



Strengthening the Foundation of Organics in Canada

All across Canada, in fields and barns, laboratories and market gardens, people are conducting research on organic farming methods. And not just scientists. More than 150 organic farmers and 79 researchers from 22 universities and 14 government research stations are engaged in the Organic Science Cluster 3 (OSC3).



At the University of Alberta, Dr. Martin Entz leads farmers, researchers, and government officials through test plots of dozens of different populations of organic farmer-bred wheat developed through participatory plant breeding. Submitted by SeedChange.

We're now partway through OSC3 (2018-2023). At the end of it, organic farmers will have more information to help increase yields, farm more efficiently and adopt more environmentally sustainable farming practices. Beyond the scientific impact, the OSC3 can strengthen the foundation of organic agriculture in Canada.



The Organic Science Cluster is managed by Nicole Boudreau, Coordinator of the Organic Federation of Canada (OFC); Dr. Andy Hammermeister, the Science Coordinator of the OSC3 and Director of the Organic Agriculture Centre of Canada (OACC); and Margaret Graves, OACC Program Manager. OSC3 is one of 19 AgriScience Clusters supported by Agriculture and Agri-Food Canada (AAFC)-Canadian Agricultural Partnership. Before the launch of each Cluster, OFC and OACC work closely with organic organizations to identify the research

needs of producers. Researchers submit letters of intent then proposals, which are reviewed by OFC and OACC, and eventually by AAFC. The goal of the review process is to ensure the research is relevant to the organic industry, has scientific integrity, and fits within the AAFC criteria.

Dr. Andy Hammermeister explains that the priority of the Organic Science Cluster is to address the greatest challenges for organic farmers, specifically:

- maintaining soil health and fertility to maintain good crop yields;
- finding ecologically-based solutions to pest management challenges; and
- identifying opportunities to add value to commodities.

“We are looking for ecologically-based solutions in all the research activities,” says Hammermeister. These correspond to the AAFC priority areas of environmental sustainability and climate change.

“We want a better understanding of the agroecosystem so we can modify our practices to protect it. We want to assess different organic practices to see, for example, how to enhance biodiversity in organic management systems and how to increase our efficiency in CO₂ sequestration,” he explains.

“We also need to learn how to better recycle nutrients,” says Hammermeister. “For example, struvite is a possible new nutrient source.” One activity looks at how struvite can be crystallized from human and livestock wastewater streams to provide phosphorus, a nutrient that is lacking on many organic farms. Currently, the common source of phosphorus for organic farmers is rock phosphate--a non-renewable resource in short supply.

“It’s critical that we find a way to close the phosphorus loop,” adds Margaret Graves. “The struvite project is one of a few controversial projects,” she adds. “Research should be on the cutting edge.”

Other innovative technological advances can help organic farmers increase productivity and improve energy efficiency. In Quebec, Dr. Martine Dorais is investigating the use of high-tech high tunnels to produce berries. The goal is to produce higher quality berries over a longer season and with less pest damage. Dorais is also exploring the potential of an energy-efficient organic vertical farming system – a plant factory growing organic vegetables under LED lights in a controlled environment. In BC, Dr. Sean Smukler is working with market gardens to develop an online tool for organic nutrient management planning.

“We need to dispel the myth that organics is just using old practices,” says Hammermeister. “We have a much better understanding of the ecosystem now and ecological innovations.”

Hammermeister’s personal interest is to explore how new smart technology can be applied to organic farming. “For example, maybe the smart technology can be used to enhance the productivity and welfare of organic livestock and to assess the effects of organic farming practices on the environment.”

One Cluster, Many Commodities

“Part of the reason the OSC is so exciting,” says Margaret Graves, OACC Program Manager, “is that it can offer solutions for many types of production.” Most other AgriScience Clusters serve one commodity, such as canola or dairy, whereas the OSC3 has 27 research activities covering field crops, horticulture, pest management, livestock and environment.

