ACORN

Atlantic Canadian Organic Regional Network

ACORN Organic Conference Notes 2010

March 4-6, 2010

Charlottetown, PEI

ACORN recognizes the support of:

Canada

Prince Edward Island ADAPT Council

2010 ACORN Organic Conference Notes

Table of Contents.

Berries and Beyond ~ Ken Taylor

Ken learned a lot of non-profitable farming from his father's conventional farm.

Philosophy: Embraces organic and looks beyond – zero interference (trees going wild, growing on their own), spends time on plant genetics (key to everything they do), so that there is less work and more money. Innovation is key, and he uses permaculture design and principles and uses plasticulture to cut down on labour and interference

Using plastic: never looked back after trying it – convinced by friend after being against it. Uses tree plastic – saves time and labour, reduces disease vectors, uses for strawberries, captures spring heat, retains water, doesn't use irrigation anymore, ploughs down green manure in between rows for most fertilization.

Propagates fruit trees - Looks for high fresh market value. Found for pear 90% marketable - Lots at value per acre, not just per tree.

For most berries it takes awhile to pick. Ken looks for early season, high value-added potential, high ORAC scores, aware of health benefits for consumers, colours, plants that aren't addicted to a certain soil (ones that can take heavy clay, poor soil). Examples: Seaberries, mulberries

Seedless grapes (counted them as berries for the sake of mentioning them in the presentation) – Canadians spend $360 million a year, imported, $ getting higher every year $6.99/lb

Most of green and red seedless come from California – time is ripe to think about growing them in Canada. His grapes – never been sprayed, fertilized, very good for disease resistance, brix were the same last summer as other summers (reached 20 brix) despite wet weather
Can dry or semi-dry seedless grapes too – or make juice, lots of potential for processing (like pies…)

Haskap more traditional – edible honeysuckle, from the University of Saskatchewan, Japanese people love them, heavily promoted in the west. Hardy bush – looks like forsythia, does well in shade although maybe better than full sun, ripens early in June, earlier than strawberries, birds love them, no disease or pest problems, can take high winds and dry sandy areas, thinks they can take -45C, taste a bit like blueberries. Borealis is a good variety, need 2 varieties for vigour,

Zero interference doesn't work well for raspberries – best was early black raspberry – should consider them, they'll keep in fruit for 3-4 weeks, very productive, better yields than red raspberries, berries sweet, firm, black higher in anti-oxidants than any other colour (potential for health market)

Seaberry – good for processing (oil, juice, etc.) china produces 99% of supply, doesn't need pesticides, don't need to pick fruit at certain time – won't fall if not picked, harvest by cutting off branch and freeze, then tap off berries. Pineapple citrus flavour not so sweet, more sour, Has 15 % sugar in some, has increased size of berries through breeding selection, organic oil from seeds is most expensive in world could replace olive oil, fruit soft and juicy, has one edible seed, ORAC (oxygen radical adsorption capacity) higher than blueberries, thinks it's ideal for sandy soil, salt spray, can take -50C (grow in Russia), pretty plant. Varieties: Cascade, Igor (male) – add for every 9-10 females

Bush cherries – very hardy (zone 3), fresh or processed, disease resistant, adaptable to variety of soils, harvest July-August, developed at University of Saskatchewan (mongolia x morello cherries), brix can be >20%. Bush can be different layer of or 'guild' between trees (permaculture term). Birds won't touch Nanking cherry – very resistant to disease, good as a hedge (very popular item at the Green Barn nursery).

Currants: Black, white, red, golden, pink, Demand is high for currants – good time, best varieties from Scotland, Titania is good. Clobber spice currant has intoxicating smell, very aromatic. Maple black is black-coloured, but has flavour of golden

Gooseberries – store very well, do well under plasticulture, not recommended for commercial use because of thorns…looking for thornless varieties

Chums – cherry plums – red to dark purple, really hardy zone 2 – takes zero interference, loves sandy poor soil, tolerates drought, bears fruit 1 year after planting, tend to over-produce, the branches weep down loaded with fruit, easily pollinated, need 2 varieties, 2 favourites are Manor and Kappa (red and yellow)

Kiwi – kolo, krupno, bi-sex – very vigourous, shade tolerant, shade tolerant zone 2, good for northern climates…sold as kiwi grapes in Loblaws this summer – fruit sweeter and less acid than regular kiwis, grows them were nothing else will grow, have to make sure male is around, 1 male to 10 females

Mulberry – berry tree…berries start in June, fragile, super sweet, juicy, good fresh or processed, birds love them – good trap crop for birds, deer, raccoons

Cherry olive – fixes nitrogen, ORAC – higher than seaberries, hang on bushes late in the season

Strawberries 'Sparkle' best seller, new variety, day neutral 'albion' best variety

Blueberries – use plasticulture, variety 'patriot' (huge berries) – didn't spend a lot of time on blueberries since other talks focus on them and they are so popular already…

Hazelnut - Windbreak for berries, especially for blueberries. Give more profit than blueberries they're trying to protect

Wild Blueberries: Battling Pests and Weeds ~ David Yarborough

A research project began at U. of M. in 2004 and has just finished three (two year) cycles. For more complete information and to access fact sheets go to
www.wildblueberries.maine.edu/factsheets.html#organic

Sour top berries yield better in second year but can't be cross pollinated with low sweet. Low sweet more productive.

As weeds are a big issue in organics, it's generally better to start with a well developed and generally weed free conventional field and use the best organic methods identified to maintain field during the three year transition.

Commercial wild blueberries (WB)are found in Maine, Quebec, and Atlantic Canada, where land is acidic and well drained. They tend to have greater diversity of clones and flavour and 10x phyto chemical as high bush.

The biggest obstacle in organic WB is getting rid of competition. Having a second non-fruiting year does help keep pests down. Burning is expensive but provides good sanitation (insects, weeds and disease) Mowing is less expensive and maintains the organic pad, but allows pests to overwinter. 2/3 of the WB biomass is underground in rhizomes. Removing stems right to ground level (mow or burn) encourages new growth.

Weeds - WB aren't tolerant to shading. Taller weeds must be limited for this and to avoid mashing fruit during harvest. Best practice - mow above blueberries 3 x in the season (late June, July and August) to reduce shading and seeding. Ex. White birch 1cut did little to discourage, 2nd considerably discourage, 3rd

pushed them back. This needed to be repeated in second and third year. Willow was not controlled completely by even three cuts.

Mulch - on bare spots prevents erosion and promotes filling in of blueberries, retains moisture and reduces extreme heat which burns up organic pad. Berry size tended to increase with mulch layer and moisture retention. Bark is the best and breaks down slowest but expensive. Wood chips second best but should be less than loonie in size (larger dries out). Cedar third. Sawdust tends to dry out.

Fertilizer - WB leaf tissues should show 1.6 Nitrate, 0.125 Phosphorous, and 24 ppm of Boron. Tests are down at tip die back of leaves. You have to be careful not to over fertilize and promote weed growth.
The following were compared for affect on yield : DAP @ 400 lbs/acre, Fish hydrolysate (2-4-2) @ 33.6 kg/ha. FH did as well as DAP for stem growth and yield (5000-9000lbs/a). Both were applied only when plants were deficient.

Pests - Scouting with a net (10 sweeps) important for flea beetle, spanworm. If spanworm defoliates leaves in the sprout year, leaves may grow back in the same year but not produce fruit the following. BT/Entrust effective.
Thrips - spot burning works well.
Scout blueberry maggot using sticky pheromone traps around the perimeter of the field. Some growers harvest after the maggot infested berries fall to ground, but this leaves them in the litter for the following year. Field isolation is better because the fruit flies hatching in a sprout field the following summer have nowhere to lay eggs. Winnow piles should also be destroyed. Burning periodically helps destroy the maggot if the leaf litter is ignited. Flies take 10-14 days to mature. This is the period to apply spray if needed. GF 120 (molasses with spinosad/entrust) or Mycotrol/BotaniGard work fairly well but must be reapplied after rain. It takes about a week to see a big drop in numbers.
Flies will tend to only be in the outer edge of field, so spraying only needs to be done here. 1meter high netting at edge of field can be effective in a small area if the screen is consistently kept up. Baited spheres were not a good control.

Disease- Monolinia Blight: Primary infection reduces plant health. The following were compared for effectiveness: Sonata, Serenade, Compost Tea, mulch, Neem. Only mulch worked really well but is impractical for extensive use. Serenade maximum allowable rate in the U.S. is 3.3kg/h. It was tried at 8kg/ha and gave some control but still not as effective as conventional controls like Topas. It took 2 applications to have some degree of effectiveness.
Leaf spot/drop disease- burning is the most effective control to date for organic.

Pollination - Bees are essential. Adding 5 hives/acre raised yield from 1000-5000/a. Encouraging natural pollinators in the edge of fields (esp if small) is good. Sweat bees are NP found dug into ground in fields. Organic systems encourage natural pollinators because of less toxic pesticide use. Bumblebees work in more adverse conditions but if weather is good the sheer #s of honeybees will do more pollinating.

Harvest - rake gently, not pulling, keep cool, no moisture on berries, use low boxes partly full rather than buckets. Machine raked berries look okay at first but don't have same shelf life.

When the project started in 2004 the following were being compared:
Sulfur at 0 vs 1000lbs (@100/lbs to bring pH down .1 unit for a goal of pH 4.0)
mow vs burn
ProHolly 4-6-4 vs and it's interaction weeds
Cutting weeds 3 x per season. On larger fields you could use a bush hog. If the tracks are not in the same place twice, the plants will bounce back from the travel on them.

Burning - Grass reduction from 50% to 20%
Sulfur - Grass reduction from 45-25% by 3rd year.
Fertilizer - 40lbs/a ProHolly increased weeds.

Sulfur increased aluminum, iron, copper and magnesium.

Burning increased yield
Sulfur increased yield
Fertilizer did not increase yield on its own
Combined burning and sulfur increased yield threefold.

Organic yields were still well below conventional (1800-2000 lbs/acre) 10-15 acres may be the largest feasible size for organic.

Burning methods: oil gives hardest burn but very expensive, propane lighter but should work, straw at 1T/a in the fall and left work in and burned in spring.

Taste test of berries from field where sulfur was applied to reduce pH to 4.0: Tasters could tell the difference but preferred the berries from sulfured field. They thought other berries had a tarter taste. Chemical differences: colour and acidity and pH were the same. Nutrients: More calcium and potassium, slightly less magnesium, and significantly more manganese (good for bones and teeth) but nowhere near toxic levels.

For complete presentation click: http://acornorganic.org/pdf/WildBlue.pdf

Blackberries and Raspberries ~ David Handley

R&B production guide form NRAES revised last year - highly recommended
www.nraes.org online to order or extension services at University of Maine $48 US
A good supplement is the ATTRA organic culture of bramble fruits – good complement to NRAES guide

Cornell extension new high tunnel publication guide - free download or buy for $15

He'll start with bad news – only 100-200 acres are in raspberries in Maine – more people get in and out than any other crop…
Labour is a huge issue – need dependable labour pool, finesse work like picking. Hard to get crop off.
Organic growers should look at blueberries first, less aggressive pests than raspberries

Good news – lots of demand, good price, can make crop profitable if have good resources

Need to be well drained, don't like wet feet, need full sun, protect from wind, wind break critical, plant quick-growing red pine, something else behind for long term like fir

Slope good for drainage, plant up on slope, avoid heavy cold air and frosts (especially primocane fall fruit)

Grows at higher pH than Highbush blueberry

Eliminate perennial weeds prior to planting – worth it! – don't carve strips into pasture, grasses with grow into row and compete with raspberries.

Don't follow solanacaea with raspberriy or plant close to wild brambles (disease vectors) – need to be about 500 ft., or ideally put wind breaks in between, vector is aphids

Crown is perennial, lives 10-20 yrs, loaded with buds than produce canes and roots
1st yr primocane, 2nd floricane (lives 2 yrs)

Red raspberries spread from crown, black varieties don't really spread.

