Fall 2007
Volume 10, Issue 4

British Columbia Organic Grower

Journal for the Certified Organic Associations of BC

COABC, 3402 32nd Ave. Vernon BC V1T 2N1
Canadian Publications Mail Agreement #40047167

CONTENTS

BC Organic Grower

is received by all members of organizations belonging to the Certified Organic Association of British Columbia. BC Organic Grower is published quarterly by COABC.

We welcome letters to the Editor (300 words maximum) and articles (1000 words maximum). We reserve the right to edit for length.

Letters & submissions to:
Cassandra Redding, Editor
7306 Old Stamp Mill Road
Vernon BC V1H 1N2
phone: 250-307-5705
fax: 250-260-4436
editor@certifiedorganic.bc.ca

Advertising (rates & copy) & non-member subscriptions ($20/year plus GST) to:

COABC
3402 32nd Avenue
Vernon BC V1T 2N1
phone: 250-260-4429
fax: 250-260-4436
office@certifiedorganic.bc.ca

For general information or to contact your local Certifying Body, call the office – or check our website:
www.CertifiedOrganic.bc.ca

Front and Back Cover Photos:
Paddy Doherty
Layout & Design:
Cassandra Redding

Products advertised in BC Organic Grower are not necessarily approved for use by organic farmers/processors. Please consult the Materials List.

Next Issue Deadline:
November 15, 2007

President's Letter

by Deb Foote

And so the seasons turn again. Autumn is well upon us and with this change the growing season comes to an end for many of you. It is time to plant the winter cover crop and mulch the perennials. I know this is what I should be doing, but for now I am back in "the city" doing the daily commute to Richmond for the next couple of months.

I attended the last market at Trout Lake this past weekend. It was a pleasure to see many of the farmers, whose stands I have frequented in past years. I was also host to a houseful for thanksgiving dinner. It was wonderful to share the bounty of your harvest with my clan. While it was one of only two mainland markets I attended this year, my Mayne Island Farmer friends can attest to the fact that I missed very few market days on Mayne this past summer. I look forward to more of the same next year.

Over the course of the summer the COABC went through a process of review with the Canadian Organic Office. This actually began over a year ago as we began to take steps toward being recognized as an accreditor under the Canadian Organic Regime. Our application was submitted in early January, and the review took place in July. Two government officials interviewed Kristy, Anne, and Navneet at the office. They also conducted a thorough review of the documents and guidance papers provided with our application. They wrapped up their review by meeting with me to overview their findings. I am more than pleased to say that the COABC will be receiving an official letter approving our ISO Accreditation system to operate within the Canadian Organic Regime.

It is an interesting time to be a producer in BC. There are lots and lots of opportunities, given the growing demand for locally produced food, but there are at least as many obstacles - the biggest being access to land. We need to develop creative ways in which to allow people who want to farm to find land. To that end, Farm Folk/City Folk, in partnership with The Land Conservancy (TLC), have created a program to develop alternative forms of land tenure.

A community farm is a multi-functional farm where the land is protected in perpetuity, long-term leases are assigned for agricultural enterprises, and farmers are housed on the land. With experience in supporting farmers and producers, FarmFolk/CityFolk is leading the way in developing a program to create community farms by placing farmers on the land, mentoring them, facilitating on-farm housing, and developing community programming on the farm. To date they are networking with over 20 existing community farms and working with 10 potential community farms. These organizations should be commended for doing this work.

Then there are the new rules for meat inspection, and the challenges they are presenting to small producers. I am very concerned by the amount of postings for Organic Herds for sale that have been showing up on the Listserve. It is a shame when farms are driven out of business by bureaucracy. It is especially discouraging when there is a growing demand for local production. While I recognize that food safety is a primary health concern, it is also a concern that all food business take to heart. Your bottom line depends on it. But let's be reasonable. I surely hope a better solution can be found, and soon.

Over the next few months we will be busy preparing for the Annual Conference and AGM. We will also embark on a strategic planning process, looking at COABC's role in shaping the future of organics in British Columbia, and Canada, as we move toward December of 2008. Next week a meeting will take place with BC's Minister of Agriculture and Lands to look at this very topic. I will report on the outcome in the next issue of the *BC Organic Grower.*

Deb

organicdeb@shaw.ca

Report from the Office

Who knew? It was obvious to me that 'organics' was a fast growing trend but I did not know to what extent and how big of a part COABC played. It is remarkable that the website received 474,531 hits in July compared to only 259,586 hits in July 2004. Though this interest comes from a variety of sources, for different reasons, it is exciting to know that we are being used as a resource for potential members.

Another response to this growth has been the addition of the Extension Agent, Rochelle Eisen, to the team. She will be available to answer your questions about the complex needs of organic farming, processing and handling. This program has already been an effective solution to the many calls that we receive. It is with pride that we continue to develop our capacity to provide an even greater level of support.

As many of you know, with the restructuring, the focus of the Administrator's position will be different than that of the Executive Director. An ED often carries two very full plates, one being that of external networking and the other being internal organizational development. I, as an Administrator, will have the privilege of carrying the one plate of internal organizational development. This will allow me to serve the Board, the members and the staff with excellence.

These early weeks have been spent developing strong working relationships with our contractors and getting to know the Directors better. We have also developed a new financial reporting format which will make them easy to read planning tools. I have to admit that the one outstanding thing that I have learned is that although COABC is a part of a growing and dynamic sector, and that the people who are part of it have done amazing work, there is still much more to do!

Karen

Editor's Note

Time is flying right by. Already the leaves have changed, the days have gotten darker, and the weather is so much colder than what seems like just yesterday. Many of the stores have their Christmas promotions on display and we have not even got through Halloween.

The stores also are carrying so many "green" products these days as it becomes more and more popular to buy organic. The questions still remain - how far did that product travel and how much labour and energy did it take to bring that product to me? Am I doing the world a favour by buying that product or not?

As the new meat regulations came into effect this season, one has to wonder how that will affect the bigger picture, as well. The increase in the amount of transportation does not seem like a step towards creating a better planet. Food safety is, of course, a huge concern, but it seems a hard balance to adjust to.

I hope everyone enjoyed the fruits of their hard toil and labour over the Thanksgiving weekend - the food and wine would taste that much sweeter for everyone gathered at the table.

In this issue you will notice we have a new feature. We now have *Dear Rochelle* where Rochelle Eisen answers important questions concerning all things organic. Please send your questions to Rochelle at rare@telus.net.

Please remember that if you have an idea, an article or an event that you would like to see featured in the *BC Organic Grower* you can contact the COABC office or myself.

Cassandra

Pick a Peck of Prairie Pulses

By Brenda Frick Ph.D., P.Ag.

Pulses (dry, edible legume seeds) are widely recognized as a good source of protein, starch, fibre, and B vitamins and are considered a healthy part of a balanced diet. These legumes are valued as high protein livestock feed, whether as seed, for grazing, as hay or as silage. Similarly, legumes are ideally suited to feeding the soil and as a healthy part of a balanced rotation.

On the prairies, the most commonly grown pulse crops are field pea and lentil; though pulses such as dry bean, chickpea, faba bean, and soy bean also have a place.

Field pea

Saskatchewan has long been the world's leading exporter of field pea, so it's not surprising that organic farmers on the prairies often turn to field pea as the legume in their rotation. Both yellow and green field peas are grown. They are sold both as food and as feed. The classic food use is in split pea soup, though of course more innovative cooks have developed a greater repertoire of pea recipes. Pea seeds contain up to 25% crude protein, so they are much valued as livestock feed. Much of the prairie organic pea crop is exported, especially to Europe, but a small local market exists for food and especially for feed.

Field pea is best suited to black and grey soil zones on the prairie, where moisture is less limiting and high temperatures are less frequent. Field pea can be grown in the drier regions if seeded early to avoid excessive heat during flowering.

Field pea is often grown at a point in the rotation where nitrogen is limiting. Legumes are able to partner with bacteria to obtain nitrogen from the air. This gives them a tremendous advantage against weeds in low nitrogen soils. Field pea also withstands mechanical disturbance very well. When damaged, the pea plants are often able to regrow from nodes under ground. This gives the pea another advantage in weedy fields, where harrowing, rod weeding or rotary hoeing can be used to good effect. Many producers feel that leafy peas are more competitive with weeds than the semi-leafless varieties, perhaps because they let less light through the canopy. Research results have been inconsistent. Semi-leafless peas often resist lodging better, and this too can improve weed competition.

Powdery mildew is a common disease of field pea in the prairies. Often considered minor by producers, it can reduce yields by 10-15% on average, and the release of spores during harvest can be a risk for combine fires and grain dust allergies. The easiest way to avoid powdery mildew is to select a resistant cultivar. Field pea is relatively free from insect attack, and is not a preferred food of grasshoppers.

Field pea can be used as forage at the early bloom stage, or for winter grazing on pea stubble. Field pea can provide a valuable green manure. Usually the plant material is incorporated into the soil at early bloom. With adequate moisture, field pea can provide over 170 lb N / ac. Small seeded peas, such as 4010 forage pea are available at lower cost per acre.

Lentil

The lentil is a relatively recent introduction to the Canadian prairie. From humble beginnings in the 1970s, lentil production has grown to the point that now Saskatchewan is the world's leading exporter of lentils. Organic farmers produce a variety of lentil types, including large seeded greens, medium seeded greens, small seeded greens, French greens, and reds. Lentil is primarily grown as food. Dhal, or split lentil, is a staple in India. Lentil recipes are abundant, and range from soups and salads to casseroles and baked goods. Because of their small size and flattened shape, lentils cook quickly. Lentils average 22% protein, and are also an important source of fibre, vitamin A and a variety of minerals.

Lentil is best suited to brown and dark brown soils on the prairie. They are somewhat drought tolerant, but they do not tolerate flooding or waterlogged soil. Lentil, like pea, can access nitrogen through their partnership with bacteria. Lentil is a relatively short stature crop, and a notoriously poor weed competitor.

