

British Columbia Organic Grower

tech & tradition

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COABC
Certified Organic Associations of BC

In This Issue

Editor's Note	3
COABC News Patch	4
Organic Stories: Thinking Like an Insect	8
Footnotes: Organic Nutrient Management	22
Ask an Expert	27
COABC Order Form	31

BC Organic Grower

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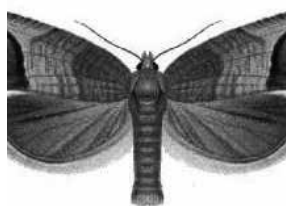
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40 Years of Thinking Like an Insect

Bob McCoubrey shares the story of Gary Judd, tree fruit entomologist.

Page 8

Features

Where is the Arctic Apple?	6
All is Grist for the Mill	12
Paper Mulch	14
Sweat Farming	16
COABC Conference Program	20
Horse Powered Farming	24
Prairie Organic Grain Initiative	28



Sweat & Horses

Two authors explore alternatives to fossil fuel power on the farm:

Sweat Farming: *Page 16*

Horse Farming: *Page 24*

Editor's Note

By Darcy Smith

Organic farming is sometimes seen as a throw-back to an idyllic (and pesticide-free) past, but if you asked the farmers of 1916, they'd likely tell you that farming was bloody hard work. Today's organic farming takes the best of what tradition has to offer—biodiversity, healthy ecosystems, natural soil amendments, a connection to the land—and marries it with the best of technology. Our Winter 2017 issue explores the meeting place of tech and tradition: how at times they diverge, and at times are one and the same.



To kick the issue off, our Newspatch (p 4-6) turns to the digital sphere with a recap of the successful ThinkBC Organic campaign and an update on the coming Organic Online System. Next, a look at technology gone awry as CBAN tries to track down the Arctic Apple (p 7). On page 27, our Ask an Expert columnist, Karen Fenske, follows up on online tools with a how-to on using Google sheets to manage your finances.

Our featured Organic Story dives into the life and times of Gary Judd, a tree fruit entomologist who may bear as much responsibility for the success of BC's organic apples as the growers themselves (p 8). This is the first of a series of profiles of the scientists, researchers, and others who have been instrumental behind the scenes growing the organic sector.

We're lucky to showcase the technological talents of BC's organic farming community in this issue: on page 12, we learn about WoodGrain Farm's hand made grain mill, and on page 14, Randy Hooper dives into his love-hate relationship with paper mulch. Naomi Martz talks up horse powered farming on page 24, while on page 16, we get a peek into the life of a "sweat farmer" at Hope Farm Organics—two noble alternatives to fossil fuels.

Pop over to the prairies on pages 22 and 28, for Footnotes from the Field and an update from the Prairie Organic Grain Initiative, respectively—plenty of interesting research and resources afoot for cover crops, biofertilization, and more.

And finally, we focus on the most important resource we have: community. Yes, our #COABC2017 conference is just around the corner, so be sure to check out our conference insert on page 20 and start planning your schedule!

The BC Organic Grower is a tool too—how can we help you? We want to hear about it! If you'd like to write for the Grower, there's no time like the present. Send in your comments, questions, and story ideas to editor@certifiedorganic.bc.ca.

 bcorganicgrower.ca



Celebrating 25 Years

Pro Organics is proud to represent BC organic producers and to be celebrating our 25th year of supporting local, organic, sustainable farming.

Today, as it was 25 years ago, our mission remains the same:
Promoting the growth and integrity of organics from field to table.



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Join the Campaign for Consumers to ThinkBC Organic

By Shauna MacKinnon, Canada Organic Trade Association

Over 250,000 consumers were encouraged to ThinkBC Organic in 2016 with the launch of a BC spin-off of the national Think Canada Organic campaign developed by the BC Certified Organic Brand Working Group with support from the BC Ministry of Agriculture. As a part of the preparation for mandatory organic certification coming in fall 2018, the campaign was designed to:

- Educate BC consumers on

what organic certification means and how to identify organic products at market

- Build trust in organic certification by communicating the benefits and philosophies of certified organic
- Promote made-in-BC organic products to increase the value of the sector long term
- Support the Organic Transition program by providing certified organic farmers with a set of customizable marketing materials

Canadian consumer attitudes

While Canadians are increasingly interested in food issues and want to make better choices, there is still a long way to go

towards food literacy. Sharing stories about your own personal commitment to organic practices builds a pathway for greater trust, understanding, and ultimately support.

There is a lack of knowledge among consumers about the rigour and practices of organic certification, as well as organic values.

Sharing BC organic #FarmerFriday stories

Over 10,000 print materials were distributed in Fall 2015, putting the benefits of organic products—and the certified organic logos for BC and Canada—front and centre. In spring 2016, the #FarmerFriday social media

campaign focused on sharing personal stories from BC farmers that showcased what the commitment to organic production meant to them through online profiles, video, images, and gifs.

The public response was very positive, and many BC organic businesses were eager to share the #FarmerFriday stories with their audiences. That support helped the campaign reach more than 250,000 on Facebook.

Join the campaign

The ThinkBC Organic and #FarmerFriday campaign is just beginning. All print and digital materials are available for BC certified organic producers and companies, and COABC continues to showcase #FarmerFriday stories. An on-line tool kit provides everything from social media how-tos and consumer research to customizable templates for infographics so you can profile your own farm.

Last summer we saw #FarmerFriday trend across social media platforms. We can spread the word even further with the combined force of our many amazing BC organic farmers!

Access the ThinkBC Organic marketing toolkit here:
media.thinkcanadaorganic.ca/thinkbcorganic
password: org8nic

Organic Online System

As part of our commitment to the organic community, one of COABC's mandates is to foster innovation. In our Fall issue, we announced the development of the Organic Online

System, an innovative online transition tool that will directly populate a BC Organic database. This Organic Online System will streamline the application and certification process, saving you time, paperwork, and money. As well, the tool will facilitate applications for the anticipated increase in transition of new entrants as a result of the government's initiative to regulate the term organic.

Recently the Ministry of Agriculture passed the Food and Agricultural Products Classification Act, which will enable the government to complete their commitment to regulating the word organic.

Over the past two and half years COABC has advocated for this regulation. As an organization, COABC is committed to helping the sector move smoothly into this new regulatory climate. In order to do this effectively, we must create innovative ways to increase the capacity of the sector, both to accommodate new entrants as a result of the new regulations and to track the impact of the sector within the province.

With the regulatory changes, we expect to see increased requests for certification, putting pressure on the certification system. The new Organic Online System will benefit not only new entrants, but also current certified organic producers.

Currently in BC, there are no certification bodies that offer a live online application process, so this project will bring a new technology opportunity to our sector. The applicant portal will be intuitive and designed both for ease of use and efficiency. For the tech-savvy farmer, the OOS will provide opportunities for integrating into your current

system while enhancing the certification system. (And not to worry, for those who prefer good old-fashioned paper, you'll still be able to break out the ball point with print versions).

The online application will feed directly into a high functioning database that will provide up to date data on the BC organic sector. This system is not currently offered in BC for organic certification and data collection on the sector is insufficient. With accurate numbers, we will be better positioned to identify gaps and predict potential areas for growth. The system will also allow the sector to provide better statistics for the public and the Ministry of Agriculture.

Because COABC and its certification bodies currently manage member information with the utmost regard for privacy we are well positioned to implement this new system. The online system will not change the strict management of personal information. In fact, a high functioning database will ensure the protection of private information by providing differing levels of access for various users. Data released to outside sources, such as the government, will be aggregated so privacy would not be compromised.

Currently, the system is scheduled for a pilot release in March of 2017, with the full system rolling out through the rest of the year. Keep an eye out for updates in the COABC ENews, website, listserv, and the BC Organic Grower. Please reach out with any questions or comments to the COABC office at:

assistant@certifiedorganic.bc.ca.



Where is the GM Apple?

CBAN BULLETIN NEW GM FOODS

Market status of new genetically modified (GM) foods



The GM apple is not sold in Canada yet.



The new GM potato could be planted this year.



The GM salmon is not yet being produced anywhere in the world.

JANUARY 2017

By Lucy Sharratt

In March 2015, Okanagan Specialty Fruits (OSF) got approval for its GM non-browning Golden Delicious and Granny Smith apples in both Canada and the United States. The US government also just announced approval of the GM Fuji, and a GM Gala is coming next. After having said in August 2016 that 1,000-1,200, 40-pound boxes of GM Golden Delicious apples would be sliced and sold in grocery stores in the western US¹, the company now says it will test markets in the US early this year. But where will these apples come from?

Establishing orchards of genetically modified (GM) apples will take time and like other GM products that have been approved by our government, the new GM non-browning “Arctic” apple will be hard to track down. The GM apple is already particularly difficult to trace: OSF itself does not know exactly what to do with it because the market for the apple is unknown. But orchardists in BC, particularly organic growers, need to know where it is cultivated.