Where leaf meets stem there are axillary buds, cane overwinters, axillary buds form shoots, then fruiting laterals (where fruit forms) in second spring, then fruiting cane dies

Everbearing/primocane raspberry = cane still lives 2 yrs, but primocane axillary buds on top of cane break late summer/early fall of 1st year, and in 2nd year lower buds give fruit in summer

Handles – dormant canes from nursery, should have good roots 8inches to a couple feet long – least expensive, should be from certified/inspected nursery
Tissue culture plug plants, like tomatoe transplants, sterile conditions, are chilled and come dormant, 2-3 times the cost than handles (but clean so no viruses) grow more uniformly than handles, good vigour

Planting – early spring (mid-may in Maine)
Add a lot of organic matter (OM) – at least 2% minimum, should be 4%
Holes 1 ft deep for handles, plant to same depth as from nursery, plug should be covered by soil, susceptible to draught
Handles should be trimmed (top) to avoid plant sending out fruit

Raised beds good for poorly drained areas
75 % root system is 8-10 inches in soil, helps with root rot, but now need irrigation (trickle is best)

'Kilarney' variety very aggressive can plant far apart
minimum 8 ft distance between rows (12 ft with tractor) – give them their space, need lots of light and air movement 1st line of defence against disease. In-row spacing 20-30 inches

Mulching really helps raspberries. Classic: woodchip/sawdust, keeps weeds down, fine sawdust will compress too much, use mat w/ good porosity, like mature compost, add another layer in spring (compost has to be clean – should be covered to prevent weed seed contamination). Compost mulch also provides nutrients vs. woodchip mulch

Plasticulture: when using plastic have slit down middle to make sure primocanes can come out – biodegradable plastics may not be certified, but may work well

Important – no competition in planting year, likes to see clean cultivation or grow non-competitive crops like lettuce and beans between rows

Primocanes will spread, cut them out if beyond 1.5-2 feet, fruit in the middle could harbour disease in a wide row. Best narrow row with lots of light

Fertilize in June and August

Raspberries have small root system in 1st year, trickle drip system best , keep them hydrated, keeps foliage and fruit dry (less diseases), overhead irrigation can work for frost control, expensive, gets foliage wet

To control weeds in planting year, need good tillage methods, budding cultivator, burner (only when weeds are small), vinegar for small weeds, mulching in-row with hand weeding

Spring 2nd season, establish ground cover between rows, turf to mow 4-6 times a yr, aug/sept, hard fescue/bluegrass mix, slow growing bunch grasses don't creep, stay away from contractor mixes, don't add clover –it comes in anyway and can become a weed problem – source tomato ringspot virus

In 2-3 years (when established) – add 60 lb. N total every year. Soil test every 2 yrs, check pH, P, K

Late July test primocane leaves – near tip youngest fully emerged leaf, 40 leaves per acre

Average life span of patch 10-15 years, due to disease issues, but he's seen 25 yr old plantings

Trellising: tall and narrow row, makes picking easier. Posts in groud at least 2 ft (prevent frost heaving), people using iron posts, need anchors. Recommends #9 wire. Can use tomato clips, bailing twine used for attaching canes to wire

T trellis more popular, internal braces better since don't trip over anchor at the end of rows
3.5-4 ft tall for cross placement (cross should be 3-3.5 ft long). Want posts to be sturdy (lots of weight). 1.5 ft wide at ground, 3.5 ft at cross bar (top), creates a V effect, bring light in the row, puts fruiting canes on outside

V trellis 2 posts every 25-30 ft – longer lasting system

I Trellis – likes the least, cheapest, single posts, shove canes between wire, canes can be heavy, not so stable in high wind, harder to open up as much as you want,

Hill system, good for blackberries, like growing beefsteak tomatoes, 1 plant 4ft, 8-12 ft between rows, solid stake for each plant, choose best 6-8 canes tied to post, blackberries have branching growth habit that doesn't lend itself well to hedge planting

Why prune? Manage vegetative growth, not competition, improves quality, size, picking ease, reduces disease
2 steps:
summer – maintain 1.5 ft row width, cutting out primocanes that are beyond edge of hedge
late summer/fall can remove floricanes – he discourages that in north, keep until winter since carbohydrates go back into winter, acts as windbreak for primocanes
winter – dormant pruning – after new year, snow has to be gone (mid march usually, before canes bud out). Spent floricanes have gray bark, highly branched (1st step)
Prune weak, spindly canes, save good healthy brown bark primocanes
Prune outside 2.5 ft row width to maintain proper row
Step 3 – thinning, selecting for tallest thickest cane - 3-4 canes per linear ft row, tie canes to wire. Take old material out – could spread disease.
When you're done, planting should look drastically thin

Another option: mowing – eliminates crop for the year, saves pruning, mow _ field each year to have fruit every year
Exception: primocane variety will get crop after mowing (only after 3-4 yrs old), but need to take trellis down and up again

Growing blackberries hard situation – hardiness an issue
Blackberries break in 1st year, fruit in 2nd year – do much better on hill system, bushier than raspberries. 30 inches tall, break top growing point in 1st year to encourage branching
6-8 canes tied to a stake, shorter laterals to 12-16 inches, christmas tree shape (16 inches at bottom, 12 inches at top)

Varieties
favourites: hard. Zone 4
'Prelude' from NY (gd flavour large size, susceptible to phythoptera), 'Boyne' (fruit small soft dark) from Manitoba, 'Killarney' (larger fruit, brightly coloured) from Manitoba, 'Nova' (mid season, fairly disease resistant, few thorns) from NS, 'Encore' (late, largest fruit late july/early august, bridges gap between summer and fall fruiting types, not as winter hardy as prelude NY) (in order of ripening)

Everbearing – 'Autumn Bliss' from Scotland (popular high tunnels, earlier, weak plant, susceptible to phythoptera, mid august harvest), 'Autumn Britten', 'Polana' (Poland, fruit small, not favourite flavour), 'Polka' (new from Poland), 'Joan' looks great good tasting, impressive variety from Scotland

Yellow raspberries – hard to market – makes ugly jam not good for processing
best variety 'Anne' 3rd wk august good flavour, 'kiwi gold' more orange

Black raspberries – hardiness an issue (from southern north America), not good variety choice (jewel), disease susceptible, thorny ones more hardy.

Blackberries:
'Darrow' susceptible to genetic breakdown after 6-7 yrs stop fruiting, some out of Maine 'fort kent king' (not thorny) – home garden variety where can't grow anything else
Thornless: 'chester' needs protection, triple crown

Primocane fruiting varieties for blackberries – most exciting thing in black/rasp berries – maybe in 10-15 yrs available for commercial production. Prime-Jan and Prime-Jim too late for here, for home garden market – from Arkansas. High tunnels in Pennsylvania

Pick every day, morning when dry and cool, shallow package, not more than 3 inches deep
Stack on flats with good air movement – floor fans, close to 32 F. can keep for a week and still marketable

Pick-your own _ farms in Maine
Pre-pick harvest, you have to deal with lots of labour issues
Retail good demand, price resistance, good markets in restaurants
Wholesale good demand, storage issues

Most common failure is weeds! Too much competition. Get some good mulch down, hand pulling of weeds, must keep up

Raspberries – mosaic virus, curled up leaves could be potato leaf hoppers (look under leaves) if not, it's a disease problem. Remove diseased canes and 2 on either side. And get ride of wild brambles.
Phytophthora – caused by standing water (algae, blocks the plant from getting moisture) – pick good site and/or used raised beds

Bottom line – labour most difficult
Establishment and maintenance costs similar to blueberries
0-$6,000 net returns (0 if bad winter, so get hardy varieties) not going to have demand problems
price $1.50-3.50/lb. in Portland can get $6/lb

For complete presentation click: http://acornorganic.org/pdf/B&Rpres.pdf

Weed and fertility management of establishing black currants ~Karen Nelson

Latin name for this plant is Ribes Nigrum. It is a wood perennial plant. It can be planted as a hedgerow. It can grow 3 to 7 feet in height. Best if planted 2.5 feet apart in rows, with rows being 11 to 13 feet apart. It takes 4 years for them to reach production.

Black currant has a very sweet, sharp taste. It is used in fresh market and as well as in value-added production. Can be used to make liqueurs, ice cream, juices, etc.

They have not been produced locally in a long time because of the appearance of White pine blister rust in the 1900s. This doesn't kill it, but the industry back then lobbied for its destruction because of the effect on the white pine needle.

It contains more potassium, vitamin C and antioxidants than most fruit, and has been found to reduce inflammation in arthritis.

Its production is really taking off in PEI. Exports are mostly to Japan. There are 40 acres presently in production and plans for expansion. There are many different types of fertility tests going on.

A mechanical harvester was purchased on the Island in 2009. Hand-harvesting has proved to be labour-intensive. It has cut harvesting time from 332 hours to 30 hours. To use the machine, one must first select

cultivars that are suited for mechanical harvesting. The harvester starts 6 inches off the ground, so it misses the lower berries.

In 2008, trials on the Ben Hope variety was done on two farm sites. Researchers looked at weed control and fertility. Landscape fabric was used. Some areas had weed control, some didn't, and some areas received no fertilizers and others did.

In 2009, trials were done with the Titania variety. All the plots were covered with landscape fabric. A 50:50 mix of crab-meal and pelletized poultry ___ was used.

Researchers measured whips, height and soil samples. Measurements were done monthly. For the Ben Hope trials, the plots with no weed control had reduced growth. Supplemental fertility did not increase the bush size. Fish fertilizer did increase the leaf nitrogen content.

The bottom line is that the focus needs to be on giving the plant a good start. Early fertilizer can increase the bush size.

Future trials will look at fertilizing in the spring only, as well as fertilizing in the fall only, and split application (spring as well as fall).

Issues of concern are the weed control options. You need to eliminate weeds prior to planting and keep free of weeds throughout the season, and maintain a 3 foot wide weed free zone. What also needs to be figured out is what is more economical.

For 2010:

- no weed control
- mowing
- cultivated/tillage
- landscape fabric
- black plastic (PVC not allowed)
- acetic acid

For disease control, there are not many diseases or pests in North America. American powdery mildew is a white powdery growth on the leaves, shoots and fruit that changes to dark brown as the plant matures. The white pine blister rust is a disease caused by fungus (cronartium ribicole). The currants are an alternative host with the white pine. Tiny yellowish spots show up on the upper side of the leaves, and orange-yellow spots on the bottom. It causes premature defoliation and can affect next year's yield. It affects mostly the Ben Hope variety.

There are not many organic controls for the disease. Sulphur and mineral oil have been found to have some effect. The best is to select the right cultivar. Titania, Coronet, Crusader and Consort seem to be immune in Europe. It is not quite the case here, we still need to study the cultivars here.

When selecting cultivars, examine: disease resistance, frost tolerance, taste, use, growth habit, harvest time and harvest type.

Cultivars: Ben Alder, Ben Connan, Ben Hope, Ben Tirran, Whistler, Ben Lomond, Titania, Ben .....

Not many are available in North America as of yet. We still need to try different varieties.

The optimum pH is 5.7 to 6.5. The closest propagators are located in Quebec.

Highbush blueberries and grower discussion ~ Dr. David Handley

Highbush blueberries are more of a pick-your-own, dessert crop, not ideal for canning, caters to the fresh market. There are two growers in Maine now that are mechanically harvesting.

The species is vaccinium corymbosum
There are specialists starting to mix highbush with wild.

Chile and Mexico are major players at the moment. The market has been able to absorb it so far. But it is good to take a good look at the market, because some producers are keeping their product longer than expected. It is a health-promoting crop and this is a good way to market this product.

The local demand for highbush has not been met yet, road-side stands are still popular and doing quite well.

Highbush blueberries are from the same family as rhododendrons, so they like the same types of soils. They have winter hardiness issues.

Some bushes have been in production for more than 50 years and are still going strong.

