ON Organic

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Welcome to ON Organic

Evan Elford, New Crop Development Specialist, OMAF & MRA

As we continue through the field season the Organic Agriculture Centre of Canada (OACC) has posted a number of useful extension articles and webinars which may be helpful during the growing season. Some topics include: "Tools for Minimizing Laborious Hand-weeding in Row Crops", "Breeding for Organic and Low Input Pig Production Systems", and "Hedging Bets: Legume Mixtures in Pasture". Visit the OACC website at www.oacc.info for these and other articles of organic production interest.

We want to hear from you! Are there livestock or crop management issues you are facing or would like to learn more about? Please let us know so we can address it for you (and others) in an upcoming newsletter!

As always we welcome your comments and any suggestions for topics in the newsletter. Thank you once again to our contributing authors and to EFAO, OCO and others who pass along our newsletter on a regular basis.

Subscription to this newsletter is easy and free. For details go to the webpage:

http://www.omafra.gov.on.ca/english/subscribe/index.html#organic
The newsletter is also posted on the OMAF and MRA website at:
http://www.omafra.gov.on.ca/english/crops/organic/news/news-organic.html
The French version of these newsletters is available at:
http://www.omafra.gov.on.ca/french/crops/organic/news/news-organic.html
The OMAF and MRA Organic pages are linked from:
http://www.ontario.ca/organic and http://www.ontario.ca/biologique

In This Issue...

Ministry of Agriculture and Food
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Ontario

(Not So) Dry Hay: Handle With Care!

Mario S. Mongeon, Livestock Specialist, OMAF and MRA

Making quality dry hay can be a challenge, especially when conditions are cool and wet, as we experienced last summer in many parts of the province. Hopefully, this year will be different.

In order to produce quality dry hay, it must be harvested to preserve the nutritive value of the forage. Moisture level at bailing is of critical importance to insure quality. If baling hay at too high a moisture content; molds, dust and funny smells are expected. There is more; substantial losses of dry matter and nutrients can occur due to spontaneous heating. When moisture levels are greater than optimal, plant cells and microorganisms consuming forage's carbohydrates and biological activity generate heat that gets trapped in the hay mass. Even hay baled at 15 to 20% moisture may undergo some degree of heating a few days after harvest that may extend for 7 to 10 days. Usually, temperatures will not be excessive so quality damage is minimal.

Several factors can affect the impact of the post-harvest heating:

- bale size and type
- level of compaction
- storage

The larger the bale, the less easy it is for heat to escape thus increasing the extent of nutrient loss. As bale size and compaction levels increase, moisture remains trapped in the hay mass for a longer period of time thus increasing heat damage. Along the same line, if freshly harvested hay is stored in a tight pile, excess moisture and heat will not escape readily and overheating might occur for several weeks.

A team of investigators at the Dairy Forage Research Center in Wisconsin studied the relationship between moisture content at baling, size of bales and forage quality using a Heating Degree Day system. The Heating Degree Days (HDD) are calculated by subtracting 30 from the maximum internal bale temperature measured in ˚C, for each day of storage. The difference is summed each day until internal bale temperature drops below 30 ˚C. Their findings show that small square bales, harvested at a moisture level 20% or less accumulated a low level (93 or fewer) of HDD. As bale size and diameter increased, baling at a moisture content of 20% resulted in more HDD accumulated and a higher risk of spontaneous heating that could lead to significant nutrient losses. As HDD exceed 150, nutrient losses begin to increase substantially.

In the past, the effect of heat damage was believed to be mainly a reduction in the digestibility of crude protein as a result of chemical changes taking place between carbohydrates and protein known as Maillard reaction. Recent research findings indicate that not only is protein digestibility reduced but energy losses are at least as significant. Energy concentration in the forage decreases as non fiber carbohydrates (NFC) are depleted, while fiber concentration increases. Since NFCs are almost all digested by the cow, the disappearance of NFCs markedly impacts the energy content of the hay. As HDD exceed 315 the NFC losses can be as high as 25% of their original levels.

This HDD system can be readily used on the farm to monitor a new crop of dry hay. The only equipment required is a bimetallic stemmed thermometer with a long stem or a moisture tester equipped with a long probe with built in thermometer. Internal bale temperatures are taken daily until the internal temperature gets down to 30˚. The HDD value can then be calculated and an assessment of potential heat damage can be made.