...continued on page 6

...continued from page 5

It is best grown at a time in the rotation when weeds are under control, after a strong competitor such as fall rye, oat or barley, or following a green manure. Harrowing lentil is possible, but lentil is more susceptible to damage than field pea.

Lentil breeding on the prairies has focused on disease resistance and quality. Today it is possible to find varieties, especially of reds, that have dual resistance to ascochyta and anthracnose. Beyond these varieties, disease is manageable through rotation, isolation and quality seed. Lentil can be highly susceptible to grasshoppers, which are especially damaging at flowering. It is not recommended to grow lentil in years when there is a high risk from grasshoppers.

Lentil is not generally grown for forage; the straw is of high feed quality, but the amounts produced are low. The very small seeded black lentil was developed as a green manure. With adequate moisture it can produce up to 130 lb N / ac, at a relatively low cost per acre.

Dry bean, chickpea and soy bean
Organic producers grow relatively few acres of dry bean, chickpea or soy bean on the prairies. Dry bean and chickpea are used almost exclusively as food; dry bean, primarily in soups and chilies; chickpea, primarily in hummus, falafels, salads and as flour. Soybeans are valuable in both the food and feed markets. These specialty pulses require special care. Dry bean acres are limited by temperature. The plants are very sensitive to frost at both seedling and seed set stages, and they require warm temperatures for active growth. Likewise, soybeans tend to require a longer, warmer season than is reliable on the prairies. Both are high value, but high risk crops. Chickpea is better adapted to the drier brown and dark brown regions of the prairie. A major limitation with chickpea is its susceptibility to disease, especially ascochyta. Organic producers rely on a disease prevention strategy, including clean seed, rotation and isolation for success with this difficult crop.

Faba bean
Faba bean is currently grown on few acres on the prairies, but recent breeding efforts may change that. The benefits of faba bean have not been accessible to producers because the very large seed size meant a very high seed cost. The goal is to bring seed size down to that of a pea, with a seeding rate of 1 bu / ac.

Faba bean has tremendous potential as a green manure. With adequate moisture, faba bean and its associated bacteria can fix as much nitrogen as an established alfalfa or sweet clover stand, about 270 lb N / ac. Most pulses will use available nitrogen from the soil before partnering to fix nitrogen. According to Bert Vandenberg, pulse breeder at the Crop Development Centre in Saskatoon, faba bean always produces a positive nitrogen balance; it always adds nitrogen from fixation and is the most efficient nitrogen fixer of the pulse crops.

Faba bean may be ideally suited for flexible cropping in cool and moist areas such as the black and grey soils. The plant has good frost tolerance, and can be harrowed after it reaches 5-15 cm in height. Faba bean is an excellent forage or high protein silage. If the plant is swathed for forage or silage in early August, and if there is late season moisture, it can continue to grow and fix nitrogen well into the fall. Alternately, if allowed to go to seed, it averages about 30% protein.

Dr. Vandenberg suggests that faba bean is "delectable" to grasshoppers, and suggests that it would make an excellent bait crop for lentils. A producer could seed lentil at the usual time in a grasshopper prone area, then later seed the faba bean. At the stage when grasshoppers do the most damage to lentils, during flowering, the faba bean would be a much more attractive crop to the grasshoppers, deflecting them off the lentil.

Small seeded, relatively inexpensive faba bean varieties will soon be available. Organic producers may just find them "faba-lous".

Conclusion
Pulses in partnership with bacteria can pull nitrogen from the air that is in the soil and incorporate it into plant tissue. This vital interaction provides a valuable, high protein feed for us, for livestock and for the soil. On the prairies there are several options that make the most of this pulse potential.

Brenda Frick, Ph.D., P.Ag., is the Research and Extension Associate for OACC at the College of Agriculture, University of Saskatchewan. She welcomes your comments at 306-966-4975 or via email at organic@usask.ca.

Poultry Litter Composting

Prepared for the COABC by E.E. Milligan, W.D. Temple, and A.A. Bomke Faculty of Land and Food Systems, University of British Columbia, Vancouver, BC

Why Compost?
Composting kills pathogens and weed seeds, improves characteristics for land application, stabilizes the nutrients, and is required under the certified organic regulations for livestock manures used on crops for human consumption.

Composting Requirements
Important: Compost pile management must result in temperatures of >55ºC. The pile must be turned no less than five times over a period of no less than 15 days during this high temperature period to ensure complete pathogen and weed seed reduction.

Recipe for Successful Composting

In order for the compost pile to heat up above 55ºC the correct balance of carbon, nitrogen, oxygen and water are required. To achieve this you should:

- Begin with a mixed feedstock carbon/nitrogen (C/N) ratio of 25 to 30.
    - o Poultry litter has a C/N ratio of approximately 10 to 15. Thus, you will need to mix in a high C feedstock, such as horse bedding rich in straw, wood chips, fruit rind, etc.

- Begin with a moisture content of 35 to 50% (when squeezed it feels like a damp sponge)
    - o This may require adding water or allowing rainfall to dampen dry poultry litter or other feed stocks prior to turning. Also, fresh delivered poultry litter will quickly heat up on its own and loose moisture rapidly.

- Once you establish a consistent feedstock supply, have it analyzed periodically by an analytical laboratory to determine your exact C/N ratio and moisture content.

- Thoroughly mix the feedstocks to ensure adequate homogenization and aeration.
- Construct a windrow of no more than 7m wide and 3m high, length may vary.
- Monitor the core temperature (80 cm into pile at waist height) of the pile.
    - o The pile temperature will drop immediately after turning and then quickly rise again from the outside edge into the core. Once the core temperature has reached 55ºC wait 2-3 days and then turn the pile again.
- Repeat the turning procedure 5 times over a period of 2-3 weeks.
- Cure the compost for at least 6 weeks and cover from intense over-winter rainfall to avoid runoff to any surrounding waterways and/or ditches.
    - o Over-wintered windrows must be located at least 30m away from waterways/ditches.

continued on page 8...

...continued from page 7

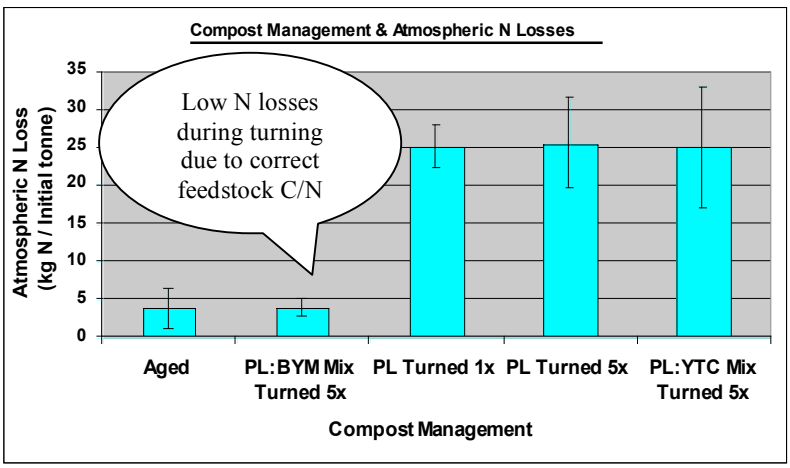
C/N Ratio

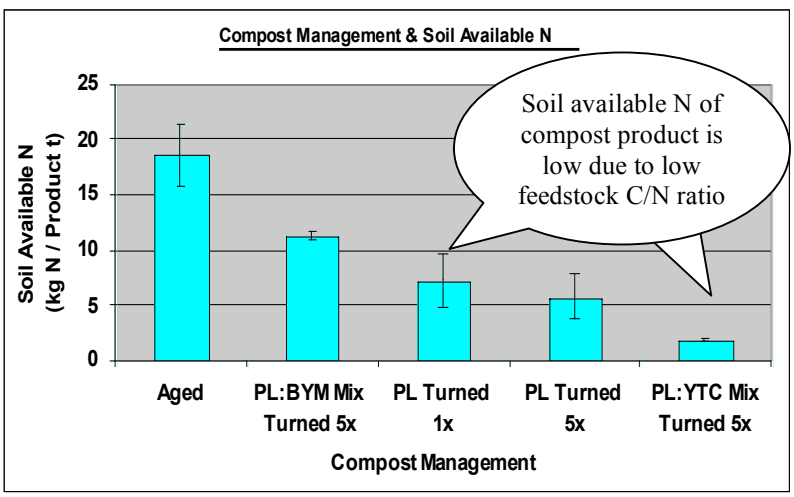
Typical Carbon and Nitrogen Analyses of Some Compost Feedstocks

	Fresh Poultry Litter (PL)	Municipal Yard Trimmings Compost (YTC)	Barn Yard Horse Manure (BYM)	Straw (Wheat)	Wood Waste
Total % C	32	28	38	56	>20
Total % N	3.7	1.6	0.9	0.4	<0.1
C/N Ratio	9	17	42	140	>200
% Moisture	25-33*	50	60	ND**	ND

*Broiler Litter = 25% moisture, Turkey litter = 33% moisture

**ND - indicates no data





C/N Ratio

The two graphs show the effects of C/N ratio on N losses during composting. Poultry litter has a low C/N ratio and thus experienced very high gaseous N losses when composted on its own (upper graph). When PL was mixed with a high C material, namely barnyard horse manure (BYM) (60:40 PL: BYM) the initial C/N ratio was increased and N losses during composting were decreased. This resulted in higher concentrations of soil available N in the finished PL: BYM compost as compared to the PL alone compost (lower graph).

