British Columbia

Organic Grower

ORGANIC FARMING + CLIMATE CHANGE

fire

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COABC

Certified Organic Associations of BC

In This Issue

Hay! Watch Out for Fires!

Meg Curtis tackles fire prevention for hay producers. *Read more on Page 8.*

Features

Selling to Retail and Wholesale?

Randy Hooper from Discovery Organics has tips for you on product, pricing, and packaging! *Read more on Page 24.*

BC Organic Grower

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Editor: Darcy Smith
Designer: Moss Dance

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editor@certifiedorganic.bc.ca

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COABC
202-3002 32nd Ave
Vernon, BC, V1T 2L7
Phone: 250-260-4429
Fax: 250-260-4436
office@certifiedorganic.bc.ca
certifiedorganic.bc.ca

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On the Cover: Wildfires in Cawston, BC approach nearby farms. Credit: Sara Dent
instagram.com/saradentfarmlove

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Editor's Note

Wildfires burning near Cawston, BC in the summer of 2018. Credit: Sara Dent (@saradentfarmlove)

By Darcy Smith

After a winter of extreme cold across the province, we're in for a similarly record-breaking hot summer—and, along with that, heightened risk of forest fires. With the memory of 2018's blazes scarcely faded, fire season is already in full swing. Speaking of setting records, in 2018, more than 2,100 fires burned through 1.35 million hectares of land. As we grow accustomed to the "new normal" of climate emergency, prevention and preparedness have become the name of the game—and as last year's fire season made apparent, farmers and ranchers, with their deep knowledge of the land, are instrumental in mitigating the damage of forest fires. Just recently, $500,000 of funding was announced for a targeted grazing program led by BC Cattlemen's Association.

Fire is a force to be reckoned with, as our Summer 2019 issue acknowledges. Last year we heard so many stories of farmers suffering long smoky days in field, or scrambling to rescue crops and livestock from spreading blazes—as if farming doesn't bring enough daily challenges! To learn more about how you can prepare for fire season, check out the on-farm fire safety guest spots from Climate Action Initiative (page 11) and AgSafeBC (page 12), full of practical tips and strategies to help you protect yourself and your business. Our Organic Story feature zooms out from visiting a single farm as Meagan Curtis gives us insight into the issue of neglected hay lands—and the increased fire risk they bring (page 8).

In Footnotes from the Field (page 20), Marjorie Harris takes us deep into the Anthropocene Era (yes, the planet is warming and it's bad), to explore what it means to manage plant health in a time of climate anxiety. Page 28 features a love letter to soil ("an elder", "a library", "a cathedral of evolutionary and cultural memory") as a key solution for climate change.

As the heat rises across BC, we look at all things warm. On page 16, Anna Helmer talks cosmic compost in her ongoing series on biodynamic farmer. As part of a drive to make research more available to organic farmers, we'll be featuring articles from Organic Science Magazine in upcoming issues, and we're kicking it off with a look at geothermal greenhouses (page 23). (Another great article about mustard crops as weed control didn't make the cut—mustard=spicy=fire?—but you can check it out in the original Organic Science Canada magazine!)

On page 24, Randy Hooper of Discovery Organics spills some retail trade secrets in the interest of opening doors for producers to get more BC products on grocery shelves. Speaking of retail, in our Ask an Expert column, Emma Holmes updates us on the Organic Certification Regulation (page 6).

If you have a story to tell about organic food and farming, please get in touch. Reach out with your thoughts, letters, and story ideas to editor@certifiedorganic.bc.ca—and be sure to visit us online at:

bcorganicgrower.ca

Wildfires consume the side of a mountain near Cawston, BC in the summer of 2018. Credit: Sara Dent (@saradentfarmlove)

COABC Summer Office Hours

Starting in July, the COABC office will be open from Monday to Thursday, 9 am to 4 pm. Please feel free to reach out by email at any time:

info@certifiedorganic.bc.ca.

Congratulations!

Big news at COABC—two new organic farmers-to-be are on the way! We're thrilled to congratulate Kristy Kruschel and Samantha Smith on their upcoming maternity leaves. Though they'll surely be missed around the office, we wish them both well and look forward to meeting the new arrivals.

That also means new faces around COABC: we're pleased to welcome Madeleine Haynes as temporary Accreditation Board Administrator!

Call for Photos

Do you have some great organic farming/production photos you'd like to share? A beautiful farm vista, mouth-watering produce, livestock or poultry, farming in action, or other images that showcase organics in British Columbia? We're looking for high-quality images to use in our e-news, social media posts, documents and publications.

Please send your shots to Stacey at communications@certifiedorganic.bc.ca along with the name of the photographer and some details about the image!

Save the Date! #BCOrganic2020

Be sure to mark your calendars—dates have been set for the 2020 BC Organic Conference. We're already looking forward to gathering with you to learn, share, celebrate BC's organic sector, and, most importantly, eat delicious organic food!

When: Feb 28–March 1, 2020
Where: Location TBD

Canadian Organic Standards Review

Public Comment Launching Soon!

The Technical Committee on Organic Agriculture held its last meeting Thursday May 16th, a three-hour teleconference during which some critical issues, such as parallel production, outdoor access for poultry, calculation of the percentage of organic ingredients in processed products composed of liquid and solid ingredients, and permitted substances in crop production, were discussed.

Launched in September 2018, the review process will now enter a new phase: the public comment period during which all stakeholders and the public will have the opportunity to issue comments on the proposed modifications to the Canadian Organic Standards. The OFC, the Chairs of the Working Groups, the secretaries and consultants involved in the process are now preparing two drafts of the CAN/CGSB-32.310 and CAN/CGSB-32.311 standards that include all the proposed modifications, one with and one without tracked changes.

Stay tuned! It will be your turn to comment!

About the review:

- Over 220 modifications were proposed under the review process and analyzed by the Working Groups.
- The WGs have participated in 85 teleconferences; their recommendations were submitted to the voting members of the Technical Committee.
- The public comment period will be launched in June; the TC has proposed to have a 90-day period instead of the usual 60-day period as it will be launched in the growing season when producers are very busy.
- At the end of the public comment period, all comments issued by the public will be analyzed by the Chairs of the WGs; they will assess if some issues are presented back to their WGs (i.e., when the comments are pertinent and were never considered in the previous round of teleconferences).
- The ballot will be held when all comments are addressed and when the final proposed modifications are inserted in the draft that will be circulated to the voting members of the TC. Each TC member votes privately, and returns the ballot by email to CGSB.
- If the vote is positive, the CGSB will have the standard process ratified by the National Standard of Canada, and the standard will be published (by November 2020).
- The operators have one year to comply with revised standards and implement the revised practices and inputs in their organic plan.

Agriculture and Agri-Food Canada is funding the review process, along with a study on funding mechanisms for the future funding of the maintenance and review of the Canadian Organic Standards that the OFC will share with the industry very soon! The required industry matching funding is covered by the in-kind contributions of the WG participants and the expenses incurred by the voting members of the TC who have attended the 2.5-day meeting held in March in Ottawa. But these funding resources are exhausted and ended March 31st. The OFC will launch a campaign to fund the other phases of the review process. More to come!

For more information about the review, please visit:

organicfederation.ca/2020-cos-review-launched

ORGANIC CERTIFICATION REGULATION

Radish microgreens. Credit: Moss Dance

By Emma Holmes

As many of you are aware, new Organic Certification Regulation came into effect in BC on September 1, 2018. The term "organic" is now a protected label within BC for agricultural products that have been produced or processed in BC and that can be assessed using the Canadian Organic Standard CAN/CGSB 32.310, 32.311 or 32.312.

Organic Certification Regulation is something the organic sector has been working towards for some time, and will significantly contribute to promoting and protecting consumer confidence in BC organic products.

What are the details?

The new regulation means that organic producers, processors, distributors, and others in the supply chain who use the 'organic" protected label are expected to be able to provide proof of up-to-date certification upon request by a Ministry of Agriculture enforcement officer. Violations under the regulation will result in legal repercussions that could include tickets being issued ($350 fine) or court prosecutions against the seller.

You can find more information on the new regulation on the Organic Food and Beverage Policies page of the BC Ministry of Agriculture website (gov.bc.ca/gov/content/

industry/agriculture-seafood/animals-and-crops/organic-food-and-beverages/organic-policy-update). This webpage includes a "Guidelines for BC's Organic Certification Regulation" document that provides specific examples of what activities organic certification is and is not required for.