Another tool to assess potential heat damage to a forage crop is ADF-CP. It is a laboratory test used to measure the amount of heat damaged protein in a forage sample, reported as a percentage of the crude protein(CP). It measures the portion of crude protein that is bound to the acid detergent fibre fraction of the cell wall, or the portion that is unavailable to the cow. Some degree of binding between fibre and protein occurs naturally even though no heating took place. This protein is often subtracted from the feed's total crude protein to estimate available crude. ADF-CP values higher than 10% (as % CP) on the analysis report indicates that some overheating of the forage has occurred. If the bound protein becomes too high (>12% of CP) then, the crude protein value should be adjusted. The analysis report will often provide an adjusted CP value. This value should be used in ration formulation.

Although dry hay was the main focus of attention of the research team, it is fair to assume that silage and haylage behave likewise when exposed to spontaneous heating and similar nutrient losses can be expected.

(Not So) Dry Hay: Handle With Care! (Cont'd)

In order to minimize nutrient losses due to heat damage, forage moisture level at harvesting, particle size, packing and oxygen exclusion are key factors to manage.

Moisture levels at baling (without acid) to minimized Heating losses

- Small square bales: 15 - 18% moisture
- Large round bales (soft core): 13 - 16% moisture
- Large Rectangular and large round hard core bales: 12 – 15% moisture

http://www.omafra.gov.on.ca/english/crops/facts/preventing.htm

Effects of spontaneous heating on forage protein fractions and in situ disappearance kinetics of crude protein for alfalfa-orchardgrass hays packaged in large round bales. W. K. Coblentz , P. C. Hoffman, and N. P. Martin J. Dairy Sci. 93 :1148–1169

Effects of spontaneous heating on fiber composition, fiber digestibility and in situ disappearance kinetics of NDF for alfalfa-orchardgrass hays. W. K. Coblentz and P. C. Hoffman J. Dairy Sci. 92 :2875–2895

Assessing the Ratio of Worm Castings to Peat-based Potting Mix for Greenhouse-grown Organic Basil

Guest Authors: Anisah Madden, Summer Research Intern and Mehdi Sharifi, Assistant Professor/ Canada Research Chair in Sustainable Agriculture, Trent University

Assessing the Ratio of Worm Castings to Peat-based Potting Mix for Greenhouse-grown Organic Basil
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There is evidence that the use of worm castings as an amendment have the potential to supply sufficient nutrients to leafy vegetables during their growth period. A greenhouse experiment was recently conducted at Sustainable Agriculture Program in Trent University to access the optimum ratio of worm castings to growing media for organic basil (*Ocimum basilicum*).

Worm casting treatments were combined with an organic peat-based potting mix[1] in different percentages (0, 15 and 30% weight basis) to study the effects on basil plant growth and nutrient availability. The total concentrations of carbon, nitrogen and sulphur in the worm casting were 13%, 1.05 % and 0.24% respectively on a dry weight basis. The moisture content of the worm casting amendment was between 20 to 22%.

Worm castings, (also called vermicompost), are the end product of the breakdown (digestion) of organic matter by earthworms. Vermicompost is rich in nutrients, beneficial bacteria and enzymes, and has been shown to improve soil structure, aeration, porosity, drainage, and moisture holding capacity, while exhibiting a positive effect on plant growth and health.[2]

The results of this project indicated that a mixture of 15% worm castings to 85% peat-based potting mix provided sufficient nutrients for basil plants during their growing cycle (8 weeks), significantly enhancing the majority of basil traits including plant height, biomass, leaf area, and number of branches compared with other treatments - without any need for supplemental nutrient application (**Table 1**).

Assessing the Ratio of Worm Castings to Peat-based Potting Mix for Greenhouse-grown Organic Basil (Cont'd)

Worm castings applied to the potting mix at the higher rate of 30% did not further enhance the growth traits observed, and only showed a marginal increase in nitrogen and sulphur uptake by the plants compared with the 15% treatment rate.

In addition, the study looked at the effects of adding biochar [3] and mycorrhiza [4] to the three different worm casting/potting soil treatments.