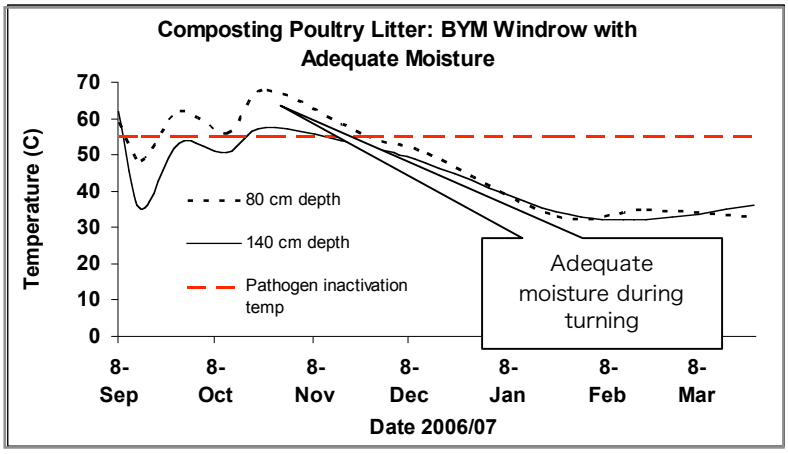
Common pathogens present in livestock manure

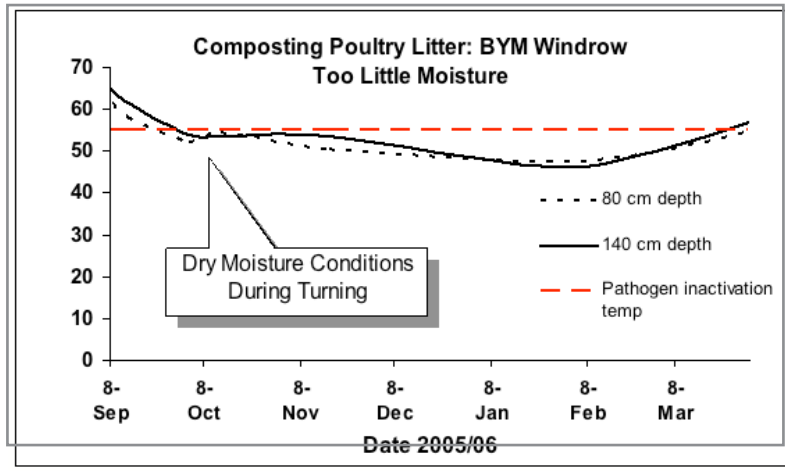
Pathogen	Inactivation Temperature (ºC)	Inactivation Time
Campylobacter **-** causes gastroenteritis	**50**	**Hours**
Salmonella **-** causes typhoid fever and gastroenteritis - can be fatal	**50**	**1 to 2 Days**
E. Coli **-** present in guts of mammals - causes intestinal and extraintestinal diseases - can be fatal	**50**	**1 to 2 Days**

(Jeffrey et al, 2001)

Temperature

Due to the 2004 outbreak of Avian Influenza in the Fraser Valley and other high profile cases of bacterial contamination of vegetables, food safety concerns regarding the use of manures in crop production have increased. Poultry are known carriers of human pathogens, most notably E. Coli, Campylobacter and Salmonella. Therefore, achieving the regulated 55ºC during composting is critical to producing a food safe crop.





Effects of Moisture on Temperature

The two graphs on the left show the effects of moisture on compost pile temperatures. Temperature measurements were taken at waist height, parallel to the soil surface, 80cm and 140cm into the pile. When moisture content was too low (lower graph) the pathogen inactivation temperatures were not reached. When the moisture content was adequate (upper graph) the pathogen inactivation temperatures were reached and exceeded. This reaffirms the importance of moisture management in the compost pile.

continued on page 10...

...continued from page 9

Typical N, P, K of Composted, Aged and Fresh Poultry Litter

	Nitrogen (N)		Phosphorus (P)		Potassium (K)	
	Total kg/t (dry)	Soil Avail.* kg/t (dry)	Total kg/t (dry)	Soil Avail.* kg/t (dry)	Total kg/t (dry)	Soil Avail.* kg/t (dry)
Composted PL:BYM turned 5X	40	11	20	2.7	19	17
Aged PL - unturned	50	18	20	3.0	18	18
Fresh PL	44	16	18	1.7	16	16

*Portion of total nutrient concentration which will be available for plant uptake in the soil.
**Conversion Factors: 3.33 m3/dry t; 1.30 yds3/m3; 2.47ac/ha; 2.2lbs/kg; 4.33 yds3/dry t; 1 t/ha = 0.45 ton/ac; 1 t/ha = 1.75 yds3/ac

Composting Effects on Genetically Modified Materials, Pharmaceutical Compounds and Pesticides

It is currently believed that composting will degrade most genetically modified and pharmaceutical materials. However, this has not been confirmed in practical field scale studies. The effects of composting on pesticides have been widely studied. Most pesticides registered for urban use are degraded during composting. The only pesticide detected in the City of Vancouver yard trimmings compost in 2004 was "Mecoprop" (0.2 ppm), which is a chlorinated herbicide found in "weed and feed" lawn additives.

Advantages	Disadvantages
Food safety issues are addressed – prolonged high temperatures reduce pathogen numbers ***Less wear and tear on spreading machinery*** – higher application rates mean lower ground speeds and more uniform applications are possible ***Better control of weed seeds and pests*** – high temperatures reduce these ***Odors during spreading are greatly reduced***	***Losses of C & N*** – these losses can be reduced by adjusting the C/N ratio of the feedstocks ***Higher application rates to meet crop nutrient demands*** – N losses during composting may lead to heavier application rates required ***Composting adds to production costs***

The Composting Council of Canada has several helpful composting fact sheets on their website: http://www.compost.org/ccc_alberta_factsheet.html
Cornell University composting website: http://compost.css.cornell.edu/science.html
BC Ministry of Agriculture and Lands: http://www.agf.gov.bc.ca/resmgmt/publist/300series/382500-3.pdf
Haug, R.T. 1993. *The Practical Handbook of Compost Engineering.* Lewis Publishers, Boca Raton, Florida.

Beyond Agritainment Growing Interest in Farming

By Andrew Rodman

When I was in elementary school, we took a class field trip to a nearby farm. I still remember the smell of hay, and the sights and sounds. It was an alternate reality to my upbringing. Though a lifetime ago, it stuck with me. Which leads to the question of how you share the vitality of your farm or community garden with the next generation. The answers can be as close as a school bus.

One of the most potent ways to impress the next generation with the dynamics and wonders of agriculture is to open up your farm to school field trips. Farm visits combine experiential learning and curriculum based connection with academic experience. While some farms offer visits for free, most should get paid fot their time. Not only is time taken out of the valuable farm day, but there is pre-visit planning and post-visit clean up to be accounted for. Fees typically range anywhere from $5- $10 per student/visitor depending on the length of the visit, which includes what is given away during the tour. It is not appropriate to turn away anyone for a lack of funds.

The real value of farm visits is in the long-term. Fostering connections with the next generation of growers and forging a lasting connection between the community and your farm. This has positive repercussions that can be unseen for years.

Planning is key

When you make the decision to open up your farm or community garden to school children, the outcome will depend on sufficient planning. Publicity, pre-trip class visits, seasonality, activities, insurance and follow-up will factor into whether the event is a success.

Avoid scheduling tours during peak season, but you want to have something interesting to see that will engage kids. Let them get their hands dirty, and plan ways that they can help you.

Getting the word out about your farm's services can achieved through working with 4-H clubs, agricultural extension services, press releases and flyers to the target school. If you are new to this, it may take a few times before you get established and teachers will seek you out.

Invitations for farm tours should generally go out to classes two to six months in advance, for planning on the school's part. Tapping into your local community to host farm visits does not require as much advance lead time.

Visiting the school the day prior to the farm day is recommended. Plan on a solid class period to introduce the farm systems, and answer general questions. Prep topics should stress appropriate clothing for visit day. Does anyone have allergies or sensitivities to sun or to insects? Waiver forms and permission slips should be bi-lingual.

continued on page 12...

...continued from page 11

Student name tags are important. Teachers generally provide this. Being able to say someone's name is valuable, especially if they are acting up.

On the ground
Dru Rivers of Full Belly Farm has been hosting farm visits for 15 years, and says that one of the biggest mistakes she made in her first years of hosting educational visits was to plan each minute of the day. "There are always so many things to see and do on the farm, that strict structure is unrealistic. It's good to leave flexibility in your schedule to reduce stress and to make sure students get enough out of their visit by spending more time on activities that really resonate with them." Try not to over plan!

Look at your production cycles. What are the different processes that you are engaged in? Are you looking at processing, orchards? Row crops? Vegetable production? An orchard may demonstrate an apple press, or let students do a tasting. Some examples of farm visit areas of focus may be windbreaks, biodiversity, organic production methods, and CSA models. Kids can taste, pick, harvest, plant and sort.

The age of visitors is going to determine the complexity of your visit. Group size is determined by how many adults are available to help lead and supervise activities, and the age and energy level of the group. There should be one parent or chaperone per group of students. Small groups ensure that everyone gets a chance to be involved, can move around the farm and stay focused better. This is especially important when working with tools like hoes, hoses and shovels. The importance of individual participation can't be stressed enough.

Anyone younger than eight probably won't have the attention span for a four hour visit, so you will want to plan for a shorter one for younger age groups.

Set the farm rules ahead of time. Rules can be really basic like no running (unless permitted), and "Look before you leap, turn your brain on, think and pay attention!"

You should get an additional insurance policy for chaperones, additional parents and other volunteers. The school policy usually covers the students and school staff.

Transportation
The school generally takes care of the transportation logistics. If the school arranges for a bus, make sure there is ample room for the bus to turn around, and enough room around the bus for safe exit and entry of the students.

Curriculum connections
As important as pre-planning is, the post visit is where you can reinforce the lessons learned.

What if the class goes next to a farmers market to see food they have seen grown being sold directly to the public? What if they meet with a grocery store produce buyer? These are important lessons.

Making the connection between curriculums like, math, geography, life and physical sciences is really easy. Don't forget the importance of composting, harvesting, looking at biodiversity on the farm, soil and water systems.

Through the English curriculum, students can write about their visit and impressions.

What people understand they value, and what they value they protect. This is the essence of the school-to-farm connection, and the most important legacy you can participate in.

Reprinted from *In Good Tilth*.

