

Eco-tilling detects herbicide resistance early

August 30 2007

A new molecular tool to help farmers address one of the major threats to conventional agricultural practices - herbicide resistance – has been developed by Australian and Japanese researchers.

More than 305 types of weed in more than 50 countries have been reported to be resistant to at least one herbicide, and an increasing number of weeds owe their success to their genetic diversity.

Scientists say techniques are needed to detect mutations when they first occur, so that farmers can test for herbicide resistance in the field and manage weeds accordingly.

NSW Department of Primary Industries (DPI) molecular biologist, Dr Mui-Keng Tan, together with a team of researchers from Japan, investigated a technique called eco-tilling and found it offers a quick, cheap and reliable means of detecting early signs of herbicide resistance in weeds.

Unlike the traditional molecular approach, eco-tilling uses reverse genetics. Genes are not fully sequenced; instead, mutations in single nucleotides (molecules that make up genes) are identified purely on the basis of their position in the genome.

Dr Tan said new mutations can be detected and known ones can be screened for at a fraction of the cost of alternative genetic methods.

This makes it a powerful, low-cost and high throughput alternative to

full sequencing.

Dr Tan has been investigating the technique in conjunction with Dr Guang-Xi Wang from Kyoto University, who was funded by the Grains Research and Development Corporation (GRDC) to work with Dr Tan at DPI's Elizabeth Macarthur Agricultural Institute.

She says the use of the eco-tilling technique to test for herbicide resistance could help farmers to better manage herbicide use in crop rotations, resulting in more economical and effective use of herbicides.

Dr Tan's research has focused on herbicide resistance in two of the most significant weeds affecting Australian cropping systems – wild oats and rye grass – and together with Dr Wang she examined weeds in rice fields in Japan.

Dr Tan said the every weed-herbicide system is specific.

“The eco-tilling technique can be applied on any particular system pending availability of molecular data on the target genes of the herbicides”, she said.

Source: New South Wales Department of Primary Industries

Citation: Eco-tilling detects herbicide resistance early (2007, August 30) retrieved 20 April 2024 from <https://phys.org/news/2007-08-eco-tilling-herbicide-resistance-early.html>

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