They have a shallow fibrous root system and have a slow-growing root. They don't like clay soils. The plants fruit on one-year old shoots.

Pre-plant preparation is essential for weed control, make sure the area is free of weeds before planting. Roots extend it to the drip-line of the bush. The roots can't penetrate heavy soils, the soil has to hold water and nutrients well.

Canes can be 6 to 8 feet tall when mature, you need to prune them, most growers keep the canes at 5 feet. The canes will start from the crown of the plant. You can see up to 3 feet of cane growth in one year. On the second flush of growth, you can see berries appearing. Watch out for winter injury. Small vegetative buds will give you shoots the next year; this is where the next year's crop is born.

The buds go dormant in the fall. Here in the North, we meet chilling requirements for the plant by the end of January. By the end of February, the shoots are ready to go, but if there's another low drop in temperature, you will lose them.

You will get 5 to 12 flowers per bud. The buds open from the tip and work downwards. Early flowering varieties take a longer period to ripen. Most varieties require cross-pollination. The fruit is many-seeded, with clusters of 5 to 8. The blue color ripens with the fruit. The size can increase 35% after they are truly blue. Give them 3 to 4 more days after they turn true blue before harvesting, it will give them more sugar.

Actual breeding of blueberries started only in the 1920s. Only a handful of varieties are suitable for our cold climates. Avoid early varieties and late varieties.

The best types for our climate

Patriot	early	large, high-quality fruit	very hardy
Northland	early-mid	small dark, good quality	very hardy
Blueray	mid-early	large high-quality fruit	hardy
Bluecrop	midseason	large fruit, attractive	hardy, MB res.
Nelson	mid-late	large good quality fruit	very hardy
Jersey	late-mid	med-small, good quality	hardy, MB res.

(Jersey takes longer, but does better in poor soils)

Newer varieties that are less popular but good

Duke	early	fruit is medium-sized	hardy

Tora	midseason	large high-quality fruit	hardy?
Herbert	midseason	pick-your-own crop, large, soft	hardy, variable
Draper	midseason	large, good quality	hardy?
Elizabeth	mid-late	large, good quality	hardy, variable
Blue gold	mid-late	med., good quality fruit	hardy

Half-high blueberries: Highbush and low-bush crosses
They have a short stature for better winter survival
St. Cloud 48": best commercial potential
Northblue 30": home garden quality
Friendship 24": good fruit quality
North Country 24" good ornamental
These last two are good ornamental plants

What to order?
Dormant 1 to 2 year-old plants 12 to 18" tall
Older bigger plants are more expensive to ship

You can typically plant 650 to 800 plants per acre
Plant in early spring. Know when your soil is ready to time the shipping. Take a soil test the previous fall, and work the soil then. The best pH is around 4.8 to 5.2. The phosphorous level is critical when the plant is getting started. If you have weed issues, plant a cover crop one season before planting your berries.

Plant them10 to 12 inches deep and spread out the roots. Add mature compost or pre-moistened peat moss and blend with the natural soil. Put no fertilizer in the trench, they'll be sensitive to the salts. Leave a little depression around for water collection. Don't prune at planting time. Space the plants 5 feet apart in the row (2 to 4 feet for the half-highs) and 8 to 12 feet between rows.

Flower clusters are to be removed by hand the first few weeks after planting, the plant needs to concentrate on setting roots. Do this the first three years. Fertilize very lightly, if at all, 4 to 6 weeks after planting (fish emulsion).

For the first season, have clean cultivation. Some growers prefer to put sod or a cover crop. To water, use trickle or drip irrigation systems. You don't want to wet the foliage in the summer, it creates disease problems. Put mulch of wood chips or shavings 4 to 8 inches deep. Do not recommend landscape fabric, the root system will suffer. With straw, there is a possibility of disease.

Establish ground cover between the plants in the fall of planting year or the spring of the second year. Stay away from conservation or contractor mix, grasses will be a problem with these. You still want a wide area of mulch around the blueberries, about 3 to 4 feet wide. Maintain the soil pH at 4.5-5.2. They may require applications of ground sulphur.

There is a high demand for nitrogen, 100 to 120 lbs per acre per year. An ammonium form of nitrogen is preferred. Source? Organic matter, ammonium sulfate (21% N) and others. Some products can be incorporated into the irrigation system.

There is a low demand for phosphorous: 0 to 30 lbs per acre per year. There is a medium demand for potassium. Decaying mulch will provide enough potassium. Iron deficiency is common, usually caused by high pH. Take soil tests to check. A magnesium deficiency is common as well, the outer parts of the leaves turn maroon in colour. It signifies that the pH is too low. Epsom salts can help with this.

Frontload the fertilizer as much as you can. Apply the fertilizer at bud break. Sidedress once after 6 weeks on 1 to 2 year old plants, and twice at 6 week intervals on older plants. Don't forget to fertilize both sides of the rows to have even growth.

Not much pruning is needed in years 1 to 3. Remove broken branches and weak growth, you want it to be upright. Start pruning in March. Prune it to 6 to 12 canes. Any cane more than 6 years old should go (the bigger canes). You can do this in two steps: First, remove 1 to 4 of the oldest canes, then remove the weak one year shoots that are less than 6 inches long with few buds. Remove the winter injured ones (turned a chocolate brown).

The bushes will overfruit, by pruning you will get a better fruit. Shouldn't take longer than 5 to 10 minutes per bush. Only plant what you can prune, and prune every year.

To renovate neglected bushes, cut all canes to the ground, or remove 1/3 to _ of the oldest each year.

Harvest blueberries when it's cool and dry; early morning after the dew is gone is best. Refrigerate them immediately. Use shallow containers so the bottom fruit won't be crushed. Store them at 32 degrees Fahrenheit or 0 degrees Celsius.

For marketing blueberries, pick-your-own is difficult because of timing, labor (having someone there to check) and price issues. Pre-picked is a problem because of labor issues. Retail could have problems with demand as well as price-resistance (because of the low price of low-bush berries). Whole sale can have problems with demand also, but also has storage and transportation issues.

The price for establishment costs (year 2000 prices) are $4,000 to $6,000 per acre for years 1 and 2. The maintenance costs for years 4 and later can be expected to be between $6,000 and $7,000 and are mostly due to labor. The net returns (above costs) are expected to be around $2,000 to $6,000 (depending on course on yield and price).

A major problem for blueberries is birds. Netting is the best method to deter them. Put posts 8 ft tall. Make sure to anchor at the bottom so that birds don't crawl underneath. Just put the nets as the berries are turning blue and remove right after, or else the UV rays will break down the netting. Other deterrents are scare-eyes, owls, sounds accompanied by mylar, but move them 2 to 3 times daily.

Another problem is insects, specifically the blueberry maggot. The fly will lay eggs in the fruit when it's blue, and the fruit will then cave in on itself. You can use traps, or some applications are also allowed.

There are a few fungi that affect the blueberry as well. The first is "mummy berry". It overwinters in mummified fruit and starts as shoot blight. The berries will turn a salmon color then white. No fungicides are acceptable organically. That the fruits that are mummified and remove them to prevent spreading, you need to break the cycle.

Another fungi is "witches broom". This fungi has two hosts, the blueberry and balsam fir (it can't spread from blueberry to blueberry). Spores can travel over 1000 ft. Witches broom is seen a lot in Patriot and St. Cloud varieties. It creates a rubbery blue-like growth that creates spores. You need to remove entire canes that have brooms, and if the brooms come from the base of the plant, the entire plant must be removed. Make sure to sterilize the pruners afterwards when cutting these.

One thing that kills buds is cold and desiccation. Desiccation is caused by the wind, so it's a good idea to put evergreen to protect them.

For more information, order the Highbush blueberry production guide at www.nraes.org or download Blueberries: Organic Production at www.attra.org/attra-pub/PDF/blueberry.pdf.

Weed Management Strategies ~ Dr. Ellen Mallory

Dr. Eric Gallant (Associate Professor of Weed Ecology and Management at the University of Maine), Lauren Cole (graduate student) and Tom Mallow (research technician) worked on this research with Dr. Ellen Mallory, whose background is in soil fertility.

This project looking into weed management strategies for organic cereal crops in Maine is a relatively new. Given the similarities between Maine and the Maritime provinces, there is an opportunity for information and research results to be shared across the region. Generally farmers in the Maritimes have more experience growing food grain than farmers in Maine, who have only recently begun growing these crops.

Background Information:
Cereal production was relatively non-existent in Maine ten years ago. Originally, interest in growing organic stemmed out of the need to provide feed for organic dairy operations. Maine is the state with the highest percentage of organic dairies in the USA. In order for these dairy farms to remain profitable they needed to be able to produce their own feed. If not producing their own feeds, farmers were spending about 40% of their gross revenue on feed, the majority of which was being shipped in from the mid-western states of the Canadian prairies. These bought feeds were also generally lower quality feed because highest quality feeds were generally sold within the region in which they were grown.

In 2005 a collaborative research project focusing on organic dairies was started by the University of Maine, the University of New Hampshire, the USDA-ARS and dairy farmer groups. The project involved researching grain production for feed, crop rotations, appropriate varieties and feeding trials and starting a farmer network (the Maine Organic Milk Producers Association).

Since the time that producers started growing organic feed grains there has been an increase in demand for locally produced products (including grains). Dairy farmers saw an opportunity to be a part of that growing "local food" market. Due to the higher prices paid for food grade grains, they could potentially sell grains they were growing at twice the price and then buy in feed. However, the quality requirements for food grade grain are higher than for feed grain and so different management approaches and more research into this field were required.

In 2008, Ellen Mallory wrote a grant proposal to start up the Northern New England Local Bread Wheat Project and received funding to do research into bread wheat production, to create tools for farmers interested in producing this crop and to start up networks and educational opportunities for those farmers.

Farmers in Maine have a lot of experience growing small grains as part of a crop rotation with potatoes. Over 40,000 acres of small grains were grown in 2007, most of which were conventional grains in rotation with potatoes and were not food grade grains. There is little experience in the state with organic grain production.

Weed management is an important part of growing organic cereals. Weeds that germinate at the same time as grains are the most competitive with the crop. Using larger sized seeds when planting can results in grain plants that have a competitive advantage over weeds.

Some preventative measures that can be taken to control weed pressure include appropriate crop rotations, timely planting and good soil quality. Reactive measure that are used to deal with weeds that are present include using a tine harrow to dislodge germinated weed seeds from the soil causing them to dry out and die. This method can be very effective under the right conditions (sunny and dry to ensure the dislodges weeds die and don't re-root). The tine harrow can be used repeatedly as more weed seeds germinate and emerge.

The first opportunity to use the tine harrow comes before the germinating crop seed emerges from the soil, about 7 to 10 days after seeding. After the crop comes up it is very susceptible to damage so you would want to wait until it is between the 2 and 4 leaf stage before doing post-emergence harrowing. That's a fairly large window in which you can do post-emergence harrowing but you want to keep in mind that if the weeds get too large they become harder to dislodge and the more forceful harrowing required could result in a lot of crop damage.

Harrowing is most effective at control very small weeds so a good time to harrow is when the weeds are in the white stage. In white thread stage harrowing can result in 90% weed control, when the weeds have two or three leaves harrowing kills 70-80% weeds and when the weeds have three or more leaves, harrowing becomes a lot less effective.

Overall, you need to time harrowing quite precisely.

As was mentioned above, ideally you need dry conditions when harrowing so weed desiccates and doesn't re-root. Note that if your soil has a lot of clods, it is harder for a harrow to dislodge weeds to seed bed preparation is important.

When talking about the aggressiveness with which you should be harrowing, some say "you can just go like hell and it will be fine" but you can do a lot of damage. Under ideal conditions and appropriate harrowing you could expect to lose around 5% of your crop but it is possible to lose a lot more.

