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Learning organic's dirty secrets

BY SEAN MOORE

Research Communications Officer

In 1992 Martin Entz started growing crops in an un-Western way to prove to himself that it couldn't be done.

But after nearly 17 years of comparing organic and conventional agricultural practices at research farms around Winnipeg the plant scientist delightfully notes his assumptions were wrong.

The Glenlea long-term organic/conventional crop rotation study is Canada's oldest and it's providing valuable insights into natural farming systems.

A major finding pertains to soil health, specifically, the microorganisms living in it. (To re-cap from a first-year Biology course, over 95 per cent of vascular plants have fungi in their roots and this association benefits the plants in numerous ways.)

In Year 13, graduate student Cathy Welsh, working with Entz and soil sciences' Mario Tenuta, compared the plots' fungal spore density and diversity – a hallmark of soil health, and indirectly and to some degree, plant health. In short, the organic system was a metropolis compared to the conventional plot.

"It shouldn't have been a surprise to find this, but it was," Entz said.

This has many implications, one of which pertains to fungal resignation.

Soil in conventional systems is obese with fertilizer-derived nutrients. This causes the plant, specifically those mycorrhizal fungi, to become lazy, which is a shame since they are superb micronutrient extractors. But in such systems they sit back and wait for fertilizers to bring the goods to them. They fail to extend their hyphae and the plant, as a result, ends up having a lower micronutrient density when



By Sean Moore

Plant scientist Martin Entz runs Canada's oldest organic farm experiment.

compared to plants in organic plots.

So organic food not only has fewer pesticides on its exterior, but its interior hosts a gala of zinc, iron and the like.

What's more, when the plant is left to fend for itself its immune and other systems become more robust. Flax

samples Entz took from his 1995 to 1999 crop years confirm this and a current project is further investigating it, as well as things like mill quality.

Another drawback to conventional farming is how much energy (read oil) it takes to cram nitrogen into fertilizer.

Indeed, since about one-half of the energy on our dinner plate came from nitrogen, we are essentially eating oil, Entz notes.

To rectify this, he is experimenting with "green manure" – plants, like legumes, that extract nitrogen from the atmosphere. These plants then get mashed into the soil by way of a tractor add-on Entz's lab created. The legumes soon decompose and cycle nitrogen into the soil.

All this sounds great, but everything seems to have a downside. A major flaw critics point to in organic systems concerns yields: you can't, the argument goes, feed the world on organic.

"But that's a premature debate," Entz said, noting that less than one per cent of Canada's land is now under organic cultivation.

"The real debate needs to be on how we can achieve sustainable agriculture because our current system is not sustainable. Also, we need to keep in mind that much of the world currently feeds itself using what are essentially organic methods."

Besides, Entz notes, the gap in yields should close with further research.

Currently, organic plots produce up to 85 per cent of the calories a similar conventional field can, but it takes 30% less energy to do so. And as Entz and others work with farmers to breed crops specifically for organic systems/the yields will increase.

"Our current agricultural model is getting tired. It had a good run, but it's time to adapt – that's how civilizations move forward.

"What Glenlea offers us is a laboratory that lets us explore what these natural processes offer humanity. And what we learned is that they offer a ton."

Breathing new life into asthma research

BY JANINE HARASYMCHUK

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Allan Becker, pediatrics and immunology, will be heading up the Winnipeg site of the new national CHILD Asthma and Allergies Study.

The \$12-million study is co-funded by the Canadian Institutes of Health Research and AllerGen NCE Inc.

The study will follow 5,000 Canadian children from their time in the womb through early childhood and investigate the roles of indoor and outdoor environmental exposure, infections, nutrition and genetics in the development of asthma and allergies. Expectant mothers will be recruited for the study in four regional centres across the country—Winnipeg, Vancouver, Edmonton and Toronto.

"We have done previous work using two different cohorts which

have helped to inform where to go with this new Manitoba cohort," said Becker. "This experience at recruiting, retaining and studying birth cohorts is a significant strength for the Manitoba portion of the study."

The team headed by Becker includes: Kent HayGlass, immunology and medical microbiology; Anita Kozyrskyj, pharmacy and community health sciences; and Clare Ramsey, internal medicine.

"The study will address many controversies that only a large study of children that looks at environmental, genetic and very specific phenotypes can solve," said Becker. "If we can solve these controversies it will have a major impact on prevention of asthma and for public policies."

Allergic diseases and asthma are the most common diseases in childhood, with one in five Canadians suffering from asthma and one in three having allergies. These factors may be



Submitted Photo

Allan Becker, pediatrics and immunology, will be heading up the Winnipeg site of the new national CHILD Asthma and Allergies Study.

acting as markers, telling us that our population as a whole is in trouble.

A parallel increase is also seen in other, less common, diseases such as lupus, multiple sclerosis, diabetes and inflammatory bowel disease.

This could be a signal that there are dysfunctions occurring in early life, perhaps in utero, that are associated with allergies and asthma. This study will work to find answers and correlations to these questions.

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