The company intends to plant 300,000 to 500,000 new trees each year but it’s unclear if this plan is for the US, Canada, or both countries². OSF now says that based on their current planting contracts, they will plant over 870,000 trees between 2016 and 2018 that at maturity will produce over 30 million pounds of GM apples ev-

ery year³. These numbers will be difficult to verify independently.

In an August 2016 letter to CBAN, Okanagan Specialty Fruits said that it will roll out the production and consumer test marketing in the US first: “OSF commercial orchards are currently planted in the United States. OSF consumer product test markets, to be conducted using Arctic® Golden apples from the first commercial harvest, will be conducted in the United States. These test markets will highlight a sliced product featuring the Arctic® brand. Most other parameters, including the Canadian market introduction, have yet to be determined.”

Because BC orchardists protested the field-testing of the GM apple, all field trials took place in the US instead of Canada, leaving maturing orchards in Washington and New York State. OSF President Neal Carter says there are already 70 acres at one ranch in Washington⁴.

The location of any GM apple trees is important information for organic growers. OSF told COABC that no GM apple orchards are planted in Canada and it may be “several years” before BC plantings occur⁵. However, in January 2016, the Ottawa Citizen reported that “So far, only a handful of Arctic Apple trees are being grown in Canada, in a greenhouse in Summerland, B.C., where

Carter owns his orchard.”⁶ Carter may not have planted GM fruit trees yet but could have a nursery where he is growing his own rootstock. The company also told COABC that when plantings in BC do take place, all trees and fruit will be under the direct oversight of OSF on either our own land or that of growers specifically contracted to produce fruit for us.”⁷

Despite the name, Okanagan Specialty Fruits is no longer a small BC company. In 2015, it was bought by biotechnology/synthetic biology company Intrexon, which also owns the GM salmon and a GM mosquito.

Ultimately, growers will need to work together to track the GM apple trees. COABC is asking growers to talk to their nurseries and report any information so that growers in BC can be aware if and when the GM trees hit the market. Some growers are already getting verbal pledges from their nurseries that they will never sell the GM trees.

OSF says “The Perfect Fruit Got Even Better” but consumers will decide if this is the case. Most major grocery chains in Canada have already responded to consumer concerns by saying that they have no plans to carry the GM apple in their stores. In the meantime, growers can also decide how far the GM apple tree gets. 🍏

For updates and more information:

 www.cban.ca/apples

Lucy Sharatt is the coordinator of the Canadian Biotechnology Action Network (CBAN). CBAN brings together 16 organizations that research, monitor and raise awareness about issues relating to genetic engineering in food and farming. CBAN members include farmer associations, environmental and social justice organizations, and regional coalitions of grassroots groups. CBAN is a project on Tides Canada’s shared platform.

¹ Dan Wheat, “Company Forges Ahead with GM Apples” Capital Press, August 11, 2016. <http://www.capitalpress.com/Orchards/20160811/company-forges-ahead-with-gm-apples>

² Laura Robin, “From Tree to Table: The Arctic Apple is Ready to Blossom” Ottawa Citizen, January 22, 2016. <http://ottawacitizen.com/news/local-news/from-tree-to-table-the-arctic-apple-is-ready-to-blossom>

³ Intrexon’s (XON) CEO Randal Kirk on Q3 2016 Results - Earnings Call Transcript, November 9, 2016. <http://seekingalpha.com/article/4021879-intrexons-xon-ceo-randal-kirk-q3-2016-results-earnings-call-transcript?part=single>

⁴ Fresh Fruit Portal, “US: GM Arctic Apple Ready for First Test Marketing in Early 2017” October 3, 2016. <http://www.freshfruitportal.com/news/2016/10/03/u-s-gm-arctic-apples-ready-for-first-test-marketing-in-early-2017/>

⁵ Email correspondence between Eva-Lena Lang, Certified Organic Association of BC and Jessica Brady, Okanagan Specialty Fruits, June 10, 2016; Letter from Neal Carter, Okanagan Specialty Fruits to Walter Makepeace, Certified Organic Association of BC, November 1, 2016.

⁶ Letter from Neal Carter, Okanagan Specialty Fruits to Lucy Sharratt, Canadian Biotechnology Action Network, August 22, 2016.

⁷ Letter from Neal Carter, Okanagan Specialty Fruits to Walter Makepeace, Certified Organic Association of BC, November 1, 2016.





FORTY YEARS OF THINKING Like an Insect



By Bob McCoubrey

Gary Judd is passionate about his work. As a researcher in tree fruit entomology at Agriculture Canada's Summerland Research Station, he works hard at balancing his passion for doing the research with his enthusiasm for sharing his knowledge with growers—particularly organic growers, many of whom he has come to regard as good friends. Over his four decade career he has proven to be a true friend of organic agriculture.

Born in England and raised in South Surrey, BC, Gary had many interests as a child, and was headed for a career in marine biology, when a couple of Simon Fraser University courses in entomology, taken to fill out his timetable, drew him into the realm of insects.

Career Metamorphosis

Once bitten, Gary was hooked. He worked as an assistant to Dr. John Borden, which led to enrolling in the Masters in Pest Management program at SFU. That led

to work with Bob Vernon's pest management company, consulting with vegetable growers in the Fraser Valley. When Bob went off to pursue a Doctorate, Gary bought the company, which he ran for three years, before pursuing his own doctorate degree.

Following the conventional wisdom that postgraduate degrees should be from different universities, Gary, now married to Linda and with a new baby in tow, headed to England to study at Imperial College. He was soon back at SFU wanting to complete his degree under Dr. Borden, the man he describes as the foremost Canadian authority in chemical ecology, the study of chemicals involved in the interactions of living organisms, particularly the production and response to signaling molecules. When he defended his thesis on the Behavioural and Chemical Ecology of Onion Flies, the external advisor on his committee, Dr. Ron Prokopy, set the tone for his career when he asked Gary if he was ready to start thinking like an insect.

“His advisor set the tone for his career when he asked Gary if he was ready to start thinking like an insect.”



As he entered the doctoral program, the federal government was offering to put promising doctoral students on the payroll, with the understanding that graduates would work for Agriculture Canada once their degrees were completed. So, with a PhD in hand, and a new way of thinking in mind, the Judds were off to Harrow, Ontario in 1986, where Gary conducted research in the field of vegetable entomology for three years before securing a position at Summerland in Tree Fruit entomology in 1989.

Always one to recognize the contribution of colleagues, Gary credits some of his success to the technicians he has worked with at the research station, particularly Don Thomson, who was on the job when he arrived, and Mark Gardiner, who took over when Thomson left to work for Pacific Biocontrol Corporation. Gardiner is still helping with the important research Gary performs.

The Apple of His Eye

Early on, Thomson introduced Gary to Similkameen Valley organic growers who were struggling to control codling moth (the proverbial worm in the apple) in preparation for the Sterile Insect Release (SIR) program, which was preparing to implement Sterile Insect Tech-

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“ Throughout his career, Gary has preferred to work in organic orchards. From a scientific perspective, the absence of conventional chemical pesticides eliminates one of the factors that can alter and confuse results in research conducted in conventional orchards.”

nology (SIT) whereby high numbers of sterilized codling moths would be released in apple and pear orchards to reduce the opportunities for successful mating, leading to lower and lower populations as the years went by.

The theory behind Sterile Insect Technology held that a ratio of 40 sterile male moths for every wild, fertile male moth would eradicate codling moth in the orchards. As the program evolved, it became clear that the goal of eradication would have to be scaled back to one of economic control.

The success of the release program depended on starting with the lowest possible moth population levels when the first sterile moths were released. Without conventional pesticides, the tools that organic growers used to achieve low levels were limited to the removal and destruction of damaged fruit and the banding of trees with corrugated cardboard bands to trap the larval stage of the moth as they searched for a protected place in which to pupate.

Gary thought that Mating Disruption Technology (MD) would be a useful tool for both organic and conventional farmers. The technique uses synthetic versions of pheromones, the chemicals that female insects emit to attract males for mating. Codling moth pheromone had been identified in 1971, and had been successfully used in monitoring to lure males into a sticky material in a cardboard trap so they could be counted. Research had determined economic thresholds upon which control strategy decisions were based—choice and timing of chemicals.

Beginning in 1989, Gary researched pheromone dispenser design, concentration and application rates, and orchard placement of dispensers to determine the role that mating disruption could play both in reducing populations prior to Sterile Insect Release, and as a stand alone codling moth control strategy. A five year study in John Hutchinson's Cawston orchard, using mating disruption, banding, and hand thinning, drove damage levels down from 25% to 1% at harvest time, and reduced larvae counts in the cardboard bands from 1000 per hectare to 1 per hectare. By 1994, many organic orchards had lower

population pressure than conventional farms, which had been using synthetic pesticides to tackle the problem.

Because the monitoring of insect populations is essential for effective decisions on control strategies, work was done to find ways to gain accurate information from pheromone traps in orchards where Mating Disruption applications had permeated the tree canopy with the same pheromone. As sometimes happens in science, a serendipitous error in mixing pheromone doses in trap lures revealed that a dose rate 10 times the normal rate would be effective under Mating Disruption conditions. Gary credits Don Thomson with the observational skills that found the solution.

