



MEDIA RELEASE

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ZERO TILLAGE: A BLESSING IN DISGUISE? HERBICIDE RESISTANCE LOOMS AS MAJOR THREAT

A crisis of herbicide resistance in wheat and rice-wheat cropping systems laid the foundations for the large-scale adoption of no-till farming in the Indo-Gangetic Plains of India, and Australia leads the world in adoption of no-till.

"Traditional farming systems in the rice-wheat cropping areas of India were heavily reliant on tillage to prepare a fine seed-bed for wheat," says Dr Ram K. Malik, a senior crop scientist with the CCS Haryana Agricultural University, Haryana State, India.

"There has been a cultural belief that 'good farmers' ploughed the land many times, exacting a heavy toll on soil health and overall productivity," says Dr Malik. "Herbicide use has also increased over the last 20-30 years, and has resulted in the emergence of quite serious problems with build up of herbicide-resistant weeds."

Dr Malik was one of a number of speakers at the 4th International Crop Science Congress in Brisbane who were addressing issues related to aspects of this farm practice which is achieving growing global and Australian significance. The Congress has brought together over 1000 delegates from 65 countries to focus on the key issues for cropping systems that provide food, feed and fibre for the world.

Breaking long-held traditional beliefs and farming practices in India called for a novel approach. In a collaborative program supported by the Australian Centre for International Agricultural Research (ACIAR), farmers, extension workers, and scientists in Haryana and Punjab States in India worked together to resolve the herbicide resistance problem and ended up helping the degraded soils as well.

"Zero-tillage, introduced by the Mexico-based International Maize and Wheat Improvement Centre (CIMMYT) but not widely taken up, was a blessing in disguise," says Dr Malik, "allowing earlier planting and less soil disturbance, which greatly reduces infestations of the main herbicide-resistant weed, *Phalaris minor*. Now farmers throughout the Indo-Gangetic Plains of India are accepting the technology."

Adoption of the zero-tillage has also helped kick-start a manufacturing business for the production of zero-tillage machines for farmers.

Dr Malik says that the success of the program means that future strategies for food security in India can now be based on conservation agriculture with better management of land, water, energy and biological resources.

4th International Crop Science Congress

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Brisbane, Australia

Conference

Secretariat

PO Box 1280

Milton Qld 4064

Australia

Telephone:

07 3858 5554

Facsimile:

07 3858 5510

Email:

4icsc04@im.com.au

Website:

www.cropscience2004.com

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“The good news is that no-till farming means that farmers can produce more for less cost, with fewer inputs as well as saving on diesel fuel, tractor time and conserving irrigation water,” he said.

Professor Stephen Powles from the Western Australian Herbicide Resistance Initiative, School of Plant Biology, University of WA, who is also speaking at the Congress warns, “Australia has the world’s biggest herbicide resistance problem.”

“Herbicides are fantastic,” he said. “They contribute greatly to the abundant food produced in major agricultural nations such as Australia, USA, Canada, Argentina and Brazil.”

“Yet we overuse these chemicals and resistance is developing in weeds. Basically it is the same as antibiotic resistance in human health – too much of a good thing.”

“Australia leads the world in the use of no-till as farmers realise its many advantages, including minimising soil erosion and enabling early seeding. For example, in WA complete no-till is about 85% of the entire crop and nationally probably around 40%,” explained Professor Powles.

“But, in essence, it is like substituting the plough with a chemical – the herbicide.”

He warns that the challenge is to be able to have the environmental and yield advantages of no-till without ending up with herbicide resistant weeds.

“Herbicide resistance looms as a major threat to Australia's cropping systems,” he said.

Mr Frank D’Emden at the CRC for Australian Weed Management echoed these concerns.

“Responses to a survey of 384 grain-growers across the southern wheatbelt indicated that most were concerned about the risks of weeds developing resistance to herbicides under long-term use of no-till systems,” he says.

“Our research highlights the need for the continued development and extension of integrated weed management techniques that allow growers to continue expanding the use of no-till systems while reducing the risks of herbicide resistance in crop weeds,” concluded Mr D’Emden.

According to Dr Drew Lyon from the University of Nebraska Panhandle Research and Extension Center, “It is imperative for conservation tillage systems to retain a flexible approach to addressing challenges while maintaining a common goal to sustain the soil resource and produce food for an ever-growing world population.”

More information:

Cathy Reade, Media Manager, 4th International Crop Science Congress
Mobile: 0413 575 934 Email: creade@squirrel.com.au

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