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FOCUS



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THE RESEARCH VIEW

Research getting to the root of durum wheat constraints

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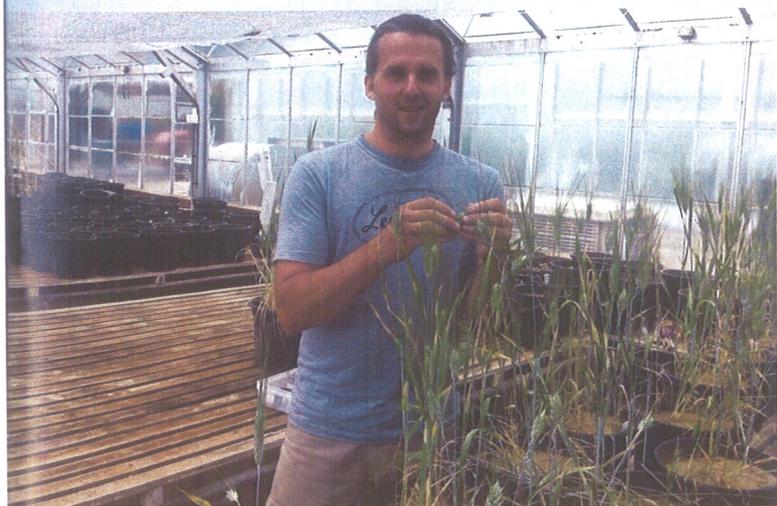
- GRDC-funded University of Adelaide project investigating durum wheat root traits and nutrient efficiency;
- Project aims to achieve higher and more consistent yields through improved root systems; and,
- Zinc efficiency and adaptation also being investigated.

RESearch funded by the Grains Research and Development Corporation (GRDC) is aiming to accelerate the development of durum varieties that achieve higher and more consistent yields through improved root systems.

The project, being undertaken by the University of Adelaide, is investigating root traits and nutrient efficiency with a view to developing more vigorous and efficient root systems for more productive durum.

Research leader Dr Jason Able says the project's objectives are to:

- Evaluate whether recent improvements in durum yield, yield stability, stress adaptation and crown rot tolerance can be attributed to differences in root architectural traits;



GRDC-funded research conducted by the University of Adelaide and led by Dr Jason Able is investigating root traits and nutrient efficiency with a view to developing more vigorous and efficient root systems for more productive durum wheats.

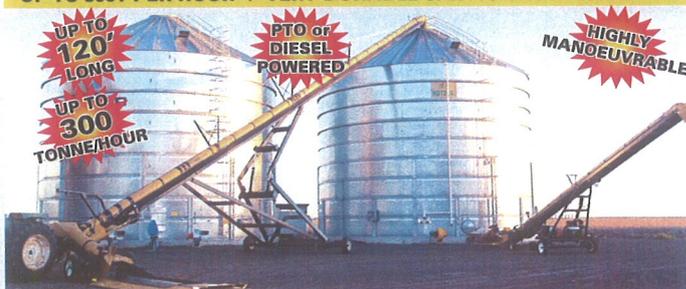
Consultants' Corner

Consultants' Corner is an initiative by *Australian Grain* highlighting current GRDC-funded research with a particular focus on the commercial implications of adopting cutting-edge research.

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Jason Able believes it is time to move on from the perception that durum is a risky crop to grow.

- Assess the extent of available variation for root traits in durum germplasm, and select new parents and new traits for use in durum breeding; and,
- Assess the utility of known sources of zinc efficiency and early root vigour and develop useful new germplasm for durum breeding.

The project's achievements will be measurable in terms of information on trait values, protocols for trait assessment and germplasm made available by this project. The extent to which the germplasm and the outputs are adopted by the national durum breeding program, Durum Breeding Australia (DBA) will be a key measure of the project's success.

Access international germplasm

As well as being important to Australia's durum growers and the broader industry, the project is also of considerable importance in a global context.

"Germplasm we produce that is used in DBA will eventually find its way overseas to some of our collaborators in Italy and Germany," Jason said.

"This enables us to access valuable and useful germplasm from our overseas collaborators. Australia is on a global scale a minor investor so any collaborations that add value to our program are important in benefitting Australian durum growers. Sharing germplasm of this kind not only promotes much-needed cooperation but it also increases the genetic base from which breeding programs can work."

Jason said some Italian researchers were also engaged within similar areas of research and he anticipated that knowledge from this work may be of use to the Australian program.

Always investigating zinc efficiency

In addition to root traits, the project is investigating zinc efficiency in durum and adaptation.

Jason says while the research findings are in their infancy, data already gathered suggests there is some genetic variability for

zinc efficiency in durum. The number of entries screened through the zinc assay was increased in 2012.

"Last year we introduced some germplasm from Italy and Turkey into the breeding program and it will be important to screen these lines to identify any potential lines that have a differential response to zinc when compared to the germplasm that has already been tested."

Trial sites for the research are located throughout South Australia. For the root traits component, trials have been conducted at Claypans, Winulta, Angas Valley, Bordertown and Kapunda.

Zinc efficiency trials have been conducted at Minnipa, Bordertown, Angas Valley, Coonalpyn and Waikerie, while the adaptation trials have been located at Winulta, Angas Valley, Bordertown and Kapunda.

This particular project is SA specific and is fully funded through the GRDC. It employs a post-doctoral fellow and a technical officer.

Jason, as the project supervisor, has also encouraged an overseas Masters student from Iraq to investigate one small component of this project (specifically looking at whether zinc deficiency affects the incidence of crown rot infection in durum).