(See slide for take-home points about harrowing)
Improving weed management: Two strategies

1. Increase competitive ability of the crop
2. Improve physical weed control

A lot of the strategies discussed in this section of the presentation come from Denmark, where there is a lot of experience with organic grain production. In 1987, Denmark was the first country to legislate money particularly for organic crop research. In Denmark they use harrows for physical weed control but are also looking for alternatives.

1.a. Competitive Varieties
Bo Melander looking at different varieties of winter wheat and their ability to compete with weeds. Some variety plots had up to 25% more weeds than others. So, varieties can be used to your advantage! There appears to be a large difference in the ability of different varities to compete with weeds.

1.b. Increased Seeding Rate
An experiement at Washington State University looked at increasing seeding rates by 25-50% seeding rates to compete with weeds. You can see that higher seeding rate under high weed pressure makes a difference. Weeds had greater effect at lower crop seeding density than higher crop seeding density

(Question: Were these trials drill seeded? Answer: Yes)

If using the crop to compete with weeds, we need the overall population we want but we also need to be good at getting the density we want. Farmers talk of seeding in bushels or pounds per acre but grain seeds vary in weight (can seen in a table in the slideshow). Seed weights can differ by up to 75% so if you put out 2 bushel you don't necessarily know what plant density will be, unless you know your seed weight before hand and/or have calibrated your drill and know how many seeds it will plant per length in each row. Corn and soybeans are planted by density and wheat should be done that way too.

(Comment from Dr. Andrew Hammermeister: Most farmers in Nova Scotia set their seed drill for the varieties they usually use. I have also been looking into seed vigour into order to improve a farmers ability to plant the density that he or she wants.)

1.c. Fertility Placement
In Denmark research has been conducted looking at fertility placement, involving slurry injection, that may provide an advantage for crops and not weeds. In Washington state, fertilizer placement has been considered crucial in grain production for many years, however when using organic nutrient sources we may not be able to have as much precision as in conventional agriculture. However, in Denmark they looked at injection slurry closer to the crop seed and not weed seeds. Overall, they found a combination of

injecting the slurry, so the crop had more access to nutrients, and harrowing resulted in the best weed control.

1.d. Uniform Pattern Planting
Jacob Weiner is a weed ecologist with really theoretical background. At one point he asked “Why do we seed in rows? Doesn’t that just increase competition between crop plants?” Generally he thought weeds between rows don’t compete with crop plants but, if sown differently, crop plants could compete with weed and not with each other. Overall his idea was that we should use the competitive ability of crop to its fullest potential when trying to control weeds.

His experimental results showed that wheat seeded so that each plant was equidistant from its neighbouring plants results in higher yields and reduced weed pressure then wheat seeded in rows. A special precision drill was required to seed the wheat at equidistance spacing but you could broadcast the seed or use two drill passes to get similar results.

However, in a experiment with barley at the University of Maine, seeds that were broadcast did not establish very well and seeds from two drill passes had uniform seed depth and variable emergence due to the wheel tracks pressing down on seeds during the second pass. So they brought in air seeder with 4.5 inch spacing and have had more success with that seeder.

Other alternatives include seeding the crop in narrower rows to increase the crop’s competitiveness or seeding wider rows and relying more on physical control. The latter option involves growing a cereal as row crop and using hoeing instead of harrowing for physical weed control.

3.Improving Physical Weed control
A wide row crop configuration allows for a wider window of opportunity for using physical weed control but there is also the potential to do a lot of damage unless the hoeing implements are controlled precisely.

(See presentation slide for advantages and disadvantages)

Inter-row hoeing is thought to stimulate nitrogen mineralization. This could be useful for the production of bread wheats which needs to have high protein contents. If nitrogen could be made available later in season, it could help increase the protein content of the crop. But more research is required to see if this would actually happen.

Lauren Cole’s project at the University of Maine involved investigating the effects of different row spacings and harrowing for barley. (“+” in the graph indicates that tine row harrowing was used). Ida gold mustard was used as surrogate weed in the experiment.

Note that in 2007 weed pressure was high while in 2008 weed pressure was lower. Also, in the bar graphs, bars with different letters are statistically different from one another. In 2007, narrow spacing with harrowing resulted in significantly lower weed biomass than the other treatments. In 2008, narrow spacing with harrowing still had the lowest biomass but it was not significantly different than the wide row spacing. In 2007, the wide spacing resulted in the highest yield while in 2008 the narrow and standard spacings both with harrowing has the highest yields. However in both years, the yields of standard spacing with harrowing, wide spacing and narrow spacing with harrowing were not significantly different.

(See slide for study conclusions and cost analysis)

The higher cost of narrow spacing was largely due to the high cost of seeds at higher densities.

However the results of a similar experiment involving wheat and the relative advantages of each treatment with wheat could be different.

Question period:

Q: When seed was broadcast did you do anything after?
A: We ran over the seed with a harrow but not sure if they packed it.
Comment: When broadcast seeding contact between the seed and soil is crucial. It's a good idea to harrow once, broadcast seed, harrow second time, then pack it. Depth of cultivation is also crucial.

Q: Did the last experiment involve 2 row or 6 row barley?
A: I don't know…

Comment: Crop with more straw could be more competive

Q: Why are spacing the way they are?
A: There are lots of factors that contributed to current drill configurations but it's also interesting to remember that current drills were developed for conventional agriculture. Also, we need to think about a lot of factors in drill design including how stubble from previous crops will pass through the drill. If the row spacing in very very close this stubble could get stuck in the drill and cause problems.

Comment: Inoculants for winter wheat and winter rye are being developed.

Q: How close to emergence can you do pre-emergence harrowing?
A: It depends on where your seed is and how deep you're harrowing. Usually 3-5 days after planting is safe. You could cultivate a week before planting, pack to simulate weed germination then harrow then seed. But overall, it's all about designing your own system. Weed control varies a lot from farm to farm.

Comment: Competition between plants below ground is also important, not just shading of planst above ground. This was shown in a recent study at the OACC. (Ask Dr. Andrew Hammermeister for more details)

Comment: Cereals are more competitive with early planting. Plant in the beginning of May. You could do harrowing and leveling a week before planting, the use a packer, then do pre-emergence harrowing, then harrow again when the crop is at the 3 or 4 leaf stage. Caution, crops in lighter soils can more easily be buried during harrowing.

Comment: When you increase the aggressivness of your harrowing you lower your weed pressure weeds but past a certain point, you reduce your crop's yield potential due to damage.

Comment: Wide rows could be an advantage in areas that are coming out of sod.

More about the wheat project:
No we can' compete with Kansas but now demand is for local…so the equation has really changed. Retired potato farmers may be interested in growing grains. The project is currently looking into trialing as many varities as possible. They're also looking at the using of top dressings used later in the season to increase the crops protein content. An enterprise budget developed as part of the project will be available online and can adjusted to model our own farm (in Maine).

Some folks in Maine are currently growing heritage varieties at a small scale largely for home use/local communities. Others like Jim Amaral uses 35 to 40 acres of wheat are looking to expand that to 100s of acres of grains.

Q: What variety works on those 40 acres?
A: AC berry and Maxine. Jim Amaral doesn't have the capacity to blend wheats so he grows "self-bakers."

Q: Wondering about fusarium.
A: We just did a workshop about that. The last two years have brought that issue to forefront. Last year winter wheat was hit, year before spring wheat was hit. Fusarium is high on the list of issues to be addressed with varieties and making sure farmers know management strategies. You can manage for

moderate years with rotations (don't follow corn or grain), making sure residue tilled in and using multiple planting dates. But in epidemic years, fusarium can't really be managed.

Small Farm Dreams ~ Roxanne Beavers and Jamey Coughlin

- if you are in a relationship, your partner is part of your business!

Step 1: Setting goals

- measurement is most important
- could be financial, production, personal value (most reason people get into agriculture), collaboration, winning, solitude, peace and quiet community, sense of accomplishment, wisdom,
- why? Define success, understand partner, manage adversity
- good goals are: (SMART) specific, measurable, attainable, realistic, timely, are the most effective when written down, (flexibility suggested as addition, re-evaluate every year)
- Audience goals: to make one part time income from the farm, make people happy, grow good food, move to NS and start a farm in 3 years, raise cows to fill own freezer with no cost to them, provide food for immediate community, feed people good food, keep changing,

Step 2: Making a budget

- time and money limiting factors, therefore need a plan,\
- personal plan, not business plan; what do you need to live and be happy (lifestyle, presents, travel, debt, bills)
- assess sources of income, on farm or off farm
- assets (property, tools, skills, buildings, people, etc); figure out from assets what your best opportunities are
- figure out how many bunches of leeks will grow/sell, challenging! Boring! But better than going bankrupt
- it is not easy to make a living in agriculture, marginal at best, can't afford to make a lot of mistakes
- can you get part time or seasonal job, rent out land, sell equipment, decrease expenses, fewer luxuries, barter/trade, rent equipment, value added on items for sale
- you don't make money in your first 3 years; need to match lifestyle
- accountants are really helpful to figure out tax rebates, ins and outs, ask at RDA or government office
- do research to know incentives of registering with Department of Agriculture in NS as a formal business are worth it, taxes, RRSPs, programs available,
- what are you willing to cut out of your lifestyle? Gym memberships, Tim Hortons, letting go of doing everything, prioritizing the most critical, weekly list, invest in small tools that save time (seeders, wheel hoe!, etc), invest in tools that save money/save time (that are reliable and sized appropriately), keep working on what you have before starting something new, keep track of where you spend time and energy and set prices as such,

Step 3: Time Budget

- weekly schedule, will change throughout year
- both people should understand how to do each other's jobs in case other is sick, but good to find expertise
- may need to get help at certain times
- time is more critical than money, time management critical
- cost of production is largely based on time, not input costs

Step 4: Planning

- not an arduous task, it is a process that continues all the way through
- figure out some of the numbers on paper before making mistakes in the field,
- SWOT analysis, Strengths, weaknesses, opportunities, threats
- Personal and business, match enterprise to you and community, lifestyle and value goals fit,
- Who, what, when, where, how???
- Identify needs and challenges, be realistic, they are going to happen
- Where do you need help? What can you learn, where can you partner, where should you hire?

Step 5: What to do if it's not for me?

- That's ok!
- Maybe not the right time
- Homestead lifestyle is lower food costs, lifestyle, enjoyment, exercise, healthy, chemical free, stewardship
- Doesn't need to be formal business
- Can work in agriculture in many different ways
- Good to find out before making investment

Example: Allison Grant

- just started a new farm, did SWOT analysis, very useful to bring reality into ideals, all stuff you know but good to write down, take it to someone else to review because they see strengths and weaknesses that you may not
- strengths: passion is strength! Need it when times get tough, marketing experiences
- weaknesses: technical understanding, time management for weed control, did not want off farm labour (difficult to find people, need to manage new people which takes time too), no packing house and storage
- plan: ramp up over 3-4 years
- Opportunities: CSA in community
- Threats: other farms doing same thing in area, packing house needed in plan
- But market is so open, other farms are not threats, collaboration and sharing can help both!