The Artichoke That Isn't

By Pam Blower

The Jerusalem artichoke is a brown-coloured, knobbly, white-fleshed tuber root vegetable from the daisy (Compositae) family. It is not related to globe artichoke.

In the USA it is known more commonly as sunchoke, and in Italy as girasola artiocco, the sunflower artichoke (girasola means to turn to the sun).

Jerusalem artichokes are native to North America, and the earliest mention is in a report by the European explorer Samuel de Chaplain when he discovered them growing in an American Indian vegetable garden in 1605. By 1612 they had become popular in Europe both as human and animal food.

The plants can easily be grown by burying a fresh tuber 10 to 15cm deep, preferably in a small hill of soil to make harvesting easier. Cut the plant down once the leaves have decayed, not before or the tubers will cease growing.

To keep larger tubers forming, a new bed should be made every three years; the only problem is that every piece you leave behind will grow. This isn't a problem if you keep pigs because they love rooting for them.

The planted tubers will sprout in spring, the new tubers forming just before flowering when the plants reach one to three metres in height. The yellow flowers are similar to a small sunflower.

Each plant can produce more than 75 tubers, with 200 having been recorded on a single plant.

Jerusalem artichokes can be grown on poor soil, but the tubers would be small. They are also not partial to clay, but will grow.

Sometimes for sale at farmers' markets, it is surprising that Jerusalem artichokes are not grown more often as a winter vegetable. A crop is always guaranteed, even in the shade, although larger tubers are produced when the soil is light and rich, making them easier to harvest, as the tubers tend to cling to the roots and become entwined. Cultivated types tend to grow close to the main root/rhizome while wild ones grow at the end of roots.

Jerusalem artichokes are highly suitable for diabetics because of the inulin (an oligosaccharide) content. This is a dietary fibre with a mild, sweet taste that doesn't require the pancreas to produce insulin. Dietary fibre such as this swells in the colon and helps everything else move along. It also makes you feel fuller which is good if you have a weight problem.

Containing just 57 calories per half-cup, the uber also contains an impressive 327mg of potassium, a good supply of iron, plus a variety of other minerals and vitamins.

The Jerusalem artichoke is an extremely versatile and nutritious vegetable which can also be used for livestock feed, fuel-grade alcohol (ethanol and butanol), and fructose production. The sugars from one acre can produce 1800 litres of alcohol.

In France, Jerusalem artichokes have been used for wine and beer production, and the foliage can be used to make silage.

Jerusalem artichokes scrubbed, are then stir-fried, baked, steamed, boiled or eaten raw, and their delicate sweetness and nutty flavour make them an excellent, crispy substitute for water chestnuts.

Reprinted from *Organic NZ* Sep/Oct 2007

Announcement about Deadlines

There are many federal initiatives which give direct financial support to farmers that have looming deadlines:

The Canadian Farm Families Options Program - for those who received farm income assistance payment in 2005 (including applicants who were eligible but were not issued a cheque because it was less than $100). http://www4.agr.gc.ca/AAFC-AAC/display-afficher.do?id=1176921918054&lang=e The deadline for the next round has been extended.The Canadian Farm Families Options Program (Options) is designed to provide short-term income assistance to farmers and their families while they pursue training and advice to improve their business prospects and income for the long term. Toll free at 1-866-367-8506. Deadline of **November 30, 2007**

The Canadian Agricultural Skills Service (CASS) program will provide funding to beginning and established farmers and their spouses to develop a learning plan and take courses to help them gain the skills they need to reach their goals. CASS will assist farm families to acquire on-farm skills, or skills and training to pursue other income options, or both. This deadline may only apply to some applicants. For more information visit http://www4.agr.gc.ca/AAFC-AAC/display-afficher.do?id=1176223625955&lang=e from BC Phone: 1-800 O CANADA. Deadline of **March 31, 2008**

Farm Business Assessment – "Once you have decided to participate in the Farm Business Assessment, it's time to start turning your goals into a reality. A business planning professional will provide you with a confidential, independent, one-on-one financial review. Valued at $2,500, you may be required to pay $100 (this fee is waived for producers who qualify under the Canadian Farm Families Options Program) for the following services: Farm Financial Assessment, Action Plan and Followup. " Visit http://www4.agr.gc.ca/AAFC-AAC/display-afficher.do?id=1175634750990&lang=e, **Deadline unknown.**

Specialized Business Planning Services (SBPS) provides you with financial support to help with comprehensive business or succession planning. Through SBPS, you can access funds to help pay for the services of a consultant to develop detailed business plans for your farm operations. Visit http://www4.agr.gc.ca/AAFC-AAC/display-afficher.do?id=1175714116643&lang=e. Deadline **of March 31, 2008**

A complete list of all federal agriculture programs is posted at http://www.agr.gc.ca/index_e.php?s1=prog.

Dear Rochelle,
I found beetles (see pic) in some recently purchased peat moss! Is it a problem?
Buggy from Rutland

Dear Buggy,
From the picture I would guess that your visitors are a type of blister beetle, but you will need to confirm this with Tracy Hueppelsheuser (Tracy.Hueppelsheuser@gov.bc.ca 604 556-3031), the BC Plant Health Unit entomologist, to be sure. Blister beetles like this are not common, although they can be found in BC, but they do not seem to threaten any particular crop. However, there are reports that large populations of adults can defoliate various crops including beans, peas, potatoes, squash, tomatoes, potatoes, sugarbeets, cabbage, canola, fababeans and turnips.

On the other hand, some blister beetles feed on grasshopper eggs; so if you have a resident grasshopper population you may have just found the perfect solution! Do note though, it is only the first larval stage of the blister beetle which munches down on grasshopper eggs. Supposedly the adult females tend to lay their eggs close to grasshopper eggs to assure a feed source for their offspring. There is only one hatch per year of blister beetles, which is not surprising.

The bad news is that all species of blister beetles produce some level of cantharidin, a fast absorbing toxin, which can cause internal and external blistering/inflammation. Horses are most susceptible to the toxin, while sheep and cattle are more tolerant. Usually livestock are exposed when consuming infested alfalfa hay. Let's hope you have the good ones. Rochelle

The Use of Non-Crop Vegetation to Manage Lygus in Organic Strawberries

Funding from: the Organic Sector Development Program- an Agri-Food Futures Fund from the Investment Agriculture Foundation and Fraserland Organics

Can pests such as the lygus bug (Lygus shulli) be managed by adding flowering shrubs and perennial and annual herbs to a grower's field? Researchers in the agricultural departments of U.S. state colleges believe they can. Funded by federal grants through agencies such as Attra (Appropriate Technology Transfer for Rural Areas) and CASFS (The Centre for Agroecology and Sustainable Food Systems), they have shown that "farmscaping" can have a positive effect by reducing pests in organic crops.

To see if farmscaping principles could be applied to an organic strawberry crop in the Langley area of the Fraser Valley that had a significant lygus problem, a small research project was carried out in 2006. A strawberry field was divided into two equal sections, and flowering plants that were attractive to lygus predators, including yarrow, cosmos, fennel and dill, were planted in between strawberry plants in one section of the field. In addition, a hedgerow of native trees and flowering shrubs, including cascara, willows, elderberry, and native roses, was planted at the side of the treated area, while the other half of the field received no treatment.

Insects were collected weekly by sweeping the strawberry plants with a net. The main lygus predators in this field were generalists, which feed on a variety of small soft-bodies insects and eggs including lygus bugs. They included big-eyed bugs, damsel bugs, lacewings, assassin bugs, the minute pirate bug, and some beetles. In a previous year's sampling, these predators were present at levels that indicated they could have been important biocontrol agents of lygus.

The results of the experiment did not show a significant difference in numbers of lygus bugs between the experimental and the control sections of the field except on one early date. Overall insect populations, including lygus, dropped dramatically from mid-June to the end of the season. This was most likely due to a decline in crop plant quality, as the strawberries were in their fourth year of production, and to some problems with the irrigation system which resulted in some areas of the field not receiving adequate water during the hot dry months of July and August.

Because of the overall decline in insect numbers after the end of June 2006, it is not possible to draw any conclusions about the effect of the insectary plantings and the hedgerow based on this one year of data.

Permanent insectary plantings take several years to become established, so a project such as this should be continued over more than one year to obtain useful data. To make it easier to keep permanent non-crop plants in with impermanent crops, the insectary plants should be planted in strips within or near the crop, rather than interspersed with the crop plants, as was done in this experiment. In addition, more plants, such as Ceanothus, Erigeron and wild buckwheat, should be added to the hedgerow to increase its diversity.

Other interesting farmscaping techniques that have been used successfully include:
1) using trap crops consisting of early season plantings of radish and late season plantings of alfalfa which provide continuous bloom over the season to attract lygus away from the strawberry crop
2) using a tractor-mounted vacuum called a Bug-Vac to remove lygus bugs from the main crop or a trap crop
3) using a mixture of annuals called the Good Bug Blend planted along the field edges to attract both lygus and predators, and then applying control measures to the trap crop

In conclusion, developing a good farmscaping program for organic farms is a matter of trial and error for each farm to determine the best methods to use for the pests that are present, and several years may be necessary for insectary plants to establish and contribute to pest reduction.

Regional Seminar Series has a bit more cash to give away!

Interested in demonstrating the latest farming techniques or equipment to farmers? Looking for some financial support to get this kind of hands-on event off the ground?

The COABC's Organic Sector Development Fund has enough funds left to sponsor a few more regionally oriented seminars. These events must demonstrate something new that can help producers increase their organic productivity. If you have an idea, and a CB or a regional production group who will help coordinate the event, talk to Rochelle Eisen to see if you qualify for financial assistance.

250.547.6573 (h) 250.306.7980 (c) or via email rare@telus.net.

Lygus shulli: Population Trends in Fraser Valley Strawberries, 2004-2006

Funding from: the Organic Sector Development Program- an Agri-Food Futures Fund from the Investment Agriculture Foundation and Fraserland Organics

Lygus bugs (Lygus shulli) are serious pests of many agricultural crops, resulting in significant annual losses to fruits and vegetables in many areas of the province and in a number of different crops. In the Fraser Valley, strawberries are one of the crops that can be seriously affected by lygus bugs, particularly when they are grown organically.

