

Maximising wheat production through managing risks in dry and drying environments

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Key messages

- In low yielding environment with yield potential around 2.0 t/ha, Wyalkatchem (APW), Emu Rock (AH) and Corack (APW) outyielded Mace (AH) by 14%, 8% and 6% respectively across three times of sowings.
- In high yielding environment with yield potential around 5 t/ha, Cobra (yielded similar to Mace (4.87 t/ha) in both May and June sowings.
- New variety Trojan (quality grade not yet known in WA) outyielded Mace by 17% and 8 % across three times of sowing at Merredin and across two times of sowings at Wickepin.
- Selecting two or three varieties with different traits should help to manage production risks and to achieve yield stability in risky environments.

Aims

The aim of this work was to identify varieties for yield stability and grain quality in dry and drying seedbeds in the Central Agricultural Region (low rainfall areas at Merredin and in medium rainfall area at Wickepin).

Method

Twenty four new wheat varieties of different traits (www.nvtonline.com.au) including three common check/control varieties (Calingiri, Wyalkatchem, Yitpi) were tested both at Merredin and Wickepin. There were 20 common varieties (as listed in Table 2) tested on both sites. The trials were conducted in a split plot design with time of sowing as main plots and varieties as subplots. The details of trials sown at two locations are listed in Table 1.

Table 1 The details of two variety x time of sowing trials at Wickepin and Merredin in 2013.

Trial location	Soil type	Crop rotation	Sowing date	Growing season rainfall (May-Oct), mm
Wickepin	Sandy Loamy duplex	Pasture 2012	16 May (dry) 11 June (Dry)	286
Merredin	Red shallow loamy duplex	Fallow 2012	7 May (dry) 22 May (moist) 5 June (dry)	193

The trials were machine harvested and grain quality samples were recorded.

Results

Plant establishment

At Merredin, plant establishment averaged 106 plants/m² across all cultivars and three times of sowings. Summer rain (January to March) of 114 mm provided stored soil water. The main treatment effects were significant; however the interaction between variety and times of

sowings was not different. The establishment was similar in both dry (7 May) and wet (22 May) sowings (110 and 115 plants/m²). The third sowing (5 June) was also in dry and drying seedbed and establishment was significantly reduced to 93 plants/m². Figure 1 shows the varietal differences in establishment averaged across three sowings.

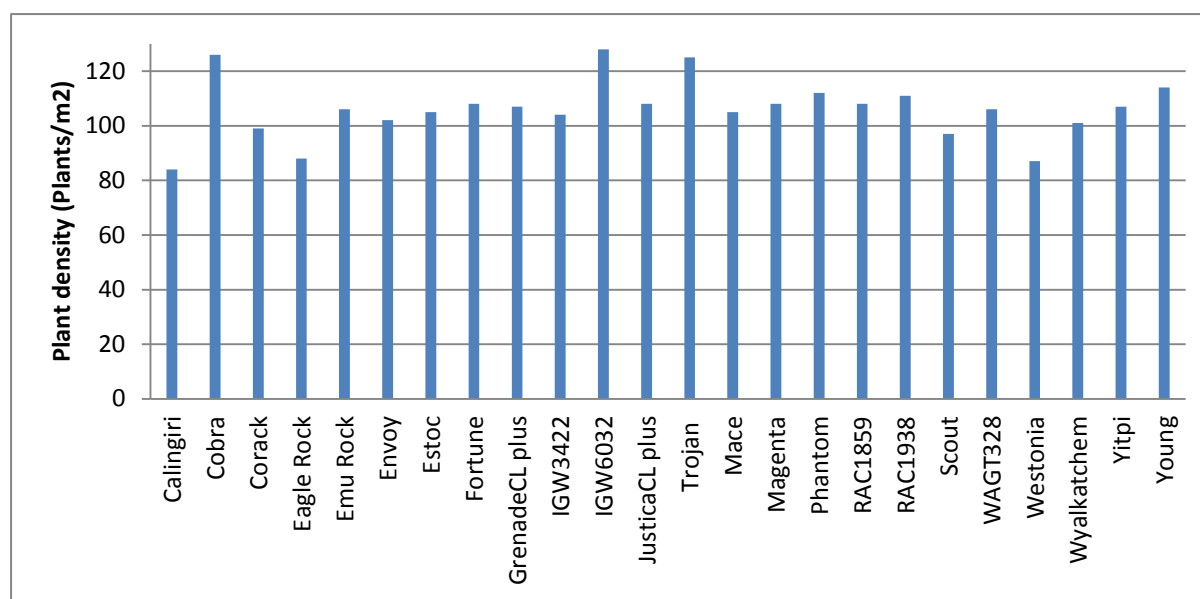


Figure 1 Establishment of 24 cultivars averaged across three times of sowings at Merredin (Lsd: ($p < 0.05$) 16 plants/m²).

At Wickepin, crop establishment was not uniform due to dry conditions particularly for June sowing. May and June sowings had no effect on crop establishment, however cultivars differed in plant establishment ranged from 63 to 110 plants/m² averaged across two times of sowings (Figure 2).