Activities range from developing organic grain and soybean varieties for large Prairie farms to controlling weeds in baby greens on market gardens. Poultry and berry producers may be interested in the study

of the use of berry byproducts in feed to reduce incidence of pathogens in chickens.

Due to the diversity of commodities, OSC3 has more partners than any other cluster. Commodity organizations, regional organic organizations, businesses and universities contribute funds and other resources. In addition, 150 farmers volunteer their labour and land.

“The abundance of partners can increase the impact of the research by having close ties between scientists and the industry,” explains Hammermeister. “The research better suits the needs of farmers and there is more potential for knowledge transfer. On the other hand, it makes finding matching funding much more challenging when you need to solicit funds from so many industry partners rather than using check-off funds which many commodity groups have.”



Unlike many other clusters, the organic industry doesn't have a check-off or levy program to provide the funds required to match the contribution of the federal government. AAFC contributes \$8,342,000, while 79 external industry partners contribute \$3,988,000 in cash, incurred expenses and in-kind contributions, explains Nicole Boudreau, OFC Coordinator.

Boudreau, who is responsible for collecting funds from AAFC and the partners, is “more than grateful to AAFC and the partners of the industry. Industry partners are heroic, patient and... resilient. The organic industry as a whole owes them a debt of gratitude.”

A Collaborative Approach

“What makes the organic cluster interesting is that many of the scientists involved are not dedicated exclusively to organic research but are interested in how to improve the environmental responsibility of agriculture overall,” says Hammermeister.

“Organics offers a platform to pursue a variety of sustainable solutions.” Hammermeister adds. “Many practices used on organic farms can be applied to non-organic farms.”

Boudreau, Hammermeister and Graves connect with non-organic industry representatives at annual meetings of representatives of each Science Cluster.

The meetings offer “a fascinating interface between the different industries,” says Graves. “Many other commodities have organic producers so there's cross-over among the clusters.” For example, the Manitoba Pulse & Soybean Growers is involved in four clusters and provides more than \$2-million in matching funds with \$20,000 of that going to the OSC3.

“The Organic Science Cluster has created more relevance for us and has helped improve the image of organic farming and improved our integrity,” says Hammermeister.

“This helps the whole organic sector,” he adds. “Conducting science in organic agriculture provides researchers with an alternate pathway to finding ecological solutions to production challenges. As a niche market, organic can springboard new ideas that can serve all of agriculture. The Organic Science Cluster clearly demonstrates that we have built strong connections with researchers across the country.”



Meeting of a group of scientists involved in organic research in Guelph, in February 2020.

In Photo L-R (Research activity affiliation): Jocelyn Cameron (25), Susan Ratz (Guelph Organic Conference), Marney Isaac (11), Renee Bergeron (25), Ralph Martin (Science Advisory Body), Xin Lu (2), Istvan Rajcan (2), Manish Raizada (22), Jade Muileboom (22), Kimberley Schneider (26), Moussa Diarra (24), Yousef Hassan (24), Simon Lachance (19), Andy Hammermeister (Science Director), Munene Kithma (24), Patricia Tolton (AAFC Science Partnerships).

“The OSC research has improved the reputation of organic science among researchers,” Graves adds. “They see that a highly rigorous scientific method is used. We are now getting the respect that we deserve.”

Scientific articles in peer-reviewed journals help build credibility for organic research in general and also contribute to the scientific foundation. The researchers also share their findings at conferences, workshops and field days.

The legacy of the OSC can extend far beyond science. Forty graduate students are involved in the research, along with many undergraduates. “Even if these students don't end up working directly in the organic sector,” says Hammermeister. “They have been exposed to organic concepts and thinking in terms of ecological systems; this will influence their approach to finding solutions to agricultural challenges in the future”

Transferring knowledge

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To find out the latest research findings, check out the [OACC website](#). OACC and OFC also plan to distribute results and success stories to conventional, as well as organic, producers through magazine articles, technical bulletins, videos, podcasts and social media.