

Local breakthrough to revolutionise weed biocontrol

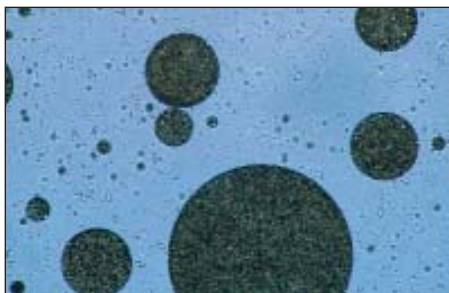
By Kellie Bradley, NSW Agriculture

A scientific breakthrough which could revolutionise broadacre weed control, may also provide a tool in the fight against increasing herbicide resistance and help alleviate concerns about spray residues in crops.

In what is believed to be a world-first, principal research scientist at Orange Agricultural Institute, Professor Bruce Auld has developed a formulation which he hopes will dramatically increase the use of fungi as biological weed control agents.

Until now the use of fungi to control weeds — commonly known as bioherbicides — has been limited by what is often referred to as the ‘dew requirement’, according to Bruce.

“To infect target weeds, fungal biocontrol agents typically need dew or very high humidity almost as soon as they are applied to a plant and for as long as possible — preferably for up to 24 hours,” he said. “But unfortunately that kind of envi-



LEFT: A microscopic view of the formulation: The large spherical objects are the oil droplets which contain water and the small cylindrical objects are fungal spores. The spores are in water and are about 15 microns long (one micron equals one millionth of a metre). (Photo: NSW Agriculture.)

ronment does not commonly occur in nature, which is probably the biggest obstacle preventing more widespread use of bioherbicides.”

Bruce is confident his new double emulsion formulation will overcome this barrier, and spark more research into biocontrol agents.

“The biggest advantage of bioherbicides is that they use naturally-occurring fungi, making them an environmentally-friendly alternative to herbicides,” he said.

“Basically the formulation is for a water-

based spray in which microscopic droplets of water are trapped in tiny oil droplets, which are then suspended in the water. The oil reduces the rate of evaporation, making the water available for longer and encouraging the growth of the fungus.

“There are products available for use in irrigation systems in the US and Japan to achieve this moist environment but there is nothing for use in dryland agriculture, apart from cut stump applications to woody plants which are used in products in the Netherlands and South Africa.”

NSW Agriculture weeds agronomist Andrew Storrie — based at the Tamworth Centre for Crop Improvement — said the prospect of increased bioherbicide use was



Bruce Auld at work in the research laboratory at Orange Agricultural Institute developing a fungal bioherbicide to control Bathurst burr. (Photo: NSW Agriculture.)

very exciting, especially given their potential benefits for human health, international trade and the environment.

He said because bioherbicides were very target specific — meaning they only attack a particular weed — they don't impact on humans or other organisms.

“With herbicide resistance becoming more widespread and placing increasing pressure on farming systems, bioherbicides could also be a tool to fight and even avoid resistance,” Andrew said.

“There are no spray residues either, which is becoming increasingly important, particularly in export markets.

“This lack of residues means they won't affect crop rotations like some herbicides do, giving farmers greater flexibility. Because farmers like to keep their options open they don't like to use some herbicides which might limit their crop choices down the track.”

Bruce Auld has already been granted a provisional patent for the formulation and is hoping to generate commercial interest in the product before the patent is examined in 12 months time.

“It can cost up to \$20,000 for a patent so we're hoping there'll be some commercial interest in the formulation to help fund the process,” he said.

“It is a generic formulation which means it can be used with different bioherbicides. It can also be made using different oils — important because their cost can vary between countries and seasons — and is about 95 per cent water, which reduces the cost significantly.”

Bruce said although it was impossible to know how many, he expected there were plenty of potential bioherbicides being held back because of the dew requirement.

“Hopefully this formulation means potential bioherbicides which have been

STEPS IN BIOHERBICIDE DEVELOPMENT

1. Identify target weed, search for diseases specific to that weed;
2. Check that disease does not affect non-target plants;
3. Develop mass production techniques for the disease spores;
4. Develop methods of storage for extended shelf life for spores; and,
5. Develop a formulation for application as a spray which retains water.

held back in the past will now be able to go ahead.”

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