Maximising wheat production through variety selection and better agronomy

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AIM

The aim of this work was to identify new wheat varieties for maximising grain yield in dry and drying seedbeds in the scenario of possible frost risks during the growing season at Wickepin.

TRIAL DETAILS

Property:	David Quartermaine
Plot size & replication:	1.54 m x 20 m & 3 replication
Soil type:	Sandy Loam
Crop Variety:	24 Varieties
Application Date:	Pre-emergent at seeding - 16 May, 11 June
Sowing Date:	16 May 2013 & 11 June 2013
Seeding Rate:	150 plants/m2 (i.e. Mace @ 80 kg/ha)
Fertiliser (kg/ha):	Agras N0 1@100 kg/ha, 50 kg Urea
Paddock rotation:	Pasture 2012
Herbicides:	Pre-emergent – Boxer Gold 2.0 Lt, Lorsban 0.5 Lt, Sprayseed 2.0 Lt

BACKGROUND

Climate and weather conditions greatly influence the performance of new wheat cultivars both for yield and quality. Radiant frost risk in spring is the single most important issue affecting the wheat yield and profitability in the central agricultural region. New varieties may differ in their resilience (i.e. ability to yield or maintain quality) in response to stresses of radiant frosts. Agronomy trials are conducted to assess current and new varieties and elite lines for managing frost risks in aligned with Ben Biddulph pre breeding frost studies.

METHODOLOGY

Twenty-four wheat cultivars were sown at two different times, starting at close to the break (dry sowing) and late sowings (following at approximately 3-4 week intervals. The trial was sown in a split plot design across three banks, with time of sowing as main plots and varieties randomised as subplots.

RESULTS

Crop establishment

At Wickepin, crop establishment was not uniform due to dry conditions particularly for June sowing. Plant establishment averaged 84 plants/m^2 that was 44 % lower than the target plant density of 150 plants/m^2. May and June sowings had no effect on crop establishment, however cultivars differed in plant establishment ranged from 63 to 10 plants/m^2 averaged across two times of sowings (Figure 1).