Lygus bugs feed on the achenes of the strawberry, causing a deformation called "cat facing" or "monkey facing". The greatest damage is done when lygus bugs feed on the fruit immediately after petal fall, and all stages of lygus from small nymphs to adults are capable of causing damage. The deformity is caused by lygus puncturing individual achenes and sucking out the juices, and if a sufficient number of achenes are punctured on a berry, receptacle growth is affected and the berry develops unevenly.

Lygus bugs overwinter as eggs laid in plants or adults hibernating in plant debris in the field. In the spring, eggs hatch or adults become active and lay eggs. They go through five nymphal stages, with a moult in between each one, until they reach the adult stage in about five weeks. Previous research in the Fraser Valley by D. Gillespie of Agriculture Canada in 2003 found that there were two generations of Lygus shulli per growing season.

This article reports on research done over three summers, 2004 to 2006, in an organic strawberry field with the Seascape everbearing strawberry cultivar. The purpose was to collect, identify, and count major pests and predators in the field, and to gain information on the timing of the life cycle stages of the lygus bug. Insects were collected by sweeping with an insect net and identified to major groups. The population trends of the lygus bug over these three years are reported here.

In 2004 (Figure 1), data collection started July 13, and the low numbers of lygus on that date would indicate that the first generation had completed development. A peak on July 28 could be attributed to a second generation of lygus, and another peak on September 6 is evidence of a third generation. There were a relatively large number of overwintering adults in the field on October 27, 2004.

In 2005 and 2006 (Figures 2 and 3), the first generation of nymphs appeared in mid-May and completed development by the end of June. Due to a hiatus in data collecting for two months in 2005, the timing of the second generation cannot be verified for that year, but the numbers in October indicate that there was one. In 2006 the numbers of adults and nymphs declined to such low levels from July to September that a second generation did not appear. Numbers of overwintering adults in the samples in 2005 were slightly lower than in 2004, and almost none in September 2006.

Nymphs of the first generation of L. shulli were collected earlier in the spring, in mid-May, in both 2005 and 2006, than has been reported in previous research done in the Fraser Valley (Gillespie et al, 2003), when they were first collected in early June. This could be due to a change in weather patterns, with warmer weather occurring earlier than in previous years. This earlier onset of warm weather as well as unseasonably warm weather (above 20C) continuing into October could also account for three generations of lygus in 2004, as evidenced by a peak of nymphs on September 6 and an increase in adults continuing until the last sample on October 27, which also still included some nymphs.

In 2006, the number of nymphs in the first generation was as high as it had been in 2005, but most of these nymphs did not appear to develop into adults or perhaps left the area, because the number of adults declined after June 30 to less than 2 per 25 sweeps. The most likely explanation for this decline is that there was a decrease in the quality or quantity of the food supply. The

strawberry plants were in their fourth year of production and nutrients had not been applied to the soil since compost was added the year they were planted. Many plants had died in the last two years also, due to the watering system not reaching all areas of some rows, so that the density was reduced compared to the previous two years. Weeds had taken over the areas where plants had died, so there was additional competition for nutrients. The plants in the fourth year were visibly smaller, as were the berries.

In summary, in three years of data collection in a strawberry field in the Fraser Valley, there were three, two and one generation of lygus bugs recorded in the first, second and third seasons respectively. Several factors, including temperature, quality of the plant food, watering regime, and competition from weeds were cited to explain the variation from year to year.

Combining Profits and Environmental Benefits on Organic Farms

By Frances Willick

Organic farming produces similar yields and often higher profits compared to those of conventional farming, while consuming approximately 30% less fossil energy, eliminating pollution from herbicides and pesticides, and conserving soil life and water.

These findings, written by David Pimentel of Cornell University and published in Bioscience, are based on the 22-year Rodale Institute's Farming Systems Trial. The study compared conventional corn and soybean production using recommended fertilizer and pesticide applications; organic production of corn, soybean, wheat, hay, and cover crops using aged cattle manure as a nitrogen source; and organic production of corn, soybean, and wheat using legume-based sources of nitrogen. Neither of the organic systems used herbicides or pesticides.

Yields of both corn and soybean were similar for all systems over the 22-year study period. Yields were lower in the organic systems during the biological transition of the first five years, but under drought conditions the organic systems yielded roughly one-third more corn than the conventional system. The authors of the review attribute this to the higher water content, increased groundwater recharge, and reduced runoff measured in the organic systems.

While energy inputs for soybean production were similar for all three systems, the energy requirements for organic corn production were approximately 30% lower than those of conventional corn.

Organic systems used 35% more labour than the conventional system. In the organic systems, however, labour was spread out over the whole summer, when the farmers were occupied with the wheat, cover crops, and mechanical cultivation. The bulk of labour in the conventional system was required at the beginning and end of the season during planting and harvesting.

Although synthetic herbicides were absent in organic plots, four herbicides were applied at recommended rates in conventional corn and soybean plots. Two of these four - metolachlor and atrazine - were detected in water leachate samples. While the Environmental Protection Agency has not set a limit for acceptable levels of metolachlor in drinking water, the levels of atrazine in the water leachate samples sometimes exceeded the EPA's maximum contaminant level. Nitrate leaching occurred in both the organic and conventional systems, with 20%, 16%, and 10% of samples exceeding the nitrate limit in the conventional, organic legume, and organic animal systems, respectively.

Using cover crops helps retain water, prevent soil erosion, and sustains life in the soil when the land is not being used to grow a cash crop. While crop residues were left on the land in the conventional system, no cover crops were planted.

In both organic systems, cover crops were used. Soil in both the organic systems contained significantly higher levels of soil carbon, soil organic matter, and beneficial fungi than the conventional system. These elements contribute to higher water content, improved disease and drought resistance, and better soil aggregation.

With all economic factors considered – input costs, labour, and yield, the annual net return for the conventional system was slightly higher ($184 per ha.) than that for the organic systems ($176 per ha.) without the price premium. However, since organic products obtain a higher price in the marketplace, the net return for organic production is often equal to or higher than that of conventional production. The study notes that the organic price premium required to equalize organic and conventional returns was only 10% above the conventional price. During the 1990s, the premiums surpassed this level, and now range between 65% and 140%, in the study area.

As the authors of the study note, the environmental and health care costs of conventional farming are significant. The effects of soil erosion, synthetic pesticide and herbicide use, and excessive fertilizer application detrimentally disrupt the planet's ecology as well as human health. Organic farming methods reduce the negative impacts of agriculture on the environment by reducing chemical inputs and soil erosion, conserving water, and improving biodiversity. As this study indicates, these benefits come with adequate yields and good economic returns.

The reference for the reviewed article is Pimentel et al. 2005. Bioscience: Volume 55, pages 573 – 582.

Frances Willick is a Consultant for the Organic Agriculture Centre of Canada. Please send comments or questions by phone to 902-893-7256 or by email to oacc@nsac.ca.

Husky Mohawk Community Rebate Program

COABC is involved with the **Husky Mohawk Community Rebate Program** in order to raise additional funds for the organisation. Husky forwards 2% of the loyalty card users' purchases to COABC in the form of a rebate. All COABC members were sent a card in 2005 and a small amount of members have been using the card resulting in an average rebate of $125 per quarter. We still need more help to raise funds using this loyalty program.

If you would like to receive a card or additional cards, please contact the COABC office at (250) 260-4429 or email us at office@certifiedorganic.bc.ca

The Kootenay Organic Growers Society is pleased to present:
From Soil Foodweb Canada

The 2 day Soil Biology Course

2nd—3rd November 2007

REGISTER TODAY!!!

The Kootenay Organic Growers Society in conjunction with Soil Foodweb Canada in Vulcan, AB, is pleased to announce a NEW two day course from November 2nd to 3rd. The course is designed to be a condensed version of previous Soil Foodweb courses, providing more 'how to' information including compost pre-activation receipts, compost tea receipts, making a compost tea brewer and more. For those who have never taken their previous courses, this course will be a good starting point, providing an overview of Soil Foodweb principles without committing to the full six day course. For those who have taken their pervious courses, this course will not only be a good refresher of the Soil Foodweb principles, but is intended to be more practical, less theoretical.

The course will be taught by Matthew George , Manager of Soil Foodweb Canada, who has a Bachelor of Science from the University of Toronto, has been working with Soil Foodweb for over two years, and has taken the Soil Foodweb courses three times himself.

Introduction to Soil Biology – 1 Day

Sample Course Information: What is the Soil Foodweb? What is Biological Farming? Is there a difference between Biological Farming & organic Farming? How does the Nitrogen Cycle play a role? Are nutrients/minerals important in the Soil Foodweb approach? How does this approach work for farmers? Ranchers? Gardeners? Arborists? Nurseries? & more!

Compost Technology – ½ Day

Sample Course Information: What is good compost? Is there such a thing as bad compost? How do you make different types of compost, such as thermal compost, worm compost, and static compost? Does my soil need compost? & more!

Compost Tea Technology – ½ Day

Sample Course Information: What is compost tea? What do you need to brew it and how do you do it? What are the compost tea receipts? How do you pre-activate compost for your tea? What inputs do you need and where can you get them? What are the benefits and drawback to compost tea compared to direct application of products? & more!

Date: 2nd and 3rd November 2007— 9am to 5pm (Bring a packed lunch….)

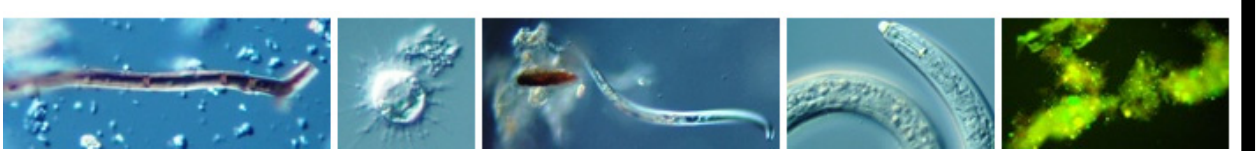
Cost: For members of KOGS- **$50.00** per person; for non-members **$75.00** per person. This is a special price. If attending the course in Alberta, the attendance fee is $200 per person, plus travel and accommodation.

