Herbicide link to low N-fixation

New information on herbicide selection could increase nitrogen fixation in pulses by more than 50 kilograms per hectare.

A CSIRO Land and Water project aims to assess all herbicides currently recommended for use in pulses for their impact on nitrogen fixation and crop growth.

The work will help farmers in south-east Australia improve herbicide management in pulses and minimise the negative impact on nitrogen fixation.

Mallee Sustainable Farming Project trials have shown that herbicides used in pulse crops (both pre-sowing and in-crop) are a major factor causing poor nitrogen fixation.

Paddock trials at Waikerie, South Australia, show non sprayed vetch fixed up to 90kg of nitrogen/ha compared with 20kg of nitrogen/ha for sprayed vetch.

Eight herbicides, including broadleaf and grass selective herbicides, were tested on vetch and peas at the recommended application rates. Most herbicides tested reduced effective nodulation and nitrogen fixation by more than 50 per cent.

The impact of herbicides on nitrogen fixation and crop growth is likely to be highest in low rainfall areas as the shorter growing season means there is less time for the crop to recover.

But it is also likely significant herbicide effects on nitrogen fixation in pulses are occurring in other more favourable cropping environments.

The pulse crops being investigated in this study include peas, lupins and vetch. Two trial sites have been established at Waikerie and Avon, SA.

Information collected will include the impact of single and multiple herbicide applications, application timing, soil type, fertility and seasonal conditions on nitrogen fixation.

Project support has been provided by the Grains Research and Development Corporation.

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Primer plants promote crop growth

Farmers could soon be using 'primer' plants to enhance crop productivity and water use.

A collaborative project between CSIRO and the Department of Natural Resources and Environment, Victoria, is investigating the benefits of primer plant species such as lucerne in crop rotations.

A primer species has the potential to lift crop productivity by improving hostile subsoil conditions.

This is mainly due to the ability of the plant roots to modify the soil and provide a better pathway for the roots of following crops.

Primer plants could improve annual crop yields and subsoil water use in high and low-rainfall areas due to improved root growth.

Lucerne is an example of a primer plant, which the project is using as a benchmark.

Other potential primer plants include native plants and introduced weeds.

Preliminary information collected in southern New South Wales from duplex soils prone to waterlogging indicate the subsoil following lucerne has more biopores (root channels) than after other species and these root channels can influence the infiltration of water into the subsoil.

Lucerne is an example of a primer plant, which can improve hostile subsoil conditions.

Wheat roots have been observed growing in old lucerne channels at the trial site and tests indicate higher water extraction by wheat following lucerne.

Similar trends also have been recorded on duplex soil at Birchip, Victoria, where infiltration rates on plots previously sown to lucerne (six millimetres per hour) were nearly twice that of plots sown to wheat (3mm/h).

The three-year project, which will be carried out at Temora, NSW and Birchip, aims to understand the key mechanisms, which allow the roots of primer plants to colonise hostile subsoils, when the roots of most annual crop species cannot.

The research will identify useful physiological traits for coping with hostile subsoils which could be incorporated into commercial pasture and crop species.

The project is funded by the Grains Research and Development Corporation.

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Gene alliance protects crop quality

A $20 million gene technology research alliance has been formed to protect Australia's grain industry.

CSIRO Entomology and the Grains Research and Development Corporation will work together to prevent a potentially devastating range of pests and diseases infesting grain.

The main focus of the venture is to provide farmers with more effective, environmentally sensitive and long-term crop protection options using gene technology methods.

Scientists will develop resistance genes for insects including Heliothis and aphids as well as resistance against many of the major cereal, oilseed and legume diseases. Research will also look at new resistance genes for herbicides

The alliance also aims to identify markers for *Helicoverpa* resistance in chickpeas and Russian wheat aphid resistance.

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New tool for feed decisions

A decision support software package may soon be available to cattle producers and feedlot managers to assist in formulating rations and feed strategies.

As part of the Premium Grains for Livestock Project, CSIRO Livestock Industries is developing a computer model, called Ausbeef, to enable simple predictions of digestibility, nutritive value, body growth rates and composition in response to a range of feedstuffs and feeding strategies.

Ausbeef may also be used by the feed grains industry to assess the value of their products for use in feedlots.

The package is simple to use and will allow producers to evaluate, in dollar terms, different grains for cattle growth, processing options for grains, examine a full range of concentrate and forage feed options and evaluate different feeding strategies.

The model can also evaluate differences in cattle breeds and calculate waste and methane production.

Future research aims to incorporate management options to avoid heat stress and the evaluation of economic differences between feedlot sites.

It is hoped there will be a limited release of Ausbeef to cattle feedlots and feed suppliers during 2003 to test its benefits and further refine the package.

The project is supported by Meat and Livestock Australia and the Grains Research and Development Corporation.

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