

2011 Durum Agronomy Trial Progress Report

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For the SA Durum Growers Association

and funded by

GRDC, Viterra, Glencore, ANZ, San Remo, AGG and AWB

The 2011 season started favourably with good summer rains. Conditions were cold during early May, leading to slow leaf development in early sown crops and large differences in early growth between sowing times. Rainfall throughout the growing season in the Mid North and Yorke Peninsula was below average at most sites and as a result, crops were relying on stored moisture from summer rains to get through spring. With the exception of the high rainfall site at Tarlee, all sites experienced some level of moisture stress during late August to October. The more marginal sites, Minlaton and Hart, were the most affected. This led to lower than expected yields, higher proteins, and quality downgrades from high screenings in some varieties. These conditions during spring were a stark contrast to the 2010 season and provided excellent opportunity for gathering information on the interactions between agronomic practices and durum varieties in less favourable conditions during spring. The return to a wetter season in the South East meant conditions were favourable for durum production, but presented some minor problems with the experimental site at Frances experiencing minor incidents of localised water-logging. All yield and quality results from the trials have been analysed and interpreted and sent to the relevant farming system group's result compendiums for publication and grower distribution.

Importantly, all trials in 2011 identified key differences in agronomic requirements amongst durum varieties. Time of sowing was important in 2011; trials at Tarlee in the Mid Nth and at Minlaton on the YP, found time of sowing significantly changed the yield rankings of varieties. Variety differences were important; the new higher yielding lines such as WID803, WID802, and Hyperno expressed their improved yield potential to the greatest degree at earlier sowing. In favourable conditions at Tarlee, WID803 and Tjilkuri yielded 8 and 9% above Tamaroi and Caparoi at earlier and mid sowing, whereas at later sowing all varieties yielded similar. In less favourable conditions at Minlaton yield differences were much larger WID803 and Tjilkuri yielded greater than all other varieties and by 35% and 23% above Tamaroi at early sowing and by 14 and 16% at later sowing, however new releases Tjilkuri, WID803, Caparoi and Saintly all still yielded similarly at later sowing. Apart from Caparoi this highlights the improved adaptation of the newer varieties in harsh environments. Varieties with higher yield potential were favoured most by early sowing, however at later sowing grain quality differences played a more important role than yield. Screenings were more prominent in small grained cultivars WID803 and Hyperno at late sowing, resulting in quality downgrades. Negligible variety differences in grain screenings occurred within early to mid sowing dates. Caparoi had similar and superior screening levels across all sowing dates and was not downgraded with delayed sowing. Varieties such as Caparoi and Tjilkuri are therefore favoured for later sowing as they are less likely to be downgraded from small grain screenings.

There was no grain yield response to applied nitrogen (N) at three (Hart, Paskeville, Bordertown) of the four nitrogen trial sites into 2011. Varieties responded similarly in yield and many quality measurements to applied N, but showed differences in protein at Paskeville and Bordertown and screening levels at Hart. The new varieties were higher yielding than the older varieties with the same amount of N supply. At Paskeville and Bordertown, the key outcomes were that the new higher yielding durum varieties required more N to reach target protein of 13% and the later application of N at GS47 was the most effective to achieve 13% protein. At Hart conditions were less favourable and as a result, large amounts of early applied N predisposed WID803, with inherent small grain, to quality downgrading due to high screenings. Varieties with inherent larger grain (Tjilkuri and Caparoi) were not downgraded across N treatments. The key outcome from this trial was that the strategic (split application) approach to N management was more effective in maintaining grain size and achieving 13% protein, than applying all N at stem elongation.

Varietal differences in N management were identified at Minlaton. The new varieties were more responsive to N, all of the new varieties achieved maximum yield at 50kgN whereas Tamaroi achieved maximum yield at 25kgN. Due to moisture stress during spring any additional N led to lower yields in all varieties except for Tjilkuri and WID803.

Hyperno, Saintly and Caparoi, each lost 0.5t/ha when 100kg N was applied, whereas as WID803 and Tjilkuri yielded similar at 100kg with the 50kg treatment not losing any yield. Whilst WID803 and Tjilkuri maintained yield the best with the water stress induced by the high rate of applied N, this unfortunately led to significant quality downgrading in WID803 at both sowing dates, with screenings at 9%, Tjilkuri still maintained a good grain size.

At Tarlee, varieties responded similarly to seeding rate. When sown late, the higher seeding rates, 220 – 250plants/m², yielded higher than rates less than 200, whereas at other sowing dates all seeding rates yielded similarly. Seeding rate did not significant change varietal quality parameters or have any significant influence on quality. Results from other seeding rate trials at Frances in the South East also failed to show any significant variety by seeding rate interaction. Grain quality data is currently being analysed from this trial

2011 saw the extensive communication of management practices and promotion of growing durum to growers at all of the experimental sites by the SA Durum Growers Association, with key sessions held at the Yorke Peninsula Alkaline Soils and Hart Group field days. As part of the SA durum advisory committee and the ADWIP (Australian Durum Wheat Improvement Program); key working relationships for this project were developed between growers, researchers, breeders, and end users with meetings and presentation updating research and ideas throughout the year. The SA Durum Growers Association continues to extend newsletters and provide updated agronomic information on their website (www.durumgrowersa.org.au). Overall, 2011 was a successful year for both the field research and the extension to existing and potential durum growers. Results will now be collated to form part of the final report to be delivered to GRDC and industry as varietal specific agronomic packages.