Step 6: Getting Ready

- so you decide you want to go ahead with a farm business, you need to do research internationally, talk to others in industry, sit at market to determine niches, price, what is missing,
- partnerships with others,
- learn skills: travel, apprentice, woof, really helpful to see how people run farms
- what are you doing right now to get ready?: paying off debt, invited farmer friends over to house to get ideas and strategies, mentors and advisors,

Step 7: Keeping it together (relationships)

- can work but can stress relationship
- communication is key, both need to know what is going on, when to exit, future dreams
- if fault lines exist, farming will identify them
- if know partner well, know what is important to communicate, but if new relationship, need to get everything down on paper
- men and women have different communication styles
- partner's feedback is very helpful, they know you better than many, but not always the time to be critical
- what about injuries? Worst case scenarios? Risk management is comforting

Step 8: Work life balance

- most people do it for quality of life, so make sure you enjoy what you are doing
- set a day to do something fun together, hard to separate when you live where you work, but also recognize fun in what you are doing
- value of work, hire someone to cut grass if it saves you lots of time
- be present and mindful in whatever you are doing
- risk of burnout, injuries, illness, crop failure, low prices, under appreciation, commuting, paperwork, bureaucracy, idealism/reality
- secret to not burning out: stay relaxed, positive, clear roles and delegation, flexibility, trust in each other, integration with wider community,
- relationship rescue: goals that have same end, find time to talk and listen to each other, don't get too wrapped up in farm, take time to get away
- Book: Exploring the Small Farm Dream (course offered at NSAC), lots of resource available now, Organic Path on ACORN website, will post links with powerpoint on ACORN site, Johnny' catalogue have yield production spreadsheets
- biggest challenge?
- Organic certification? if less than 10% of income, likely not worth it, want to know if
- One of the most precious things you have is to be young and healthy, don't procrastinate too long! At least it will provide you with food so at least you will be feeding yourself

To view complete presentation click here: http://acornorganic.org/pdf/LoveMoneyFarm.pdf

Composting for Field Crops ~ Roger Henry

- result is not always good compost, can result in weeds
- mainstay of organic farming
- no one way to do it,
- step 1: what do you have to work with? What will you need? What scale are you going for?
- materials, tools,
- animal manure, 40-60% solid, can be static pile or windrow,
- liquid manure: 5% solid, need aeration and treatment
- slurry: 20% solid, prefers feedstock to make more solid
- Animal manure composting: manure, carbon source (straw), cover for winter composting, capture leachate for liquid treatments
- Snow stops composting because adds so much water
- Even in -15C can compost well because of heat given off (65-70C in 2 days), -20 too cold outside
- Layering in windrows (manure, straw) but not too much volume too not get too much heat, pile up to chest height, 8ft wide at base, each layer about 1ft deep (depends on heating potential of manure, mink manure very strong), too much at once will get too waterlogged and will stop composting. Turn for oxygenation
- Too hot, it turns grey, doesn't need to be turned for more oxygen
- Liquid manure, nothing grows on it, but with aeration, will grow grass on top, can spread it with no smell

Carbon

- Required my microbes to use up nitrogen, as well as water and oxygen
- Ratio of carbon: nitrogen is key, 25-40:1 ratio in initial mix
- Straw = 80:1,Hay= 25:1(which is why it rots -3x quicker in the field once wet)
- Some source more available than other:
    - Meat = 4:1 (fish wastes heat up quickly, can be used to fired up a stagnant pile)
    - Molasses in liquid manure for stimulation
    - Potatoes = 8:1
    - Hay, 25:1
    - Leaves/straw, 80:1 (more structure in final product than wood)
    - Peat: nice texture to final product, 200:1
    - Wood materials, like sawdust (250:1), also absorbs and smothers odour (like carcasses), takes longer to break down, need to make sure it is all composted before using it or will rob N from crop, but not available much anymore
    - Paper mill sludge:250:1, but no structure so needs wood chips to add air circulation
- Different characteristics
- Straw is one of only sources of carbon, or leaves from municipality, or sea grass from sea
- Manure spreaders good for mixing, give different shapes, some better than others
- Sawdust and potato (or apple) mix, layer of sawdust with V filled with potatoes, need to add more potatoes 6 weeks later to break down all sawdust carbon
- Sugary materials (apples, potatoes): alcohol>vinegar, if ph below 5.3, microbes die, so need buffer in mix at 30:1 to counteract acid (wood ashes, manure, limestone)
- For getting a kick on land from compost, need 15:1, but for long term carbon building, can use 20:1 but kick will be next year and crops this year will be robbed of manure
- Lobster shells can be spread directly on land (beside potatoes, not on top), no need to crush them even, or mix with straw, sawdust,

Turning:

- Adds air, chopping, mixing
- Method: turners, loaders, manure spreaders, moving pile
- Bottom will be wetter, can be anaerobic and smelly and varmints
- Don't need to clean turner after

Water:

- 45-60% is ideal
- Want about 50% water below 40% or over 65% moisture the composting stops (smells like septic if too much water)
- If too much, see leachate around edge of pile, smell anaerobic smell, like 60+%
- Can cone up almost ready piles if lots of rain is coming
- Squeeze test about 1 month in can identify moisture level, want a small bead of water forming at end, means 55% moisture
- Too hot, can water with cold water to manage temperature
- Want to et up compost where can add water if needed
- Like baking a cake
- Mushrooms on top are a good sign
- Need space between windrows for drainage
- If pile dries out, make them bigger so less surface area, or add water

Temperatures:
- 30C is slow process, nothing happening below that (except vermicomposting)
- low temps lose the least amount of carbon
- 40C kills all weed seeds, must be whole pile for 4 hours, not just edge, f
- tomato seeds are hardest to kill
- 55C is very active composting, potential for high amount of carbon and nitrogen loss, usually halves the volume, can even catch fire! For 3 days is pathogen kill
- he aims for 50C
- can lose 70% of nitrogen if not done properly
- carbon lost in CO, inevitable, nitrogen absorbed in bugs bodies so want them to die in pile but can be lost as ammonia when turned over
- 55C for 3 days was considered safe for pathogen kill

Compost Maturity
- depends on colour, odour, texture, C:N ratio
- field crops do not need lost of compost
- aged manure has nitrogen tied up so will add N over season, not right away
- smell is minimal, texture is fairly consistent
- should be spread before weeds start to grow but shows that compost is ready for use
- mushrooms growing is fine

Application Rates:
- can spread with spreader over tarp then weigh (more precise), or calibrate spreader per area spread
- Average values:
- N=.35-1%
- P= (will leach out)
- K= (not lost in air or leach)
- Need 100 units of nitrogen for corn, 50 for barley (but only half available in first year)

Summary:
- Contain manure, collect liquids
- Add P to manure (ex. rock P)
- Select system that fi far and schedule
- Monitor how much putting on
- Put compost pile in poor part of field

Organic Standards:
- must be 55C for 3 days to be compost, takes monitoring and bookkeeping
- can call it aged manure instead so don’t need record but do need to keep track of application time instead
- but they may not ask
- Covers not usually worth the money and wasted after 2-3 times used and air not able to get under, straw is better if no weeds in it because on top seeds will not be killed
- Piles with woodchips make not even need to be turned, but screen out chips at the end
- Ammonium nitrate and leaves made beautiful compost, not organic
- Small scale can get away with almost anything

Solutions to perennial problems: Animal Control Solutions ~ Peter Maxner

Peter Maxner: From Falmouth, just outside of Windsor NS. 35 years of experience with pasture management. Not just a topic on Gallagher products, its pasture management, predators. Not necessarily confined to livestock management, protection of gardens also.

Look at the field and see all kinds of grass. Oh we have to get the cattle in there. Need to have a fence to manage the particular forage. Good fences make good neighbours. Make the animal be the lawn mower. The more you can get the plants eaten into that 2-4 inch range the better.
2 essentials: ground and power source, with no shorts, have to have good insulators.
Energizers: looking at types of energizers available. Have to know joules of energy: their ability to push the power the distance. Size the energizer for your field and expected expansions in the future.

Grounding: can't stress enough how important. Energizer put the power to place of least resistance.

Insulated fence: any chance of contact there is a ground, loose a lot of power.
Horses learn quickly. One jolt they won't go near the fence again.
The power has to go through you into the ground and races toward the grounding roads.
The shock is a psychological. 7-8000volts, min 5000
Deer fence: 7 ft. fence, a bracket off-set 16 inches off the fence at 2ft high.
Frost or snow prevents the current from going through your feet. In winter using the non live wire as a ground, completing the circuit relies on them touching both wires at the same time. Sandy soil will do the same thing. Grounded back at the energizer: Ground rod not eliminated, just connected right to it. Can't eliminate the ground rod altogether by alternating ground live wires.
With rocky soil the ground rods are difficult to get in. More moist soil farther down which mean more surface contact and the better ground you get. Can bury the ground rod horizontally, you want vertical, but could use old car or even bed spring.
Peter has actually fenced for wild mink, cats and racoons. Figure out how to electrify chain link fence.
Chain link buried in ground all the way around. Has a ground already. Added a wire and works very well.
Energizer gives out a high powered voltage but only for a fraction of a second.
Grass brownoff with a high power energizer. A good energizer will burn off a strip of grass and it will die off. He never shuts off the energizer, most people only run it the spring.
What about in the winter? Snow won't act as a conductor so it doesn't short the circuit.
Cow is insulated by snow, but she remembers, what if a coyote jumps in and chases cow…coyote is problem not cow, same as deer.
Voltage over a km of fence line will drop from 6400 down to 600, outside perimeter fence should be solid smooth steel wire. Discourages use of barb wire, something will get caught up it is not very good at all.
Something with a little more visibility: braided.
Good corners keep a good long distance fence. Get the posts in first no wires. Then tighten up just one wire. 45-50 ft. between posts depending on land contour. Start the line at one corner and end the line on the other side of the post. Corners are really important, slaters keep them tight.
Blueberry field, keep animals out, not in. Again, smooth steel, high tensile, galvanized wire.
Buy cheap insulators or good insulators. Let the insulator move; do not put them on so tight that it can't move. Single nail insulator has opportunity for power to leak. One nail insulators: is there a problem of it jumping through the plastic? Over time, yes.
Good to go with the long-term investment with insulators. Two staples let the insulator move better. The wire needs to be able to slide. Wire doesn't need to be singing tight, just make sure they don't touch between posts
How many times have you just gone out and wrapped a wire around another? Have to make a good connection.
Run out cable. Copper and galvanized after about a year will oxidize, loose good connection. Don't use electrical cable to feed power.
Gates: spring gates work pretty slick, one end of the gate needs to hook into power. Get the power to go under ground so there is power all the way around.

Ground rods; 1 ground rod for every 2 joules that energizer puts out. 6 joules of energy 3 ground rods. Put them 10' apart. Do not use a ground rod that's hooked to garage or grounding for house, never to well casing, or lightning rods. Culvert works great, unless someone goes into the culvert.
Lightning diverter, has to be wired in. Could be strong enough to blow them all to pieces, they are not too expensive and could save you an energizer.
Pasture management: Sub divide, strip graze, pasture. Gain in production by only sub divided areas for a couple days feed in each.
Remember to get water to them. Dairy cows need that water something fierce. Underground irrigation systems for filling stock tanks work great.
A reel and portable post, hook some power on to it, and real simple to do.
You as the producer needs to determine the speed at which you rotate your livestock through the fields.
How to make an old fence still work for another couple years? Off set wire, to keep animal off old fence so they aren't leaning on it. Tumble wheels, really into intensive grazing, only one strand for tumble wheels.
Picture pasture sub divided into 3, all at different stages of grazing. He will help with pasture grazing management plan, design it so that one individual can get the animals to move in 15 minutes.
In New Zealand the strip up the hill. Another fellow intensive grazing, moving the fence two feet at time. But he only did this for two cows. Out west a combine/moving fence combination.
Questions to pasture management predator control:
Pigs are different, they'll run through fence. Pig's don't have a brain that goes into reverse, they don't see. Mesh fence can work well.
500 ft roll, 5 _ feet tall for chicken, just a grounding post on other side of battery. This could work for apiary to keep out bears. Don't want a mesh up cause you move hives for pollination. Better off with a permanent yard. Need a good 6000 volts to keep out bears.
Question: rotational grazing, finds if mowed, set cows in to clean up, stubble must be hard on nose, they won't go into it. A problem is using too high quality forage
How high for sheep and against coyote, 3 _ feet high, 5 feet. Bottom wire has to twice as tight cause coyote will try to dig under and will smell for when the power is down.
Another issue: spring power is up; summer, can't get the same hot fence. Two problems don't have a good ground. Main goal is to get zero for a reading from ground rod. How much growth: trees, bulrushes, wild roses growing up on your fence line.
Dry time: a bucket upside down over the grounding rod to keep ground moist around it. Watering ground rods in dry time is an asset, might be an inconvenience.
Ground rods last? Don't know: maybe 25 years, if hot galvanized. Lazy: put in with front end loader.
Fence to keep racoons out of sweet corn. Just have to run it out, not back into the energizer.
4-6 inches off the ground.
Bench wire? Works very slick, netting is so much easier. Grape growers use netting.
More convenient way to reroll the netting? Grab the post lay it down and roll it.
Interested: did not mention insaltimbre is great insulator wood, type of eucalyptuses, need diamond tip carbine skill saw, diamond drill, non conductive, permanent post.
Fibre glass post works well, also steel post with insulator on it. Recycle plastic posts available in Ontario, still available in Maritime? . What happened? Plant burnt. Very flexible, snow plow friendly, heavy to work with.
Pasture management, paddock layout, water systems, Peter can help design, just won't come out and lay out the fence.
How many acres per cattle for intensive grazing? Average 2.5 acres per head. 1-1 is pushing it. Depends on the pastures species, figures are based on conventional techniques. AV says 1 acre for 2 cows.
Management is more important than changing pasture species. Back in there 21 days or so, manure is gonna be a little runnier the hooves will spread it, the sun will bake it eliminates disease.
Parasite control; co-evolved together, 21-28 days for intestinal parasites. The only way to avoid it is grazed first, hayed second time, but not very feasible. Don't rely on it.
How many cows can adequately water off one nose pump with nursing cow in the summer? 25 cows 50 animals on one nose pump.
Solar waterers? Not much experience, principle is great.

