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Crop and human health 'elemental' says Scholar

By Catherine Norwood

The weather may not respond to the whims of farmers, but the application of trace element fertilisers is one aspect of production that farmers can control, to produce "nutritious" plants and healthier people, says Victorian Nuffield Scholar Evan Ryan.

In 2009 Mr Ryan began a Nuffield Scholarship, sponsored by Grain Growers Association, investigating the role of trace elements in agronomy, to increase productivity and profitability. He has returned from almost four months of international travel with a renewed appreciation of the benefits trace elements provide for crops, but also for better human health.

Mr Ryan travelled to California, Iowa, Kentucky, Missouri and Arizona in the US, and Saskatchewan and Manitoba in Canada during his scholarship. He also visited England, Ireland, Scotland and Belgium, visiting farmers and research organisations and attending a number of grain industry conferences.

While travelling in the United Kingdom Mr Ryan visited the world's oldest agricultural research centre, the Rothamsted Research Institute, where Professor Steve McGrath discussed the nutritional value of current wheat varieties. Professor McGrath is a leading UK soil scientist at the Rothamsted Centre for Soils and Ecosystem Function, with a special interest in the optimisation of micronutrient status in food crops.

Mr Ryan says the semi-dwarf wheat varieties that have been widely grown since the 1960s put lower concentrations of trace elements into the actual grain, a deficiency that flows through into human diets. In developing countries half the population suffer from micronutrient deficiencies, making them more susceptible to disease and illness.

"Deficiencies are exacerbated where crops are grown in nutrient-deficient soils, and where poverty means people have limited access to a variety of foods including fresh fruit and vegetables, that might otherwise provide trace elements," says Mr Ryan. Growing crops that can convert specific micronutrients from the soil into grain more efficiently than current varieties is one way to address these dietary deficiencies.

Mr Ryan highlights zinc deficiencies as one issue research is working to address addressing. He says zinc is critical to the development and functioning of the central nervous system, and worldwide more than a billion people are at risk of zinc deficiency, mostly in Asia and Africa.

Dr Ismail Cakmak, based at the Sebensci University in Turkey, is using genetics from wild wheat varieties in that country, which have been shown to be highly efficient at converting zinc from soil into the grain. During his travels, Mr Ryan was able to meet with Dr Cakmak to discuss his project, which is part of the international HarvestPlus program. HarvestPlus is developing bio-fortified crops, focusing initially on increasing iron, zinc and vitamin A in the staple crops such as beans, cassava, maize, pearl millet, rice, sweet potato, and wheat.

"We can change our management in an economically viable way to help improve health outcomes for people eating our food," Mr Ryan says. "There's a terrific opportunity in the grains industry to add value to our produce through an elevated mineral content."

In developed nations like Australia that may mean seeking a premium by targeting health conscious market sectors, such as those that have accepted higher prices for plant sterols in margarine to reduce cholesterol.

Mr Ryan says as a producer, his journey has confirmed the importance of making sure plants have access to the necessary macro and micronutrients during their growth cycle.

“Optimal levels of nutrition allows plants to deal more effectively with stresses that may be beyond the control of the farmer, and the plant, such as drought, or insect and disease attack. People take a multi-vitamin to make sure they can cope with stresses, and trace elements do the same things for plants,” he says.

While visiting the US, he met with Iowa farmer Kip Cullers, who holds the world record for soybean yield. Mr Ryan says Mr Cullers achieved his record through attention to detail – ensuring that his crop was never deficient in the minerals and trace elements it needed for each stage of its growth.

“Plant enzymes produce hormones needed for plant growth. If plants are stressed by a lack of an essential nutrient they shut down the production of hormones and the production of grain. Providing trace elements keeps plants happy and provides a stable growth environment.”

Mr Ryan is planning trials with different combinations of macro and micro-nutrients as part of his own cropping program at Yarrowonga, on the Victorian-NSW border. He also intends to work towards developing premium markets for nutrient-enhanced grains.

He co-manages the family farm business at Yarrowonga with his parents John and Helene. Their 1000-hectare property ‘Clontarf’ includes 400 hectares of flood and sprinkler irrigation. They use no-till production systems, continuously cropping cereals, oilseeds, lucerne for seed and oats for hay.

Mr Ryan says although he had already done a considerable amount of research on micronutrients over the phone and on the internet, his scholarship provided him with an invaluable opportunity to meet with people face-to-face, and has given him a much broader perspective on the importance of agriculture.

He said he was looking forward to speaking about his travels and scholarship findings during the annual Grain Growers Association’s Innovation Generation Conference in Albury from 6-8 July, 2010.

For more information contact Evan Ryan on 0428 298 031, email ev_ryan@hotmail.com

For information on Grain Growers Association and the annual Innovation Generation Conference visit www.graingrowers.com.au

High-resolution photographs of Mr Ryan can be downloaded from www.coretext.com.au/communications_images.php.

Please contact Catherine Norwood at Coretext Communications (03) 9670 1168, cnorwood@coretext.com.au if you have any problems accessing images.

Captions:

Victorian Nuffield Scholar Evan Ryan gained a new perspective on the value of micronutrients in crops to improve human health outcomes, following his scholarship studies.

Nuffield Scholar Evan Ryan visited a hybrid corn trial in Iowa, during his scholarship tour, investigating the role of trace elements and production improvements.

NUFFIELD SCHOLARSHIP APPLICATIONS CLOSE JUNE 30, 2010

Only weeks remain until applications for 2011 Nuffield Farming Scholarships close, on 30 June, 2010.

There are 18 scholarships on offer for primary producers with a passion for the future of their industry who are aged 28 to 40 years, although applications outside this range may be considered.

Each scholarship is valued at \$28,000, sponsored by major agribusiness and industry groups across Australia. All scholars take part in a six week Global Focus Program, with up to 10 weeks of individual travel to investigate a topic of their choice. Winners will be announced in October 2010.

Scholars are selected for their farming and leadership capabilities, and potential to make a valuable contribution to the future of Australian agriculture. They join a growing international network of scholars, which has more than 200 members in Australia and 1300 members worldwide.

The Nuffield Scholarship program aims to improve the skills of Australian primary producers, provide a global perspective of agriculture and help scholars bring back new ideas and strategies for the benefit of both individual scholars, and their respective industries.

Recent scholars have been drawn from a wide pool of primary industries and include grain and rice growers, fishers and aquaculturists, chicken, beef, lamb, goat and pork producers, woolgrowers, dairy farmers, apiarists, orchardists, horticulturalists and vignerons.

Study topics have varied from the basics of production such as soil, water, crop varieties, weeds and disease to production systems, new technologies, natural resource management, biofuels, carbon trading, supply systems, marketing and public relations.

Application forms are available from Nuffield Australia on 03 5480 0755, via email, enquiries@nuffield.com.au, or from the website www.nuffield.com.au.

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