Location: Tarrys Hall, Highway 3A, Tarrys, near Castlegar.

There is a imposed limit of 50 participants. Bookings will be taken and confirmed on a first come—first served basis. Therefore we suggest that if you are interested in the course, you book and pay for the course as soon as possible.

Please note—The fees are **NON refundable** and Non transferable.

To book a spot, please contact: Nette Lack at KOGS office on Tel: (250) 304 5831 or email at office@kogs.bc.ca



Commercial Organic Seed Production

– flowers, grains, herbs and vegetables

A pre 'Bread and Wheat' Festival event; visit www.breadandwheat.com

(October 27, 2007, Fairfield Community Place Victoria)

1 day workshop with Alan Adesse, Munk Bergin and Sharon Rempel

Date: **Friday October 26, 2007** 8**:30 am to 5:00 pm**

OUTLINE

This one day workshop is designed to provide participants with the opportunity to learn the tricks of producing high quality seed, maintaining varietial purity and integrity, seed storage and insect problems, cleaning up seed lines, developing brand recognition and agritourism marketing of specialty seeds and products.

Alan Adesse runs Hands on Organics and is one of the pioneers who helped launch the organic seed industry in North America and also pioneered the medicinal plant trade growth in the 1980's and 90's. He's a commercial organic seedsman, wildcrafter, herb grower and wholesaler. He's coming from Eugene Oregon.

Munk Bergin is an entomologist working with organic farmers and orchardists along the Columbia River. He consults with people storing seed, grains, and other products. Munk and Sharon Rempel worked together in 2007 on a project with heritage corn and wheat and amending the soil with compost teas to enhance nutritional content. He's coming from Hood River Oregon.

Sharon Rempel is a Victoria based organic and heritage seed researcher. She's teaching courses in small scale grain production and food security and safety issues. She's hosting this workshop as part of Canada's first 'Bread and Wheat' Festival www.breadandwheat.com

PROGRAM

8:00 to 8:20 Arrival and registration
8:25 Welcome and introductions
8:30 – 10:00 am Basic Planning – locating field; leasing land and writing a lease; crop choice; crop rotations; irrigation and water; site preparation; what's the land like and soil; getting in the field to prepare land; weeding; machinery options (leasing, contracting, buying, sourcing).
Refreshment break
10:30 to 12:00 Production – seedlings, transplants or direct seeding; seed amounts; weeding(manual, cultivator, rototill); assessing water needs; monitoring for diseases and pests; cleaning up lines; rouging; dealing with off types; maintaining varietial purity; timing for planting and harvest.
12:00- 1:00 lunch vegetarian friendly food; local and organic meal
1:00 to 2:30 Enhancing Production for higher quality – germination testing; disease testing; seed storage basics; new research ideas about enhancing nutrition and taste in crops; customized compost teas.
Refreshment break
3:00 – 3:30 Grain basics – amaranth, quinoa, corn, wheat, emmer, einkorn, spelt
3:30 – 5:00 Marketing and Community Seed for Diversity and Security - marketing strategies; community seed coordination to have a diversity of lines for a region; packaging; selling wholesale vs. retail; finding markets for seed; agritourism options; economics of production and expected returns.
A full intense day; handouts provided to save taking piles of notes.

PLEASE REGISTER BY OCTOBER 20, 2007

Location: Metchosin Community House, 4430 Happy Valley Road, Metchosin (part of Victoria, western part) – next to the Metchosin Fire Hall.
More information: Workshop organizer Sharon Rempel, phone (250) 298-1133; email slrempel@shaw.ca and www.grassrootsolutions.com
Who should come: This workshop is targeted for people who are already familiar with production of seed and want to develop higher quality seed and better marketing strategies.
Cost: $50 per person (includes handouts, lunch and refreshments). Preregistration a good idea; room size is limited. Register by October 20 so we can order food. There are dishes at the venue. Thanks to COABC for funding support for the event.

Organic Weed Control Solutions in Broccoli

Funding from: the Organic Sector Development Program- an Agri-Food Futures Fund from the Investment Agriculture Foundation and Fraserland Organics

Prepared by:
Jackson Chu, Lena Syrovy and Heather Meberg
E.S. Cropconsult Ltd.
3041 West 33rd Avenue, Vancouver, BC, V6N 2G6
604-266-6560
December 2006

Abstract
A need for cost-effective weed control has been identified as a major concern among organic growers. Mechanical cultivation and hand weeding currently provide effective control, however high labour costs make hand weeding increasingly uneconomical. Trials were conducted in transplanted broccoli and cranberry in Delta, BC in 2006 to evaluate two naturally derived herbicides, corn gluten meal (CGM) and vinegar, as potential tools for organic weed management. The broccoli study consisted of six replications of five treatments: CGM broadcast and incorporated at transplant, at 200g / m2; vinegar sprayed twice on weeds at 1:2 (1X) and 1:3 (2X) parts water to vinegar; hand cultivation (twice); and an unweeded control. The cranberry study consisted of eight replications of three treatments: CGM broadcast at 200g / m2; vinegar at the 2X rate, sprayed once on weeds; and an unweeded control. Common weeds in the broccoli study included pigweed (Amaranthus spp.), lamb's quarter (Chenopodium spp.), chickweed (Stellaria spp.), creeping Charlie (Glechoma spp.), shepherd's purse (Capsella spp.), and lady's thumb (Polygonum spp.), while bog blueberry, blackberry, vetch, and juncus were most abundant in the cranberry study.

Broccoli plots were assessed twice for percentage weed cover and number of weeds. An additional study was conducted to determine phytotoxicity to broccoli plants. Cranberry plots were assessed before and after treatment to determine percentage weed cover and phytotoxicity to cranberry plants.

In the broccoli study, a significant treatment X location interaction was observed, as weed cover was higher along the field edge than within the field. Under lower weed pressure in the middle of the field, vinegar applied at 1X or 2X rates produced similar % weed cover and number of weeds to hand cultivation after one application. The lowest levels of weed cover were achieved with the 2X vinegar treatment. After two applications, all four methods were successful at reducing the number of weeds compared to the uncultivated control.

Along the field edge where weed pressure was higher, no treatments were effective at suppressing weeds on the first sampling date. The two vinegar rates and hand cultivation resulted in fewer weeds along the edge after two applications. The highest percent weed cover and weed counts were found in corn gluten meal plots, while the 2X vinegar rate had lowest weed cover and number.

Significant yellowing, browning or bleaching symptoms were observed on both broccoli and cranberry plants in vinegar-treated plots, indicating phytotoxicity. Thus vinegar will need to be used with care to minimize the risk of crop damage. Further work to examine appropriate timing of vinegar sprays with other weed control options, such as mechanical cultivation, is needed.

Introduction

Weed management is a major concern of organic vegetable crop production. Mechanical cultivation is widely regarded as the most commonly used non-chemical, weed control method (Smith et al., 2000). However, cultivation does not eliminate all weeds and hand weeding is often required, which maybe time consuming as well as cost prohibitive for the grower. Several natural herbicide alternatives have been suggested to be effective in controlling weeds in organic crops, including corn gluten meal and vinegar.

Corn gluten meal (CGM) is a by-product of the wet-milling process of corn and is an animal feed product (McDade 1999). CGM has been found to have several growth-regulating effects on certain monocotyledonous and dicotyledonous weed species (Christians, 1991; Liu & Christians, 1994, 1997; Liu et al., 1994; Gardner et al., 1997; McDade, 1999; McDade & Christians, 2000). CGM inhibits weed germination by preventing the formation of root systems in plants (Christians, 1993). However, it has also been shown to decrease seedling survival in several crops through this same process (McDade & Christians, 2000).

Limited research has also shown that vinegar (acetic acid) may have potential as a natural herbicide (Chadran, 2003; Chadran et al., 2004; Coffman et al., 2004a, 2004b; Radhakrishnan et al., 2002, 2003). Vinegar acts as a contact herbicide, destroying cell membranes resulting in tissue desiccation (Webbler & Shrefler, 2006). However, vinegar is also non-selective and may also damage the crop depending on the application method (Coffman et al., 2004a, 2004b; Radhakrishnan et al., 2003).

The purpose of this study was to investigate the efficacy of corn gluten meal and vinegar as potential weed management tools for organic vegetable production. In addition, a smaller phytotoxicity study was conducted to examine the potential negative effects of vinegar on the crop.

Methods: Efficacy

Description of study field

The study was conducted in an organic broccoli field in Delta, British Columbia Canada. Broccoli (var. italica) seed was first planted in a seed bed on June 5th and seedlings transplanted in the same field on June 27. Typical weed species found in this field and fields in the vicinity are: pigweed (Amaranthus spp.), lamb's quarter (Chenopodium spp.), chickweed (Stellaria spp.), creeping Charlie (Glechoma spp.), shepard's purse (Capsella spp.), lady's thumb (Polygonum spp.), vetch (Vicia spp.), pineapple weed (Matricaria spp.), horsetails (Equisetum spp.), and various grasses. Although the field was mechanically cultivated as per the growers practice, plots used for this study were flagged off prior to cultivation and were not mechanically cultivated.

continued on page 26...