Solar Fencers? Doesn't disrecommend. They are costly, they do the same job. The solar panel will just recharge that battery. Biased to plug in unit: not much for energy use monthly. Remote location necessitates. Danny says solar works great, his is not a Gallagher, but it works great.
Gallagher has replaceable components.
Emphasize water: controlling factor. Herd mentality making sure they are watered is key.
How far is reasonable to expect them to go for water? 800m is the farthest. Av says half that.
Sheep, live off the lush grass first, and then after a couple days they need to drink more. Cows can go twelve hours between drink, on lush wet grass they can drink half as much.

Increasing Small Farm Capacity: Introduction to Small Scale Farm Machinery/Equipment ~ Rupert Jannasch

Questions, Answers and Comments

Q1: Question about extended axels in the picture on one slide of the presentation.
A1: The tractor was specially modified for use on wide beds. Please contact Norbert Kungl for a more comprehensive answer, it is his tractor.

Q2: The bean thresher pictured in the presentation: did you build it? Do you use it?
A2: It was made by someone from various parts that were manufactured in the late 1800s. Yes, I use it but the beans been threshed come out it a bit randomly.

Q3: How deep are you trying to go with a broadfork?
A3: Not deeper than 6 inches in greenhouse but you could go deeper depending on your weight, the force you exerted on the fork etc.

Q4: Do you work the bed backwards with a broadfork?
A4: Yes.

Q5: Would broadfork deal with hardpan?
A5: I think it would help but it depends on how firm the hardpan is. But if you broadfork every year or two, it could help.

Comment: Rototillers can destroy soil structure that is difficult to restore. Using a rototiller once per year should be okay but it depends on what soil amendments you're adding, soil type etc. So be cautious and don't overuse it.

Comment: Seeders for tractors are easier with a pole attachment than a three point hitch.

Q6: Is the Planet Junior still being manufactured?
A6: There are three "vintages" of Planet Juniors available: pre-1965 (the parts of which are all steel), Post-1965 to the 1990s (the parts of these machines aren't as robust) and post mid to late 1990s (at this time Planet Junior went broke and now the machines are built in China. Reports indicate that they don't work.)

Comment: I saw an old planet junior that sold at auction for 900 dollars!

Q7: Is the Stan-A like the Earthway?
A7: The Stan-A has a belt with holes and will drop each seed in precise location, unlike the Earthway. This model has two problems: 1) cost: $2500
2) you need a special belt for each size seed you plant: belts=$120

Q8: How quickly can you make sprocket changes on the Wang seeder?
A8: About a minute and a half, no wrenches required.

Q9: Can the Wang seeder handle any size seed?

A9: It can handle small seeds up to a corn or a pea. A bigger model is available that will do pumpkin or bean. Also, there is another version that will plant multiple rows at once.

Comments: Veseys also sells a little plactic rolling seeder that is another seeding option.

Q10: Is there problems laying black paper with mulch layer?
A10: Some people in the crowd have had experience using black paper with a mulch layer and it works fine. You can adjust tension on mulch layer so as to not rip the paper.

Comment: You can grow a lot of food without using all this equipment or raised beds or plastic mulch.

Comment: Labour is a challenge so that justifies equipment for me.

Comment: Landscape fabric can be used instead of plastic or paper mulch. It can be reused and lasts for up to 4 years.

Q11: With a broadcast seeder, is there a way to pack down the seeds without a tractor?
A11: You can use a lawn roller.

Useful book: Steel in the field, it's available for free.

Comment: I found a backpack mist blower ideal for spraying! It cost around $1000.
It only takes 5 minutes to clean out so you could spray multiple things in an hour. But takes a strong person to use it (55 to 60 lbs/unit.) You can adjust the nozzle so that it sprays lots or just a little. But it could have problems with wetable powders. Also it's important to use sprayers in calm air (no wind).

Weed Control and Organic Field Rotations ~ Roger Henry

Potatoes
- weed control without herbicide is entirely possible for potatoes, just over them with soil, hill, flame, inter-row cultivation
- prep field, plant, 3 week to raise out of ground, cultivate, finger weed, or flame tops of rows, then cultivate 10 days later, then hill,
- can lame after ground crack but only have a week or will burn plant too much
- propane cots 50$/ac
- alfalfa: controls wire worm for potatoes

Cereals
- finger weed, flex tine harrow
- rotary hoe – heavier soils
- spike tooth or light harrow
- pre-emerge: go when weeds are white root stage
- post-emerge: when weeds most susceptible, do not worry much about the grain
- false seed bed technique: prep soil but leave bare, 5 days later cultivate, then plant, then flame 5 days later just before seeds germinate
- winter cereals need no weeding (rye and wheat)
- frost seeding of double cut red clover into winter rye is great system, can spray on with broadcast seeder
- winter rye blocks everything, no weeds
- plant winter rye before Oct 1, broadcast clover seed in April or May 1, use a 4 wheeler with broadcaster
- winter cereals won't grow in wet spots, sow around or use different area
- for wet spots, drill plant barley first thing in spring with barley
- don't want winter cereal too high ~6-8 in, or will mold
- spring cereals following a spring cereal, need to add fertility. Use sweep of top 4 inches after harvest

- incorporates combine losses, false seed bed that will frost kill, no erosion, fertility available slowly in spring

Soy beans
- plant soybeans after May long weekend
- when at unifoliate stage, use tine weeder harrows 2 times, takes out some beans but also lots of lambs quarters
- let them grow because lambsquarters die before combining, will have weed seeds
- can plant in rows and cultivate in between
- they are slow to germinate, right lazy! (7-10 days)
- plant more than _ in, less than 2 in
- don't fix N much
- try not to till or will have erosion
- plant in 20th of may, harvest in sept, challenge is to get soybean off in time, may take it off moist and dry after (works in ON because they have 3 more weeks of season than us)

Carrots
- can be profitable but tricky
- formed rows, waited to weeks, cultivated tops of rows, planted
- come up in 9 days, so on day 7, flame or use clove oil (more effective than flaming)
- make sure no carrots are not up when flame because will kill them
- cultivate in between rows,
- use side knives to cut between rows
- carrots are very susceptible to weed pressure, cuts yield in 1/2, take care until July

Canola
- plant when soil warm
- false bed 7 days prior
- cultivate before planting

Weed control
- exhausting weeds, buckwheat and oil radish work well
- buckwheat: 6 weeks nothing will compete with it for summer growth, allopathic (nothing wants to grow around it), makes P more readily available
- oil radish: takes longer to get going but handles frost well so good for fall, absorbs N, isothious, nematode suppression, disease suppression
- can clean up weedy fields (even cooch grass) with buckwheat in spring, disc once seeds come up (right after flower first time because flowers successionally and rains seeds below) to re-seed in July, then plant with winter rye in fall
- lobster shells about 10 T/ac provides lots of N
- white clover does not grow as high but more extensive, double cut red grow the highest if winter is hard on wheat and lots of rain in July then clover takes over
- here we have sandy loan acidic soils with iron and Al, lucky for 3% organic matter. No P, no K (P bound up with Fe and Al so need to raise ph to 6-7 to free it. Can release P for 2-300 yrs in Prairies without having to add more, not sure here), N from legumes

Rotation Options: for fertile soil
- alfalfa: grows well here, need potassium sulfate (boron), makes 50 units of N available for wheat next year, manure after first cut, plow, winter wheat
- frost seed wheat, red clover
- corn, 2T/ac manure pre-plant
- barley/oats/peas: 10T/ac in Sept
- winter cereal
- note: alfalfa in rotation sucks P and K out of field so careful if low P + K soil, must add manure and boron with it.
- Rarely used to deplete P levels, high P can cause soil erosion but if this is not an issue, may just change weed balance and nutrients in crops. Hardest to get organically so hard to get too much. Supply may be depleted in 60 years, need to figure out how to recycle biosolids

Rotation Option: not great soil (non-corn or alfalfa)
- Frost-seed Winter rye is good, no weeds, plow down for spring cereal
- Red clover, hay early, plow with cover or late fall (Nov) plow

- Cereal or spring plow, oats if wet, can take off as silage, fall cover
- Spring or winter cereal (re, wheat, spelt)
- Note: if cultivate in red clover, need to use it right away or will lose it and pollute ground water

Best Frost-seeders:

- legumes, red clover, white clover, timothy (better than planting in Sept, Aug not bad but frost seed better)
- frost changes heave soil and covers small seeds
- not grasses
- adding P to fields sometimes makes red clover seeds there already come up
- can broadcast onto sticky snow when sunny and not windy, dark seeds melt into snow
-
- Chisel plow right after combine spring cereal, then plant oats or buckwheat to hold nutrients
- Don't bother after that because annual weed will not go to seed
- For cooch grass, want to keep rhizomes close to surface, use chisel plow after first frost to expose rhizomes to frost
- Shallow cultivation many times in Aug to deplete reserves of energy in leaves

Rotation Options: Cash Crops with winter cereals:

- Milling wheat, fall sweep add 75 lbs rye/ac
- Soybeans,
- Barley/peas, fall sweep plant winter cereal, and fertility
- Winter cereal frost-seed red clover, mow 1t cut add compost
- Red clover, mow first cut (adds N to soil), add compost
- Soil builder, heavy feeder, medium crop,
- Expect 100,000lbs/ac
- Strip cropping for cereal beside forage crop, blow mowed forage crop onto cereal crop mid season
- Mixed Grain considerations:
- Need to select one that ripen together
- Peas at 20%, protein content of grain 15-16% (dairy ration), 16% ideal
    - Pure peas 30% protein
- Hard to market unless prearranged or own use
- Late maturing barley, early maturing oats
- Barley wheat harbour same diseases
- Reduces incidence of disease in each variety
- Forage peas are indeterminate, grain peas determinant (usually), want determinant especially if wet summer
- Mozart is indeterminate and not sure to be 20%, not recommended
- Walton wheat (~30%), nova oats (~30%), golden peas (20%) = 15.8% protein feed with 80% total digestible nutrients, competitive with weeds
    - Too much peas will pull cereal down,
- Encore barley good too (tall)
- Can green manure from lambs quarters if don't let it go to seed
- Disking in straw will rob nitrogen from your soil but will add long term fertility
- Bulletins on mixed crops and kooch grass on website OACC
- Grasses like high N, legumes like low N, therefore diversify mix for resilience
- Good brochure from QB, "Mechanical equipment for field crops"
- Hulless oats = 19% protein vs. 9% in regular oats, will reduce yield because drop early, hard to mature at same time
- Lupins, white sweet type, protein 40% +, great potential, not yet registered in Canada
- Anthracnose is disease they are susceptible to, disease seed has no yield
- Grows in low ph, especially white
- Corn for silage or high moisture, likely to have failure first year organically, needs nutrients over season (July and Aug), weed control trick, need to be able to cultivate so plant in rows of wheel tracks, only have short time to get weeds in between plants by throwing clay on them, tyne weed and inter-row cultivate, cold and wet kills germination
- Wheat and corn are soy beans, stay with them! There is money in organic corn
-

