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Future food

Initially opposed to GM crops, Professor Richard Roush is now an enthusiastic convert, and regards it as ironic that he is not perceived as a campaigner to protect the environment. By **Silvia Dopulich**.

Dr Roush identifies the single greatest challenge facing humanity as producing food for eight-to-nine billion people in just a few decades while preventing any further damage to the environment.

He is active in public debates and believes these are critical to ensuring science has a proper role in policy and decision-making. These days Dr Roush, Dean of the Melbourne School of Land and Environment, is increasingly being asked to talk about genetically modified (GM) crops.

Best known for his work on pesticide resistance and its management, Dr Roush's research draws on experience in agricultural crops and natural ecosystems in various parts of the world including the US and Australia. It contributes to a range of areas including practical pest management, basic biology and toxicology of insects, molecular biology of insect neuroreceptors, biological control of insects and weeds and conservation biology. Dr Roush has a strong background in research management and came to Melbourne from the United States where he had been Director, Statewide Integrated Pest Management Program at the University of California for three years.

"I'm really passionate about reducing pesticide use in the environment," Dr Roush said. "The bad news is that there is evidence that some pesticides accumulate in the environment. GM crops have proven that they can reduce the use of such

persistent pesticides."

In 1974 Dr Roush was between school years in the University of California system. By chance he came across the controversial book *Silent Spring* by Rachel Carson.

"I read it in about a day and half and changed my major from genetics to entomology," Dr Roush said.

When he first learnt in the mid-1980s that scientists were trying to express genes from the bacterium *Bacillus thuringiensis* (Bt) in plants, particularly cotton, he thought, like most entomologists at the time, that it was a bad idea.

"We were especially concerned that this would lead to the rapid evolution of resistance to Bt, which many of us saw as having great potential to reduce the use of chemical insecticides," Dr Roush said.

"However, scientists are trained to confront their opinions with new facts, and the facts converted me to become a supporter of GM crops that are currently registered around the world," he said.

"In retrospect, the decision should have been simple: the evidence that these crops can contribute to sustainable agriculture is overwhelming."

Dr Roush says that a key point about many genetically engineered crops is that the foods they produce are not genetically engineered.

In the case of cotton, the foodstuff was cottonseed oil, and like most oils and sugars, no detectable protein or DNA remains after processing.



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That is, sugars and oils produced from insect- (or herbicide) resistant crops were the same as from standard crops.

In a public letter, Dr Roush initially opposed the registration of Bt corn in the US.

“What changed my mind was strong evidence that Bt corn was far safer for humans and livestock than conventional corn, because it made corn much less susceptible to fungi that lived off insect damage and produced toxins,” he said.

Dr Roush believes that Africa is likely to be the greatest beneficiary of GM crops in the future. Viruses, weeds, drought, and insects were now taking as much as 50 per cent of the crop yields in Africa.

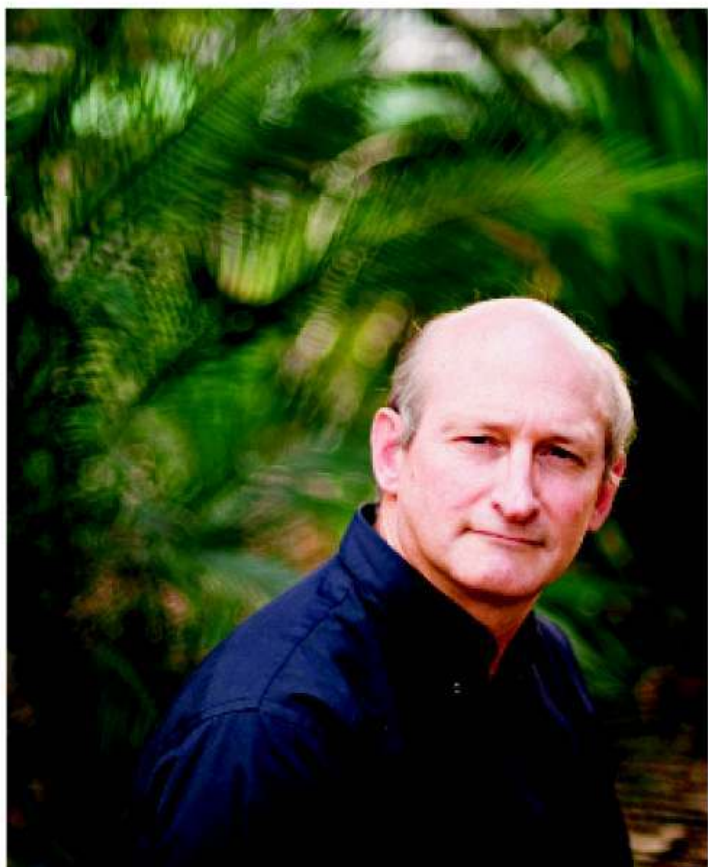
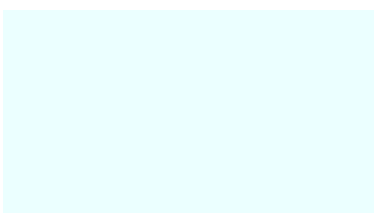
“Australian farming contributes enormously to our economy,” Dr Roush said, “and the maintenance of rural infrastructure is under threat from a wide range of sources.

“In the long term, GM crops have the potential to address major issues such as nitrogen fixation, which can help soil acidity. Worsened by the addition of the fertilisers agriculture needs to retain its productivity.”

Dr Roush observes that the principal food safety concerns for GM plants are potential toxicity and allergenicity of the newly-introduced proteins, the changes in nutrient composition of the plants, and the safety of antibiotic resistance marker-encoded proteins included in the transgenes.

Some people were also concerned with the potential that DNA could be passed from GM feeds to livestock or meat.

“A wide range of studies has shown that consumption of milk, meat and eggs produced from animals fed GM crops should be considered as safe as traditional practices,” Dr Roush said.



Professor Rick Roush is passionate about reducing pesticide use in the environment