...continued from page 25

Treatments and experimental design

The experiment consisted of five treatments: corn gluten meal, vinegar 2X, vinegar 1X, hand cultivation and control. Each treatment was replicated 6X and divided between two areas of the field (blocks). The two blocks were chosen due to a difference in weed pressures. Block 1 (east edge) had high weed pressure and block 2 (mid-field) had lower weed pressure. Plots were 2.5 m long by 2.0 m wide with 1.0 m wide buffer zones between plots (Fig. 1). Corn gluten meal was applied on June 27 with a manual hand crank fertilizer spreader at a rate of 200g / m2. The corn gluten meal was then incorporated into the top 0.05 m of soil using a hand cultivator. On July 11th vinegar at both 1x (1 part water: 2 parts vinegar) and 2x (1 part water: 3 parts vinegar) recommended rates were applied via backpack pump sprayers. Vinegar treatments were applied to the plots a second time on July 25. The vinegar treatments were sprayed between rows of open canopy broccoli to mimic application by a boom sprayer. Hand cultivated plots were weeded twice on July 11th and July 25. Buffer areas between plots were also hand weed on these same dates. Treatment details are summarized in Table 1.

Table 1. Summary of treatment details for organic weed control efficacy study.

TREATMENT	APPLICATION METHOD	APPLICATION DATE(S)	APPLICATION RATE	NOTES
Corn gluten meal	Broadcast	June 27, 2006	200g/m2	The corn gluten meal was then incorporated into the top of 0.05 m of soil using a hand cultivator
Vinegar 1X	Backpack Sprayer	July 11, 2006 July 25, 2006	1 part water: 2 parts vinegar	sprayed until run off
Vinegar 2X	Backpack Sprayer	July 11, 2006 July 25, 2006	1 part water: 3 parts vinegar	sprayed until run off

Data collection and analysis

The effect of the different weed control tactics was assessed twice first, on July 25 when broccoli plants were still small. The second assessment was done on August 17, when plants were near harvest. Efficacy was measured in two ways: weed cover and number of weeds. A 25cm2 quadrat was placed randomly in each plot and the percent weed cover in the quadrat was recorded. The number of weeds within the 25cm2 quadrat was also counted and for each plot we did four separate weed counts in four different quadrat locations. Thus the weed count for each plot represents the total weed count in four 25cm2 quadrats. For the August 17 assessment only the number of individual weeds above the crop canopy were counted because the crop canopy had closed by this point and weeds had grown to above the canopy. The quadrats were placed on the crop canopy and again counts for each plot were the total of four locations. The effect of weed management tools on weed cover, measured once on July 25, was analyzed using two-way ANOVA (block X treatment). Effect of treatment on number of weeds, counted on July 25 and Aug 17 was analyzed with two-way repeated measure MANOVA (block X treatment X time).

Methods: Phytotoxicity

A small-scale vinegar phytotoxicity trial was performed on 18 broccoli plants located in the same field as the efficacy study. Plants were located in a single row and were randomly assigned to either the water control, 1X or 2X vinegar treatment. Between each plant there was a 100 cm buffer. Plants were sprayed with the assigned solution to run-off. Phytotoxicity was assessed on August 22, 2006. The proportion of each plant with phytotoxicity symptoms (describe the phytoxicity symptoms) was recorded. Results were compared with a one-way ANOVA.

Results: Efficacy

Weed cover - Weed cover was higher along the field edge than within the field and the weed control tools performed differently in these two areas, leading to a significant treatment X location interaction (Table 2). When treatment efficacy is examined separately in each area of the field we see that within the field the lowest levels of weed cover are achieved with the 2X vinegar treatment and as expected the unweeded control has the highest cover (Fig. 1). Surprisingly, however, along the field edge the highest amount of weed cover was found in corn gluten meal plots with 2X vinegar treatment resulting in the fewest weeds (Fig. 1).

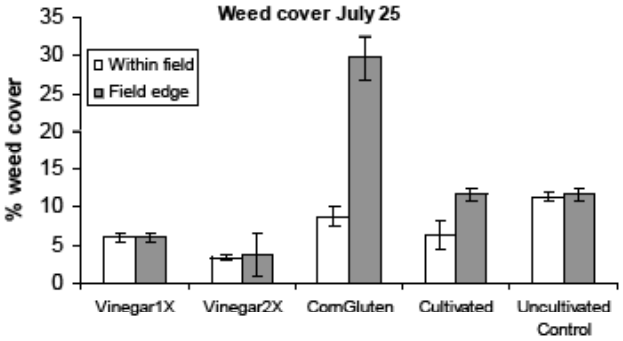


Figure 1. Effect of organic weed control treatments on weed cover in each plot. Each of the 5 treatments was replicated 3 times in the two locations of the field. Each column represents the mean ± s.e. of 3 replicates. None of the plots were mechanically cultivated prior to or during the study, the cultivated treatment was only hand weeded.

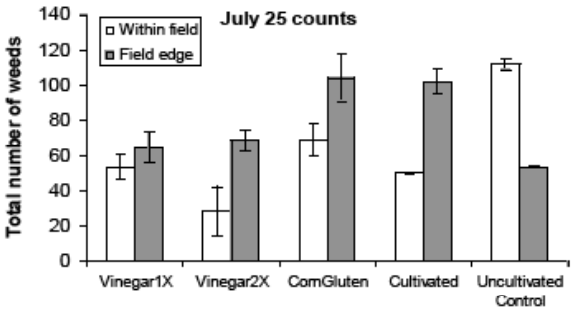


Figure 2. Effect of organic weed control treatments on the number of weeds in each plot following one application of each vinegar treatment and one month after application of corn gluten meal. There were a total of 30 plots, 3 for each treatment in each location. Each column represents the mean ± s.e. of three replicates. None of the plots were mechanically cultivated prior to or during the study, the cultivated treatment was only hand weeded.

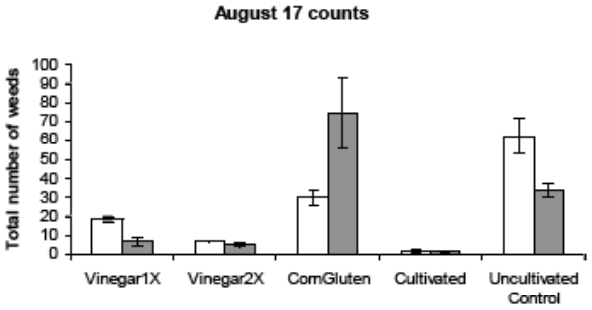


Figure 3. Effect of organic weed control treatments on the number of weeds in each plot following two applications of each vinegar treatment and six weeks after application of corn gluten meal. There were a total of 30 plots, 3 for each treatment in each location. Each column represents the mean ± s.e. of three replicates. None of the plots were mechanically cultivated prior to or during the study, the cultivated treatment was only hand weeded.

Number of weeds - The different weed control tactics did not perform in a consistent manner over the two sampling dates leading to a significant interaction of time X treatment X location (Table 2). When we examined the results separately for each sampling date we see that early in the summer, weed pressure is higher along edges than within the field, leading to a significant location effect (Table 2). All four weed control tactics are effective in suppressing weeds within in the field, compared to the uncultivated control (Fig. 2). Along the field edge none of the treatments are effective at suppressing weeds compared to the control (Fig. 2). The 1X and 2X rates of vinegar did result in fewer weeds along the edge than hand cultivation (Fig. 2). Later in the season, the number of weeds above the crop canopy is similar both within the field and along the edge (Table 2). Again, within the field all four methods are successful at suppressing weeds compared to the uncultivated control. Further, both vinegar treatments performed as well as hand cultivation (Table 2, Fig. 3). Along the field edge weed counts are highest in corn gluten meal plots; with vinegar and hand cultivation treatments resulting in significantly lower weed counts than the unweeded control(Table 2,Fig.3).

Table 2. Summary of statistical results for comparison of different organic weed control methods.

	TREATMENT	LOCATION (BLOCKING FACTOR)	TREATMENT X BLOCK	TREATMENT X BLOCK X TIME
Weed Cover (July 25)	F4,20 = 10.16 P < 0.001	F1,20 = 10.19 P = 0.005	F 4,20 = 5.66 P = 0.003	N/A
Weed Number (July 25 & Aug. 17)			F 4,20 = 11.56 P < 0.001	F 4,20 = 11.64 P < 0.001
Weed Number (July 25)	F4,20 = 7.66 P = 0.001	F1,20 = 9.46 P = 0.006	F 4,20 = 14.20 P < 0.001	
Weed Number (Aug 17)	F4,20 = 24.72 P < 0.001	F1,20 = 0.008 P = 0.928	F 4,20 = 7.73 P = 0.001	

continued on page 28...

Results: Phytotoxicity
Both rates of vinegar caused significant yellowing and bleaching of broccoli leaves compared to the water control (Fig. 3 A & B; p = 0.002

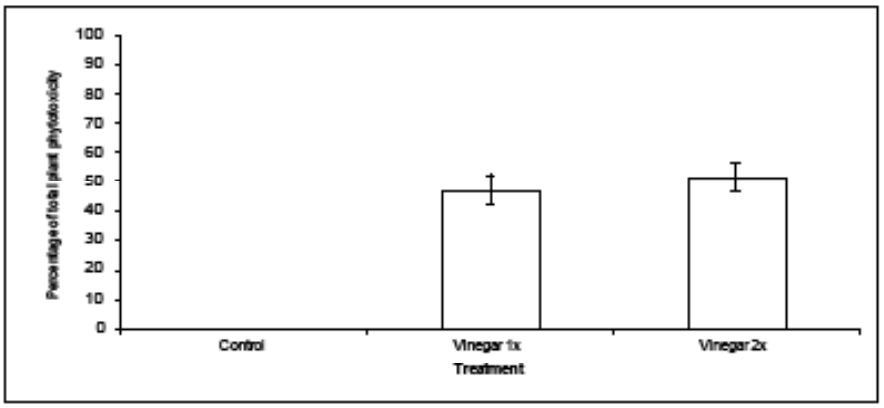


Figure 3A (right) Effect of vinegar treatments on amount of phytotoxicity on broccoli plants (mean ± sem amount of damage per plant). 3B (below) Symptoms of vinegar phytotoxicity on broccoli.