Gary's work on Mating Disruption led him to champion the technology as a stand alone strategy for codling moth. However, the political leaders of the British Columbia tree fruit industry, and the SIR Board, made up of municipal representatives of the Regional Districts that were collecting and contributing tax revenues to fund the program, decided to proceed with Sterile Insect Release.

As sterile moths began to be released, organic growers needed to learn how SIT and MD could work together, since they lacked the synthetic pesticides that conventional growers were using to try to keep moth populations low enough for SIT to work. From '95 to 2000, Gary's work compared three control strategies: SIT alone, SIT with the synthetic chemical Guthion, and SIT with Mating Disruption. His research benefited from the data he had collected in organic orchards prior to the release of sterile moths, and showed the best results from a combination of SIT and MD.

With the SIR program well under way, Gary shifted his focus to secondary pests, which scientists suspected would become significant when heavy duty chemical controls for codling moth were replaced by SIT. Bud Moth and Leafroller were two such secondary pests for which Mating Disruption held promise as a control strategy, since all three species, members of the Lepidoptera order of insects, employ pheromones to help male moths find their mating partners. Dual and triple lures were tested, proving that all three pests could be controlled with the application of a single lure containing three distinct pheromones without affecting the efficacy of the strategy.

An Organic Perspective

Throughout his career, Gary has preferred to work in organic orchards. From a scientific perspective, the absence of conventional chemical pesticides eliminates one of the factors that can alter and confuse results in research conducted in conventional orchards. On a personal level, he prefers not to be exposed to toxic chemicals while doing the research, and he finds organic growers to be great

people to work with, enjoying their company and their ways of approaching the work they do.

As retirement approaches in a few years, Gary is looking forward to travelling, doing a bit of fishing, driving the '65 Austin Healy he restored a few years back, and most importantly spending time with family—he and Linda, married for 36 years now, have four children and three grandchildren. But he plans to stay in the Okanagan, and to stay involved in the industry, doing some consulting and helping with a start-up pheromone company that will use wireless aerosol delivery of pheromones for mating disruption control strategies. His travel plans will include sharing his knowledge and skills around the world where it might be useful.

In the meantime, there are filing cabinets full of research that needs to be written up, and there are new challenges that keep emerging. Invasive species that continue to surface will need attention.

The Future of Fruit Tree Pest Management

Apple Clear Wing Moth is emerging as the most important pest in organic apple orchards. First identified in the Okanagan Valley in 2005, it is difficult for organic growers to control, as its larval stage can spend two years buried under the bark of the tree, eating the cambium layer and hiding from control measures. Gary is working on a mass trapping strategy that will use flower and fruit odours to trap out the females, combined with pheromones to disrupt mating.

Another recent arrival is the Brown Marmorated Stink bug, a pest of apples that will also attack soft fruits and vegetables. There seem to be no end of challenges to last till Gary's retirement. His message to anyone interested in entomology: there is opportunity for a fascinating career, exploring the life cycles and habits of a wide range of species, and devising ways for humans to control the impact of those that cross swords with us.

His advice—just develop the skill of thinking like an insect.

For a person who has spent four decades in the world of creatures that most of us tend to ignore until they get in our way, Gary Judd has had an impact on the lives of organic and conventional farmers throughout agriculture in the Okanagan Valley and beyond, with contributions that are impossible to ignore. He has earned a sincere debt of gratitude. 🌱

Bob McCoubrey is a retired organic orchardist in the Okanagan's Lake Country. With his wife Sharon, he farmed eight acres for 38 years before turning his efforts to mentorship, writing, volunteering, and community building.




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All is Grist for the Mill



The Story of WoodGrain Farm's Hand Made Grain Mill

By Jonathan Knight

I like good technology. I don't mean my smart phone (I don't have one) or the latest gene spliced varieties, but rather the tools and innovations that have evolved over decades or centuries of use to make life easier. Appropriate technologies reduce daily drudgery, or improve efficiency to the point that what was otherwise impossible is now doable. They are the innovations and devices that make our lives simpler, not more complex.

Good technologies are invented and perfected over time by the people who use them. The best innovations, and the most reliable, are the ones where the inner workings are easily understood, open to repair and adaptation by the user to suit their specific needs. Open-sourced. Good technology is durable and timeless, impervious to the fashions of the day, and without built-in obsolescence.

With perfect technology, the beauty is in its simplicity. Fewer moving parts to break, less complexity to figure out. The wheel hoe is a perfect tool for its intended pur-

pose: efficient, ergonomic, drudgery-reducing, never breaks down, and is easily adaptable to the posture of the user. The digging bar is the perfectly appropriate implement for levering rocks, not the spade. The user and the tool work together, in step. There is no technological gulf.

Another perfect technology is the grist mill, or stone flour mill. Quarried from natural granite, a heavy stone gradually 'shears' whole grains into smaller and smaller fragments until you're left with a nutritious flour ready to be kneaded into dough and baked into bread. The stone can be spun by the wind, by moving water, by your arm or legs, or these days by an electric motor. The mass of the stone and slow speed keep the grain cool as it is ground, preserving its goodness. Nothing needs to be added or taken away from the flour. What goes in is what comes out.

As with most technology, attempts have been made to improve upon it. Modern industrial flour mills involve a complex system of steel rollers and separators that very

efficiently divide the grain into its component parts—the starchy endosperm, the nutritious inner bran, the fibrous outer bran, the nutrient-packed germ—to produce the highly refined products that the food industry demands. Commercial ‘Whole Wheat’ flour on the supermarket shelf is always refined, adulterated white flour with some bran mixed back in (the germ, the nutritious heart of the kernel, is always removed as the essential oils it contains limits shelf life), because these mills don’t have the ability to simply grind the whole grain into flour. They are too complicated for that.

In smaller scale mills, steel burrs and whirling flails—cheaper to produce and easier to handle than heavy rock—are also used in place of stones to pulverize grain. Some give better results than others, though most burr mills have the tendency to heat and degrade the flour.

Composite stones are most common in small-scale stone mills these days. Instead of quarrying a single stone from the hillside, these stones are manufactured by cementing small rocks onto a concrete base. This gives the grinding surface a sandpaper-like texture that, like burr mills, tends to ‘shred’ the bran into tiny fragments rather than leave the intact bran flakes typical of a natural granite stone mill. These tiny bran ‘shards’ affect the bread baking quality of the flour by cutting through the gluten strands in dough (the complex protein web that trap the gas bubbles in a fermenting dough), limiting the volume of the loaf. These small fragments can also be an irritant to the digestive tract. The quality of wholegrain flour produced by millennia-old mill stone technology remains unsurpassed.

On the farm, we grow a modest five acres of cereal crops, mainly for our own bread making. We also supply wholegrain flour to a small bakery in town and sell bags on the side at our farmers’ markets stall to complement our mainstay vegetables. The grain is sown by hand with an antique broadcast seeder, harvested with a 1940’s Massey Harris Clipper pull-behind combine, and cleaned through a 1920’s Cockshutt fanning mill. Granite stone mills, however, are more difficult to come across than pieces of old farm machinery.

Previous to the farm I had a bread bakery and imported a stone mill from Osttiroler Getreidemühlen in Austria, a family-run company that has been building beautiful wooden mills for generations. These European mills, increasingly common in craft bakeries, are of the traditional ‘horizontal axis’ orientation meaning the stones are set horizontally like the massive slow-turning stones in the windmills and watermills of old. Another common stone mill nowadays in bakeries and small-scale flourmills is Meadows Mills from North Carolina. For over a century they have been quarrying mill stones and building a more industrial metal-encased ‘vertical axis’ stone mill, which can run at a much faster RPM than horizontal mills; a



Photos: Fanning mill (top); the WoodGrain mill (centre); and freshly milled flour (bottom) Credit: Jonathan Knight

Continued on page 29....

LINERBOARD

A Love Hate Story



*Success! Beds mulched with linerboard in Spring 2016.
Photo credit: Randy Hooper*

By Randy Hooper

As one of the original conspirators of mulching with kraft linerboard ‘paper’ back 20 years ago, and a continuing fan, I would just like to say that if you listen to my words of wisdom and take this path, you may be really, really happy. Or maybe not. But here’s the deal:

25 years ago I worked with the late Eva Temmel, a self-taught intuitive permaculturalist. She taught me a thing or two, or 80. Eva wasn’t into mulch but the neat thing was that she somehow stumbled across dozens and dozens of used hospital sheets from Lady Minto Hospital and transplanted brassicas and lettuce under colourful rows of blue, green and yellow for weeks with no damage from rain or sunburn. Eva taught me to be unorthodox when it came to farming.