Biochar is the name for charcoal used as a soil amendment, and is produced by the pyrolysis (thermophilic decomposition of organic matter under high temperatures, in the absence of oxygen) of biomass (crop residues, or wood). Biochar is being researched for its carbon sequestration potential as well as its ability to improve soil fertility and agricultural productivity.

A mycorrhiza is a symbiotic association between a fungus and the roots of a vascular plant. This beneficial relationship improves the plant's ability to uptake water and nutrients, and additionally protects the plant roots from infection by pathogenic organisms.

In this study, mycorrhizal inoculation showed a positive significant effect on some basil plant growth parameters (shoot dry weight, leaf/stem ratio), and mycorrhizal dependency, and also improved nitrogen and sulphur uptake by plants; however, the addition of biochar did not show a significant effect on measured parameters.

This research project will help organic greenhouse producers to use the optimal amount of worm castings as an amendment for their growing media mix. The results of this project are also relevant to growers using integrated production methods as well as conventional growers who wish to minimise their synthetic fertilizer use, thereby reducing the risk of environmental damage while improving the sustainability of their production systems.

Table 1: Effect of worm casting ratio to peat-based potting mix in growing media on organic basil growth parameters.

Worm casting rate (%)	Shoot DW (g/plant)	Stem Diameter (mm)	Leaf DW (g/plant)	Total leaf area / plant	Number of branches/ plant	Mycorrhizal Dependency	Chlorophyll content NDVI
0	12c	6.8c	7.6c	2686c	15c	10.5a	0.54b
15	28a	8.1a	19.0a	4470a	28a	4.4c	0.61a
30	26b	7.9a	16.7ab	3847b	28a	9.8b	0.58ab

Values in each column with the same letter are not significantly different at 0.05 probability level using LSD test

Assessing the Ratio of Worm Castings to Peat-based Potting Mix for Greenhouse-grown Organic Basil (Cont'd)

Figure 1: Dr Reza M. Ardakani evaluating basil plants grown in a worm casting and peat-based media for organic greenhouse production systems.

1 Sunshine #4 Natural & Organic Peat
2 http://www.vermiculture.ca/transform/worm_castings.htm
3 Blue Leaf ; 10% weight
4 +MYKE® PRO PS3, Glomusintraradices

Acknowledgements: This research was made possible by support and the generous donation of worm castings by Greenscience Technologies Inc., plant donations from Johnny's Seeds, Biochar donation from Blue Leaf, and funding from the NSERC Engage program.

Credits: *Dr. Mehdi Sharifi, Canada Research Chair in Sustainable Agriculture, Trent University; Dr M. Reza Ardakani, Research Associate in Sustainable Agriculture Program at Trent University; Dr Tom Hutchinson, Professor Emeritus in Environmental and Resource Science/Studies at Trent University, Anisah Madden, Sustainable Agriculture and Food Systems (SAFS) student at Trent University.*

Flea Beetles on Crucifer Crops

Marion Paibomesai, Vegetable Crops Specialist, OMAF & MRA

Originally posted on ONvegetables.com on 15 May 2013. Flea beetle activity in brassica crops has been reported in several areas (11 June 2014).

What species of flea beetles affect crucifer crops in Ontario?

Two species of flea beetles that commonly feed on brassica crops in Ontario are the crucifer flea beetle (*Phyllotreta cruciferae*) and striped flea beetle (*Phyllotreta striolata*). There are reports that the crucifer flea beetle is more common in Ontario than the striped flea beetle.

Biology of flea beetles

In Ontario, both flea beetles have one generation per year. Adults overwinter in soil and leaf litter and become active the following spring (usually in May). Striped flea beetles typically become active two weeks earlier than the crucifer flea beetle, but you can usually find these species co-existing in the same field. Soon after the beetles become active in the spring, they lay eggs in soil near host plants. These eggs hatch in about 5 days and the larvae undergo three instars (or stages) followed by pupation in the soil. Adults emerge in July and feed until they need to seek hibernation sites in the fall to overwinter. In hot, dry weather (ideal conditions), development from egg to adult can take place in as little as 7 weeks, as such there is the potential for 2 generations per year here. Flea beetles will also consume cruciferous weed species. Sunny, warm, dry conditions are ideal conditions for flea beetle feeding. Feeding activity decreases when conditions are cool and damp.

How do you identify flea beetles?

