



# Local adaptation for revegetation



*CSIRO Plant Industry, as part of the Centre for Plant Biodiversity Research, is taking part in a collaborative project to help farmers revegetate more successfully, especially for important species such as acacia. By focusing on the relationships between plants and soil communities and their geographic location, CSIRO Plant Industry aims to improve plant establishment success rates and the efficiency of seed sourcing for revegetation projects.*

Native vegetation loss is a significant issue for many of Australia's agricultural areas and is linked to increases in dryland salinity and the widespread loss of biodiversity. Replanting viable patches of native vegetation is vital for building healthier agricultural systems.

Revegetation can be a daunting task for farmers; they need to know which plants to use and where to source high quality seed. Limits on the amount of seed available also mean that revegetation projects need to be as targeted and efficient as possible to maximise resources.

## **The right plants for the right area**

The geographic origins of plants are an important consideration for revegetation. Plants of the same species are often distributed across a wide area but develop patterns of local adaptation, meaning they become suited to the specific conditions in the local area. This means that plants have a better chance for survival if they are locally adapted to the area being revegetated.

In this project CSIRO Plant Industry scientists will use genetic markers and growth trials to measure local adaptation so it can be taken into account in revegetation planning.



*Replanting viable patches of native vegetation is vital for building healthier agricultural systems, but revegetation projects need to be carefully planned to be efficient*

## Bringing out the bugs

CSIRO Plant Industry has demonstrated that soil bacteria, or rhizobia, contribute to the successful establishment and survival of acacias. The plant and rhizobia form a mutually beneficial, or symbiotic, relationship, and both thrive through their interaction.

As seen with plants, it may also be the case that rhizobia are adapted to particular environments and host plants. Rhizobia are present in natural ecosystems together with the specific plants with which they form symbiotic relationships, but are often absent in farm land, disappearing as a result of the clearing process. Without the benefits supplied by rhizobia, plants used in farm revegetation projects are less likely to establish and survive as effectively.

CSIRO Plant Industry is working to better understand the patterns of local adaptation for rhizobia and develop a system that allows farmers to apply rhizobia during the revegetation process.



*Interactions between acacias and soil bacteria lead to better establishment and growth*



*Locally adapted rhizobia may be a key to successful revegetation projects*

## Putting it all together

By combining their findings on local adaptation and plant-rhizobia relationships, CSIRO Plant Industry researchers expect to help farmers improve their revegetation outcomes. Using the right plants in the right location and in conjunction with the right rhizobia, farmers can maximise the success of their revegetation projects. More effective revegetation will help farmers address the environmental issues associated with dryland salinity and loss of biodiversity in agricultural landscapes.

*This project is a collaboration between CSIRO, the Centre for Plant Biodiversity Research, NSW Department of Environment and Conservation, Greening Australia ACT, the Southern Rivers Catchment Management Authority, Charles Sturt University, and RMIT University.*

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### For further information contact:

CSIRO Enquiries  
Bag 10 Clayton South VIC 3169

Phone: 1300 363 400 (National local call)  
+61 3 95452176 (International phone)

Fax: +61 3 9545 2175

Email: enquiries@csiro.au



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