The concept of using paper as a mulch is not new—backyard and market gardeners have been using flattened cardboard boxes in the aisles to keep weeds down for decades. The practice of using straw and hay mulch for weed control and water retention goes back millennia. Growing vegetables through paper mulch, on the other hand, doesn’t have much history. Like all mulches, the benefits are many: much less weeding, less soil compaction, and wetter and warmer soil. But for some of us,

there is absolutely no joy in rolling up thousands of feet of plastic row cover and trundling it off to landfill. For some purists, it may seem antithetical to marry organic production methods and single use plastics.

When I was back in the dirt again 15 years ago I took on a task far too hard—to convert about 20 acres of pasture back into vegetable production, with high weed pressure and nowhere near enough water. Mulching was the answer, and I chose paper. Most of the paper that was available in industrial sizes was too flimsy - the kind you use to mail a parcel. The Yellow Pages (remember those?) led me to Novapak in Richmond, a converter manufacturing all sorts of products from rolls of raw pulp fibre. The product I chose from them, and continue to recommend, is 40# linerboard, the same weight of fibre used to manufacture laminated cardboard boxes. (40# means it weighs 40# per thousand square feet. A standard length we use is 5’ X 400 feet, 2000 sq. feet, so about 80# a roll.)

Bearing in mind that a few inches on each side are getting buried as you lay it, labouriously by hand, or with ease with a mulch layer, a 5’ wide sheet gives you a bit more than 4’ of row. Paper is much more expensive than plastic, but if you do the math, at a cost of, say, \$.04 a square foot, vs. the cost of substantially more weeding and watering, the economic benefit is huge.

After an initial year of tests on a wide variety of crops, I decided that the only way to take on the other 14 acres was to go big or go home. I found a great mulch layer that worked perfectly for paper. It took just a few days to lay paper on our whole main field—17 acres.

In retrospect there was some major heartache, and for anyone who wants to have fun with paper, heed my wisdom. First, don't look back. You know what I mean—it is nearly impossible to steer perfectly straight if you look behind you, and when you are laying paper, every time you look back you will steer a little crooked and end up with a big wrinkle or rip. Plastic stretches. Paper doesn't. No field is perfectly flat, and lumps and bumps in the bed will also wrinkle the paper. However, paper does shrink, and after a few days of wet / dry cycles (dew and sun) many of those wrinkles will go away. What we did find that really helps is to have someone ride shotgun on the mulch layer itself, not just to shift balance, but to yell up to the operator to stop, or steer a tad left or right.

Paper shrinks—a lot. It's quite amazing that a sheet of paper 400' long will shrink up to a foot in length in just a few days. But it will literally rip apart if you don't ease the pressure. An easy fix is slicing the paper every 80' or so, right across the bed, covering the cut with a bit of dirt. These shorter lengths will shrink just a few inches and not rip. Do not cut holes for a few days, or start to transplant or direct seed before that paper has shrunk to its final dimension. If you do seed right away through a hole you've engineered with a box cutter, and the paper literally shifts a few inches as it shrinks, the seed is now germinating in the dark, because the hole above it moved. Trust me—I learned the hard way.

Once the paper is down, walk the bed, making sure that all the edges and ends are buried. Wind is your enemy, and an exposed edge can let wind get underneath and create havoc. You cannot lay mulch paper in the wind. It is even harder to re-do it after the paper has blown all over the field. Been there.

The edges of the paper that are buried in dirt will start to break down within a few weeks. After that, you are once again left with a wind issue, because once the buried portion has rotted away, you now have a flat piece of paper lying on the beds that can be vulnerable if you're direct seeding because there's nothing to hold it down besides gravity. There is less of a risk if you have transplanted through it.

The only way I know to protect the integrity of the paper is to immediately, literally on the same day, sow buckwheat heavily in the aisles. Why buckwheat you ask? You can walk, kneel or drive on buckwheat and it bounces right back within a day, but the most important factor is that it germinates and sprouts in a few days, and by the time the sides of the paper have rotted out, the buckwheat is a couple of inches high. The wind blowing across your field is now riding across the top of the buckwheat, protecting the now exposed edges of the paper from going airborne.

What can you grow? Well, any plant that likes cold feet will do well, because the paper keeps the soil a few degrees cooler—so kale, chard, collards, cabbage, Napa, Brussels and bok choy were a few very successful ones. Obviously there is a long list of what won't work with paper—row crop like carrots, parsnips, beets, cilantro, radishes to name many. And there's another list of varieties that just don't make sense economically, an example being broccoli. Other crops that don't grow well through paper are basil, tomatoes, eggplant and cucumbers. The soil temperatures just aren't warm enough.

Because water was a big issue for me, paper was a saving grace. Whether in plastic or paper, if a chard plant is taking up a square foot, then all the rain that hits that square foot is going to go into the hole—a 10:1 water capture advantage over bare soil, and much slower evaporation. Unless your beds are dead flat and dead level you will have quite a few little lakes and ponds on the paper surface. I jab a hole in the paper at the lowest point of the puddles and let the water drain through. When planting out hard squash or zucchini, set transplants where you have poked holes, knowing that every bit of rain falling near those plants is going to drain right through those same holes—and for zucchini, you could be directing all the rain that falls over up to 10 square feet right to its roots.

Our two most outstanding successes were leeks and beans. Wait until the paper is wet and then punch holes through it with a ski pole (without basket.) If you try that when the paper is dry it will rip. Drop leek transplant into hole. Water in transplants or wait for rain to set them in. Do not weed. Do not water. Don't think about them for months. Come back in the fall or next spring and harvest. Same deal with beans—they were the best! Stab hole in paper. Drop seed. No weeding, no watering, and the best part? Crows and ravens, as you know, apparently have photographic memories and will carefully glean bean seeds, even while you are watching. Even while you are sowing. Well what a piss-off for them because they can't extract them through those little holes in the paper.

Let me know if you have any fun stories about paper. Like how you hate the sound of flea beetles bouncing off the drum tight paper on summer afternoons—or how you write your field plans and production notes in felt pen right on the beds. 🌱



discoveryorganics@gmail.com

Randy Hooper is an off-and-on again organic farmer, more off than on, and with less and less acreage each time over 25 years, on Saltspring Island, in Abbotsford, in Mexico, and currently in Ruskin east of Maple Ridge. He and his wife Annie own and operate Discovery Organics in Vancouver. His email is discoveryorganics@gmail.com

Sweat Farming

AT HOPE FARM ORGANICS



Photo: Andrew and his trusty wheel hoe. Credit: Hope Farm Organics

Sweat farming: an ideal low-carbon, low-stress, grease-less-hands, no-knuckle-bashing approach to organic farming.

By Andrew J. Adams

From Fossil Fuel to Sweat Power

All of you know that the price of food is low relative to the costs of production (though some might argue this), and that is due to our fossil fuel addicted economy. Mechanization sought to end the drudgery of producing sustenance, but at what costs? Now that the drudgery is gone, people pay money for drudgery and go into buildings to lift pieces of metal and contort their bodies in strange ways. Ironical, don't you think?

We all know the saying there is no free lunch and in this case, it couldn't be any truer. The true costs of our fossil fuel addiction are now only being fully realized since the tractors invention in 1892, though much could be said about the dust bowl days of my home state's past.

It has been a steady race to the bottom ever since in terms of prices and environmental degradation. Falling prices due to the use of fertilizers and mechanization have caused an agricultural arms race in which there is truly no winner.

Here at Hope Farm Organics, we have been utilizing as little machinery as possible since our farm's inception. This is not only due to our convictions but also the price of equipment in the north where there is comparatively hardly any agriculture happening. The reality of the low pricing and market competition hit hard and quick once we started jumping into producing on a larger scale and attempting to make our living from our produce.

We have dabbled in the devil's promises with our potato digger, tiller, and tractor pulled plow, but to our defense we now feed our tractor waste veggie oil and we primar-



*Carrots, harvested and cleaned
Credit: Hope Farm Organics*

ily use only hand tools and train ourselves to essentially become the machines that we loath. This does require some time in training to become efficient and safe without harming joints. We hope to one day move toward primarily horse drawn equipment once we build a couple more barns and fine tune our production.

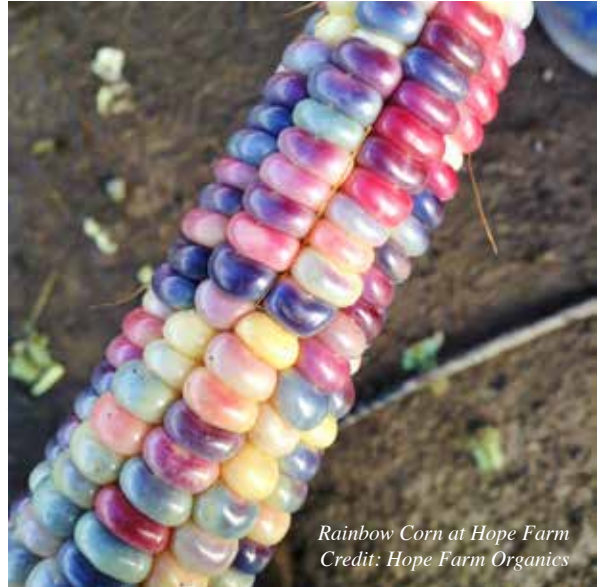
Tools of the Trade

Tools of the trade that we highly recommend to anyone wanting to make a go of what we are doing would be the following: A diamond hoe, stirrup hoe, earthway seeder, broadfork, double wheel hoe with attachments and an assortment of peg boards for planting accuracy when it comes down to the little seeds like carrots (yes, we do all the carrots by hand).