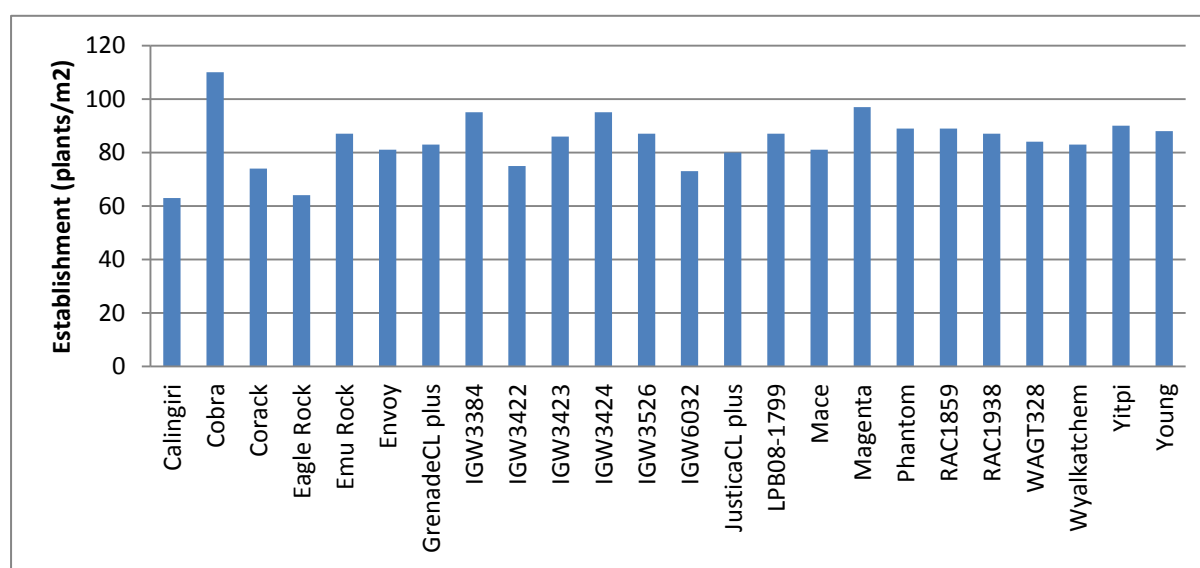


Figure 2 Establishment of 24 cultivars averaged across two times of sowings at Wickepin (Lsd ($p < 0.05$) 15 plants/m²).

Grain yield

At Merredin, the treatments effects of cultivars and time of sowings were not significant (at $p=0.05$). Grain yield was averaged 2.0 t/ha across all cultivars and three times of sowings. The dry sowing on 5 May and 11 June did not produce grain yield advantage compared to moist sowing of 22 May. Seasonal rainfall (May-October, 193 mm) was close to average at Merredin in 2013.

At Wickepin the main effect of variety was significantly different for grain yield ($p=0.05$ Lsd: 0.425 t/ha). Table 2 shows yield of selected common varieties tested at low yielding environment at Merredin and high yielding environment at Wickepin in 2013.

Table 2 Grain yield (t/ha or % of Mace) and ranking of common selected cultivars tested at Merredin and Wickepin in the Central Agricultural Region

Variety	Merredin			Wickepin		
	t/ha	Ranking	% of Mace	t/ha	Ranking	% of Mace
Calingiri	1.64	24	82	4.25	18	87
Cobra	1.9	20	95	4.87	3	100
Corack	2.14	6	106	4.67	9	96
Eagle Rock	1.8	23	90	3.93	24	81
Emu Rock	2.18	5	108	4.26	17	87
Envoy	1.94	15	97	4.61	12	95
GrenadeCL plus	2	14	100	4.19	20	86
IGW3422	2.07	10	103	4.43	14	91
IGW6032	2.09	7	104	4.21	19	87
JusticaCL plus	1.94	16	97	4.17	21	86
Mace	2.01	13	100	4.87	4	100
Magenta	2.02	12	100	4.67	10	96
Phantom	2.09	8	104	3.97	23	82
RAC1859	2.21	4	110	4.63	11	95
RAC1938	2.08	9	103	4.95	2	102
Trojan (LPB08-1799)	2.35	1	117	5.23	1	108
WAGT328	2.25	3	112	4.73	8	97
Wyalkatchem	2.3	2	114	4.75	6	98
Yitpi	1.92	18	96	4.42	15	91
Young	1.92	19	96	4.29	16	88

Grain quality data is not yet available at reporting.

Discussion

At Merredin, grain yield averaged 2.0 t/ha across all cultivars and three times of sowings. There were no significant effects of varieties and times of sowings on grain yield probably due to the 2013 season at Merredin, in particular the good spring rainfall (September-October 63 mm). Wyalkatchem (APW), Emu Rock (AH) and Corack (APW) outyielded Mace by 14%, 8% and 6 % respectively at Merredin.

Similarly at Wickepin, May and June sowings had no effect on grain yield which was likely to be due to better than average season in 2013. Mace and Cobra averaged 4.87 t/ha, yielded 9%, 13% and 19% higher than Emu Rock, Yitpi and Eagle Rock respectively. Corack, Magenta and Wyalkatchem as well as few potential new releases (RAC 1938, WAGT328 and RAC1859) were most competitive with Mace at yields greater than 4.5 t/ha at Wickepin.

Trojan (LPBR08-1799) was ranked 1 and yielded the highest 17 % and 8 % better than Mace both at Merredin and Wickepin. Trojan is a mid to long season variety with the potential to replace Yitpi. Trojan was recently classified an APW variety for Eastern Australia. Trojan was a promising variety in 2013 agronomy trials both for low and medium rainfall areas in WA, however as such not yet qualified for APW grade in Western Australia.

Key words

Cultivars, wheat agronomy, time of sowings

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