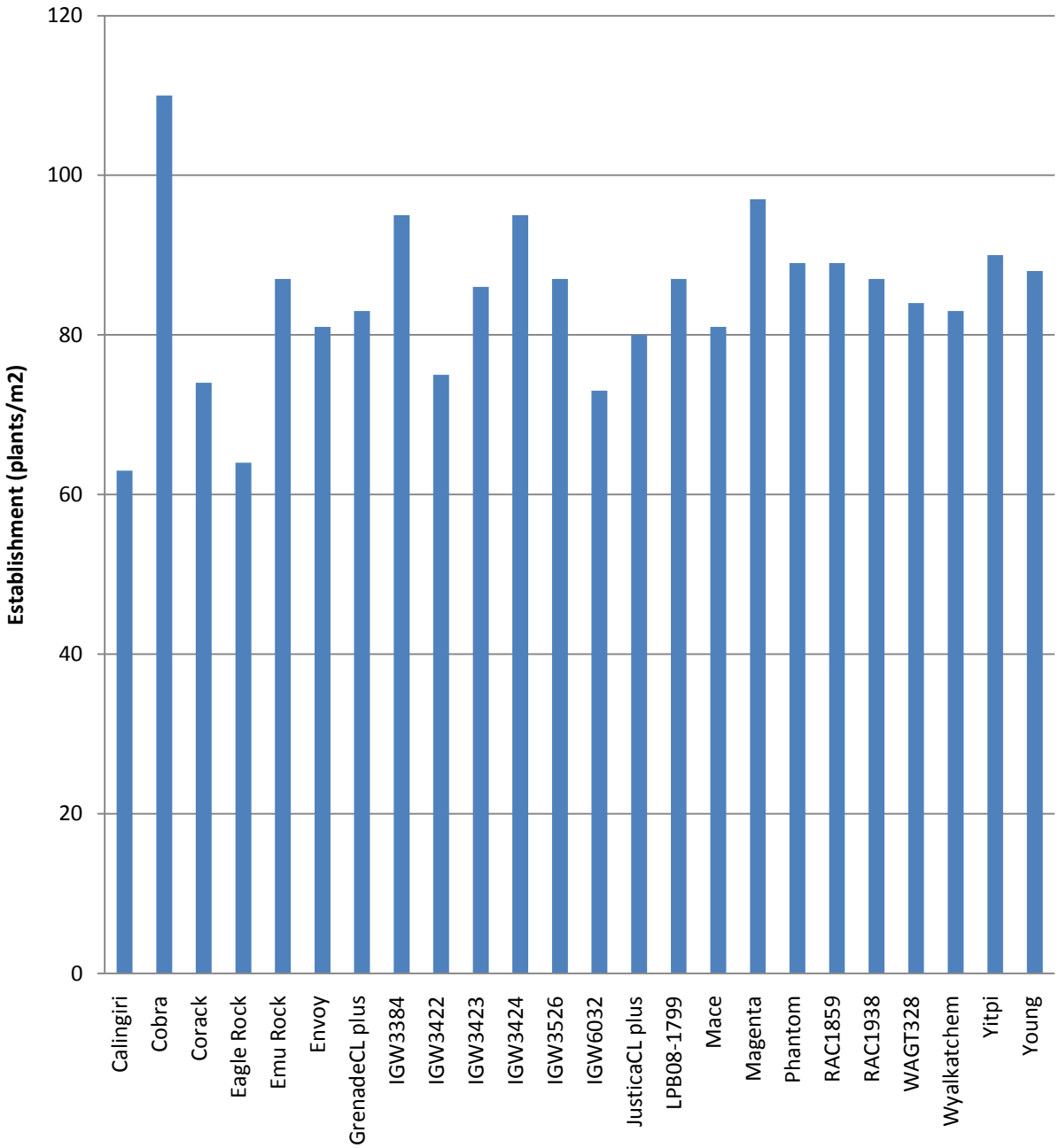

Figure 1 *Establishment of 24 cultivars averaged across two times of sowings at Wickepin (Lsd (p<0.05) 15 plants/m2).*

Grain yield
The main effect of variety was significantly different for grain yield (p=0.05 Lsd: 0.425 t/ha) (Table 1).

Table 1 *Grain yield (t/ha or % of Mace) and ranking of cultivars tested at Wickepin in the Central Agricultural Region*

Variety/TOS	16-May	11-Jun	*Average*	Ranking	% Mace
Calingiri	4.48	4.01	4.25	18	87
Cobra	5.23	4.5	4.87	3	100
Corack	5.06	4.28	4.67	10	96
Eagle Rock	4.22	3.63	3.93	24	81
Emu Rock	4.95	3.56	4.26	17	87
Envoy	5.19	4.03	4.61	12	95
GrenadeCL plus	4.69	3.68	4.19	20	86
IGW3384	4.8	4.07	4.44	13	91
IGW3422	5.11	4.35	4.73	8	97
IGW3423	5.21	4.48	4.85	5	100
IGW3424	4.8	4.05	4.43	14	91
IGW3526	4.73	3.58	4.16	22	85
IGW6032	4.43	3.99	4.21	19	87
JusticaCL plus	4.38	3.96	4.17	21	86
Mace	5.11	4.62	4.87	4	100
Magenta	5.44	3.91	4.68	9	96
Phantom	4.43	3.51	3.97	23	82
RAC1859	5.53	3.74	4.64	11	95
RAC1938	5.52	4.39	4.96	2	102
Trojan	5.84	4.62	5.23	1	108
WAGT328	4.95	4.52	4.74	7	97
Wyalkatchem	5.32	4.18	4.75	6	98
Yitpi	4.91	3.92	4.42	15	91
Young	4.56	4.02	4.29	16	88

Grain quality and frost assessment data are not yet available at reporting.

DISCUSSION
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.

Trojan was ranked 1 and yielded the highest 8 % better than Mace. 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.

CONCLUSION

- In high yielding environment with yield potential around 5 t/ha, Cobra (AH) yielded similar to Mace (AH) in both May and June sowings.
- New variety Trojan (quality grade not yet known in WA) outyielded Mace by 8 % across both time of sowings.
- Selecting two or three varieties with different traits should help to manage production risks and to achieve yield stability.

ACKNOWLEDGMENTS

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