A sharp hoe, or sharp tool of any kind for that matter, is essential for ease of work. Daily sharpening of tools before use is a must. On days that you forget to sharpen a tool, you will notice in terms of effort required to cultivate and weed.

One tool that, once we found it, we could not do without besides our hands and backs is the double wheel hoe. This horse drawn plow look alike has made life so much easier and efficient. With its many attachments, from cultivating teeth to stirrup hoes and even plows, this wheeled wonder has saved many hours of back breaking work and allows you to use different muscles not typically used in long handled hoeing.

The benefits of hand tools over machines? Think of it this way: you will never need to go to a gym! But a fair



*Rainbow Corn at Hope Farm
Credit: Hope Farm Organics*

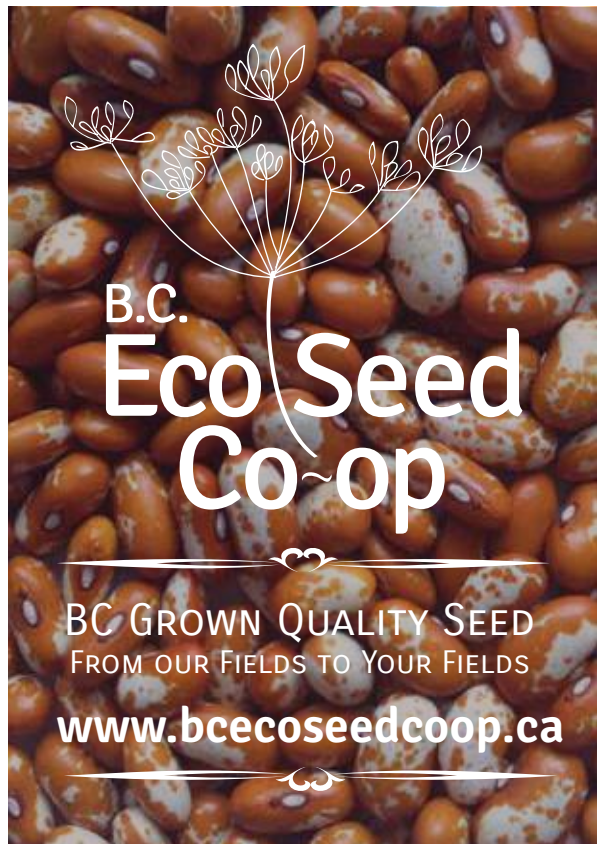
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*Even lambs sometimes get the sweat-farming, do it by hand approach.
Credit: Hope Farm Organics*

must have a passion for it because you won't ever get a decent return on the effort in a monetary sense until someone turns the oil spout off for the planet and food prices reflect the lack of fossil fuel subsidies.

Stewards of Ecology

Another part of our “sweat farming” mantra is zero input production. When we talk about zero input farming, we are discussing no feed and no seed coming from outside sources. For us, this is an ongoing mission that will take years to fully achieve. Hey, we have nothing but time, right?

We believe almost to an obsession that a farm must become an ecology. The farmer is the master conductor in this symphony of soil, and must make all efforts to create bountiful production through thoughtful planning in the cold winter months, including where seed crops will be produced for the following years, animal grazing rotations to maximize soil health, and crop rotations to mitigate pests. This planning takes several years of observations of water drainage, soil fertility, ease of access, etc... after you first set foot onto your plot of land and decide to farm.



*Tidy rows of beans and brassicas.
Credit: Hope Farm Organics*

There is no get rich quick model in this type of food production, but it will in the end increase food security in an ever-growing uncertain climate. If the climate keeps changing alongside the predicted exponential hockey stick graph, then we can be sure that it will not take long for the food revolution to truly take root. Only then will the masters of the organic farm ecology finally have their day in the sun.

Careful planning, thoughtful observations and attention to plant breeding will yield great bushels of gold for those who are willing to wait and work at it. Heck, it only took us six years to produce our famous cantaloupe that is supposedly not possible to be grown in our biogeoclimatic region of the SBSvk (Sub Boreal Spruce Zone). Think of what we can accomplish with a lifetime of perseverance to do something different! 🌱

Andrew has a bachelors of science in Agriculture from Kansas State University and Janie has a Bachelor of education. After seeing the state of food security and agriculture in the north the two felt obligated to make real change in the form of organic food production and thus created Hope Farm in 2011.



*An abundant winter squash harvest.
Credit: Hope Farm Organics*

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COABC Conference

Relationships in Transition: Land, Livestock, Waterways & Community



February 24-26, 2017
Coast Bastion Hotel
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Nanaimo, BC

This year in Nanaimo, February 24th to 26th, our annual conference will celebrate and connect our certified organic community. The COABC conference strives to provide a weekend of inspiration, learning, and networking by inviting presenters from all walks of the organic world. We will enjoy locally sourced, certified organic ingredients, paired with local musicians that will rouse us to cut loose—in the most organic way, of course.

The diversity of presentations and discussions will reflect the many hats we wear as entrepreneurs, farmers, processors, distributors, leaders and researchers, and so many more.

This year we will be incorporating cross cultural exchange at our conference, to enhance relationships with our neighbours and the land we farm. We are thrilled to have Nicholas Peterson take the floor Saturday morning for his keynote presentation on our conference theme.

Keynote Speaker:
Nicholas Peterson

Nicholas will be helping to create meaning and value in our relation-


ships with everything around us. He will speak to why these connections are crucial for true sustainability and will share the practices he and his family use to develop, strengthen, and deepen connection. Nicholas's experiences and stories will come from the lens of a husband and father, farmer, and First Nation's leader. Nicholas believes we as farmers play a vital role in restoring relationships across humanity, as we teach others and offer intimate experiences with food.

Nicholas is an Organic Farmer at Nicola Valley Produce with his wife Vileena and five children, specializing in gourmet garlic cultivars. He is a member of the Lower Nicola Indian Band in Merritt, BC, and was

elected Councillor in 2013. Nicholas is currently working on his MSc of Environmental Science from TRU, exploring Native Seed Germination for land reclamation and restoration. Nicholas has always had a passion for growing plants and learning from his natural surroundings. He loves learning and applying the principles taught to him through his First Nations heritage.

Information & Highlights

Register online at

 certifiedorganic.bc.ca/infonews/conference2017

Accommodation:

We hope to see you at the Coast Bastion Hotel in Downtown Nanaimo. Accommodation at the Hotel can be booked by phone 1-800-663-1144—be sure to specify the Nanaimo location and that you are attending the COABC Conference. You may receive a discount in our guest room block if you book soon!

Friday Afternoon Workshop: Organic Certification 101

This session will be an organic certification introduction for the uninitiated. Rochelle will outline the certification process, give an orientation to the do's and don'ts of organic standards, cover organic labeling claims, and explain who's who in the organic certification world in BC, Canada, and beyond. She will try to answer all questions, or at least advise where to go to get an answer. Rochelle will also give guidance on taking the next steps. Bring your pens, paper, and your questions. Regional CB administrators will join for the last hour to help complete paperwork. Register for this event separately on our eventbrite page. Space is limited.

COABC Trade Show

The COABC conference features an exciting trade show located on

the second floor with the conference Open Networking area and snacks. This is a great opportunity to discover new resources and products that could be integrated into your farm operation.

If you would like to register for a booth in our Trade Show please visit our Eventbrite COABC 2017 Conference Trade Show page. Limited space is available.

eventbrite.ca/e/coabc-2017-conference-trade-show-tickets-3019616755

Silent Auction

At our auction you will find an amazing array of items to place your bid on: clothing, art, books, art, food, wine, tools, seeds, services, and so much more. If you would like to donate an auction item, please do! You can indicate this upon registering. Alternatively you may contact our conference coordinator. Bring items with you to the conference. Auction items will be displayed Saturday afternoon until bidding closes on Saturday at 9 PM.

Poster Session:

We are pleased to offer free space for poster presentations related to innovative organic production. Contact the conference organizer with your poster idea and to book space. conference@certifiedorganic.bc.ca

Seed Swap

Come and share seeds with fellow farmers! The COABC Seed Exchange is the perfect place to explore new varieties, share your favourite cultivars, donate the extra seeds you have, and learn about seeds and seed saving from fellow seed producers. Bring seed that are open-pollinated and share as much information as possible about your seeds (location, population size, cultural stories, etc.). Packets and markers will be provided. The Seed Exchange will be hosted by the B.C. Eco Seed Co-op and the UBC Farm Seed Hub.

Young Agrarians Mixer

Join us for a YA social mixer on Saturday evening! Meet other awesome agrarians, who value food, farmers, nature and community. All ages welcome! This event is for the young and the young-at-heart.