How can I contribute to the strength of the BC Organic sector?

BC's Organic Certification Regulation is enforced on a complaint basis so if you know of a business that is marketing their agricultural products using the organic label, but does not have certification, please let AgriServiceBC know.

AgriService BC can be reached by phone (1-888-221-7141) or email (AgriServiceBC@gov.bc.ca).

All complaints are strictly confidential and no personal details will ever be shared with the party in question or anyone beyond the enforcement team. Contact details are requested when lodging a complaint so that the enforcement team can follow up and provide details on the outcome of the file.

COABC recently published an article on how to lodge complaint and the link can be found in their April 2019 ENews: certifiedorganic.bc.ca/infonews/kyi.php

How is it going so far?

The number of complaints were steady over the fall and winter and have been revving up in recent weeks. The Ministry enforcement team has been following up on all complaints promptly.

What we are seeing is that businesses are voluntarily complying with the regulation by removing organic claims from their products and marketing, and several are pursuing organic certification so they will be able to resume using the protected label organic in their marketing in the future. The goal of the regulation, to remove operators who are falsely marketing their products as organic from the marketplace, is being met.

Is there organic regulation in the rest of Canada?

Yes. Since 2009, federal regulations have required organic certification for any food or beverage products that bear an organic claim and cross a provincial or international border.

Strawberries.Credit: Moss Dance

In 2006, Quebec was the first province to adopt and enforce provincial organic regulation for products produced, processed, and marketed within their provincial borders. Manitoba, New Brunswick, and Nova Scotia followed suit in 2013, 2014, and 2015 respectively. BC's regulation came into effect on September 1, 2018 and on April 1, 2019 Alberta became the most recent province to adopt provincial organic regulation.

Questions?

Any questions or concerns about filing complaints or the Organic Certification Regulation in general can be directed to me at emma.holmes@gov.bc.ca or 250-241-2430.

Emma Holmes has a BSc in Sustainable Agriculture and an MSc in Soil Science, both from UBC. She farmed on Orcas Island and Salt Spring Island and is now the Organics Industry Specialist at the BC Ministry of Agriculture. She can be reached at:

Emma.Holmes@gov.bc.ca

HAY! There's a Fire!

Hay bale with bird. Credit: Fir0002/Flagstaffotos

By Meagan Curtis

During the first decades of the 20th century in rural Vancouver Island, horses were used for farm work and personal transportation. It seemed everyone had a horse of some kind. Horses co-harvested the hay and grain that would feed and warm them through a cold rainy winter after these crops were cut by scythe, raked into wind rows, and left for days to cure. The numerous hay fields surrounding us are remnants of this past work—two centuries of clearing and harvesting.

Although sometimes used for pasture, a hay field is a not a rangeland. It is not a fire-adapted grassland like a tallgrass or shortgrass prairie composed of native plants. These fields of forage were created with non-native plants—plants that are maintained, managed, seeded, cut, irrigated, and fertilized. These fields were essential to how people fed themselves and the livestock that were typically present on farms in the past. In 1871, an average farm in Canada had four pigs, seven head of cattle, and 33 acres of cropland. There were three times more horses on farms then compared to 2016. This meant that much less livestock feed and soil fertility came from off-farm sources.

Many smaller acreages of previously hayed or grazed fields are no longer harvested. Their grasses choke out any possible forest encroachment. Fir, hemlock, spruce, cedar, and understory brackens and ferns cannot re-occupy the spaces. As forest fires are projected to become more frequent and severe in Western Canada and the United States, unless maintained these fields are looking more and more like a patchwork of fire risk across the landscape. An ignited field can spread to barns and houses. Underutilized hay fields have become a question of emergency preparedness and fire safety.

On average, one to two million tonnes of hay and silage are cut each year, according to the B.C. Ministry of Agriculture. The 2011 Census of Agriculture found that 64% of B.C.'s total cropland was hay. At the same time, hay production totals are becoming increasingly variable as drought and unpredictable weather patterns continue. The BC Forage Council reported in 2011 that record precipitation during the growing season and a reduction in livestock demand produced an estimated hay surplus of 122,566 tonnes in the Bulkley-Nechako region. This surplus contrasts conditions in 2006, when widespread drought and reduced livestock numbers resulted in hay shortages throughout the Central Interior, and the reality for some last year, when hay production plummeted in parts of BC and Alberta and buyers faced a price increase from $80 to $200 a ton.

With this cost, some may be convinced to get rid of farm animals. If this occurs, a decrease in demand may result in the increased likelihood that more fields sit fallow. Oscil-

Wildfires near Cawston in 2018 at night. Credit: Sara Dent (@saradentfarmlove)

lating years of surpluses and shortages bring uncertainty and could result in a decreased willingness to participate in haying as a sure stream of income.

When a shortage arises, alternative supply possibilities within the region are not numerous and importing hay carries its own set of risks: the introduction of invasive species, the inability to secure a sufficient volume to match herd size, and/or an inability to source appropriate quality. Farmers can use some tools to help ensure sufficient hay production and reduce fire risk on their own farms. These include:

- rotational grazing
- utilizing different types of grass
- water storage and conservation
- mowing perimeters, field edges, and near farm buildings in the spring
- avoiding mowing in late summer when conditions are dry and there is risk of sparking

These suggestions are appropriate for those still engaged in haying, but irrelevant to those whose fields stay untouched. Encouraging the haying of abandoned fields, or at least their perimeters, is one idea that Farmer's Institutes and others have begun discussing within their communities.

This patchwork of abandoned fields is also symptomatic of a larger problem we face: the lack of working viable diverse small farms and the ongoing loss of a generation of farmers with more haying experience and equipment then the next generation can afford. Buying the equipment necessary for haying acres of land is estimated to cost $60,000 used and $130,000 new. As the average age of farmers increases and their farms are sold for millions, these fields are markers of our ever-declining food security. In the 1950s, Vancouver Island was estimated to produce 85% of its own food. Today we sit between 5-10%. Fields that have not been hayed for many years are rarely in good shape. Their gaps and bumps damage machines and the resulting feed may be of low quality. The economics of haying these fields are questionable, but so is the decision to leave them untouched and not confront why they are unused. As many pieces of haying equipment are retired with the generation that bought them, it appears time to discuss the future of our fields.

Thanks to DeLisa Lewis, Jerry Emblem, and the BC Ministry of Agriculture for their insights.

Meagan Curtis is a member of the BC Eco Seed Coop in Port Alberni, on Instagram @mtjoanfarm. Inspired by EF Schumacher, her farm has three goals: health, beauty, and permanence—productivity is attained as a by-product.

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10 ACTIONS TO PREPARE FOR WILDFIRE SEASON

Credit: Province of BC.

By BC Agriculture & Food Climate Action Initiative

The impacts of climate change include hotter and drier summers, which means that wildfires are expected to become more frequent and intense. But ranchers can take steps to prepare for an emergency wildfire event and reduce risks to their operation.

The following actions are extracted from the Workbook: Wildfire Preparedness and Mitigation Plan and the Guide to Completing the Workbook, resources that were developed as part of the Regional Adaptation Program delivered by the BC Agriculture & Food Climate Action Initiative (CAI).

Funding to develop the Guide and Workbook was provided in part by the Governments of Canada and British Columbia through the Canadian Agricultural Partnership as part of the Regional Adaptation Program.

1. Complete your farm/ranch wildfire preparedness plan

Go to BCAgClimateAction.ca/wildfire and download the Workbook and the Guide.

The Workbook is available as fillable PDF so you can save and edit your plan as needed. The Guide walks you through detailed action planning for before, during and after a wildfire.

2. Prepare an agriculture operation map

Guide p. 8-14

Maps are an essential step for wildfire preparedness, response and recovery and are especially useful for engaging with emergency services personnel.

Continued on page 29...

WILDFIRE PREVENTION AND FARM SAFETY

By Wendy Bennett, CRSP, Executive Director, AgSafeBC

It's only been two years since one of British Columbia's most devastating wildfire seasons. In 2017 over 1.2 million hectares were destroyed by 1,353 wildfires in the Cariboo, Kamloops, southeast and coastal regions. (i) According to recent forecasts, this summer could be another long, hot, and dry one.

