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Late cereal sowing options – Gilgandra 2015

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Key findings

- From a late sowing date of 6 July, the two bread wheat varieties Suntop(Φ) and LRPB Dart(Φ) out-yielded the two barley varieties (Commander(Φ) and La Trobe(Φ)) and two durum varieties (DBA Lillaroi and Caparoi).
- Increasing the plant population from 120 plants/m^2 (district practice) to 150 and 180 plants/m^2 had no influence on yield or grain protein levels in any variety, but did increase screening levels in all varieties at 180 plants/m^2.

Introduction

Growers are often faced with decisions around late sowing due to late autumn breaks, waterlogging or initial crop establishment failures necessitating re-sowing. Barley has traditionally been considered a better late sowing option than bread wheat because it can progress more rapidly to the vital stages of flowering and grain filling, minimising heat stress in typically hot springs. Durum has also been used as a late sowing option in preference to bread wheat because it is generally considered quicker maturing. However, growers are still faced with the questions:

1. How late is too late?
2. Should I increase the seeding rate when late sowing?
3. Which cereal species is my best option?

In recent years, a number of fast-maturing bread wheat cultivars have been released that are quicker to flower than some barley varieties and a few durum varieties. While speed to flowering is not the only determinant of successful grain fill in a short season, it is an important factor.

In this experiment, three cereal types; bread wheat, barley and durum were examined with two popular cultivars of each. Three target plant populations were chosen (120, 150 and 180 plants/m^2) to assess whether additional plant numbers increased yield in a shortened growing season. The same experiment was also conducted at Trangie Agricultural Research Centre sown on 2 July 2015.

Site details

Location	"Inglewood", Gilgandra
Co-operator	Kevin Kilby
Soil type and nutrition	Red clay loam, pH_{Ca} 5.6 (0–10 cm)
Starting nitrogen	26 kg N/ha (0–60 cm)
PREDICTA®B	Nil root lesion nematodes and 0.9 log *Fusarium* DNA/g (low) at sowing (0–30 cm)
Sowing date	6 July 2015
Rainfall	see Table 1
Fertiliser	95 kg/ha Granulock® Z Extra (flutriafol) at sowing 70 kg/ha of urea at sowing

Weed management	**Pre sowing**: Logran® 30 g/ha (triasulfuron 750g/kg) Boxer Gold® 2.5L/ha (prosulfocarb 800 g/L, s-metolachlor 120 g/L) **In crop**: Velocity® 770 ml/ha (bromoxynil 210 g/L, pyrasulfotole 375 g/L) Hasten® 0.5 L/ha (esters of canola oil 440 g/L) Axial® 150 ml/ha (cloquintocet-mexyl 25 g/L, pinoxaden 100 g/L)
Disease management	Flutriafol 2.5 L/t on starter fertiliser (Granulock® Z Extra)
Harvest date	16 November 2015

Table 1. Monthly rainfall total at the experiment site – 2015.

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Total rainfall (mm)	59.2	0.8	11.2	114.4	48.0	44.2	44.0	32.8	3.0	27.8	98.8	56.0

Treatments

Varieties (6)	Two wheat varieties: Suntop$^{\Phi}$ and LRPB Dart$^{\Phi}$ Two durum varieties: DBA Lillaroi and Caparoi Two barley varieties: Commander$^{\Phi}$ and La Trobe$^{\Phi}$
Three plant populations:	120, 150, 180 plants/m^2

Results

Grain yield

The late sowing resulted in relatively low yields ranging from 0.64 t/ha La Trobe$^{\Phi}$ (at 120 plants/m^2) up to 1.44 t/ha (Suntop$^{\Phi}$ at 180 plants/m^2; Table 2) The crop types and varieties differed in yield with Suntop$^{\Phi}$ > LRPB Dart$^{\Phi}$ > DBA Lillaroi > Caparoi > Commander = La Trobe$^{\Phi}$. Plant population did not significantly affect yield within individual cultivars (Table 2).

Grain protein

Plant population had no significant effect on grain protein concentration within individual varieties (Table 2).

LRPB Dart$^{\Phi}$ had significantly higher grain protein levels (0.5%) for each plant population than Suntop$^{\Phi}$.

The durum variety, DBA Lillaroi, had higher grain protein than Caparoi, while the protein difference between the barley varieties La Trobe$^{\Phi}$ and Commander was not significant.

Screenings

Increasing plant population from 120 plants/m^2 to 180 plants/m^2 increased screenings levels in all varieties with some being more affected than others (Table 2).

Table 2. Grain yield and quality of six cereal varieties at three different plant populations – Gilgandra 2015.

Variety	Plant population (plants/m^2)	Yield (t/ha)	Protein (%)	Screening (%)	Retention (% above 2.5 mm)	Screening (% below 2.2 mm)
DBA Lillaroi	120	0.86	13.4	5.4		
	150	0.89	13.2	5.0		
	180	0.92	13.3	6.5		
Caparoi	120	0.75	12.9	9.7		
	150	0.78	12.8	9.4		
	180	0.81	12.9	10.9		
Commander	120	0.66	10.4		0.38	0.19
	150	0.69	10.3		0.38	0.20
	180	0.72	10.4		0.38	0.19
LRPB Dart	120	1.11	12.4	8.2		
	150	1.14	12.2	7.8		
	180	1.17	12.3	9.3		
LaTrobe	120	0.64	10.3		0.13	0.42
	150	0.67	10.2		0.13	0.33
	180	0.70	10.3		0.13	0.40
Suntop	120	1.38	11.9	3.1		
	150	1.41	11.7	2.8		
	180	1.44	11.8	4.3		
l.s.d.		0.08	0.3	0.02	0.05	0.06

Conclusions

July is considered a relatively late sowing date for any cereal in most years at Gilgandra. In an adjacent cereal experiment sown on 12 May (seven weeks earlier), a mean yield of 4.6 t/ha was achieved in bread wheat, barley and durum varieties. This highlights the considerable drop in potential yield from such late sowing.

It is not clear why the bread wheat varieties out-yielded the barley in this experiment. The November rain would have been too late to have assisted with grain fill, however the 11 mm recorded on 22 October likely coincided with wheat grain set and floret retention. Many farmers use increasing plant population with late sowing to attempt to compensate for the lower yield potential from reduced crop growing/tillering time. In this experiment, there was a trend toward higher yield with increasing plant population in all varieties, but the effect was very small (0.02–0.03 t/ha) and not statistically significant. Increasing plant population to 180 plants/m^2 disadvantaged the bread wheat and durum varieties by increasing screenings. Increasing plant population did not affect barley retention and screenings.

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