While the research is undertaken by the University of Adelaide, it does have implications for DBA – previously known as the Australian Durum Wheat Improvement Program – which is funded by the GRDC with support from the NSW Department of Primary Industries, the University of Adelaide and pasta manufacturer San Remo Macaroni Pty Ltd. This program is led by Dr Gururaj Kadkol of NSW DPI.

The second five-year phase of DBA is targeting improvements in performance under crown rot pressure and adaptation to different regional biotic and abiotic stresses.

Durum in Australia

Jason said durum was a niche, high value crop in Australia and on average produced close to half a million tonnes of grain annually, although this figure fluctuated from one year to the next.

"We're a small bit player globally, but our export market is very strong because of the quality of grain we produce for pasta manufacturers."

In terms of the amount of land currently being sown to durum Jason said plantings in SA alone in 2012 totalled around 80,000 hectares. This was about 10,000 hectares more than the previous year, with a number of reasons contributing to the increase.

"Firstly, growers are starting to see that there are some good new varieties that have recently been released, and there are others in the pipeline to be released in the coming years.

"Secondly, the price premium over bread wheat during 2011 was roughly \$100 per tonne more if you received DR1.

"Growing several hundred hectares of durum that averaged five tonnes per hectare means that your profit margin increases substantially compared to growing bread wheat (that won't necessarily out-yield the new durum varieties)."

While durum production in Australia has largely been limited so far in terms of geographical spread, Jason says potential does exist for expansion and current research is aimed at underpinning this larger production area.

As the DBA southern node leader and breeder, Jason is keen to see a significant increase in durum production in two key areas.

"The first of these is in the south-east of South Australia, from Keith all the way through to the Western Wimmera region of Victoria," he said.

"The second area is the southern Yorke Peninsula region, in addition to expanding the grower base around the mid north of SA, where durum is currently widely grown.

"For the northern region, we expect to increase our production area in the north-east and north-west, as well as the irrigated regions around southern NSW.

"Yawa, a recently released variety from the southern node is yielding around nine to 10 tonnes per hectare in southern NSW. So for growers who are looking to try out durum, or for growers that are already in durum, it is all good news."

Jason said growers in a number of regions had expressed a desire to try growing durum or wish to grow more of it.

He said a perception that durum was a risky crop to grow, particularly because of crown rot, had discouraged some growers from planting it.

"It's time people moved on from that perception because we

have come a long way in terms of practices and strategies to mitigate risk."

Although a niche crop, durum research in Australia does require substantial investment, according to Jason.

"While durum may not compete with bread wheat for equivalent research dollars, it is important to conduct research that specifically addresses some of the unique challenges specific to durum.

"Increasing the investment at the pre-breeding end means that breeding programs can benefit in the mid to long term. In the short term, the breeding program does what it does best – that is, generates new varieties based on yield potential across many different environments, while still ensuring that high quality attributes are maintained."

For more information: Dr Jason Able, Senior Lecturer in Plant Breeding and Durum Breeder, The University of Adelaide. Phone 08 8303 7075 or 0459 841 586, email jason.able@adelaide.edu.au

THE WORLD DURUM SCENE

In 2012–13 world durum production is forecast to decrease by 1.4 million tonnes to 35.3 mt, as higher production for the US, Canada, Algeria and Tunisia is more than offset by lower production for Kazakhstan, Morocco, the EU, Syria, Mexico and Australia.

As a result, world durum supply will decrease by 1.1 mt to 43 mt. Use during 2012–13 is expected to decrease by 0.6 mt and ending stocks are forecast to decrease by 0.5 mt to 7.2 mt.

This is the lowest level of ending stocks since 2008–09.

The supply from the three major exporters, Canada, US and the EU, is expected to increase by 0.7 mt in 2012–13 to 20.4 mt.

Average world durum prices are expected to be similar to 2011–12 as support from the lower world supply is offset by lower world use and by the higher US supply.

Canadian production

For 2012–13, the world's biggest durum producer Canada, is forecast to increase production by 11 per cent from the 2011–12 harvest to 4.63 mt. Average yield is estimated at 2.46 tonnes per

hectare. There had been a 17 per cent higher seeded area but this was partly offset by lower yields.

The quality of the Canadian durum crop was on average better than 2011–12 in terms of both grade and protein. The supply increased by seven per cent as lower carry-in stocks partly offset the increase in production.

Canadian durum exports are forecast to increase by 14 per cent to 4.1 mt because of lower production in the EU, Morocco and several other countries – which is expected to increase demand for Canadian durum.

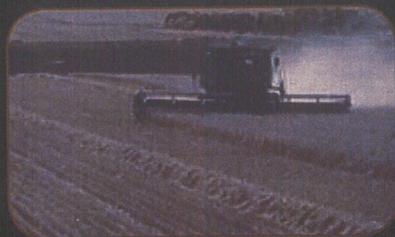
Canadian ending stocks for 2012–13 are forecast to decrease by 14 per cent to 1.3 mt, which is 25 per cent lower than the past five-year average and the lowest since 2007–08.

US durum production is estimated to have increased in 2012–13 by 0.86 mt to 2.23 mt due to a 61 per cent increase in seeded area. Supply rose by 0.8 mt to 4.13 mt as the increase in production was partly offset by lower carry-in stocks. EU durum production decreased by 0.2 mt to 8 mt, while supply fell by 0.4 mt to 10.2 mt.

Source: Agriculture and Agri-Food Canada

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