Flea beetles are small, 2-3 mm long, shiny black beetles with strong hindlegs. When you approach plants infested with flea beetles, the beetles will jump away quickly. When you see this behaviour you can understand why they are called "flea" beetles. The striped flea beetles are brownish-black in colour with yellow stripes down their backs (**Figure 1A**). Crucifer flea beetles are black and very shiny (**Figure 1B**). In **Figure 2**, a crucifer flea beetle is sitting on a leaf of a Brassica crop.

What does flea beetle feeding damage look like and how does it affect the plant?

Feeding damage is described as small round holes or

'shot-holes' on the leaves of crucifer crops. Older feeding holes may be ringed with dried, brown tissue, while newer feeding holes are surrounding by green tissue (**Figure 3**; you can see both old and new damage on these young leaves). Damage may also appear as small pits on the leaves. Flea beetles can cause enough foliage damage to seedlings resulting in death. Direct-seeded crops and young tender transplants are quite susceptible to damage. Brassica transplants seem to be less susceptible to flea beetle damage compared to direct-seeded crops and these beetles prefer specialty Brassica crops, like Chinese cabbage, bok choy, compared to the 'traditional' cole crops (broccoli, cabbage, cauliflower). Plants can tolerate no more than 1 flea beetle/plant up to the 6th leaf stage. Generally, after the 6th leaf stage there is enough leaf tissue that plants can tolerate damage, which may otherwise interfere with growth at earlier crop stages.

Management options for flea beetles

Use transplants, if possible. Flea beetles can cause significant damage on seedlings of direct-seeded crops. Using transplants can give you head start against flea beetles. Control cruciferous weeds to reduce potential feeding sites in the spring.

Floating row covers may help, but keep in mind that crop rotation is important. If you are planting in the same area of the field that had crucifer crops last year, the flea beetles could potentially be trapped with your crop under the row cover this spring. Row covers need to be installed with sealed edges soon after planting to prevent infestations of flea beetles. Row covers may interfere with growth of cole crops. Be sure to check under the covers for the presence of flea beetles (and other pests) and to see how your crop is growing under cover.

Pest control products may help manage populations of flea beetles. When scouting, inspect 25 plants throughout the field. For newly emerged or transplanted crops, you may need to check the fields every couple days, as flea beetles can cause significant damage during this stage the crop. Flea beetles will try to jump away when you are walking through the crop, so try to make counts as you approach the plants. Record the number of beetles on each plant and divide by 25 to calculate the average number of beetles per plant. Make notes on the feeding damage caused by flea beetles, as well. In terms of treatment thresholds, up to the 6-leaf stage, plants can tolerate no more than 1 flea beetle per plant; however, feeding damage incurred in later growth stages may negatively impact the quality and thus the marketability of the crop (this is particularly a concern for the 'leafy' brassica vegetables).

Please refer to Publication 838. Vegetable Crop Protection Guide and supplement available at http://www.omafra.gov.on.ca/english/crops/vegpubs/vegpubs.htm for more information on pest control products registered for flea beetles. Always follow directions for use and precautions on the product label. Check with your certification body before making a pest control product application. More information on flea beetles is available at http://www.omafra.gov.on.ca/IPM/english/brassicas/insects/flea-beetles.html#advanced.

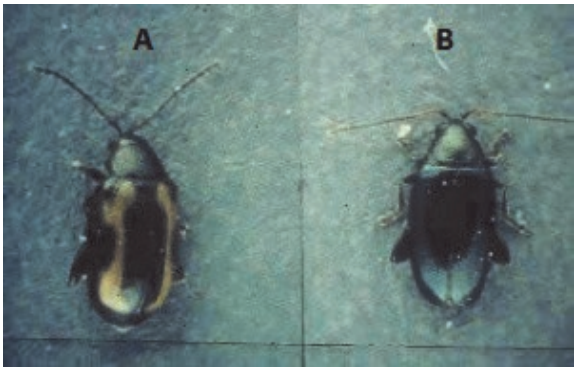


Figure 1: Striped flea beetle (A) and crucifer flea beetle (B) adults

Figure 2: Crucifer flea beetle sitting on brassica crop cotyledon.

Figure 3: Old and new flea beetle feeding damage on brassica crop cotyledons. Old damaged is ringed with brown, dried leaf tissue. Newer damage has green edges.

