

More crop, less weeds- competitive cereal cultivars have higher yield and suppress weed seed set

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Purpose:	<ul style="list-style-type: none">- To evaluate yield and competition with weeds of new wheat cultivars selected by recurrent selection for early vigour compared to common commercial cereal cultivars.- To evaluate current commercial wheat varieties for their ability to suppress weed seed set and to yield under high weed pressure.
Location:	Eradu
Soil Type:	Yellow sandplain
Rotation:	2010 Lupin: 2009 Wheat
GSR:	401mm

BACKGROUND

There is a lot of room for improvement in cereal competition with weeds in Western Australia. Improving vigour and biomass of cereal cultivars leads to suppression of weed growth. Dr. Greg Rebetzke from CSIRO in Canberra has used recurrent selection techniques to screen several thousand wheat varieties for early vigour / competitive ability. Dr Grugeet Gill from the University of Adelaide has been testing these lines to assess their competitive ability with weeds.

TRIAL DESIGN

Plot size: 1.8m x 20m
Repetitions: 4
Crop details: 60 kg/ha on 13 April 2011 (dry)
Herbicide: Nil pre-emergent herbicide. One broadleaf spray post-em

RESULTS

Figure 1 really tells the story of this area of research. Increased cereal biomass results in increased suppression of ryegrass biomass and vice versa. The variety UA47 had high levels of leaf disease in 2011 which reduced the biomass, yield and competitive ability of this variety. No fungicide spray was applied to the Eradu trial in 2011. The Eradu site in 2011 had on average 80 ryegrass plants /m² emerge with the crop. The trial was sown dry but one replication of the trial emerged at the end of April on stored soil moisture so this replication was not considered in the results.

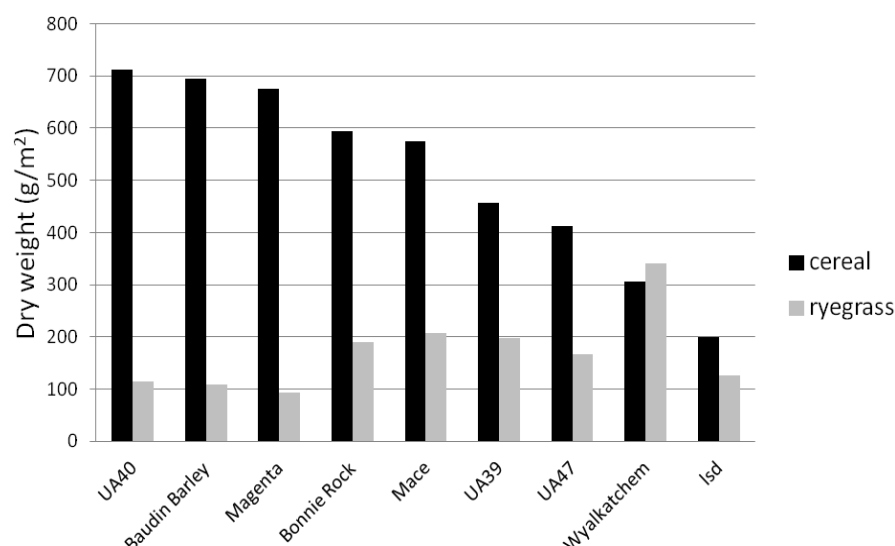


Figure 1: Cereal and ryegrass biomass (g/m²) and yield at Eradu in 2011

Table 2: Cereal and ryegrass growth at Eradu 2011

Variety	Yield (t/ha)	Cereal biomass (g/m ²)	Ryegrass biomass (g/m ²)	Cereal tillers /m ²	Ryegrass tillers /m ²	Ryegrass head length (cm)	Ryegrass Index (tillers x head length)
Barley	4.17	695	110	591	173	24.25	4692
Magenta	2.86	676	94	303	191	24.63	4590
UA40	2.76	711	115	321	190	26.05	6370
Mace	2.67	575	208	236	290	26.38	7687
Bonnie Rock	2.65	595	190	269	279	25.2	7099
Wyalkatchem	2.10	305	342	147	516	24.53	13021
UA39	1.76	458	199	138	354	24.2	8617
UA47	1.67	412	166	209	281	24.62	6901
lsd	0.47	200	127	80.3	198.3	n.s.	n.s.
cv %	9.5	8.6	27.5	9.6	28.4	0.4	27.4

DISCUSSION

Magenta and Baudin barley were the most competitive cultivars at Eradu, reducing ryegrass seed set by 65% compared to Wyalkatchem. UA40 reduced ryegrass seed set by 51% which was a similar result to UA47, Mace and Bonnie Rock. Leaf disease in UA47 reduced its competitive ability. The cultivar UA39 is a very tall variety, and visually it appeared to significantly compete with ryegrass. However, tiller counts and biomass measurements reveal that this cultivar is not as competitive as it appears.

While the UA cultivars may be useful as germplasm for future breeding programs, perhaps the most significant aspect of this research is the competitive ability of currently available cultivars. Magenta is a high yielding, competitive wheat variety that is a useful tool for weedy paddocks. Baudin Barley was very high yielding at Eradu and also very competitive with weeds. This weed competition of barley is consistent with past research. Future research will focus on ribbon / twin row seeding of competitive cultivars at higher seeding rates to maximise yield, profit and weed suppression.

REVIEWED: Dr Abul Hashem

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