Speerville (Tony)

- Yields down last year, red fife, berry, spelt, but more disease resistance, less fusarium (because wet weather more when spring cereals flowering than winter cereals), red fife is variable (acclimatizing still)
- Aleana and Walton (higher yield) not milling grade last ear but higher
- spelt had winter kill and low wet spots iced
- winter triticale and winter rye better off in wet weather
- can't use Walton straight, need some berry, but can use berry straight, so paying more for berry than Walton now
- deal 60% berry, 40% Walton and will result in 50/50 yield
- buying prices: Walton (6), berry (4.50), wheat (3.5), red fife (7.5), spelt 5.5), Hulless oats (500), rye (350 milling, 300 cereal)

Co-op Atlantic (in Sussex)

- first mill in Atlantic for feed grade, had 30% growth in first year, couldn't find enough barley and corn in Atlantic, most business in winter is poultry feed, warehouse in Moncton

Solutions to Increasing Livestock Profitability ~ Ron Gargasz

Organic beef entirely grass fed. Healthier beef: Fatty acid protein profile
Ron's profile: Forage-fed is a better. Started small, 79-80 Angus cattle high quality cattle, limousine blood into the angus 7-8 generations red calves, no horns, 40 head a year, at local processor
Sell a lot of grain on the side. Time went on clients grew. Walk-in freezer on farm, open to public for 2 hours Saturday morning. Can make 2000-2500$ in a morning.
Time magazine is different in Canada and States: Save the planet eat more beef. Cattles grazing use less fossil fuels, more solar power, and 200 gallons of oil to finish a beef on grain.
Processor not certified organic, so he can't say it is organic beef, but he says it is organic farm.
Some fofo regulations about letter size. So he circumvented it with crafty marketing
No question about how we are doing things a little wrong in Agriculture, manpower and horse power 1 calories to produce 2 calories. Modern: 10 calories to produce 1 calorie
Ag importance: ecological, green plants are key to our existence on this green sphere
economics, doing it way big business wants.
Ecological
Ecological importance of farming production /consumption
new wealth (agriculture) (agribusiness) specialist giving too much vested interest information, makes ecological sense, post WWII "fossil fuel agriculture", 1960's loss of livestock, loose crop rotations
Total net income of farm operators in Nova Scotia, dropped 23 grand over 11 year period.
Loosing 400 head of cattle over 11 years.
Cattle were size of cat hundreds of thousands of years ago. Rumen, many stomachs, eating the bacterium that breaks down cellulose.
Eat all their favourites in a 40 acre pasture, divide it up and let them only eat a certain area, reseeding? No because tramping actually gets the seeds into the ground more.
Cattle in 40 acres, no way to produce as much as compartmentalized. Intensity of management more important than intensity of grazing.
Doubling production as often as possible. Profit potential greater if you are willing to commit money to fencing and more time for management, helps with low milk prices, seasonal dairying. In New Zealand: seasonal dairying.
Why choose rotational grazing, lower fuel and labour costs. More economically viable, broadens farm income, turkeys get 60% of their needs out of the foraging, chickens get 40% as followers in rotations, alternative markets (regular cuts, now beef jerky, all organic healthy hot dog), Reduce soil loss,
Leaning more toward beef, less toward cropping, 4$ /lb hanging carcass, 5$ lb ground beef, 15$ steak.
Can't raise enough beef, good problem to have.
Bread basket, soil loss on the bread basket from 7 states, Nebraska, Illinois etc. Filled rail cars with soil lost, the train would go around earth 3 _ times. 300 mile dead zone around mouth of Mississippi. No

surprise. Interruption of pest cycles. Not just crops you don't want there, gives good plants a chance to recover.
Why it makes sense to change. Rumens co-evovled with grass land. Animals harvest own feed avoiding…mechanical harvesting…feed storage…transporting feed to animals.
Grazing season length? 8-9 months. Make hay?? Oh yea yea yea. Other graze more.
We don't know enough about our grasses, and plants, in the fall they shed almost complete root system, keep animals off grass in sept-oct. Let clover or alfalfa (4-5 cuts) let bloom at least once.
Soy bean as cover crop make huge amount of nitrogen, let it go to seed, sucks it up pretty hard.
Reduced feed and equipment costs. Health of animal and people better off with grass fed system. Doesn't remember the last time he had a vet, it was for injury, not health problem 9 years ago.
Medical reasons to consider grass fed products. 1.3 m cancer /year, 975k blood vessel/heart disease, 555k cancer deaths, 72% men are over weight.
Grains high fatty acid 6 levels, forages high omega 3 fatty acid.
Penn state study 89-90 proves increased health from eating grass fed beef
mostly grain 17.7, grain + forage 12.6, pasture 3.4 even lower from stored feed, because clover boosts omega 3 levels.17.7 versus 1.7 1043% healthier for grass fed beef.
What about tenderness? His restaurant clients aren't going to buy meat that's not tender. Where do you attribute that tenderness? Diet, could be Breeding. Always kill when eating grass, not hay? No, not always.
Old tag 21 months 1430 lbs – 865lbs dressed, that's 60%.
Do recognize it as a challenge for grass fed beef? Oh yes. Can't fence off swamp, need good food. Use all bailage, round bales, keeps driest for beef to be finished. Used to feed a little bit wetter, meat was stronger, more gamey, for more alcohol content in bailage, fungi creates fermentation.
What do you do to maintain pasture quality? Don't seed and recognize> We'll come to that
Fatty acids are unique birds
1. 1/3 to _ less saturated fat
2. Lower in calories
3. 2-6 time more omega 3's
2-5 times more CLA's
Vitamin E
Managed intensive grazing MiG
Inventory to farm resources, don't just in both feet.
ariel photography
establish goals look at fencing.
Logical subdivisions change will impact a farmer management time, animals no vet bills, plant community
What can you expect? Less mechanical forage harvest more time demands for management improved animal health increased production, no substitute for doing it.
Grazing/resting depends on YOU, forage selection, Mother Nature, rotational sequence
Use the plants drive to reproduce. Cut prior to head stage, because it will continue to grow. Seed head will stale plant growth.
More growth when it is not grazed as low at 2" has more photosynthesis panels to create food.
Energy storage sites in grass, some store energy above ground, timothy just below surface, others in roots.
Never graze between Sept 4 and October 5, feed them with forage, or put in the pastures that have never been tilled. Tillage is the death of the soil system.
NE pasture diversity survey
268 plant species identified
range of 5 to 56 species per paddock
average of 30 species per paddock
dominant species, more species (to a degree) the better
Harvest for quality, get it done before head stage maintain stubble height for rapid growth, select mixtures based on yield potential, other reasons.
A reason for mixture adds stability to production, fast starters act as nurse for slow starters.
Need to reseed or not? If managing it properly than you don't need to reseed.
Improve pastures> slides are coming up.
Grazing: move animals at least every 4 days Moving after every milking is much better) ideal, not practical
Dealing with Orchardgrass have to be right on, can't be frigging around.

Grass management, 2 plant processes, shoots and roots above and below ground is mirror Just as much if not more growth in falls as in spring, just under ground. Pasture forage production year begins in late summer. Plant growth begins much earlier than spring. New white roots grow in fall and spring. How to grow fall forages and protect roots and shoots, rethink forage management a bit.
Excessive grazing can damage plant growth. Starting new pastures; prepare a level firm seedbed, no till on highly erodable land. Calibrate seeders for depth, seeding rate. Pack after seeding for better seed to soil contact. Mow or graze lightly until fully established (how long for full established,>hard to say)
Harvesting for high quality Maturity factor is #1, harvest method, hay silage, grazing
Hay drying is important, ryegrass, and festuloliums will take longer to dry than orchardgrass of fescue, 3" 4" residue? Faster regrowth at 4"
Remember the customer is always right.
Hereford with white head, light eyes are fly magnets.

Bringing out the best in your soil: Organic Soil and Fertility Management ~ Dr. Ellen Mallory

- many useful books and videos available for sale at agro-point

Soil health/Quality

- good tilth, water infiltration, nutrients released over time, weed seed bank, disease
- soil organic matter, 1-6% of total soil mass, types: active (turn over in weeks/months, supplies nutrients, energy to microbe, soil structure, not easily measured in organic matter), slow (years, carbonation, structure, nutrients slowly released), humus (stable, centuries, structure)
- additions to soil: organic residues including roots, manure, compost
- losses: decomposition, don't want fast burn from tillage or oil disturbance, erosion
- tillage is most effective way to destroy organic matter, destroys structure and oxidizes organic matter
- "tillage is an earthquake followed by fire"> Bob Papendick

Building soil:

- Reduced tillage, rotation,
- Study from Presque Isle ME; 2 yr barley/potato rotation, 13 year study
- Conventional fertilized crop vs amended soil (manure, compost, rotation, green manures, 70% less fertilizer)
- Organic matter increased 75%, water stable aggregates, density, less dense, gation exchange increased, decreased fertilizer needed, P went up significantly
- yield of potatoes higher in amended soil, especially in poor growing years, buffers poor rainfall years
- competed better with weeds than non-amended
- oil building cannot: change intrinsic characteristics (i.e. rocky), correct soil ph, compensate for intense tillage,
- needs P:N = 0.2:1 (too high is polluting for water cycle)
- poultry manure = 1.4:1, dairy manure = 0.6:1, composted manure = 1:1, composted leaves = 0.5:1
- potatoes are one of toughest crops on soil structure because of turning of soil every year
- to maintain 2.7% organic matter, need 2.5 ton of dry matter/ac/yr (i.e. hay harvest)
- fall cover crops: 2-4" = 1/3 ton DM; 4-6" = _ ton DM, 14" = 1ton DM
    - can't rely on fall cover crop to maintain organic matter
- organic matter lost most from Mb plow, less with disc, less with chisel plow, less with no till
- less tillage saves fuel, time, water
- how to reduce: shallow till (perfecta harrow for small seeded crop), zone till (strips for vegetables),
- Rob Goranson working with organic strip tillage and smaller cart, Anu Rogen working on zone till

Rotation

- Cover crop (fava beans), Broccoli, cover crop winter squash, cover crop
- Early harvest, rye/vetch mix (plowed in spring)
- Alternative year rotation: Winter rye, bare fallow (2-3 weeks), broccoli, rye vetch, fallow, squash, cover crop.
    - Better for killing weed seed bank than 2 year cover crop

    - Best systems target times of weed germination with tillage to flush out, not just suppress. Good for high weed seed bank soils
- Nordell's are horse farmers with cleanest fields
- Summary of improving soil health: balance with other goals (like weed management), amendments, reducing tillage
- Test soil: ph level, organic matter, P levels, correct nutrient deficiency
- Organic matter: ideal amount depends on what you are growing and your type of soil, reflects nutrient imbalances,
- Crimper roller used after winter crop, needs lots of residue to act as mulch to keep weeds down while large seeded crop comes through
- Used as termination technique for green manure crop, knocks off weeds, eliminates tillage but gets green manure benefits
- Biochar: take carbon form, humifies it into stable form through pyrolysis (burn wood like willows, 2 in at most, with low air and temperature), has higher nitrogen than charcoal, powdered, adds to soil, doesn't add fresh organic matter needed, balances moisture over season,
- Biological tests of soil: measurements of earthworms, microorganisms, but only one of factors in overall soil health
- Dry soil, when rewet, flush of nitrogen comes out because of dead microorganisms storing N that gets released
- P and K easy to measure because says put, but N up and down quickly so can look at organic matter somewhat
- 2-5% of organic matter released during typical growing season
- PSNT test for dairy systems using lots of manure for corn silage, when corn 1ft tall so spring variability passed, look at nitrate (inorganic form of N), finds sufficiency level (25ppm),
- Can be used for vegetables too but 30ppm is sufficiency level
- Chemical test using growing degree days or exchange membranes also available
- Post-hoc testing at end of season, demoed on corn stalks but could apply to vegetable systems also, test bottom 8-16" for nitrate or total nitrogen, relates to total levels in soil; takes few years to calibrate, but seems more reliable number
- Reading the weeds can be an indicator to soil, but are lots of other factors. Weed survive by adaptation so they survive in lots of places, but used with other indicators like smell can be helpful
- Ex. Purple strife indicates nutrient shortage,
- Test strips are helpful, if applying something new, leave a check strip for comparison
- Get neighbours to all do test at same time to compare results

Audit trail workshop with Roxanne Beavers and Rowena Hopkins

(This workshop was very interactive. Many examples were asked from the participants.)

