



# Rice CRC Update

Cooperative Research Centre for Sustainable Rice Production  
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This newsletter is being compiled at a difficult time for those involved in all aspects of the rice industry.



## With The Grain

by Rice CRC Director  
Dr Laurie Lewin

Most discussion is about water – availability, access and rights. Much of the research in the Rice CRC aims at making best use of available water. One of the items in this newsletter discusses a cooperative study on the use of permanent beds for cropping systems that include rice. Indications to date are that permanent bed systems for rice can save water but also often result in lower yield. It is the potential to improve water use over the whole system that is being studied in this research.

Cooperation is also highlighted in the report in this newsletter on the HELP workshop. Dr Shahbaz Khan represented the Murrumbidgee basin at this workshop. His efforts have led to the basin being recognised as the first reference basin in this program. Undoubtedly water availability and management are going to be world issues and such cooperation will lead to better outcomes both in Australia and elsewhere.

Remote sensing seems removed from the water issue. Applications of remote sensing, however, when combined with elements of precision agriculture have great

potential to lift productivity on individual farms. This could well be the next 'revolution' in crop productivity. Many of the elements required have been studied in CRC research and, along with many others, we are now trying to bring the work together in a coordinated approach.

Making the most of available water means being efficient with water application and gaining best possible return from each unit of water used. Rice CRC research on cold tolerance is now making solid progress and we should see more tolerant varieties in the near term. We are also studying the impact of disease – those diseases already in our production area and those that are threats to the industry if introduced. The report by Dr Ric Cother in this newsletter on rice blast is timely.

We will return to a better water supply situation – hopefully before the next rice season. Those engaged in rice research extension and education realise that we must keep pressure on those aspects that will give best return for each megalitre used. This will require improved productivity, higher valued products, and integrated production systems. This will remain a focus of the Rice CRC for the rest of its life.

Dr Ric Cother (NSW Agriculture) travelled to the USA in 2002 to look at rice diseases overseas and see if they were potential threats to rice in Australia. This was the first visit by a pathologist to look at rice diseases overseas since the rice industry started in Australia over 80 years ago. Whilst Ric's major interest was in rice blast, he took the opportunity to look at all diseases that were present at the time. Rice blast is an important disease in the southern states of the USA at all stages of growth. It is less important in the (comparatively) drier states of Mississippi and Missouri. It has been present in California since 1996, although its occurrence is very weather dependent. It was not observed this year in California until mid September because of drier conditions. While the relative humidity in the southern states is more conducive to fungal diseases than in Australia, questions were raised as to the effect of water depth (deeper in NSW) on plant physiology and blast resistance. It may be that deep water would protect seedlings in NSW from blast infection – panicle infection will be dependent on free water at panicle emergence. Canopy structure and RH will govern whether conditions favour spore germination. Given the ancestral relationship between much of the NSW germ plasm and that of Californian cultivars, it is expected that our cultivars will be susceptible to the blast pathogen. The molecular marker research being carried out at Southern Cross University will be important for establishing the current status of our cultivars. However, there are differing opinions in the USA rice fraternity as to the robustness and practicality of large scale marker testing.

## Are we at risk?

### Strategies and recommendations

Blast remains the single biggest threat to the Australian rice industry. Even though our research has shown that the pathogen could initiate multiple disease cycles if introduced, the exact behaviour of the disease will not be known until it occurs. It is possible that our agronomic practices are such that the disease will be of minor importance. The recent arrangement with California to screen NSW germplasm in their disease nursery is an important step. However, as prevention is the best strategy, our quarantine must be maintained. Should the disease be observed on a limited scale, options for crop destruction must be seriously considered. In California, the infected crops were harvested in the first year of detection and there was no hope of containing the pathogen.

A full copy of Ric's study tour report, including strategies for other rice diseases researched during the study tour, is available on the Rice CRC website.



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## Rice promoted at Sydney Show

The Rice CRC presented a display at the 2002 Sydney Royal Easter Show and also participated in the RGA/SunRice display at the 2003 Show. This was very successful in raising the profile of rice with city folk, who had an opportunity to touch and see rice at various stages of growth and production. Many visitors had very little idea of how or where rice was grown in Australia.