Discussion and summary
The objective of this study was to investigate the efficacy of corn gluten mean and vinegar as a replacement for hand cultivation or weeding for organic production. In an area with moderate weed pressure such as the middle of the field, weed area coverage and total number of weeds significantly decreased in all treatments compared to the untreated controls after the first product application. In an area with higher weed pressure, like the field edge, efficacy was not apparent after the first application of vinegar or indeed after one session of hand cultivation. However by the second assessments weed counts were much lower in vinegar treated or hand-weed plots than the uncultivated control plot along the edge. Thus in areas of higher weed pressure multiple vinegar applications may be required.

However, a single vinegar application may have been sufficient along the field edge had the field been mechanically cultivated as well. Given its phytotoxic effects on the crop (Fig. 3B), vinegar use should be used with care to minimize the risk of crop damage, e.g. application when windy or when crop is larger.

Although corn gluten meal did appear to suppress weeds within the field, the product had the opposite effect on weed growth along the field edge. Since corn gluten meal is a source of nitrogen (Nonneck & Christians 1997) it may have contributed to weed growth in the higher moisture soils of the field margin. Since corn gluten meal acts by inhibiting root growth (Christians 1991) it may only be effective in drier soils where germinating roots face additional stresses. Another limitation of corn gluten meal is that it is not effective on already established weeds.

In summary our study demonstrated the following:
• Vinegar applied at 1X or 2X label rates performed as well as hand cultivation for weed suppression after one application in the mid-field area where there was lower weed pressure. Along the field edge where weed pressure was higher, two applications of vinegar were required to effectively suppress weeds. However if fields are mechanically cultivated prior to transplanting or seeding, then a single vinegar application may be sufficient to manage weeds, even in areas with high weed pressure.

• Vinegar did result in crop damage, yellowing and blanching of leaves. Because of phytotoxicity issues further work should examine timing of vinegar sprays with other weed control options, such as mechanical cultivation

• Corn gluten meal did not appear to perform as well as hand cultivation. Along the field margin where soil moisture was high, the addition of corn gluten meal resulted in higher weed counts compared to the uncultivated control.

Literature Cited

Bond, W., Grundy, A.C., 2001. Non-chemical weed management in organic farming Systems. Weed Res. 41, 385-405.

Buhler, D.D., 1999. Weed population responses to weed control practices. I. Seed bank, weed populations, and crop yields. Weed Sci. 47, 416-422.

Bussan, A.J., Dyer, W.E., 1999. Herbicides and Rangeland. Biology and Management of Noxious Rangeland Weeds. Corvallis, Oregon: Oregon State University Press, 116-132.

Chadran, R.S., 2003. Evaluation of vinegar and corn gluten for weed control in field Grown sweet pepper. Proceedings of the Northeastern Weed Science Society.

Chadran, R.S., Stenger, M., Mandal, M., 2004. Effect of vinegar on potato weed control. Proceedings of Northeastern Weed Science Society.

Christians, N.E., 1991. Preemergence weed control using corn gluten meal. US Patent No. 5030268.

Christians, N.E., 1993. The use of corn gluten meal as a natural preemergence weed Control in turf. In: Carrow RN, Christians NE, Shearman RC (eds) International Turfgrass Society Research Journal. Intertec Publishing Corp., Overland Park, 284-290.

Coffman, C.B., Radhakrishnan, J.R., Teasdale, J.R., 2004. Corn and soybean responses to basal applications of vinegar. Proceedings of Northeastern Weed Science Society.

Coffman, C.B., Radhakrishnan, J.R., Teasdale, J.R., 2004. Vinegar for weed management in corn and soybean. Proceedings of Northeastern Weed Science Society.

JMP, Version 5.0.1.2. SAS Institute Inc., Cary, NC, 1989-2005.

Gardner, D.S., Christians, N.E., Bingaman, B.R., 1997. Pendimethalin and corn gluten meal combinations to control turf weeds. Crop Sci. 37, 1875-1877.

Liu, D.L., Christians, N.E., Garbutt., J.T., 1994. Herbicidal activity of hydrolyzed corn gluten meal on three grass species under controlled environments. J. Plant Growth Regulat. 13, 221-226
Liu, D.L., Christians, N.E., 1994. Isolation and identification of root-inhibiting compounds from corn gluten hydrolysate. J. Plant Growth Regulat. 13, 227-230.

Liu, D.L., Christians, N.E., 1997. Inhibitory activity of corn gluten hydrolysate on monocotyledonous and dicotyledonous species. HortScience. 32, 243-245.

McDade, M.C., 1999. Corn gluten meal and corn gluten hydrolysate for weed control MSc thesis, Iowa State University.

McDade, M.C., Christians, N.E., 2000. Corn gluten meal – a natural preemergence herbicide: Effect on vegetable seedling survival and weed cover. Amer. J. Alt. Agri. 4, 189-191.

Nonnecke, G.R., Christians, N.E. 1997. Strawberry production using corn gluten meal as a natural nitrogen source and weed control product. Acta Hort. 439, 725-730.

Pielou, E.C., 1966. Shannon's formula as a measure of species diversity: it's use and Misuse. Amer. Nat. 100, 463-465.

Radhakrishnan, J., Teasdale, J.R., Coffman, C.B., 2002. Vinegar as a potential herbicide for organic agriculture. Proceedings of the Northeastern Weed Science Society.

Radhakrishnan, J., Teasdale, J.R., Coffman, C.B., 2003. Agricultural applications of vinegar. Proceedings of the Northeastern Weed Science Society.

Smith, R., Lanini, W.T., Gaskell, M., Mitchell, J., Koike, S.T., Fouche, C., 2000. Weed Management for Organic Crops. UC ANR Publication 7250.

Webber III, C.L., Shrefler, J.W., 2006. Vinegar as a burn-down herbicide: Acetic acid concentrations, application volumes, and adjuvants. 2005 Vegetable Weed Control Studies, Oklahoma State University, Division of Agricultural Sciences and Natural Resources, Department of Horticulture and Landscape Architecture. Stillwater, OK. MP-162, 29-30.

AUGUST 2007

COABC

3402 32nd Ave.
Vernon, BC
V1T 2N1

ORDER FORM

phone (250) 260-4429
fax (250) 260-4436

Farm Name: _____
Contact: _____
Address: _____
City/Prov: _____
Postal Code: _____
Phone: _____

Date ordered: _____
CB + Cert. No.: _____

PST Exemption

☐ **BCAC Farmer ID Card #:** _____

If No BCAC Farmer ID Card #:
☐ **Certificate of Exemption must be provided for PST Exemption for each purchase. Form available at : www.sbr.gov.bc.ca/ctb/forms/0465fill.pdf or request the form from the office**

Item	Units	Unit Price	Quantity Discount	Quantity	Total
Packaging Materials: available only to COABC Certified Organic Members					
Plastic produce bags 10" x 12" w logo	1000pc roll	$30.00	Case-4 rolls $100.00		
Plastic 10 lb apple bags vented	250/wicket	$20.00	Case-6 wickets $100.00		
Stickers 1" round	1000 pc roll	$11.00	10 rolls $90.00		
Stickers 1 1/4 " square	1000 pc roll	$11.00	10 rolls $90.00		
Twist Ties 10" (15,000 per case)	1000 pc	$10.00	Full case $105.00		
Have you signed a new *'Consent to use Official Marks Declaration'* form? (revised July 2006) Y / N					
Have all your labels been reviewed by your CB? Y / N					
With which products will you be using the packaging materials? _____					
Promo Materials: available to Everyone	**Member $**	**Non-Member $**			
Cloth Aprons with 3 pockets	$12.50	$12.50	PST taxable		
NEW bucket hats size M or L	$15.75	$15.75	PST taxable		
Ball Caps	$13.10	$13.10	PST taxable		
Green T Shirts L XL †	$18.00	$18.00	PST taxable		
Natural T Shirt (logo) M L †	$10.50	$10.50	PST taxable		
Natural T Shirt (plain) S M L XL XXL†	$6.50	$6.50	PST taxable		
Organic Tree Fruit Management	$32.00	$39.95	(no PST)		
Steel in the Field	$25.00	$25.00	(no PST)		
Livestock Nutrition	$12.00	$12.00	(no PST)		
				Subtotal (before taxes & shipping)	

† Limited Quantities Available
Contact office for availability

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

GST # 887782431 RT0001

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

Letters to the Editor

Letters to the editor are welcome. Letters must be under 500 words. We reserve the right to edit for length.

To the Editor:

I'm a bit bothered by the shrillness with which one or two people react to anything political on the COABC listserve. However, this is about food, and producing food, which is the ultimate political act, to my mind.

Our governments - provincial, federal and international (though we don't vote for them, or even know who or where they are, they still govern us) - are centralizing and industrializing the slaughtering and butchering of all meat.

This is done under the guise of protecting us from contamination and disease, but we all know that this is not the reason. It's not even true.

When we objected, the government threw a promise of some funding to us, to help small slaughtering seem vaguely possible. And we accepted this.

What we need is not to sign petitions, but to actively say that we will not accept this regulation of our lives. I heartily approve of the action up north: the march after market with a bbq of soon-to-be-illegal meat.

I think that there might be enough consumers and supporters to at least consider defying this regulation. If I had chickens, or any other meat animal, I'd be tempted to take some of them down to the legislative lawn and illegally sell them to the public. I'd make very sure that all the health and safety standards were met, both in their slaughter, handling and cooking. I'd invite MLAs and others to purchase and enjoy, and use the event to educate people about food safety.

This would be a big risk, because getting involved with anything that is illegal involves you in the court system and can be very long and involved and expensive, at least of time and stress.

Letters to the Editor

It would be best if this was not a one-time event, but an ongoing demonstration that there was active opposition from many people.

I'd be happy to help and support anyone that wants to oppose the meat regulations directly. I feel that it's important to oppose this regulation in ways that are more powerful than signing a petition. I'm open to suggestions.

Peter Johnston

Mark your calendars

2006 COABC Conference, Tradeshow, and AGM

February 29th, March 1st and 2nd, 2008

Event to be held at the Mary Winspear Centre at Sanscha, in Sidney, BC