The effects of wildfires on the agricultural community are devastating. Recognizing potential fire hazards, knowing how to reduce the risk, and planning for a possible emergency will help you reduce the possibility of damage to your property or injury to you or your workers.

CAUSES

Approximately half of wildfires in BC are caused by humans and an out of control farm fire could spark a wildfire. The source of many farm fires goes undetermined due to significant damage, but there are three general causal categories for farm fires. (ii)

MECHANICAL/ELECTRICAL

- Short circuit or ground fault in electrical equipment.
- Failure of built-in automatic controls in mechanical equipment or systems.
- Improper use of extension cords.

MISUSE OF IGNITION SOURCE OR IGNITING EQUIPMENT

- Improperly discarded smoker's material and smoking where flammable vapours are present.
- Ignition source left unattended.

DESIGN, CONSTRUCTION, OR MAINTENANCE DEFICIENCY

- Improperly constructed building, feature or system.
- Improperly installed heating appliance too close to combustible building features.
- Improper facility maintenance (e.g. failure to remove accumulation of combustible dust or debris).
- Faulty product design causes a fire even when the product is installed and used correctly.

MITIGATION

Those involved in agriculture can take measures to prevent or significantly reduce the chances of a large-scale fire occuring. Start by installing a detection system and test it regularly.

Controlling your environment is important. Maintain a well cleaned workplace free of flammable materials. Collect and remove generated waste, including solids, semi-solids and liquids.

Credit: Wendy Bennett, CRSP Executive Director AgSafeBC

Clearing vegetation and flammable debris away from fences and structures by at least 10 metres will help mitigate the risk as well. Make sure to be in compliance with all regulations and acts pertaining to the clearing of standing trees larger than 6 inches in diameter.

Compliance also applies to open burning. In B.C. you must contact the BC Wildfire Service to obtain a Burn Registration number before doing any open burns.

When using equipment or tools, ensure that the equipment is bonded or grounded properly and tools don't give off sparks.

Check the Government of BC Wildfire Status website regularly to report or monitor the status of fires in your area.

PREPAREDNESS

Planning is essential for emergency preparedness. Begin by doing a risk assessment of the worksite(s) and develop a realistic Emergency Response Plan (ERP). Your ERP should include the following:

- Map of your property, including Crown and lease land.
- List of your workers and their locations.
- List of hazardous materials and a safety data sheet of all liquid and spray chemicals and their locations.

Establish and rehearse pre-determined escape routes as well as livestock evacuation procedures. Check-in protocols are

WILDFIRE SMOKE

Frequently Asked Questions

Wildfire smoke over Kelowna, BC. Credit: Jack Borno

Excerpted from WorkSafeBC

What is in wildfire smoke?

Wildfire smoke is a complex mixture of particles and gases containing hundreds of chemicals. The smoke contains large amounts of fine particulate matter, as well as gases such as carbon monoxide, carbon dioxide, and nitrogen oxides. Depending on the type of materials burned, the smoke may also contain sulfur oxides, volatile organic compounds, and other compounds such as hydrocarbons and formaldehyde that are known to be carcinogenic. These components can vary greatly over time, from fire to fire, and from area to area within a fire zone.

What are the potential health effects of wildfire smoke?

There are a number of potential health effects associated with wildfire smoke. Inhaling fine particles of smoke has been linked with the aggravation of pre-existing respiratory and cardiovascular disease.

Workers exposed to wildfire smoke may raise concerns about long-term health effects, such as an increased risk of cancer or other chronic health problems. In general, however, the long-term health risks from short-term exposure to low or moderate levels of smoke during a wildfire event are considered to be quite low.

The potential for adverse health effects from wildfire smoke depends on the level and duration of exposure, age of the workers, individual susceptibility, and other factors. For these reasons, not everyone exposed to smoke will be affected in the same way.

What are some common symptoms of smoke exposure?

Breathing in smoke can cause irritation of the eyes, nose, and throat. It can also cause headaches and worsening of allergies. In healthy workers exposed to smoke for short periods of time, symptoms are likely to be temporary and will resolve when the smoke clears.

Workers with lung diseases such as asthma or chronic obstructive pulmonary disease (COPD) — as well as workers with other chronic diseases, pregnant women, and older adults — are likely to experience more serious or acute symptoms. These symptoms can include shortness of breath, persistent coughing, wheezing, chest tightness, and increased mucous production.

Be aware of other health issues related to wildfires, such as heat stress or heat exhaustion, and the need for workers to stay hydrated by drinking lots of water. In addition, remind workers of other safety hazards associated with wildfire smoke, such as reduced visibility.

My workers work outside. How can I limit their exposure to the smoke?

The primary approach to minimize the health risks of wildfire smoke is to reduce contact with the smoke as much as possible.

If the nature of your work requires workers to be outside, look for ways to reduce workers' level of physical activity when possible, since physical exertion can increase air intake as much as 20 times.

Consider the direction of the smoke and follow the air quality advisories in the area to schedule the work accordingly. For example, look for ways to relocate work to less smoky areas or reschedule it until the air quality improves. Keep in mind that some workers may be more susceptible to health effects from the smoke and may need additional measures to reduce their exposure.

bit.ly/2HqoKgr

Credit: Ajmint

SMALL SPACES

In an enclosed space, even a small fire can become uncontrollable very quickly. To prevent a fire or explosion in an enclosed space, isolate any source of power or flow of materials so that it cannot possibly enter the space. The isolation method must be locked in place to be certain that it cannot be inadvertently removed or fail in some other way.

important at all times, more so during an emergency. The worker location list along with a check-in process or buddy system will help you locate and identify any missing worker, visitor, or family member on your property.

RESPONSE

Should you have to address fire on your property, implement your Emergency Response Plan. Retrieve your map and locate your workers, family members and visitors on site and instruct them to follow the ERP.

Check the area. If flammable products are present leave immediately and alert firefighters. Determine whether electricity needs to be turned off and remove any extra vehicles or machinery from the area around the fire to clear space for fire service equipment.

If you have to leave the property, check DriveBC.ca or tune into your local radio station for road closures and updates.

Dealing with a large-scale emergency often requires assistance from others. If you are part of a community emergency response program follow the plan.

For more information about AgSafe services or agriculture-related workplace safety call 1-877-533-1789 or visit:

