Effect of sowing time on 32 wheat varieties – Condobolin 2015

Ian Menz, **Nick Moody** and **Daryl Reardon** NSW DPI, Condobolin

Key findings

- LPB10-0018 was the highest yielding variety sown on 30 April (2.09 t/ha).
- Emu Rock$^{\Phi}$ was the highest yielding variety sown on 22 May (1.72 t/ha) and 11 June (0.89 t/ha).
- Emu Rock$^{\Phi}$ was the highest yielding variety (1.49 t/ha) when averaged across all sowing times.
- Dry conditions during September and October contributed to the lower average yields in the 22 May and 11 June sowing times.

Introduction

This experiment investigated the effect of time of sowing (TOS) on grain yield of 32 new and current wheat varieties in the low rainfall region of central western NSW. The three sowing dates represented the full span of the sowing window.

Site details

Location	Condobolin Agricultural Research and Advisory Station
Soil type	Red-brown earth
Previous crops	Lucerne pasture (2012–14). Fallowed August 2014.
Fertiliser	70 kg/ha MAP + Jubilee @ 400 mL/ha (fungicide on fertiliser)
Available N	174 kg/ha (0–60 cm)
In-crop rainfall (April–Oct)	198.2 mm
Harvest date	24 November 2015

Treatments

Varieties	Bolac$^{\Phi}$ Condo$^{\Phi}$ Corack$^{\Phi}$ Dart$^{\Phi}$ EGA_Eaglehawk$^{\Phi}$ EGA_Gregory$^{\Phi}$ EGA_Wedgetail$^{\Phi}$ Elmore CL PLUS$^{\Phi}$ Emu Rock$^{\Phi}$ Espada$^{\Phi}$ Forrest$^{\Phi}$	Gauntlet$^{\Phi}$ Impala$^{\Phi}$ Janz Lancer$^{\Phi}$ Lincoln$^{\Phi}$ Livingston$^{\Phi}$ LPB09-0358 LPB10-0018 Mace$^{\Phi}$ Merinda$^{\Phi}$ Merlin$^{\Phi}$	Mitch$^{\Phi}$ Phantom$^{\Phi}$ Spitfire$^{\Phi}$ Strzelecki$^{\Phi}$ Sunguard$^{\Phi}$ Sunmate$^{\Phi}$ Suntop$^{\Phi}$ Sunzell$^{\Phi}$ Viking$^{\Phi}$ Wallup$^{\Phi}$
Sowing dates	TOS 1: 30 April TOS 2: 22 May TOS 3: 11 June		

Seasonal conditions

Growing season rainfall at the experiment site was slightly below average; the Condobolin Agricultural Research and Advisory Station recording 198.2 mm. The long-term average (LTA) growing season rainfall is 209 mm. The rain was spread across the first five months of the growing season. Rainfall in May was 11.6 mm (LTA 34.4 mm) and in September 6.2 mm (LTA 29.1 mm), which fell in the first week. The next substantial rainfall of 16 mm was not until 22 October (Table 1).

Condobolin experienced high day time temperatures (34–38 °C) and hot winds in the first week of October. These high temperatures and dry conditions coincided with flowering and could have contributed to the lower yields in TOS 2 and TOS 3.

The experiments were sown into adequate moisture, had even establishment and were weed-free.

Results

Time of sowing significantly affected wheat grain yield ($P < 0.001$). When averaged across all varieties, there was a grain yield reduction of 0.51 t/ha from TOS 1 (30 April) to TOS 2 (22 May) and a further reduction of 0.65 t/ha from TOS 2 to TOS 3 (11 June) (Figure 1).

The lower grain yields in TOS 2 (22 May) and TOS 3 (11 June) may have been attributed to the dry spring conditions coupled with high day time temperatures experienced in Condobolin during October. There was below average rainfall during September (6.2 mm recorded, LTA 29.1 mm). These dry conditions and high temperatures coincided with the optimal flowering window for Condobolin.

Table 1. Condobolin rainfall 2015.

Condobolin Agricultural Research and Advisory Station rainfall for 2015 (mm)														
Dec 2014	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total	In-crop
88.8	59.2	35.9	0.2	64.7	11.6	31.8	41.6	42.3	6.2	65.2	67.3	28.5	454.5	198.2

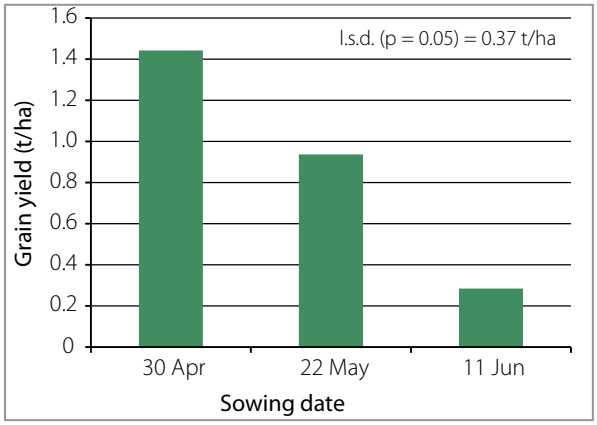

Figure 1. Average grain yield (t/ha) of 32 wheat varieties for three times of sowing at Condobolin, 2015.