The Rice CRC provided the initial funding with significant support now coming from RIRDC, GRDC and ACIAR for a large field experiment located at Murrumbidgee Shire Community Demonstration Farm with in field support from Coleambally Irrigation and Murray Irrigation. The experiment is investigating the role of permanent beds for sustainable cropping systems in rice based farming systems. The experiment will compare irrigation systems- conventional flood, furrow irrigated raised beds, sub-surface drip irrigation as well as a range of feasible cropping sequences which will include rice, summer and winter cropping including double cropping combinations. Measurements which are currently being made include water on and off, soil moisture, plant growth, crop yield and yield components, and comparison of nitrogen rates. The experiment is expected to run until 2006. The experiment seeks to explore the productivity, water use efficiency and sustainability of the range of farming systems. The experiment commenced in October 2002 with all cropping treatments drill sown to Amaroo. As well as the field experiment the overall project will see modelling and economic evaluation of the irrigation and cropping sequences.

## Permanent Beds

## Laurie wins Award

Laurie Lewin has been honoured as recipient of the 2003 Farrer Memorial Medal, which is presented annually to recognise and encourage leading Australian agricultural scientists. This award recognises Laurie's significant contribution to the rice industry breeding new rice varieties suited to Australian conditions. It also recognises his expertise as an international authority on rice breeding and the role he has played leading NSW Agriculture's team of researchers in working towards boosting the productivity and sustainability of the Australian rice industry.

Recent research performed in project 1105 has developed new methods using broad band remotely sensed data, specifically Landsat Enhanced Thematic Mapper (ETM), to accurately identify rice paddocks within Coleambally Irrigation Area (CIA). A remotely-sensed index related to moisture was used to differentiate rice paddocks from other summer crops early in the growing season when moisture differences are at a maximum. Rice paddock accuracy was approximately 97% in late November (Van Niel *et al.*, 2003). This method was refined by using a GIS mask to eliminate confusion between winter cereal paddocks early in the growing season, further increasing accuracy to over 99% (Van Niel and McVicar, 2003). These refined methods solely use Arc-VIEW, the same operational GIS software used to manage geospatial databases at CIA, MIA and MV. The refined methods were tested for the 2000/2001 and 2001/2002 growing seasons and in both seasons it is interesting to note that atmospheric correction did not improve the rice paddock classification accuracy. The satellite remote sensing method provides a way for irrigation companies to determine rice areas much earlier in the growing season, and for much less, when compared with the current information sources.

## Remote Sensing in the CIA

### References

Van Niel, TG, McVicar, TR, Fang, H, Liang S (2003) Calculating environmental moisture for per-field discrimination of rice crops. *International Journal of Remote Sensing* 24, 885-890. Van Niel, TG, McVicar, TR (2003) A simple method to improve field-level rice identification: Toward operational monitoring with satellite remote sensing. *Australian Journal of Experimental Agriculture* 43 (4).

Dr Shahbaz Khan (CSIRO Land & Water) participated in the 3rd World Water Forum in Japan which commenced on 16 March, 2003. This included a session on 21 March organised by the Swedish Research Council and UNESCO's HELP (Hydrology for the Environment, Life and Policy) on "Towards Integrated Catchment Management: Increasing the Dialogue Between Scientists, Policy Makers and Stakeholders" in Shiga. HELP is a joint initiative of UNESCO and WMO, led by the International Hydrological Programme (IHP). One representative from each of three HELP-basins - Thukela in South Africa (Professor Ron Schulze), San Pedro in Mexico/USA (Professor Robert Varady), and Murrumbidgee in Australia (Dr Shahbaz Khan) presented a key note address. This session highlighted that HELP (Hydrology for the Environment, Life and Policy) is creating a new approach to integrated water management through the creation of a framework for water law and policy experts, water resource managers, and water scientists.

## HELP

The demand driven and client responsive hydrology research and participative management tools developed by CSIRO in the Lower Murrumbidgee Catchment were highly appreciated by participants. The research in Lower Murrumbidgee Catchment was highlighted as an example of best practice in integrated water resource management ready to be used by other catchments.

Key message of this session was that the HELP program is unique in that it has moved beyond words and into action. Through case studies in pilot catchments around the world successful approaches promoting sustainable land and water management have been identified. These include:

- \* **Use** of real catchments as frameworks that enable water scientists, water law and policy experts, water resource managers and stakeholders to work together on locally defined water-related problems.
- \* **Definition** of local water problems and the subsequent need for water information by a dialogue among multiple stakeholders, water resource managers and scientists. This ensures that the scientific community are stimulated to develop new research methods that are appropriate for dealing with stakeholder defined issues.
- \* **Communication** of scientific information, both physical and socio-economic, that identifies current and future risks and uncertainties, evaluates options and anticipates potential impacts for future management strategies in ways that can be easily understood by stakeholders and decision makers.
- \* **Encouragement** of water management actions that are based on well-informed and balanced decisions in the multiple uses of land and water.