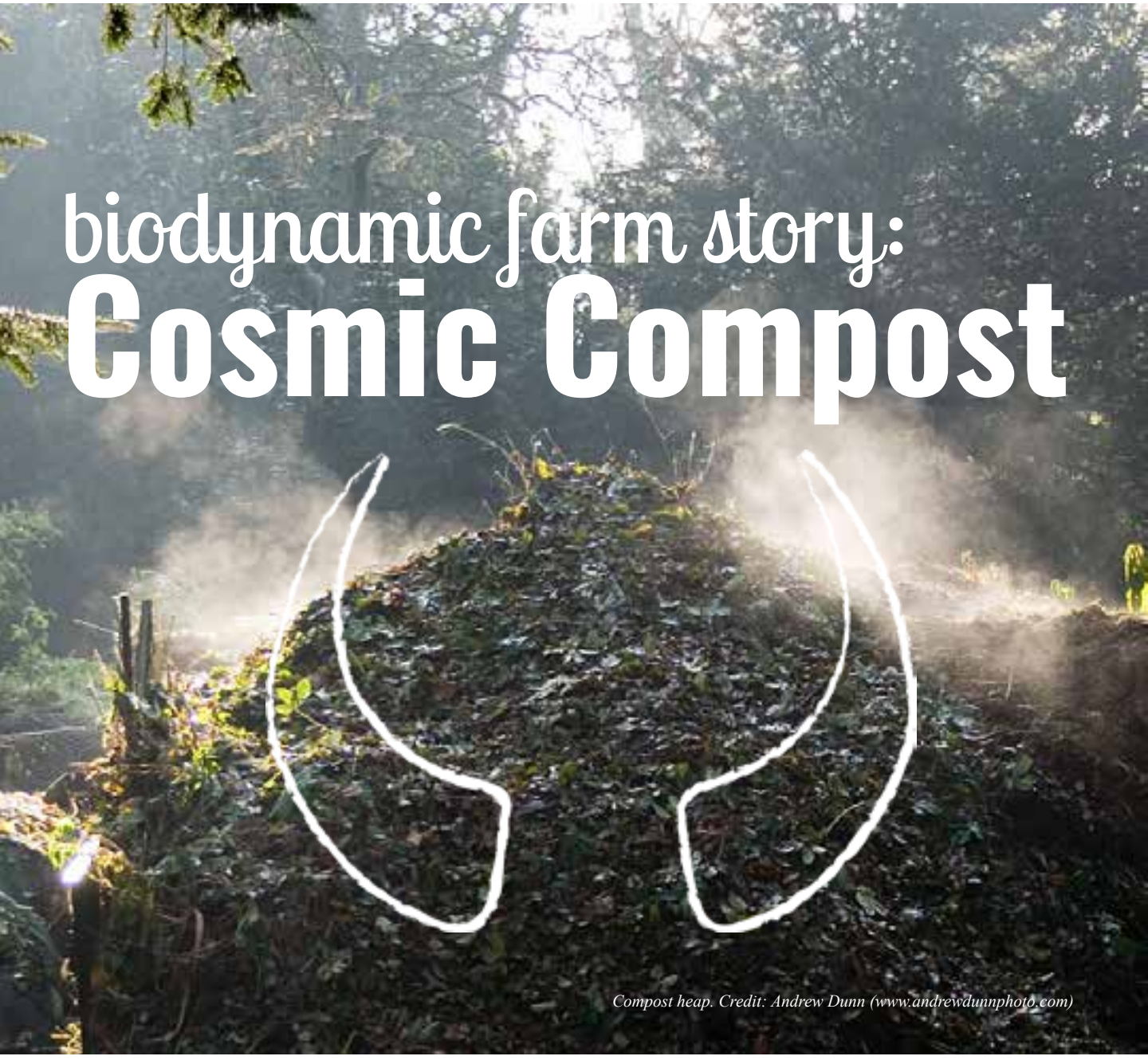
AgSafeBC.ca

AgSafe is the non-profit health and safety association for B.C.'s agricultural producers. The organization provides site-specific consultation, on-site safety education, and online workplace safety resources and materials including Fire Safety Inspection Check Lists and an Agriculture Wildfire Plan template.

Resources:

Government of British Columbia Wildfire Services
www2.gov.bc.ca/gov/content/safety/wildfire-status

BC Fire Smart
FireSmartBC.ca



biodynamic farm story: Cosmic Compost

Compost heap. Credit: Andrew Dunn (www.andrewdunnphoto.com)

By Anna Helmer

Hello and welcome once again to The Biodynamic Farming Experience for the Celestially-Challenged: a partly-formed, poorly-articulated, and over-hyphenated chronical of a particular journey in which a woman-farmer-of-a-certain-age-and-experience (me) delves into the theory and, more importantly, the practice of Biodynamic farming in search of fun and the future of farming.

Rambling along here, aren't I? I do that when I am not sure of the destination. And now that I am in full digression, I can see that "journey" is not the right word as it would suggest both a destination and a plan, neither of which I can guarantee. Voyage of discovery? Too fancy. Is it a process? Nope. I don't think that sounds like fun. Compost heap. I think it might be a compost heap: piling up ideas, layering with experience, mixing up theories (some quite junky), letting it sit. For absolute certain something good is going to come of it, but it might take a while depending on how raw the material is.

The bottom layer in my compost pile of cosmic cognitive sentience (how about that!) is a cover-to-cover reading of the original lectures (the Biodynamic farming origin story) delivered by Dr. Rudolph Steiner. I am just about done. I remain perplexed most of the time, although I experience (sadly random and rare) flashes of triumph when I realize I have managed to grasp a concept or follow an argument, very quickly snuffed out usually by the next paragraph. I persist however, because I find it fascinating.

> “Is Biodynamics fun? Is it the future of farming? I remain firm in my conviction that it might be both.”

The Biodynamic practice of filling cow horns for preparation of preparation 500 or “horn dung.”
Credit: Sugar Pond (www.flickr.com/people/88927846@N00)

In the last article I mentioned Biodynamic Preparation 500, which we have been using for years on the farm. It’s easy to make. You just stuff a cow horn full of fresh manure and bury it a foot or two down in the soil for the winter. In the early summer, when dug up, the manure has transformed into a delightfully hummus-y, sweetly-smelling substance which is incorporated into water and sprinkled about the fields and gardens. Steiner manages to explain why the use of a cow horn is necessary, but I can’t. The point though, is to avail the farm of the powerful forces of the universe.

Well the thing of it is, I have discovered that BD 500 works not just on the crops and soil: it works on people too. If you are not picking yourself up off the floor after collapsing there in a dead faint of amazement, I have not expressed myself well. This reflects a problem with the writing, not with Biodynamics. You see, I myself have been made available to believe that the universe has an influence on the health of the farm because I have been using the Biodynamic Preparation 500. Probably it’s what’s made the lectures readable and fascinating too. I did try a decade or so ago but there was no joy.

Another batch of Biodynamic Preparation 500: cow horns neatly lined up at Helmers Organic Farm. Credit: Helmers Organic Farm

I realize in fact, that it's taken close to 20 years of using the preparation for me to get to this stage. I hope it doesn't take everyone else that long to feel its affects. Steiner seemed to think about four years should do it.

To return to the point of this exercise: is Biodynamics fun? Is it the future of farming? I remain firm in my conviction that it might be both. It is certainly more fun than the organic certification process, which I find has gotten a little dry. It's necessary of course, if we are keen to relieve certain large industry leaders of their self-appointed mantle of agricultural way-finders. It's obligatory, if we want to sell to people who feel the same way we do.

Practicing biodynamic farming, while still offering the certification experience, brings some serious, additional motivation. I count inspiration, wonder, amazement, incredulity, reality-checks, positive feedback from customers, and tantalizing experiences of powerful forces among the benefits of the practice. Oh, and increasing yields of very tasty produce. Lovely things to add to a compost heap of galactic oomph. I think I am going to be a better farmer because of it. Certainly, the farm is better because of it.
Could Biodynamics be the future of farming in general? There are snags. One of them has got to be that it can get a little bogged down in discussion, which I would like to flag as one of the biggest hinderances to farm productivity. A talking farmer is very often not a working farmer.

Another issue is this insistence on involving the position of the sun and the moon in relation to the stars and planets when making farming decisions. People like me, whose astrological understandings end even before the horoscopes page, are simply going to switch off when this topic arises. People who like a little more conventional science in their lives will also be left wanting, and very little apology is made for that. These are difficult aspects to accept, and in my case required 20 years of using BD 500 to get over.

Cynically, I would also suggest that the fact that Biodynamic farming does not require much in the way of support from the agricultural industry is a close-to-fatal flaw. Apart from the odd tractor, a few implements, and some cover-crop seed, Biodynamic farmers spend very little in the

mainstream agricultural system. There is simply no need. Thus, there will be no corporate champion, with a big marketing budget, to help turn heads and change minds.

So, as far as the future goes, Biodynamic farming can be hazardously non-productive, bizarrely off-putting, and doesn't contribute to the bottom line of the world's largest companies. This is not promising...or is it?

It's May, it's go-time, and theoretical considerations on fun and the future of farming may not strike quite the right tone at your place just now. I completely understand. It would not hurt in the least however, since you have read this far, to throw a little Biodynamic 500 around as you carry on with the business of farming. At the very least, your soil and plants can get busy working with the infinite energy of the universe. You'll get there too, although perhaps that doesn't matter as much.

Anna Helmer farms with her family and friends in the Pemberton Valley and recently hosted a farm open house that could have gone really badly, but didn't.

