup>2</sup> to 130plants/m<sup>2</sup>.

Sowing rate x plant density

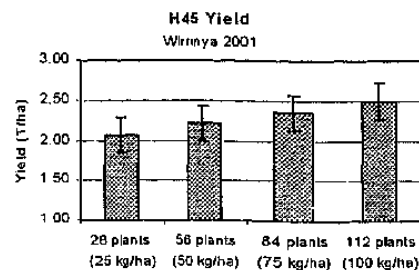
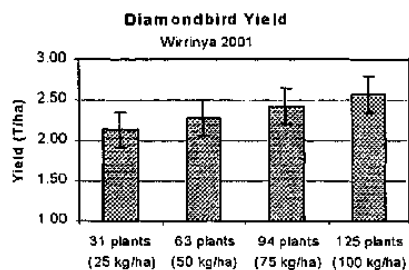
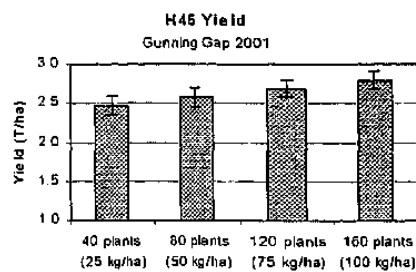
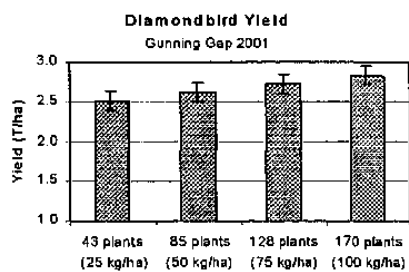


Source: CWFS crop monitoring results 2001

*Yield*

Higher plant populations resulted in significantly higher yield in both trials with both wheat varieties (Diamondbird and H45). Low plant

populations typically yielded 15-20% less than the high plant populations. The graphs below highlight the consistent trend of increasing yield with higher plant populations.



*Grain Quality*

High populations did not significantly affect screenings. However, there was a consistent trend at both sites and both varieties with screening actually being lower with higher plant populations. High plant numbers appeared to reduce protein levels slightly. No trend was apparent on grain weight. Grain size was not measured.

**Conclusion**

From the 2001 trial data, 100-120 plant/m<sup>2</sup> appears an appropriate target population for dry land wheat crops in the Forbes and Parkes districts. Further trials are needed to look at the influence of high plant populations on grain quality over a wider range of seasonal conditions. Sowing rates should be calibrated for a target plant population and will vary depending on seed size, germination and sowing conditions.

Detailed trial results follow in an Appendix A.

**Acknowledgments**

Thanks go to the trial cooperators for hosting the trials. Greg Gibson and Tim McNee provided technical assistance. Arthur Gilmore carried out statistical analysis of the trial data.

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Appendix A.Detailed trial results; effect of sowing rates.

**Trial** Wheat sowing rate  
**Location** Gunning Gap  
**Cooperator** Clem Hodges  
**Sown** 30-May-01  
**Fertiliser** 120 kg/ha Granulock 12Z  
Presown 25 kg/ha N  
**Herbicides** Tristar and Banvel M

Variety	Sowing Rate Kg/ha	Plants Established /m2	Results				
			Yield		Protein	Screenings	TestWt
			T/ha	%	%	%	kg/HL
Diamondbird	25	43	2.51	96%	9.66	10.48	79.5
Diamondbird	50	85	2.62	100%	9.48	10.37	78.9
Diamondbird	75	128	2.72	105%	9.30	10.26	78.3
Diamondbird	100	170	2.83	109%	9.12	10.15	77.7
H45	25	40	2.47	95%	9.60	10.78	79.1
H45	50	80	2.58	99%	9.55	10.67	78.5
H45	75	120	2.69	103%	9.51	10.55	78.0
H45	100	160	2.80	107%	9.47	10.44	77.5
Mean			2.60	100%	9.44	10.48	78.4
LSD (5%)			0.12	5%	0.29	1.85	3.9
Co. Var. %			2.1%		0.0%	7.7%	2.5%
Significant			Yes (rate)		Yes (rate)	No	No

**Trial** Wheat sowing rate  
**Location** Wirrinya  
**Cooperator** Kim and Wendy Muffett  
**Sown** 3-Jul-01  
**Fertiliser** 120 kg/ha Granulock 12Z  
Presown 40 kg/ha N  
**Herbicides** Tristar and Banvel M

Variety	Sowing Rate Kg/ha	Plants Established /m2	Results				
			Yield		Protein	Screenings	Test Wt
			T/ha	%	%	%	kg/HL
Diamondbird	25	31	2.13	92%	14.1	3.81	76.1
Diamondbird	50	63	2.28	98%	14.1	3.47	75.3
Diamondbird	75	94	2.42	105%	14.2	3.13	74.5
Diamondbird	100	125	2.57	111%	14.2	2.79	73.8
H45	25	28	2.06	89%	14.0	3.85	75.0
H45	50	56	2.21	95%	14.0	3.59	75.4
H45	75	84	2.35	102%	14.1	3.33	75.9
H45	100	112	2.50	108%	14.2	3.07	76.4
Mean			2.32	100%	14.1	3.47	75.4
LSD (5%)			0.22	10%	0.3	1.10	2.2
Co. Var. %			4.3%		1.1%	15.4%	0.7%
Significant			Yes (rate)		No	No	Yes (var.rate)