The interaction between sowing time and variety also significantly affected wheat grain yield. LBP10-0018 (2.09 t/ha) was the highest yielding variety sown on 30 April, and Emu Rock was the highest yielding variety sown on 22 May and 11 June (1.72 t/ha and 0.89 t/ha respectively). These two varieties were ranked within the top six varieties across all three sowing times (Table 2).

Table 2. Grain yield and rank of 32 wheat varieties at three sowing times at Condobolin, 2015.

TOS 1: 30 April			TOS 2: 22 May			TOS 3: 11 June		
Rank	Variety	Yield (t/ha)	Rank	Variety	Yield (t/ha)	Rank	Variety	Yield (t/ha)
1	LPB10-0018	2.09	1	Emu Rock	1.72	1	Emu Rock	0.89
2	Dart	1.99	2	Corack	1.72	2	Mace	0.78
3	Wallup	1.86	3	Mace	1.63	3	Corack	0.69
4	Emu Rock	1.84	4	LPB10-0018	1.46	4	LPB10-0018	0.56
5	Suntop	1.84	5	Wallup	1.43	5	Dart	0.54
6	Janz	1.81	6	LPB09-0358	1.37	6	LPB09-0358	0.50
7	Sunmate	1.71	7	Livingston	1.37	7	Condo	0.47
8	Merinda	1.70	8	Condo	1.33	8	Espada	0.40
9	Condo	1.66	9	Impala	1.26	9	Impala	0.39
10	Elmore CL PLUS	1.65	10	Sunguard	1.23	10	Spitfire	0.35
11	Gauntlet	1.59	11	Spitfire	1.15	11	Elmore CL PLUS	0.33
12	Espada	1.58	12	Dart	1.08	12	Livingston	0.31
13	Impala	1.55	13	Sunmate	1.04	13	Merlin	0.31
14	Merlin	1.52	14	Lincoln	1.01	14	Lincoln	0.31
15	Sunguard	1.51	15	Merinda	0.98	15	Sunmate	0.28
16	EGA_Gregory	1.50	16	Viking	0.97	16	Sunguard	0.25
17	Spitfire	1.48	17	Espada	0.96	17	Phantom	0.24
18	Corack	1.46	18	Suntop	0.93	18	Merinda	0.20
19	LPB09-0358	1.46	19	EGA_Gregory	0.90	19	Janz	0.19
20	Mace	1.45	20	Mitch	0.84	20	Suntop	0.18
21	Phantom	1.44	21	Elmore CL PLUS	0.82	21	Wallup	0.15
22	Viking	1.42	22	Merlin	0.73	22	Mitch	0.12
23	Livingston	1.41	23	Gauntlet	0.72	23	Lancer	0.11
24	Lancer	1.40	24	Phantom	0.71	24	EGA_Gregory	0.10
25	Mitch	1.29	25	Janz	0.52	25	Bolac	0.09
26	Lincoln	1.29	26	Lancer	0.49	26	Strzelecki	0.09
27	Strzelecki	1.15	27	Strzelecki	0.40	27	Sunzell	0.08
28	Bolac	1.02	28	Bolac	0.31	28	Viking	0.08
29	Sunzell	0.94	29	Sunzell	0.29	29	Forrest	0.06
30	Forrest	0.73	30	EGA_Wedgetail	0.27	30	Gauntlet	0.06
31	EGA_Eaglehawk	0.57	31	EGA_Eaglehawk	0.18	31	EGA_Wedgetail	0.05
32	EGA_Wedgetail	0.26	32	Forrest	0.14	32	EGA_Eaglehawk	0.01
	l.s.d. (P <0.05)	0.48						

Summary

The highest yielding varieties across all sowing times were the very fast or fast maturing varieties (e.g. LPB10-0018 and Emu Rock). The dry conditions in September and higher than average temperatures in October favoured the quicker maturing varieties as they had the ability to flower before the dry spring conditions.

The slower and longer season varieties (e.g. EGA_Eaglehawk and EGA_Wedgetail) yielded lowest across all sowing times. The shorter 2015 growing season, characterised by hot temperatures during grain filling, resulted in the longer season varieties being moisture stressed and heat stressed during flowering. The earlier sowing times had less exposure to the hot dry finish and grain yields were significantly higher than the latest time of sowing.

Acknowledgements

This experiment is part of 'Variety Specific Agronomy Packages for southern, central and northern New South Wales', DAN00167 2013–17, jointly funded by GRDC and NSW DPI.

Thanks to Technical Officers Nick Moody and Daryl Reardon at Condobolin Agricultural Research and Advisory Station, and Dr Neroli Graham for statistical analyses.