Advancing Plant Health in the THE ANTHROPOCENE EPOCH

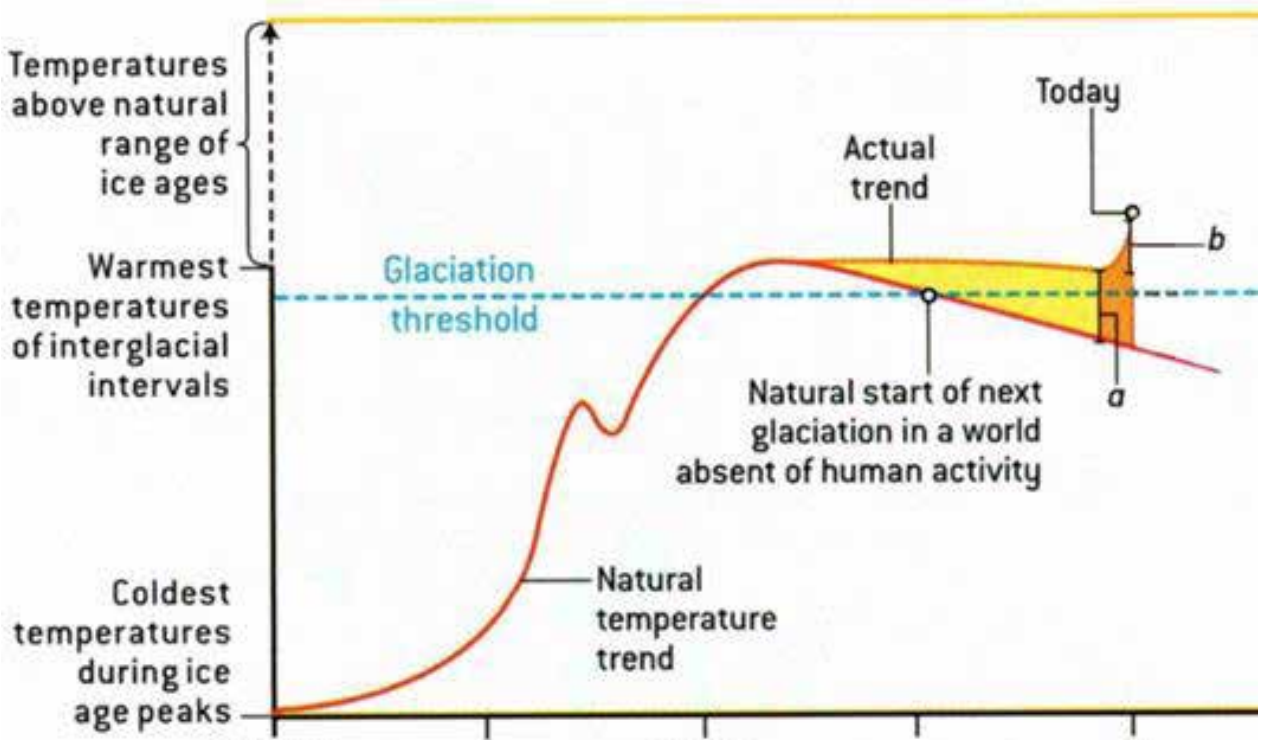


Figure 1: Source: Dr. Dan Britt: Orbits and Ice Ages 2018. Edited to indicate the beginning of agriculture.

By Marjorie Harris BSc, IOIA V.O.

We are in the Anthropocene Epoch.

Although the term Anthropocene Epoch, or the Human Epoch, has not yet received official approval as a recognized subdivision of geological time, in common jargon it refers to a new time epoch where human activities significantly impact and shift Earth's geology and ecosystems. This includes climate changes due to the advent of agriculture, deforestation, and earthworm expansion, resulting in the increased release of carbon dioxide and greenhouse gases into the atmosphere.

Small but Mighty

In addition to agriculture contributing to deforestation, it also promoted the dominance and spread of earthworm populations. A study in the journal Nature Climate Change reports that earthworms are small but mighty in their impact on the climate. A meta-analysis of previous studies suggests the worms may actually increase soil outputs of two key greenhouse gases, carbon dioxide and nitrous oxide. The study found that the presence of earthworms appears to increase soil outputs of CO2 by 33 percent and of nitrous oxide by 42 percent, demonstrating the essential role worms exert in determining the greenhouse gas bal-

CAN/GSB-32.310-2015: Ammended March 2018

5.4.1 *The main objective of the soil fertility and crop nutrient management program shall be to establish and maintain a fertile soil using practices that maintain or increase soil humus levels, that promote an optimum balance and supply of nutrients, and that stimulate biological activity within the soil.*

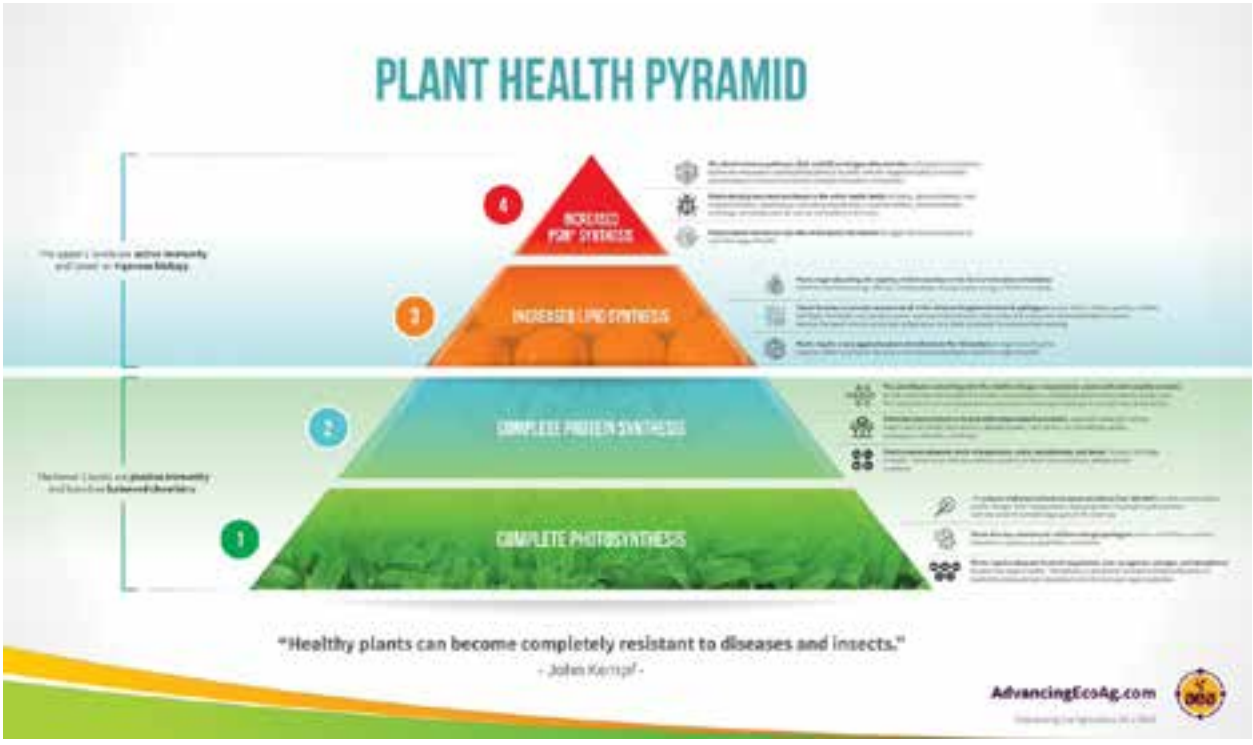


Figure 2: Source John Kempf, Advancing Eco Agriculture

ances of soils globally. Although earthworms are largely beneficial to soil fertility, they do increase net soil greenhouse gas emissions and that influence is expected to increase in the decades to come.

Decent into Glaciation Triggered by Earth's Orbital Variations

Milutin Milankovitch, a Serbian Mathematics professor, theorized and then proved that Earth's periodic glaciations are triggered by variations in Earth's orbit. Milankovitch calculated the cyclical changes in climate based only on Earth's orbital variation in relationship to the Sun caused by the additive effects of Orbital Eccentricity (100,000 year cycle), Axial Tilt (41,000 year cycle), and Precession (23,000 year cycle). The results demonstrated that over the last million years the climate has been varying between long glacial periods and short warming periods creating a cyclical 25% temperature variation at 65° North over the 100,000 year Milankovitch cycle.

A leading expert in Climate Change, Dr. Dan Britt, Pegasus Professor of Astronomy and Planetary Sciences at the Department of Physics, University of Central Florida, has graphed out (Figure 1) the temperature divergence attributed to the beginning of the Anthropocene Epoch, starting 10,000+ years ago with the advent of agriculture, deforestation, and earthworm expansion and leading up to the 20th century with fossil fuel consumption. The graph in Figure 1 shows the Milanovitch prediction for a cooling trend heading toward a glaciation period. The diverging lines indicate the actual temperatures (trending upwards) versus the prediction (trending downwards). Dr. Britt spent part of his scientific career studying ancient ice cores to determine temperature conditions and can attest to the results he presents in his lectures and publications.

