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News

Global ties lift barley traits

Collaborations focus on higher-yield, low-rainfall varieties.

By Brendon Cant

While the perfect barley variety can only be a pipe dream, GRDC-supported researchers are edging closer - busily breeding new cultivars with increased yield per-millimetre of rainfall, less environmental impact and improved yield stability.



One such committed researcher is the University of Adelaide's Stewart Coventry, of the South Australian Barley Improvement Program, who is collaborating with the International Centre for Agricultural Research in Dry Areas (ICARDA) in Syria. The collaboration is looking to breed barleys that re better adapted to

southern Australia's low ainfall environments, where the twin stresses f drought and hostile soils limit yields.

Mr Coventry says the partnership with ICARDA has allowed the exchange of barley lines and performance evaluation between the low-rainfall environments of Australia and the Middle East. "ICARDA barley offers a genetically unique source of adaptation to such environments, with the potential to increase the yield-per-millimetre of rainfall for Australian barley," he says.

ICARDA has used wild barley and primitive landraces to improve drought tolerance and adaptation to poor soils, and to select types that give higher yield under drought stress.

"We have evaluated many of these ICARDA lines in low-rainfall trials in Australia, and identified those with yield and physical grain characteristics equal to elite Australian breeding lines and cultivars," Mr Coventry says.

The GRDC-supported collaboration began in 1999, with the first introductions evaluated from 1999 to 2001 in SA. A national low-rainfall trial was established in 2002 to also include WA, Victoria, NSW and Queensland, with a national focus on the usefulness of ICARDA germplasm.

"The purpose of these trials is to identify ICARDA lines and Australian breeding lines with performance equivalent to or better than existing Australian cultivars in low-rainfall environments, and to investigate the genetics of drought tolerance," Mr Coventry says.

Genetic resources from this project have been made available to Australian breeding programs and they show potential for midto-low rainfall areas. The South Australian Barley Improvement Program has used ICARDA barley lines as parents and crossed them with Australian feed and



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malting barley.

"More than 100 crosses have been made with the aim of producing the next generation of Australian barley better adapted to the low-rainfall environments," Mr Coventry says. "The trials have highlighted superior adaptation of the breeder's line WI3804 to drought stress conditions across a range of soil types, including deep sands. WI3804 is on track to be commercially available as a feed barley for the 2006 season."

The project has provided researchers with a better understanding of the genetics and physiology of traits related to drought stress tolerance, particularly those focused on yield and physical grain quality.

Mr Coventry says it is also acknowledged that a wider range of barleys from similar environments, such as Spain, the Central Asia and Caucasus region, the Middle East and the West Asia/North Africa region, also need to be evaluated.

He says similar collaborative projects are the key to gaining access to such genetic resources.

Such collaborations are encouraged through the new GRDC-supported National Barley Breeding Program and Barley Australia, which seeks to raise the level of barley breeding, not only to provide growers with improved varieties but also to ensure breeding programs are in step with market forces.

According to the GRDC's managing director, Peter Reading, the national program will lift efficiency of crop development through increased collaboration and integration, while still catering for specific regional or end-user needs.

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