Saturday Feast

We will enjoy locally sourced, certified organic ingredients, followed by live music, check the website for who will be playing!

One of the ways we keep the conference costs affordable is by featuring food donated by local growers and producers. Please contact conference@coordinator.bc.ca if you are able to donate. You can also indicate this on your order form and Jesse, our coordinator, will be in touch.

Presentations & Workshops

Here are our presentations & speakers at-a-glance, with a few more TBA. Be sure to check the COABC website for Conference 2017 speaker & session details as they emerge.

Indigenous Perspectives & Food Policy

Sharing Perspectives Across Cultures on Indigenous Foods: A Roundtable hosted by Heather Pritchard & Jen Cody and Guest Speakers TBA. This discussion will be bringing cultural perspective to managing land for food production and identifying commonalities between farmlands and foodlands.

Scaling Sustainable Local Food Systems Up and Out: The Potential of University Procurement with Celia White, the Real Food Challenge Coordinator for Meal Exchange. Celia will discuss the process, progress, and challenges as well as our hopes for leveraging campus long-term support for just and sustainable food systems through the Real Food

Continued on page 30...



New Techniques for **ORGANIC NUTRIENT MANAGEMENT**

By Marjorie Harris BSc, IOIA VO, P.Ag.

As the International Year of Pulses draws to a close it is nice to give a tip of the hat to pulses, the peas and beans, and to their leguminous cousins, alfalfa and the clovers. Research has demonstrated that legumes in symbiotic relationship with Rhizobacteria biofertilize the cropping system by fixing prodigious amounts of nitrogen from the air. Able to deliver hundreds of pounds of nitrogen per acre, legumes are an extremely valuable green manure crop to include in crop rotations.

2016 marked the 25th anniversary for Canada's oldest organic vs conventional comparative study conducted by the University of Manitoba at the Glenlea Research Station. The organic cropping research primarily focuses on long term crop rotations for grains and green manures.

This year Martin Entz, lead researcher, in conjunction with Joanne Thiessen Martens, and Katherine Stanley, rolled out a two year consultant training program for their new Organic Nutrient Management (ONM) system. Currently only 10 consultants from across Western Canada are enrolled in the hands-on training working directly with farmers to implement the ONM system.

The ONM program is designed to track the soluble and plant available nutrients Nitrogen (N), Phosphorous (P), Potassium (K), and Sulphur (S) as they move on and off the farm as imports and exports through an 8 year crop rotation plan. The ONM also includes livestock production within the system.

New nutrient monitoring techniques are employed that rely on leguminous plant tissue bioassays to understand how plant tissue nutrient concentrations relate to soil fertility conditions. Interpreting this kind of data is still quite new, although research has proven that this type of data can lend useful insight for long term soil fertility nutrient management strategies.

There are two parts to the data development. Part 1 determines the nitrogen fixation and nutrient concentration rates of N, P, K, S for the legume green manure cover crops on a per acre basis. Part 2 creates a net summary balance of N, P, K, S for imports and exports over an 8 year crop rotation on a per acre and per whole field basis.

Part I

Determine level of nitrogen biofertilization in pounds per acre and green manure nutrient uptake.

Step 1: Dig up legume roots to check for nodular growth and nodular activity. It is important to inoculate the legumes with the appropriate symbiotic Rhizobacterium for optimum nodular development. The root colonizing Rhizobacterium form large ball-like nodules on the roots of peas and beans, and smaller flat, hand shaped nodules on clover and alfalfa roots. When the nodules are actively fixing nitrogen the inner flesh of the nodule will turn a reddish color when broken open and exposed to the oxygen in air. If the inner flesh of the nodule is brown, green or clear the nodule is not actively fixing nitrogen.

Step 2: Cut biomass samples of legumes from a predetermined number of quadrants per field. Sort the legumes from the cut vegetation to record the percentage of legume vs weeds and other plants, then send the total biomass for plant tissue nutrient analysis.

Step 3: From the same plant sampled field take soil samples at 6 and 24 inch depths and send for nutrient analysis. Phosphorous and Potassium are relatively stable in the top six inches of soil whereas Nitrogen and Sulphur are more mobile and tend to leach down through the soil profile, the 24 inch depth sample will capture this movement.

Step 4: Enter the plant tissue and soil fertility results into the specified Excel spreadsheet to calculate nitrogen biofertilization per acre. The plant tissue results will also demonstrate if the legumes have sufficient P, K, & S for optimum growth. Long term research has shown that many legumes only need a soil test P at 5 - 9 ppm, to produce optimum nitrogen. However, a soil test rating of 5 - 9ppm P will be reported as Low as a standard soil test interpretation. Martin Entz's research demonstrates that 5 - 9ppm P is sufficient for good legume growth. Most other crops will require supplementary nutrients for optimum growth.

The three main supplementary forms of phosphorus are: livestock manures, rock phosphate and animal feeds. Rock phosphate has been shown to be a very slow releaser of plant available phosphorous. The ONM general recommendation for supplying a plant bioavailable form of P is a periodic light application of livestock manure, whether composted or spread raw followed by a green manure cover crop to catch the nutrients up into the plant tissue for slower release of plant available P.

Part 2

Determining the net summary balance import and export of nutrients N, P, K, S, through an 8 year crop rotation per acre and per whole field.

Step 1: Send samples of exported farm biomass, seed, plant, and livestock manure for nutrient testing. Enter results into the ONM Excel spreadsheet. The import, export and nitrogen fixation biofertilization date is entered and automatically calculated per field per year and then summarized over the 8 year crop rotations on a Whole Field (total acreage) and Per Acre basis.

Examples of 8 year rotation: *Table 1.1* is the standard crop rotation the farmer has traditionally employed. The farmer noticed that his yields were falling and that weeds were starting to encroach the crop.

Table 1.2 is a modified crop rotation to balance nutrient imports and exports:

This new approach to Organic Nutrient Management over long term crop rotations employs biomass nutrient uptake monitoring and soil testing. The laboratory data generated is entered put into the ONM Excel spreadsheet for net import and export nutrient calculations. The summary results allow the operator to visualize the long term results of various combinations of crop rotations and nutrient supplementations.

Regular green manure crop rotations provide nitrogen biofertilization and assists in the building and maintenance of soil fertility. Higher seeding rates of legume and cover crop can help suppress weed pressures. Plowing down green manure cover crops, straw and plant waste helps to increase organic matter in the soil. Overall higher soil fertility will increase crop yields and promote healthier disease resistance plants due to sufficient plant available nutrients for optimum growth conditions.

The Glenlea long term research project has proven that organic rotational cropping systems that rely on perennial forage legumes are 222% more energy efficient than conventional farming techniques. The energy efficiency in the organic management system was attributed to the vast reduction in the use of fossil fuels and the reduction of greenhouse gas emissions associated with burning them.

Table 1.1 - Traditional Crop Rotation Plan

Year	Crop	Notes
2016	Sweet Clover & Rye	Plow down green manure
2017	Spring Wheat	Harvest seed, plow down straw & rye
2018	Buckwheat	Harvest seed, plow down straw & rye
2019	Lentils	Harvest seed, plow down straw
2020	Sweet Clover & Rye	Plow down
2021	Spring Wheat	Harvest seed, plow down straw
2022	Lentils	Harvest seed, plow down straw
2023	Flax	Harvest seed, plow down straw

Table 1.2 - Modified Crop Rotation Plan

Year	Crop	Notes
2016	Sweet Clover & Rye	Plow down green manure
2017	Spring Wheat	Turn in straw & rye, swine manure
2018	Buckwheat	Harvest seed, plow down straw & rye
2019	Lentils	Turn in green manure, swine manure
2020	Sweet Clover & Rye	Plow down
2021	Spring Wheat	Harvest seed, plow down straw
2022	Lentils	Harvest seed, plow down straw
2023	Flax	Turn in straw, swine manure

This is a very brief overview of the University of Manitoba's new Organic Nutrient Management system. For more in-depth information about implementation and to develop long term nutrient management strategies using green manures and nutrient supplements contact Marjorie Harris, Organic Nutrient Management consultant, at ecoaudit@telus.net.

Written by Marjorie BSc, PAG, IOIA V.O.

 ecoaudit@telus.net

HORSE POWER



Sometimes the best tool for a job isn't a tool at all

Naomi Martz driving her horses. Credit: Four Beat Farm

By Naomi Martz

Despite what some may think, farming with horses is not always about wanting to go back to the “good old days”. For me, it comes from a pretty extensive list of things that are important to me as a young person starting a farm business: less time spent fixing engines and running power tools, more time listening, less fossil fuel use, more conscious fine-tuning of the work/play/sleep/love/grow balance that sounds great in theory. With all that in mind, choosing to start farming with live horsepower has very much been a decision based in the present.

At this point, I would consider myself to be “barely a beginner” at draft horse work, so if you are looking here for expert advice I strongly suggest seeking out experienced teamsters who are willing to share their craft. Publications by Lynn Miller, Stephen Leslie, and the Small Farmer’s Journal can also provide a jumping off point for further resources. But I can share what adding two 2,000 lb. coworkers brought to my first year running a farm.

