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# Cooperative Research Centre for Sustainable Rice Production

... of growing importance

## Media Release

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### CHINESE LINES BOOST SEARCH FOR COLD TOLERANT RICE

Breeding lines imported from China offer promise of improving the cold tolerance of Australian rice. Temperatures below 13 degrees C when rice is flowering cause significant loss of yields and the standard way of protecting the crop is by deep ponding.

Four of the lines, bred at the Rice Research Institute at the Yunnan Agricultural University, have already shown extraordinary cold tolerance under glass house test conditions. This germ plasm is part of a scientist-to-scientist exchange of material with Dr. Xiaochun Zhao working at the University of Sydney's Plant Breeding Institute.

While two of the lines, are landrace types, grown for perhaps hundreds of years and of indifferent quality, Dr Zhao says that one of the others is a current cultivar. He's subjected this cultivar, R34, to temperature stress for a period of four days at critical stage with outstanding success.

“ Under green house conditions we dropped the temperature at critical stage to 12 degrees C for a period of four days then returned them to normal conditions. Compared with unstressed plants they yielded 94 percent grain and these results have been replicated by other groups working with the Rice CRC at the main campus of the University.”

Dr. Zhao says that in China, R34 produces between 8 and 10 tonnes per ha and is a mid-season variety taking 160 days to harvest and 100 days to panicle initiation. He's already crossed it with the Australian variety Doongara, and begun the conventional process of backcrossing. Importantly he's also using a tissue culture technique perfected at the Plant Breeding Institute which could speed the development of a new variety by between five and ten years.

Known as the double haploid approach to plant breeding it involves gathering young pollen cells from the panicle, growing them in a culture, treating them with a chemical to restore their fertility and growing them out to mature plants.

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The Rice CRC is sponsored by the Australian Government's Cooperative Research Centres Program. The Centre coordinates the research activities of teams from Charles Sturt University, NSW Department of Primary Industries, CSIRO, Department of Infrastructure, Planning & Natural Resources, University of Sydney, SunRice and the Rural Industries Research & Development Corporation.

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“ The great advantage of the system,” said Dr Zhao, “ is that the plants produced will breed true to type. Normally some eight to ten generations are needed to fix the genetic segregation and to do the selection to produce plants that breed true. The process isn’t new but until recently yielded very limited success with rice. The work we’ve done here at the Plant Breeding Institute has improved the success rate dramatically and I’d say that we’re ninety percent of the way to perfecting it.”

Besides using conventional breeding techniques Dr Zhao has selected cold tolerant plants from the backcross of Doongara and the Chinese cold resistant variety R34 and has begun the process of producing double haploids from them. These will be handed over for the conventional breeding process.

“ I haven’t made any selection other than for cold tolerance, “ said Dr. Zhao.  
“ But, because the double haploids breed true, we could get a variety from that initial backcross. It’s important not to waste too much time in the laboratory.”

Dr Zhao rates the association with the Yunnan Rice Research Institute highly.

“The institute has perhaps as many as 10,000 germ plasm types, many with different qualities that could be useful to the Australian industry. They have rice types with different processing parameters including those with high and low amylose starch properties and different tastes. Cold tolerance is just one of the many attributes that could be useful to us.”

- ENDS -

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