The Plant Health Pyramid

Fortunately, while agriculture, deforestation, and earthworms were releasing the first 50 percent of the atmosphere's greenhouse gases, farmers and scientists were making advances in understanding the promoters of plant, soil, and ecosystem health.

An example of a leading advancer of plant and soil health is John Kempf and his Plant Health Pyramid method of crop production. John started the "Advancing Eco Agriculture" website as a platform to share plant health knowledge

and it is worth checking out (https://www.advancingecoag.com/). Kempf based his plant health approach on ideas put forward in a book written by Francis Chaboussou, *Healthy Crops: A New Agricultural Revolution*, published in 2005. Chaboussou proposes a theory of plant health that he calls 'Trophobiosis'. The foundation concept is that insects and diseases are unable to use food sources comprised of complete proteins and carbohydrates.

According to John Kempf, "the degree of plant health and immunity is based on a plant's ability to form structurally complete compounds such as carbohydrates and proteins. Complete carbohydrates, proteins, and lipids are formed by healthy plants with a fully functional enzyme system, which is dependent on trace mineral enzyme cofactors." In order for plants to form complete compounds they need certain micronutrients along with environmental factors.

Here is a thumbnail sketch description of John Kempf's Plant Health Pyramid (also see Figure 2):

Phase #1: Complete Photosynthesis

Complete photosynthesis is the foundation of plant health and growth. As the plant harnesses the sun's energy into sugars, the first sugars to form are simple monosaccharides. As the plant secures more resources they can produce complex sugars such as cellulose, pectin, and starches, and the plants become more resistant to soil born pathogens. John's experience shows that soil pathogens decrease as a problem when the plants are fully and actively photosynthesizing.

Phase #2: Complete Protein Synthesis

During phase 2 the plant translocates up to 70% of energy production in the form of sugars to the roots and the surrounding rhizosphere microbial and fungal communities. In exchange for plant sugars the rhizosphere communities deliver essential trace minerals and nutrients from the soil that the plant uses to make enzyme cofactors that are then used in the manufacture of complete carbohydrates and proteins.

If the plant does not have access to these essential trace minerals it cannot make the catalytic enzymes that change single amino acids into complete proteins. Kempf says that insects target plants that have lots of free amino acids (incomplete proteins), because they have simple digestive systems. If plants have been able to transform the amino acids into complete proteins then they are not susceptible to insects with simple digestive systems such as whiteflies, cabbage loopers, corn earworm, alfalfa weevil, or tomato hornworm, to name a few.

Phase #3: Increased Lipid Synthesis

Most conventional crops do not develop past phase 2 development. This where providing the essential trace mineral needs of the plant pays off in the development of increased immunity. By now the plant has enough energy production that sugars can be converted to fats (lipids) and used to make stronger cell membranes. Through Kempf's field experience it appears that plants with higher lipid content are more resistant to airborne pathogens such as powdery mildews, rust, blights, and more.

Phase #4: Increased Secondary Metabolites (Protective Polyphenols)

As the plant continues to develop under optimum trace mineral conditions, the sugars continue to convert to fats, which can then be modified into complex oil chains called polyphenols. These complex polyphenol chains are the protective essential oils, which include terpenoids, bioflavinods, carotenoids, tannins, and more. At this level of immunity with polyphenol production, plants can resist insects with more complex digestive systems such as beetles. The polyphenols also possess anti-fungal and anti-bacterial properties.

Lipids are also exuded through the roots into the rhizosphere. The soil rhizosphere fungi uses these lipids to form the macro molecules of soil stabilizing humic substances. The formation of humic substances in turn increases the bioavailability of trace minerals and nutrients from the soil to the plants, and optimum soil and plant health balance has been achieved.

In the Anthropcene Epoch, advances in understanding plant and soil nutrition are helping to hone the agricultural techniques required for optimum biomimicry practices to enhance soil and plant and health. Here's a cheer for "Healthy Soil, Healthy Plants, and Healthy People" as we continue to manage food production wisely in the Age of Discovery in the Human Epoch.

Marjorie Harris, BSc, IOIA VO and Organophyte.

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VENTING PROBLEMS?
How Geothermal Systems May Help Organic Greenhouse Management

Geothermal cooling and heat exchangers in an experimental greenhouse at Serres Jardin Nature. Credit: Organic Science Cluster.

This article originally appeared in Organic Science Canada magazine, Issue 1, 2018, as part of Organic Science Cluster II (OSCII), a national research and development endeavour led by the Organic Federation of Canada and the Organic Agriculture Centre of Canada at Dalhousie University OSCII with funding provided by Agriculture and Agri-Food Canada and by over 65 organic sector partners. We are thrilled to make this research available and accessible to organic farmers in the BC Organic Grower.

Regulating the greenhouse environment (e.g. humidity, carbon dioxide (CO2) levels, temperature) while maintaining optimal growth conditions is a constant challenge for greenhouse producers. This project explores the use of geothermal and heat exchanger systems to provide better climate control in commercial greenhouses, optimize productivity, and reduce heating costs.

Complete climate control in greenhouses is difficult and complex: humidity, CO2 levels, and temperature are all things needed to create optimal growing environments. Canada's seasonal changes in temperature present an additional difficulty as cooling measures are needed in the summer months, and heating is required in the winter. Many northern greenhouses reduce heat in the summer through natural ventilation systems. Vents or windows in the greenhouses rely on wind and thermal buoyancy to move air, instead of a powered fan. However, natural ventilation can increase heating costs by up to 10%, and deplete CO2 levels necessary for ideal growth conditions. Therefore, many ventilated greenhouses incur extra costs by needing to provide supplemental CO2.

Building on previous knowledge

Geothermal cooling systems and heat exchangers may be a way to reduce heating costs, and dehumidify greenhouses without natural ventilation. Geothermal heat pumps work by using seasonal thermal energy stores. The abundant heat created in the summer can be removed from overly hot greenhouses, and stored in a thermal bank in the soil, reducing the need to ventilate and loose crucial CO2 levels. Organic Science Cluster I data also showed that water pumped from a high ground water table can dehumidify greenhouses; however, a more water efficient method is needed for larger scale, commercial greenhouses.

Continued on page 30...

PRODUCT, PRICE & PACKAGING

How BC Producers Can Get Competitive in the Marketplace

PHOTOS: This page, from top: Organic Okanagan peaches, red chard, and cherry tomatoes. Facing page: BC organic garlic, lacinato kale, and BC Brussels Sprouts. Credit: Discovery Organics.

What price do I charge? What can I grow to make money? ... and other questions.

By Randy Hooper

This piece is really dedicated to every fruit and vegetable grower in BC who is producing for their own sales at market, to retailers, or sales to wholesalers.

There is a premium to be paid for supporting BC producers, and most retailers expect to pay more because they want to support you, as do their shoppers. There is also a premium to charge for quality, which I will discuss later. Most farmers (fruit and vegetables—big and small) in the US charge what the market will bear. Prices change daily. Often a chance frost or chance rain can impact pricing substantially. Some volatile commodities, broccoli for example, can literally double in price in two days. If unsure, any grower in BC can set up with us to receive a copy of our twice weekly price list, which is a pretty good guide to what the actual market prices are at the wholesale level, in your region, because there is no reason any grower in BC should be selling produce cheaper to wholesalers like us, or direct to retailers, than we would have to pay in the States. Profit isn't an ugly word—it's what keeps farmers farming!

> *"We, and the retailers we sell to, are not necessarily enticed with low pricing—they are enticed with quality, consistency, and grower recognition."*

As I'm writing this in mid-May, California grown Napa Cabbage is selling for well over $100 a box. They had a brutal record cold and wet spring in California and there is limited supply. Yet a BC grower may send out a price list tomorrow with Napa on it for $40—because that's what they charged last year. That wouldn't happen south of the border, and shouldn't here, and they are walking away from $60 on every box!

There is also a price range on every product—growers with the best quality can charge more, and pricing isn't as important to retailers as other factors. Retailers are willing to pay more if they know they are going to sell every bunch of kale or head of lettuce in the box, especially when prices are high.