Organic Federation of Canada (OFC) Updates

From the OFC June 2014 InfoBio Newsletter

Funding of the Canadian Organic Standards Review

The Technical Committee on Organic Agriculture (TC) has met twice to discuss the proposed modifications to the Canadian Organic Standards. The OFC has posted two reports on these meetings. The next step: the public comment period, when all stakeholders will have an opportunity to issue their comments on the modifications recommended by the TC. The CGSB will soon confirm the dates for the comment period.

The funding for the COS review complies with the budget forecast. Agriculture and Agri-Food Canada has agreed to contribute $297,000 if the sector matches this funding with a contribution of $82,000, and the financial statement for the first year of the review is conclusive. The incurred expenses correspond to the budget, and the fundraising campaign has met the objectives for 2013-2014. The 2014-2015 year appears promising.

The OFC will re-launch its fundraising campaign in order to reach objectives for the current year, and invites all stakeholders to support the COS review. Our objective is to collect $40,000 in 2014-2015. The minimum contribution amount is set at $500.00.
All of the sponsors are listed on the OFC website.

"Think Before You Eat" Campaign

The Canada Organic Trade Association (COTA) has organized a new consumer awareness program called "Think Before You Eat, Think Canada Organic".

The campaign is designed to increase consumer awarness around organically produced foods and provide more information on the 'Who, What, Where, Why and How' of organic food. For more information about the campaign, please visit the website at www.ThinkCanadaOrganic.ca.

The Dirt on Soil
Date: June 21, 2014 12:30 -4:30 pm
Location: Ebenezer Chapel & McVean Farm, Brampton
Instructor: Ian McCormick
Cost: $55 (+HST) per person or $110 (+HST) for two

The root of all life, including human life, is in the soil. In this workshop, learn the basics of soil science in an accessible and hands-on way. Rather than relying on inputs for fertility, get ready for ideas on how to optimize your soil's health, and ultimately the health of your crops, by using the biological community to unleash the tremendous potential in your soil! Come prepared to spend time outdoors with boots, warm clothing and rain gear.

Organic Seed Workshops, 2014 – Presented by Everdale

As part of their work for The Bauta Family Initiative on Canadian Seed Security, Everdale is offering a special series of organic seed production workshops in 2014 across Ontario.

Wednesday, August 6	Rogueing, Selection, and Disease Management	Hawthorn Farm
Wednesday, August 27	Integrating Seed Production into Market Gardens	Matchbox Garden & Seed Co.
Wednesday, August 27	Build Your Own Small Seed Winnowing Equipment	Farms at Work and The Cottage Gardener
TBA	Growing and Selecting Seeds for World Crops	TBA
Wednesday, September 10	Rogueing and Selection (CRAFT Interns Only)	Whole Circle Farm
Thursday, September 11	Integrating Seed Production into Market Gardens	Fare Well Farm
TBA	Diversified Heritage Grain Production	Paul Spence
Wednesday, September 17	Integrating Seed Production into Market Gardens	Saugeen River CSA
Wednesday, September 17	Harvesting, Cleaning, and Processing Wet and Dry Seed	Hawthorn Farm
Wednesday, September 24	Fundamentals of Seed Production	Guelph Centre for Urban Organic Farming
Saturday, September 27	Seed Production Trials and Selection	Everdale
November 7-9	ECOSGN 2014: Seed Connections	Sainte-Anne-de Bellevue, Quebec

For more information on seed workshops near you, please visit the Everdale website at: http://everdale.org/workshops/organicseed/ or contact Aabir Dey, Regional Coordinator for the Bauta Family Initiative on Canadian Seed Security for Ontario at 519.855.4859 ext.103; email: aabir.dey@everdale.org.

EFAO Organic Cash-Crop Tour

Date: July 21, 2014
Location: Three farms will be part of the Organic Cash -Crop Tour in 2014 including Daniel Konzelmann (Wyoming, Ontario); Ted Minten (Watford, Ontario); and Hank Veens (Arkona, Ontario).

