Weed competition – determining best management practices in durum wheat

Simon Goss and Rob Wheeler, New Variety Agronomy, SARDI, Waite Campus

Key findings

- DBA Aurora and Mace showed similar ability to compete with weeds in 2014.
- Using higher seeding rates improved weed control.
- Increased crop seeding rate resulted in reduced crop screenings in 2014.

Why do the trial?

With limited safe and effective pre-emergent herbicides currently available for use in durum wheat, other techniques of improving weed control is becoming increasingly important. Durum wheat is typically less competitive with weeds than other crops such as wheat and barley. There are several agronomic techniques which can be used to increase durum's competitiveness and some of the techniques which are in the trial include seeding rate, seed bed utilisation, variety selection and row spacing.

The aim of this trial is to identify the most effective alternate techniques and discover the impacts they have on weed control, yield and grain quality.

How was it done?

Plot size	5.0 m x 1.75 m	**Fertiliser**	DAP (18:20) + 2% Zn @ 70 kg/ha
Seeding date	28th May 2014		UAN (42:0) @ 95 L/ha on 15th August

Annual rye grass was spread of the trail area at a rate of 10 kg/ha and gently tickled in prior to seeding. Selected plots were also treated with a pre-emergent herbicide, to create plots which were under varying weed pressure. The pre-emergent herbicide used was IBS trifluralin (1.2 L/ha) + triallate (1.2 L/ha) applied 28th May 2014.

Several different treatments (Table 1) were applied to test the effects on weed populations, grain yield and quality.

Table 1. Management treatment combinations of seeding rate, sowing boot and additional management used to compete with ryegrass at Hart 2014.

Variety	Seed rate (seeds/m^2)	Sowing Boot	Management change (relative to standard practice)
Mace wheat and DBA-Aurora	200	Standard	Standard (traditional practice)
	100	Standard	Lower seed rates
	300	Standard	Higher seed rates
	100	Spreader boot	Lower seed rates + increased seed bed utilisation
	200	Spreader boot	Increased seed bed utilisation
	300	Spreader boot	Higher seed rates + increased seed bed utilisation
	200	Standard	Narrow row spacing (11.5 cm)

Results and Discussion

For both DBA-Aurora and Mace the use of higher seeding rate gave the best annual ryegrass control in 2014 (Table 2). There was no benefit of using a spreader boot over a normal boot, in contrast to 2013 when the use of a spreader boot decreased annual ryegrass numbers. The medium and low seeding rates progressively increased annual ryegrass head number.

Both DBA-Aurora and Mace were similar in their ability to compete with annual ryegrass. This highlights the improved ability of DBA-Aurora compared to Tjilkuri which was less competitive compared to Mace in 2013.

The addition of pre-emergent herbicide gave very good ryegrass control (data not shown), as also seen in 2013 and the addition of other management strategies was unable to improve the control further.

Mace wheat resulted in lower yield losses (on average 8.2%) compared to DBA-Aurora (11.3%) when under high weed pressure (Table 2). The lowest yielding treatments were those sown with 100 seeds/m^2.

Table 2. The effect of seed rate and normal or spreader seeding boots on grain yield (t/ha) and grass seed set (heads/m2) for DBA-Aurora durum wheat and Mace wheat at Hart, 2014. (Yield loss percentage is the difference between plots with high weed pressure compared to no weed pressure).

Variety	Seeding boot	Seeding Rate	Ryegrass heads/m²	Yield t/ha	Yield loss %
DBA Aurora	Normal Boot	100	138	2.29	9.2
DBA Aurora		200	90	2.44	12.2
DBA Aurora		300	29	2.95	8.2
Mace		100	100	3.02	9.6
Mace		200	79	3.52	11.5
Mace		300	52	3.75	3.9
DBA Aurora	Spreader Boot	100	104	2.41	18.3
DBA Aurora		200	67	2.75	10.8
DBA Aurora		300	54	3.02	9.2
Mace		100	138	3.19	8.3
Mace		200	90	3.75	8.7
Mace		300	29	3.83	7.4
	LSD (P≤0.05)		*ns*	*0.27*	*2.6*

In Mace wheat and DBA-Aurora durum, increasing the seeding rate reduced rye grass head set and decreases screening percentage (Figure 1).

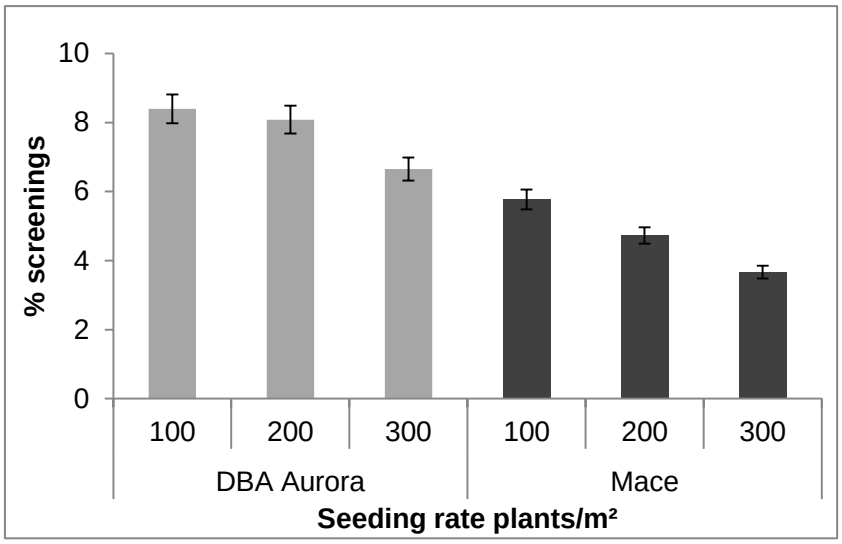

Figure 1. Effect of seeding rate and crop variety on screenings percentage (%<2.0 mm) when grown in the presence of annual rye grass.

Implications

The results show that increasing wheat seeding rates can reduce the suppression of grain yield resulting from high weed pressure. The trial also found that having a high seeding rate not only restricts annual ryegrass growth, but can also decrease the amount of screenings.

As many growers may have been turned away from durum due to its poor competitiveness, results show very similar levels of competition between Mace and DBA-Aurora in 2014. This should give confidence to growers re-entering the market in 2015, knowing there is a durum wheat variety that has improved competitive ability.