Having completed an apprenticeship with Ice Cap Organics where the Zayacs gave me the inspiration and confidence to start my own vegetable-growing endeavour, I spent the 2015 season at Orchard Hill Farm, a horse-powered CSA farm in south-western Ontario in the hopes of putting to rest my curiosity for draft animal power. While there, somehow the Laings managed to instil me with enough confidence to return home to BC, find some land to lease, and buy a pair of draft horses the following spring.

This season, Four Beat Farm grew produce for a 20 week, 30-member vegetable CSA as well the local farmers’ market. I rent a small house and 10 acres of farmable land as part of a larger property, with 4 acres in cultivation at the moment (1.5 in vegetables, 2.5 in cover crop to expand next year’s vegetable production), and the remaining 6 acres are used for horse pasture with intentions of haying and diversifying in the future. Currently the



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Photos:

(Top, left) The product of four-footed labour: rows of greens destined for CSA boxes. Credit: Four Beat Farm

(Left) The team hard at work: Naomi, Tom, Judy, and canine bear patrol. Credit: Four Beat Farm

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operation is in transition to organic and biodynamic practices are employed as well. There are countless neighbours, family members, and friends who provide infinite moral and practical support, but on paper and in the field Four Beat Farm is currently a one-person, two-horse operation, with a dog who works bear patrol.

Tom and Judy, two Belgian drafts in their mid-teens, were purchased based on their kind demeanour, having done farm work and wagon rides before, and their ability to stand still. If the latter seems silly, imagine being a work crew of one with a tractor that cannot reliably be taken out of gear or turned off when something needs to be tweaked or loaded in the field. Other than the initial ploughing that was hired out in the spring around the time the horses were purchased (ploughing is heavy work and can easily lead to soreness for out of shape horses and a frustrated novice teamster), the vegetable farming has been horse-powered this year.

This has included lots of discing and harrowing to prepare for vegetables and manage cover crop, using a straddle single-row cultivator for weed control (all crops except salad beds and one row of hot crops are direct seeded or transplanted in single rows with 3' between to allow space for the horses to walk), planting and hilling potatoes, spreading compost, and hauling in crates of produce as well as moving other heavy objects, such as bags of soil amendments, around the farm.

While a task like hilling an eighth of an acre of potatoes is not unreasonable to do by hand, establishing horse-powered systems that can be scaled up in the future, not to mention improving my own teamster abilities, was a key priority for this season. Taking the eight minutes to harness and hook up the team rather than doing a repetitive task by hand whenever feasible meant not just a lot of time savings overall, but also that this autumn I felt physically better than ever after a season of farming. This seems like a key component of sustainable agriculture that us youthful small-scale farmers prefer to overlook when handling heavy storage crops in the cold rain.

There are many articles written and discussions to be had about the role of draft horse power on a working, profitable farm. Horses can eat from, work on, and fertilize the fields. Horses are light on the land, and they can be worked in single- or multi-horse hitches depending on the task at hand. With the right knowledge and equipment, horses can also grow and harvest their own hay and grain, and breeding can lead to new engines being born and trained on the farm as the older ones slow down.


I agree with all of these and dare to add a few of my own. For one, farming with horses lends itself well to the pursuit of thrift and of mechanical simplicity. My equipment repertoire currently includes some long-forgotten tractor discs and harrows, a roller-packer, a work sled built in an evening from scrap lumber, a small borrowed trailer, a forecart which has a ball hitch attachment to pull the trailer or discs with horses, and a row cultivator. Other

than the forecart and cultivator, which worked out to about \$1000 and paid for itself in time-savings within about six weeks, the rest of the implements ranged from free to one hundred dollars.

When things break or need restoring sometimes I make time to work on them myself; sometimes I drag them to a neighbour's shop if they can make time to fuss around with my antiques, knowing someone else will do twice the job in half the time and I enjoy visiting with neighbours. Developing the skill set to speak the language of engine repair, not to mention actually repair engines, would not be impossible but would be a big learning curve in comparison. If I were a person who enjoys and excels at running heavy machinery and tinkering with tractors, or if I did not actually like horses, my farm would probably look quite different than it does at the moment.

As a final note, horses appreciate the importance of a morning routine, of stopping for a midday break in the shade, of that extra ten seconds of grooming before suiting up for the day, and this is reflected in their work quality and productivity. I daresay I am similar but am equally prone to working myself into the ground when left to my own devices. Farming can be overwhelming on the quietest of days, but 4,000lb of friendly, hay-burning accountability helps to keep me physically, emotionally, and financially grounded and present.

It goes without saying that there are unique challenges. Sometimes my horses have had several days off and have lots of energy and need to pull something heavy for a half hour to let off steam before they are ready to carefully cultivate baby beets. Sometimes even when they are doing a spectacular job a bear pops out of the woods and causes a hoof to sidestep, which can mean a few broccoli plants get stepped on. Sometimes I am amazed by how often I need to buy hay or set up a new pasture fence, and I have to remind myself that relying on a renewable fuel source that can be bought from neighbouring farmers and turned into next year's compost pile is worth more than just the cost of hay on a budget sheet.

So that is a bit of what happened in this first year of horse-powered vegetable farming in southwestern BC. Lucky for me, as the list of things I know I don't know just continues to grow, there is plenty of work to enjoy for a long while yet. 



www.fourbeatfarm.ca

Originally from Vancouver, Naomi Martz is thrilled to have stumbled across a career that incorporates her love of math, mornings, and good food. She sees farming as an excuse to tromp around in the rain, a means of satisfying her appetite for carrots and community, and a way to live well in a changing world.

Financial Tips for Life

TRACK ANYTIME, ANYWHERE & SAVE!

By Karen Fenske



Yes, even budgeting has become hi-tech. With a little help from Google Sheets, you can track your spending and plan ahead to manage your cash flow, either for your personal or farm business finances. Because this app sits in the virtual world it can be accessed on your cell phone, laptop, computer, tablet, or anywhere with a wifi connection. This makes Google Sheets the perfect way to manage finances on the go.

How to:

After you have signed into your Gmail account, click the 9 little squares in the right corner of the home page (if you don't have a Gmail account google how to set one up).

Select the green Sheets icon and set up your first Google Sheet! The online tutorials provide assistance

Set up multiple sheets to manage expenses and incoming cash—you can make this as simple or technical as you have an appetite for, as long as you're tracking something!

Be sure to update regularly with new expenses and income to keep an accurate financial snapshot

Worried you don't have time? Share. With Google Sheets you can easily share your budgeting sheets with others so you and your business partner, spouse, or kids can enter the amounts into the spreadsheet. Because the sheets are stored in the cloud, you can work in the same document at the same time. You may be surprised how easy and practical it is. If you have a business, personal income, a rental, etc... you can set up your tracking sheet to see all income and expenses in one place.

Why bother? It can be a great stress reliever knowing where your money is going—using Google Sheets to track your funds can help you gain control over some-

thing that once seemed unmanageable. Also, if you track your spending you can see the little places to save. These add up to a tidy sum each month which can help you get the things you want.

As well, if you're planning for the farm, tracking finances and projecting costs and returns can help you better understand your profit margins. As well, you'll be able to make smarter business management decisions, such as which varieties are most profitable for you, and just how much you should charge for that head of cauliflower at market.

A side note on saving:

You don't have to be rich to save, just determined. I work with folks just like you to make the best spending and saving decisions.

How can you save money? Pay yourself first! Typically we spend anything that lands in our bank account and because of our high-technology world with debit cards we have access to the money right away. After expenses and buying what we want it's easy to have nothing left to save for a rainy day or retirement.

An efficient strategy to "grow a nest egg" is to take TFSA and RRSP contributions off "at source". For those with employees, it may be possible to set up a group RRSP plan where the contribution amount of their choice is taken off before paycheques are deposited.

You're in business to take care of your family and you care about those who work for you. Farmers typically don't have pensions, so helping your employees – and yourself! – save is one of the best things you can do. Some employers choose to match 1% or more as an ideal way to show appreciation and support. For example if they give \$100 a month at 5% that's \$5/mo. Over the years it's a nice bonus that is not tied to wages. It all adds up. 🌱

Karen Fenske is licensed to sell Mutual Funds and Insurance in BC. She has a degree in business and mediation skills, and has provided strategic planning and business development for 25 years. She lives in Vernon with her husband. She enjoys spending time with her two young adult children, in her garden, hiking, skiing, travelling around the province, and watching murder mysteries.

Growing Prairie Grain

THE PRAIRIE ORGANIC GRAIN INITIATIVE



By Cari Hartt

The Prairie Organic Grain Initiative is a 4-year, \$2.2M tri-provincial project dedicated to achieving resiliency and stability in the prairie organic sector by focusing on increasing the quantity and quality of organic grains, and developing relationships across organic market value chains.