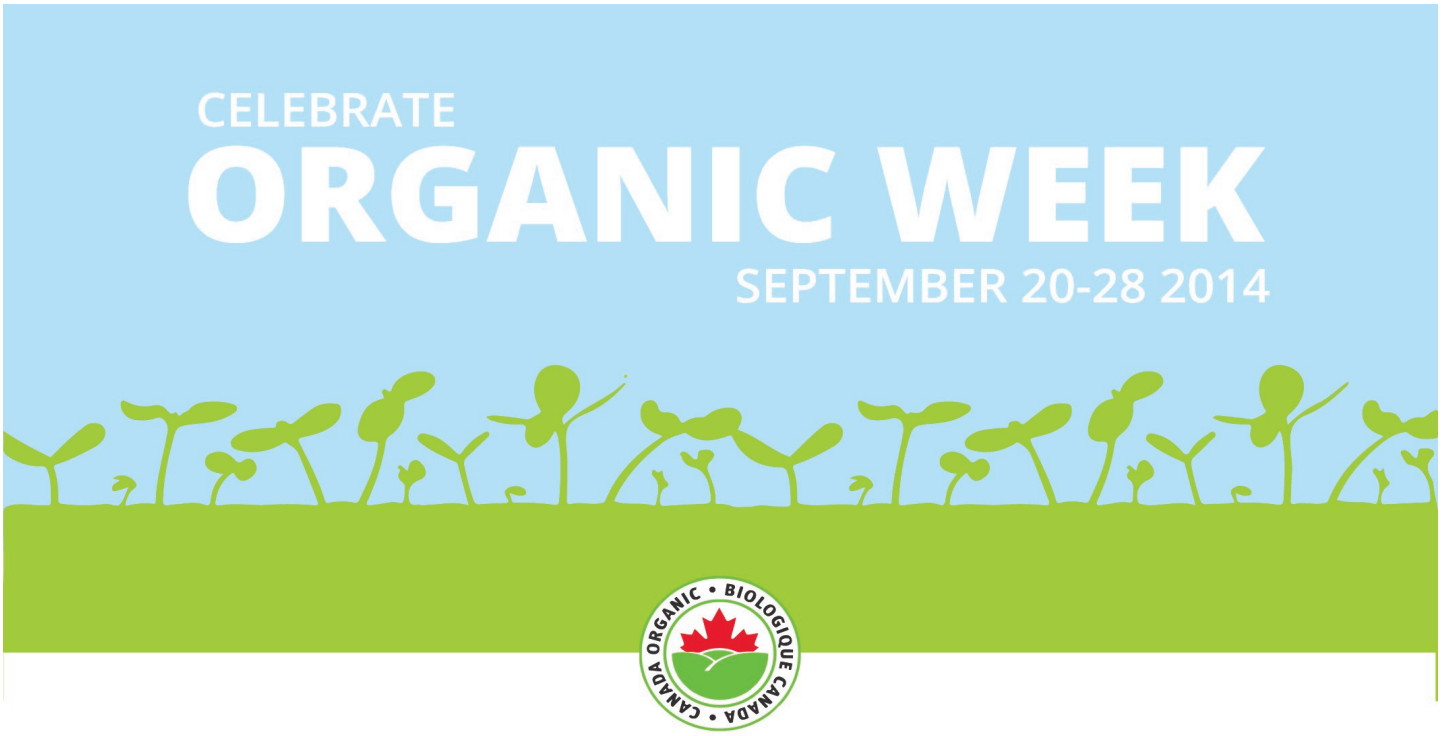
EFAO Eastern Region Farm Tour Series

Multiple dates and locations:

June 22: Heirloom Tomoato Production at Vicki's Veggies
July 14: Producing for Restaurants & Value Added at Mariposa Farm
July 24: Crop Rotation & Cover Crops at Patchwork Gardens
August 14: Integrating Livestock into Your Farm at Wise Acres
August 21: The Multi-Generational CSA at Covenant Farm

For more information on these and other EFAO tours, please visit the website at www.efao.ca/upcoming-events/.

Organic Week, September 20-28, 2014



For more information about Organic Week 2014, please visit the website at www.organicweek.ca.

Links to ON Organic Information & Staff Contacts

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Links to Organic Agriculture Information

Organic Council of Ontario (OCO)
http://www.organiccouncil.ca

Canadian Organic Growers (COG)
http://www.cog.ca

OMAF and MRA Organic Agriculture
http://www.ontario.ca/organic

Ecological Farmers of Ontario (EFO)
http://www.efao.ca

Organic Agricultural Centre of Canada http://www.oacc.info

FarmStart www.farmstart.ca

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