Do not take offense—what I am about to say may be heartbreaking for you, and it certainly is for us—considering our roots—but in the middle of August, when we have a choice of many BC growers to buy kale from, we also buy kale from one farm in Washington State, which is often 30% of our sales and the price is generally speaking 30% higher. Why? Because we have large customers in Western Canada who want that brand, and will pay that much extra simply because the bunches are big, have great labelling, and every bunch sells through—it's all about quality and shelf-life. The same in the winter—we can buy kale from a plethora of California growers, but our customers hands-down want kale from one ranch deep in Mexico—again because of quality. (That grower removes all the older low-

Oyster mushrooms from Mushroom Kingdom in Abbotsford. Credit: Discovery Organics.

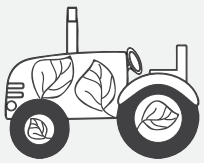
er leaves a day before harvest. Every bunch is inspected before being hydro-cooled under a shade roof, in the field, before boxing. It's off the field as quickly as possible. Pallets go through a pressure cooler and are then iced, and on their way to us 6 hours later. Every step of that process equals days and days of extra shelf life.)

The other side of this equation is the need to charge properly. Climate change is wreaking havoc on growers around the world and increasing production costs and higher risks will continue to force markets up for fruit and vegetables. What we hate to see is growers trying to get more sales by underpricing. Grower A is listing lettuce for $30, Grower B needs to move more, drops price to $28, Grower C, worried as well about losing some sales traction, goes to $25, which has now changed our local market price by 15% in one week, and may be $10-15 cheaper than imported product. We, and the retailers we sell to, are not necessarily enticed with low pricing—they are enticed with quality, consistency, and grower recognition.

So, let's look at that. Unlike everything else sold in the world, the produce department in a retail store does not sell brand. Consumers buy fruit and vegetables based on what they look like first, and will rarely balk at the price unless it's just too stupidly high. Where brand does matter is when your box of pears or leeks is in the hands of the produce people in the store. They are the folks who see what product is coming out of which box, and if they are impressed by the visual, and more importantly, the shelf-life, then they will purposely ask for that brand week after week. So if you are proud of your fruit or vegetables, then go all out—use a great box with a colourful label and give them something to remember (and re-order).

Randy's Tips for Organic Producers - Summary

1. Check current price lists before pricing your product — you may be able to charge more!
2. If you expect a bumper crop, contact retailers and wholesalers in advance to plan ahead
3. Aim for quality and consistency of product
4. Plan to grow what retailers are willing to buy



The market for organics is large and growing, yet consumers walk into a major supermarket chain or big box store, here in BC, and will see scant local vegetables. Buyers for corporate chains will not bend on industry specs. They want zucchini that's packed to Medium. Fancy or X Fancy sizing in an industry standard 22# box, and with a PLU sticker on each one. And while many of you may be dismissing this idea, BC growers have immense growth

opportunities to expand into bigger markets, corporate supermarkets, big box stores and export to the US, especially with the Canadian dollar relegated to the basement. This goes back to what I said earlier about quality. Growers who can not only grow well, but pack in the right conditions, cool to the right temperature, label with PLU or UPC stickers, use the right standardized size and dimension of box, and meet standard industry specs, will see better sales and, I dare say, better prices.

Most growers are pretty good at communicating to us what they have available to harvest and sell. Fewer are good at telling us when they are going to hit their harvest sweet spot, or if they are expecting a huge flush of peppers or early peaches. Waiting until the product is piling up in a cooler is not a good time to beg for mercy and drop pricing. Larger retailers plan ads, specials, exclusives etc. at least 10 days out. If you are worried you're going to have an upcoming bumper crop, then we need to know that early enough that we can try to place it. Moving extra volume with pre-committed ads or specials is a far better choice than simply discounting to see if you can eke out extra sales—all that manifests, again, is to lower the local market price, and once others growing the same crop feel the need to match your low price, you have now involuntarily vacuumed out a lot of profit for you and your fellow farmers.

There have been major strides in the past 10 years on extending shelf life of fruit and vegetables, mostly around MAP (Modified Atmosphere Packaging.) Special plastics that allow dormant fruit and vegetables to actually control their own environment may seem like magic, and I don't understand the science, but those bags allow fruit and vegetables do what apple growers do in the Interior with CA rooms: control the atmosphere. We specifically ask for some products we import to be packed in MAP bags, again, all in the name of quality and extended shelf life for margin-weary retailers who hate throwing produce out. A few years ago, I was talking about this subject at a COABC conference in Vernon, and placed a bunch of chard on each table in the room. I had personally harvested that chard nearly 7 weeks earlier at a farm we were operating in Sonora, Mexico. The post-harvest handling was top notch, and packed in MAP bags it was ready to stay healthy, hearty and dormant for a long time.

BC growers already pack and ship cherries in PeakFresh bags. BC blueberry growers can now ship blueberries by sea to the Orient in FreshXtend bags, giving them up to a month of shelf life. Spending the extra 30c. per case for the bag doesn't just guarantee you a higher rate of good arrivals at the wholesale dock, retailers also see that you care enough about your brand and reputation to spend a bit of money to keep your particular produce in great shape.
We are often asked that timeless question of what to grow? My response is always that you should be planning around what retailers are willing to buy, and not what looks cool in seed catalogues. Retailer stores don't have unlimited space, as you may have noticed, and are not going to take yams off the shelf to make room for those stunning Japanese Green Eggplant you decided might be a new "thing." The smaller the store, the smaller the selection, and what they need is a locally grown version of what they already sell. Instead of being the next BC grower to be competing in the grape tomato or lettuce markets, there is a wide range of product that is consistently under-supplied in BC. Peas and beans aren't that hard to grow—as one of the worst farmers out there I've met, I've still pulled both of those off, yet both are significantly under-supplied. Broccoli? Sprouting Broccolini? Cauliflower? All doable and rarely available! The advent of MAP bags has made icing irrelevant for local or even export brassica sales!

Please talk to our buyers—they are the ones buying in California for crops we could and should be growing in BC, at good pricing and with lots of available market...and have a great 2019 season!

Randy Hooper and partner Annie Moss own and operate Discovery Organics in Vancouver. They and their management team have devoted the last 20 + years developing the strength of the BC Organic fruit and vegetable market sector.

Soil is the Key to Our Planet's History (and Future)

Roots. Credit: XoMEoX (CC)

By Derek Lynch, Dalhousie Univeristy

THE CONVERSATION

This article originally appeared on theconversation.com (https://theconversation.com/soil-is-the-key-to-our-planets-history-and-future-116330) on May 20, 2019.

The English language is full of phrases—from "bogged down" to "feet of clay" and "dirt cheap"—that reflect how we appreciate the diversity of soil, but value it little.

Soil retains a special place in many cultures. In Ireland, where I grew up, patches of what is known as "hungry ground" are thought to retain the memory of the Irish Famine in the 1800s, and you are advised to carry bread while you cross them. To poet Patrick Kavanagh, the clay of soils sealed the hopeless fate of lonely Irish bachelor farmers:

"Clay is the word and clay is the flesh
Where the potato-gatherers like mechanised scarecrows move."

But is soil valueless like dirt or replete with mystery? Is it just dirt, or a cathedral of evolutionary and cultural memory? Like an elder among us, soil holds records of our planet's past and the possibilities of its future sustainability.

A repository of memory

Like a library, soil houses stories written from the microscopic to the landscape scale of human and evolutionary history. Our enormous recent impacts, from the global nitrogen cycle to our use of atomic weapons, can be read as elemental and isotopic traces in soil.

One quarter of all the world's biodiversity can be found in soil; it is where many plants, bacteria and fungi evolved together. In many cases, plants and soil microbes established mutually beneficial relationships, communicating with each other by sending signals through the soil in a complex dating game. Butterflies and beetles and some bees, too, evolved to need the soil for certain stages of their life cycle.

Soil also remembers its natural vegetation—as seeds that can be used to help restore the native plant diversity and ecosystem, even in an urban lawn setting. For plants, the memory of their interaction with soil microbes may even be transmitted to their offspring.

Ecosystem services

In our urgent search for solutions to climate change, we have realized soils are key to turning back the carbon clock and reversing CO2 accumulation in the atmosphere. Thus we are recognizing soils as far more than just an anchor for growing plants, but as the irreplaceable "skin of the Earth" providing economic, environmental and social services that are essential for life.