A partnership between Organic Alberta, SaskOrganics, and Manitoba Organic Alliance, the Prairie Organic Grain Initiative is bringing the community together to develop a strong foundation of programs, resources, and relationships upon which the prairie organic grain sector can truly flourish. Other industry stakeholders integral to the project's success include COABC, the Canadian Organic Trade Association, Organic Agriculture Centre of Canada, Bauta Family Initiative on Canadian Seed Security, and organic processors, brokers, buyers, and certification bodies.

One of the flagship programs is the Pivot and Grow campaign, which makes the transition to organics simple by providing producers with the tools required to tackle major concerns such as the certification process, weeds, and finances. Resources like the New Farmer Kit and mentorship programs help make the journey through transition easy and profitable.

The Initiative also focuses on compiling innovative research to create resources for producers that improve best management practices and consequently their resiliency, stability, and profitability. A primary objective is to help farmers increase yields and improve grain quality. Workshops, field days, and conferences train producers how to implement best management practices that build soil fertility, manage weeds, and maximize grain quality. The Prairie Organic Grain Initiative has released a series of five fact sheets that provide practical information for organic farmers to consider and integrate into their farming systems, including:

- From Harvest to Sale: Maintaining food quality in storage
- Intercropping: Increasing crop diversity
- Rotations: Designing a System that Works for You
- Cultural Practices: To Give the Crop Advantage
- Living with Weeds: Putting Weeds into Ecological Context

The fact sheets can be accessed on the Pivot and Grow website at the following link:

🔗 pivotandgrow.com/cases

The Initiative has also developed a series of five short videos designed to inform and introduce organic grain production to those unfamiliar with organic farming methods, including the following:

- Weeds: The First Emergence after Disturbance,
- Intercropping: Utilizing More Efficiently the Acres that we have,
- Planning Crop Rotations: The Diversity is what makes you,
- The Organic Ration: Eyes per Acre,
- Grain Quality: From Producer to Consumer, and
- Strategies for Successful and Sustainable Weed Management.

View the videos and subscribe to Pivot and Grow's YouTube channel at the following link:

🔗 youtube.com/channel/UCJHZq6zfgjxrz0rYmLjAz3Q

Another exciting project from the Initiative is the Organic Agronomy Training Program. The Organic Agronomy Training sessions are being held in partnership with University of Manitoba. In the Spring and Summer of 2016, Martin Entz of the U of M, along with experts such as Brenda Frick, Joanne Thiessen Martens and other U of M instructors, held three successful training sessions across Manitoba, Saskatchewan, and Alberta, that trained 120 participants.


Currently, the Prairies have a shortage of agronomists who are trained to work together with organic farmers. The goal of this program is to train agronomists to provide agronomic advice to organic farmers in areas such as nutrient management, crop rotation planning, weed management, and grain quality. Participants were equipped with data-gathering and decision support tools to take a systematic and comprehensive approach to working with farmer clients. Participants have been staying in touch with the instructors and each other through emails, Facebook, and organized teleconference calls, allowing for valuable continued learning and sharing.

The Prairie Organic Grain Initiative is also working with Martin Entz and Joanne Thiessen Martens on the Nutrient Management Program. Martin and Joanne have developed a spread sheet-based tool to help organic farmers assess crop nutrients. Because nutrients are made available through biological activity, rather than synthetic fertilizers, understanding how to manage these nutrients properly is critical to improving organic grain quality and quantity. The tool uses information from the farm including soil, plant, and grain samples, and cropping history.

Through the Initiative, the program has been extended across the Prairies. The program connected agronomists and organic farmers to develop nutrient budgets that inform management recommendations. 10 agronomists, several of whom are participants of the Organic Agronomy Training Program, work with 40 farms across Alberta, Saskatchewan, Manitoba, and one farm in the Peace River Region of British Columbia. [Editor's note: for more on the Nutrient Management Program, flip to Footnotes from the Field on page 22]

The Initiative is also working with Joanna White and Dr. Andy Hammermeister from the Organic Agriculture Center of Canada on the upcoming release of an online Green Manure Management Tool. This online resource will aid farmers in selecting the appropriate green manure to include in their crop rotations to build soil fertility. The Green Manure Management Tool will include five interactive modules, and will be available on the Pivot and Grow website in January 2017 and includes the following titles:

- Module 1: Choosing A Green Manure
- Module 2: Green Manure Profiles
- Module 3: Managing Green Manures
- Module 4: Green Manures and Weed Management
- Module 5: Green Manure Resource tool for Professionals

The Prairie Organic Grain Initiative is working to improve resiliency and stability in the Prairie organic grain sector. If you would like more information on the Prairie Organic Grain Initiative and how you can access its programs, resources and tools, please contact info@prairieorganicgrain.org. Working together, we can achieve a resilient, stable, and profitable industry for Canadian prairie organic grain. 

Cari Hartt is the new Communications Coordinator for The Prairie Organic Grain Initiative. A graduate of MacEwan University with a degree in professional communications, she is new to organics, but is thrilled to offer her skills to such a wonderful and welcoming community.

...All is Grist for the Mill, continued from page 13


more efficient design though with potential compromises to flour quality.


I decided to stick with the traditional horizontal design I was experienced with, and build a mill. I ordered a set of 12" granite stones from Meadows Mills, bought a motor, pulleys, bearings and had a shaft machined locally. I made a trade with a sawmilling neighbour for a pile of dried birch he had in his basement for a furniture project he hadn't gotten to. For the mill design, the beauty is in the simplicity.

In a traditional horizontal stone mill, the bottom 'bed stone' is stationary and anchored to the wooden base. The drive shaft passes through a hole in the center of the bed stone, which supports the 'runner stone'. This shaft is supported by a bottom bearing that can be raised or lowered to set the distance between the stones; this controls grind fineness (the bottom bearing also needs to be adjustable laterally to set stone alignment). The mill is powered from a pulley on the shaft below the stones, in my case with a 2 horse power electric motor. The stones

are encased with a wooden shroud, on top of which is mounted the grain hopper.

Grain drops out of the hopper at a controlled rate through the hole in the center of the runner stone, where it is spun out between the stones. The centripetal force of the spinning stone, together with the pressure from grain behind, moves the grain outwards across the grinding surface of the stone. The grinding surface is dressed with 'furrows', or tapered grooves, that the grain moves up and along until it is sheared off by the passing stone. The 'lands', or flat areas of the stone, further grind the starchy grain fragments into flour as it makes its way to the outer edge of the stone. A scoop attached to the side of the runner stone deposits the freshly milled flour down a chute and into a bag.

Simple, time-honed, perfect technology. 

-  woodgrain.ca/mill
-  getreidmuehlen.com
-  meadowsmills.com

Jonathan Knight organically farms WoodGrain Farm with his partner Jolene Swain.

Challenge. This presentation will focus on post-secondary campuses, but will discuss challenges and opportunities applicable to a variety of institutions. Collectively, colleges and universities across North America spend over \$5 billion per year to feed their students. By working together to shift 20% of purchasing to Real Food, we will be funnelling \$1 billion into the agriculture and supply chains we need for our future.

Stories from the Vanguard of Organics Carmen Wakeling will host a roundtable of venerated members of BC Organics to share defining moments from their careers and the history of the organic sector. Discussion encouraged and audience questions welcome. Come and see how the formative stories and experiences of BC's original organic farmers can help shape the next future of agriculture and guide a new generation of growers.

Production Stream

BC Seed Trials Update: What We Learned in Year One of Partici-

patory Variety Trials to Support Organic Seed Production in BC presented by Mel Sylvestre from BC Eco Seeds Coop and Alexandra Lyon with BC Seed Trials

Keyline Water Management: Slow, Sink, Spread, Store & Plan for Overflow presented by Tayler Krawczyk, Hatchet & Seed

Soil Research Round-up & Exchange of Best Practices presented by DeLisa Lewis

Livestock

Developing Strategies to Feed your Livestock Cost Effectively presented by Rod Reid from In Season Farm

Organic Pastured Poultry Production: A panel discussion on outdoor access and range management hosted by Anne Macey

Animal Health & Welfare on Organic Farms presented by Dr. Steph Rhebergen and Lisa Pierce

Processing & Business Stream

Planning to Reach the Wholesale Market presented by Julia Grace of Moonstruck Cheese

Moving to a Digital Record Keeping System Chris Bodnar, Close to Home Organics

Cooperative Business Structures with Heather Pritchard

Be sure to sign up for the #COABC2017 Newsletter at <http://eepurl.com/coU0lz>

Stay Tuned for updates updates on the remaining Guest Speakers and Saturday night musicians via the COABC Website and our Facebook Event Page!

We look forward to seeing you in February! 🌱



certifiedorganic.bc.ca/infonews/conference2017

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- Directa Distribution, Pointe-Claire, QC

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Item	Units	Unit Price	Quantity Discount	Quantity	Total
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).

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NEW!! COABC T-shirts Designed by Brian MacIsaac Men's size S-XXL & Ladies sizes S-L	\$17.85	\$17.85	PST taxable		
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that grow healthy communities!



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