Now more than ever, the science of soil reflects this appreciation of soil's keystone role in preserving biodiversity, reversing climate change and sustaining life on Earth.

Understanding soil

The history of soil science has often been a story of international collaboration, including the recent production of a global soil carbon map and an atlas of soil biodiversity, both wonderful examples of important global advances in soil science.

Rapid advances in application of molecular techniques are helping us understand in much greater detail the relationships between soil organisms and the many essential functions they perform. Importantly, too, we are learning much more about soil's resilience, such as how it responds to, and may recover from, the stresses imposed by human activities or a changing climate.

We are learning more about the services provided by soils in cities, and the unique stresses imposed upon them. According to Canadian soil scientist Henry Janzen, a fundamental goal of soil science and key to global sustainability is to extract the memories hidden in soil.

Managing farm soils

Intensive farming systems are a major driver of land degradation and soil losses, and declines in the abundance and

diversity of animals and plants. Applying our improved understanding of soil, an urgent challenge is to develop and support farming systems that are sustainable ecologically while also providing humanity sufficient supplies of food and fibre.

Farmers, as land managers, are on the front lines of this challenge. Many take an agro-ecological approach and consider themselves stewards or caretakers of plant diversity and the soil as much as solely producers of crops.

For example, farmers who plant mixtures of flowering cover crops (buckwheat, phacelia, sweet clover, vetch etc.) benefit pollinators. The crop also protects the soil by keeping it covered over winter. As it decomposes, the abundant cover crop residue improves the soil's structure and biological activity, while releasing nutrients to the following cash crop.

We need to cherish and learn from soil now more than ever. It holds the keys to our planet's past and future.

Derek Lynch is a professor of agronomy and agroecology at Dalhousie University.

... 10 Actions, continued from page 11

3. Create a livestock inventory and prepare/ plan for livestock protection

Workbook p. 7-8 and 16-21

Start by developing an inventory of your livestock, including types and numbers and their expected locations during fire season. Then review the list of options for protecting livestock and make necessary arrangements.

4. Reduce combustible materials and use fire-resistant materials on your property

Guide p. 16-18

Sparks and ember showers can travel 2 kilometres ahead of a wildfire, and radiant heat can ignite combustible/flammable materials, such as fuel storage, within 10 metres.

To help mitigate these threats, remove combustible vegetation and materials surrounding agricultural operation structures. Consider using fire-resistant building materials, such as metal siding or asphalt roofs.

See the FireSmart Homeowner's Manual for details, available at www.bcwildfire.ca/Prevention/firesmart.htm.

5. Document vehicles and response equipment/resources

Guide p. 16

Make special note of any water supply systems that are vulnerable to power/Internet outages, and be aware that water supply can be restricted and prioritized for use by agencies during a wildfire.

6. Document and confirm water resources and plan for sprinkler protection

Guide p. 16 and Guide p. 18-19

Identify and confirm water sources that may be available for irrigation, sprinkler protection and response. Prepare in advance to install cisterns or other emergency sources if required. Review requirements for sprinkler protection of priority structures.

7. Review your insurance coverage

Guide p. 20-22

Talk to your insurance broker annually to ensure you know what's covered and what's excluded. Take photos of your property and assets in their current state and condition.

8. Install a backup power system

Workbook p. 13-14

Backup power ensures any critical equipment, such as feeding systems, will continue working in a prolonged power outage.

9. Sign up for wildfire alerts

Workbook p. 14-15

Subscribe to your regional district's emergency alert system if available. On Twitter, follow @BCGovFireInfo and @EmergencyInfoBC and turn on your mobile notifications to receive an alert each time they tweet.

10. Share your plan and update it annually

Workbook p. 29

Make multiple physical copies of your plan and store them in operation buildings, keeping one copy in a personal vehicle. Save an electronic version to an off-site location. Ensure everyone living and working on your operation is familiar with the plan and knows where to find a copy. Share your plan summary with your regional district and other key response agencies and individuals.

... Geothermal greenhouse, continued from page 23

Dr. Damien De Halleux of Université Laval along with Dr. Martine Dorais of AAFC set up trials at the greenhouses of Serres Jardin Nature in New Richmond, QC and L'Abris Végétal in Compton, QC. Trials were set up in natural ventilation cooled greenhouses and heat-pumpcooled semi-closed greenhouses. The trials were to examine and compare the fruit quality from tomato plants, growth data, dehumidification strategies, CO2 levels, and greenhouse climate.

Cold water from the water table was used as a source for cooling for the natural ventilation and the semiclosed greenhouses at Serres Jardin Nature. At L'Abris Végétal, the source for cooling was the neighbouring soil of the greenhouses.

Using geothermal and heat exchanger systems, it was possible to limit the amount of ventilation needed in the semi-open greenhouses. This reduction in ventilation allowed for better climate management, and increased the productivity of the crops. Reducing the amount of ventilation also reduced the loss of CO2 from the greenhouse atmosphere. Cooling in the control greenhouses resulted in 421ppm of CO2 in the greenhouse atmosphere versus 652-654ppm of CO2 in the experimental greenhouses, which was an improvement toward optimal growth conditions.

Combining old and new techniques

Geothermal and heat exchanger systems limit the need to ventilate greenhouses, allowing for better climate control, however humidity control still remains a major issue. At this time, it is deemed appropriate to continue using traditional, natural ventilation during critical dehumidification times to reduce susceptibility of crops to fungus and disease.

For more Organic Science Cluster II research, please visit:

dal.ca/faculty/agriculture/oacc/en-home/organic-science-cluster/OSCII.html

To read Organic Science Canada magazine, please visit:

cdn.dal.ca/content/dam/dalhousie/pdf/faculty/agriculture/oacc/en/osc2/EN_OrganicScienceCanadaMagazine_Issue1_2018_COMPRESSED.pdf

To see all the OSCII Contributing partners, please visit:

dal.ca/faculty/agriculture/oacc/en-home/organic-science-cluster/OSCII/oscii-partners.html

Researchers:
Damien De Halleux (Université Laval), Martine Dorais (AAFC - Université Laval)

Partners:
Growing Forward 2, L'Abri Végétal, Serres Jardin Nature

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Here is our pick from the YA Farmer Podcast Club Archives:

The Magical Underground World Of Mycorrhiza

And How Cover Crops Help With Root Colonization

Cover Crop Strategies Podcast

Released April 11, 2019

In this podcast Cover Crop Coach Steve Groff will lead a discussion that defines what arbuscular mycorrhizal fungi (AMF) is, what it does for plant growth, and the factors that discourage or encourage AMF — including what cover crop species are hosts and those that are not. (Courtesy of Cover Crop Innovators)

Listen to the full episode:

youngagrarians.org/farmer-podcast-club-magical-underground-world-mycorrhiza-cover-crops-help-root-colonization-2

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Stickers 1" round	1000 pc roll	$13.50	10 rolls $120.00		
Stickers 1 1/4" square	1000 pc roll	$13.50	10 rolls $120.00		
Twist Ties 10" (15,000 per case)	1000 pc	$13.00	Full Case-$165.00		
The packaging materials above are only available to COABC Certified Organic members and are PST exempt for qualifying enterprises (see above). Have you signed a Consent to use Official Marks Declaration Form (July 2006 revision)? Y/N Are you Certified? Y/N With which products will you be using the packaging materials?_____ _____					
Promo Materials: available to everyone	**Member $**	**Non-member $**	**Tax**		
Bucket Hats size M or L *	$15.75	$15.75	PST taxable		
Ball Caps	$13.10	$13.10	PST taxable		
Natural T-shirts (Plain) S * or XXL	$5.00	$5.00	PST taxable		
NEW!! COABC T-shirts Designed by Brian MacIsaac Men's size S-XXL & Ladies sizes S-L	$17.85	$17.85	PST taxable		
Organic Tree Fruit Management	$19.95	$25.95	No PST		
			Sub-total (before taxes and shipping):		

*Limited quantities available - please contact the COABC office for availability

GST # 887782431

Postage Rates

Minimum charge of $10.00 per order for any promo and/or packaging materials
GST will be added to postage amounts
Rates vary and will be calculated at the office

An invoice will be sent with your order. Postage and applicable taxes will be added to your invoice.
Please do not send payment before receiving invoice.

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We believe a viable and sustainable local food system is essential. So our Small Growers Loan encourages growth for local farmers who show passion and potential.

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