Traceability system is necessary. You need to be able to trace the product all the way back to where it came from.

Why?

- Certification requirement
- Financial
- Farm management (what you did that year)
- Food safety / Quality assurance (trace where something went wrong)
- Product development

Good to start right at the beginning of your business, because as your business grows, the record-keeping and traceability grows with you.

Example 1: Highbush blueberries

Inputs: What you use

Fertility – compost tea, receipts for it, letter from the certifier
Pest management – GF120 Bait package
Weed control – mulch receipt, documentation

Production methods: What you do
Field activity logs (journal of planting dates, spray rates, pest monitoring)
Harvesting

Product handling
Cleaning record – berries
Packaging records and labels
Inventory
Sales receipts, invoices and records
Transportation records (not necessarily for a one-vehicle business, only when you use other transportation)

Example 2: Frozen blueberries

Is the farm sharing cleaning equipment or transportation with another farm?
The number used for lot numbers can depend on the number of harvests. Make a record of this number and information relating to it.

Example 3: Blueberry jam

Keep a record of ingredients: if it's organic sugar, recipes, production records, inventory, sales

There are two types of records:
The plan (what you intend to do. This can be more detailed)
The record (what you actually did)

It is good to record all this because then you identify changes in the data, in the processes.

Do the numbers add up?
Area planted
Harvest records
Purchases, inventory records
Processing records
Sales records

Fraudulence is not easy to detect. Organic relies on trust between the inspector and the grower. Well-kept records are easier for everyone. If there are any holes in the written information, more chance for problems to arise.

Example of in-out production balance:
20 kg of herbs harvested + 15 kg of herbs purchased = 25 kg used in poultry mix
The leftover 10 kg is bulk inventory.

Production: 1000 x 25g packages
Sales: 800 packages sold
Inventory: 175 packages
Unaccounted: 25

Not that much to be concerned about, they will overlook the 25 packages that are missing (you may have used them yourself, given them out as promotional items, lost them, punctured the bags, etc).
If the person had sold more than they produced, that would be reason for suspicion.

It is good to keep these numbers to know where your losses are and where to improve your production practices.

Lot numbers

- Use for processed good
- Use anywhere you are not doing a direct sale
- Make it traceable to field of origin
- Ex: PS-2009-176: product, year, Julian date

For more information:
"Record-keeping for organic farmers: How to get and stay certified" (book is coming out soon)
www.cog.ca

You have to think that anything that is a risk factor for certification is also a risk factor for your farm, so might as well keep the records anyway.

It's good to have the yield summaries, sales records on hand when the inspector arrives.

To view complete presentation click: http://acornorganic.org/pdf/audit.pdf

Increasing and Diversifying Organic Greenhouse Vegetable Production (Part 1)
~ Dr. A.P. (Tom) Papadopoulos

Dr. Papadopoulos has experience working with greenhouse vegetable growers in Ontario and other parts of the world. The focus of his talk was organic greenhouse vegetable production but he thought it would be useful to start with a crash course in greenhouse production in general. He thought it would be useful for those interested in organic production to learn a bit more about the larger context.

Dr. Papadopoulos works at an Agriculture Canada research centre in Harrow Ontario. Slide #2 is a 10 year old picture of the main research wing with offices and labs. The most modern greenhouses they have can be seen in the background.

Slide #3 is a picture of the research centre taken from a plane. They have the largest greenhouse research complex in North America. The greenhouses closer to the bottom of screen are used for greenhouse research. The 9 small greenhouses near the centre of the picture were built in 1987 for evaluating greenhouse structures and materials including glass, double polyethylene and acrylic. There is also another research stations that is affiliated with the reserahc station in Harrow that specific studies production in heavy clay soils.

The experiment comparing greenhouse materials and structures cost $700 000 but saved the greenhouse industry a billion dollars in heating and material costs. Most new greenhouses are double poly because it was found to takes 35% less energy to heat those greenhouses and costs half price of glass.

Slide #6 shows that Harrow is at most southern point of Canada.

Slide #7 shows that Harrow is close to Leamington where most of the greenhouses in Canada are located. More greenhouse vegetables are produced in Leamington that in the entire USA!

Slide #8 shows a map of world. The farther we go north in the world, the shorter the day gets in winter which means that the farther north a greenhouse is located, the more difficult it is to grow a crop. In addition to shorter day lengths, it is often fairly cloudy during the winter in northern locations. Light becomes limiting factor. Notice that Holland, which has a substantial greenhouse industry is much farther north than we are. Leaminton is at the same latitude as the northern border of California or Rome while Holland is as far from Rome as Rome is from Jerusalem, which is one of the locations in the globe with the highest light availability. So we're in better position to produce greenhouse crops than much of northern Europe

Still, people often say "if you want to grow greenhouse crops, go south". An a number of Canadians have investigated production in Mexico while producers in Holland have gone to Spain. But the most advanced greenhouse industries are in Canada, Japan and Holland. That's because, while in the south it's not as cold as here it is very hot in summer. Generally it is easier to heat a space (technology and cost wise) than to cool a space. Air conditioning is very expensive and there are difficulties with evaporative cooling technologies. In the south greenhouses are generally low tech and can produce for only 3 or 4 months after which conditions in the greenhouse become too hot and too expensive to air condition. In the north, producers are already producing for 9 or 10 months of year starting in March and heating is only needed for part of that period. Due to lower temperature control needs, more money is available to invest in more expensive structures.

Q1: Have any studies looked at the advantage of longer days in June in the northern hemisphere compared with greenhouse production in the south?
A: Long days are a plus, if we can control summer temperatures (which can be more of a problem in Leamingston compared with regions with a more maritime climate like the Fraser Valley) Also, in high humidity it's hard to control heat levels.

Q2: So it's easier to do greenhouse production in a maritime climate?
A2: As far as temperature is concerned, yes. Holland is one successful example of that.

Slide #9 is a picture of Leamington's greenhouse industry 20 years ago. The greenhouses were largely located along the highway and another road. Most of the greenhouses close to highway are old glass structures and those behind them they are all double poly.

Slide #10 shows a more recent picture of Leamington's greenhouse industry. You can see that the area is now running out of space for new greenhouses. The industry is moving farther outside of the city.

Slide #11 shows a large greenhouse that covers 30 acres. It is now a bit out-dated and is no longer the biggest greenhouse in the region.

Slide #12 shows the inside of a 10 acre greenhouse that now has another 20acres attached to it.

Slide #13 shows a typical boiler room that provides heat to a greenhouse.

Slide #14 shows another boiler room.

Slide #15 shows a packing house: each greenhouse typically has its own boiler and packing house. In this photo are students of Dr. Mary Peet from North Carolina State University who came to visit Leamington. Dr. Peet is one of the pioneers of greenhouse organics and is in charge of USDA program on organic crops.

Slide #16 shows all of boxes stored in a large packing house

Slide #17 shows a pepper crop operation

Slide #18 shows a close up of those pepper plants

Slide #19 shows statistics concerning greenhouse production in Leamington and all of Ontario for 2006. Most of Ontario's greenhouses are in Leamington. Today there are 2000 acres of greenhouses in that town while in 1980 there were 220 acres.

Slide #20 shows the area under greenhouses in Leamington and the rest of Ontario. In 1980, 1 acre was a big greenhouse but now there are a dozen that are larger than 50 acres.

Slide #21 shows on a bar chart how the industry has grown over the past years in Ontario.

Slide #22 shows that tomatos, pepper and cucumbers are the primary crops grown in greenhouses in Leamington. Peppers were not grown very much 15 years ago but now they are as important of a crop as tomatoes and cukes. You might ask: Why not grow strawberries in greenhouses? Or climbing beans? Tomatoes, peppers and cukes yield the most weight of produce than other plants. You could raise other crops in greenhouses but you would have to charge a lot more for them in order to balance the costs of production. If for example you grew strawberries and the yield was one fifth the weight and equal area of tomatoes would have produced then you would have to charge 5 times as much for 1kg of strawberries than for 1 kg of tomatos. Overall, alternative crops must be sold at higher price to be competitive. That's why those three crops (tomatos, peppers and cucumbers) remain the main crops in greenhouse production.

Now there are a couple slides that talk about new technologies in greenhouse production that it could be useful for organic growers interested in greenhouse production to know about. These new technologies are listed on Slide #23.

Slide #24 shows raised troughs that are produced by a machine that takes a roll of metal sheeting and molds it into troughs.

Slide #25 shows that these troughs are hung from roof and a turnbuckle is used for minor adjustments to their height.

The troughs are all filled with soiless mediums and the plants are produced using hydroponics. There is one line that provides irrigation (containing nutrient solution) and usually another line will provide CO2 gas to the plants. This set up can be seen in the next few slides of the presentation.

The raised troughs make working in the greenhouse easier and more efficient. Workers don't have to bend down to plant, harvest, prune etc. They always work at waist height. The fruit clusters are also always at waist height. As the tomato plants grow upwards they are laid down also the troughs.

Slide #29 shows, in the middle of the picture, heating pipes and rails to move carts throughout the greenhouse.

Slide #30 shows a cuke crop in raised gutters.

Slide #31 shows that cukes grown in the troughs end up being straight from hanging and are easy to pick.

Slide #32 shows that artificial light is important for year round production. Artificial lighting dramatically increases yield in the winter months.

It generally takes more energy (light) to produce tomatoes than cucumbers, which are mostly water.

Slide #35 shows the use of artificial light in greenhouses in Canada 15 years ago.

Slide #37 shows part of a recirculation system. These large tanks contain water with dissolved fertilizer that have the desired conductivity and pH for the hydroponics system.

Until recently, fluids used in hydroponic systems generally provided more water and 30-40% more nutrition than plants required because fertilizers were relativity low cost and they wanted to ensure that there plants weren't lacking nutrient or water. Those practices are no longer acceptable due to environmental concerns. Now, water and nutrients are recirculated in the hydroponics systems.

Slide #38 shows the system that adds nutrients to irrigation water. Each head feeds one nutrient into the solution and a computer controls how much of each nutrient is added. This system can be modified so you could mix a solution with different nutrient compositions each day if you wanted too. So with this system you can have a seasonal fertigation program. All a grower has to do is make sure there is enough nutrient in the machine to be mixed into solutions. Apart from that you just put in dates, what crop you're growing, what type of medium you're using and the computer takes care of rest.

Slide #39 shows large tanks of fertigation liquid in a greenhouse. These tanks are usually concrete and underground. A local bylaw states that each greenhouse must have enough storage capacity to meet their needs for 100 days. One tank contains water and the other contains excess nutrient solution. The "used" nutrient solution is tested and adjustments are made to recalibrate solution with new nutrent and water inputs. The reused solution is also cleaned/sterilized with U.V. or ozone,

Slide #40 shows U.V. water sterilization.

Q3: Don't sterile systems make it all the harder to deal with bacteria or fungus that get into these systems?
A3: Yes, it's a nightmare when something gets in. There are two main camps of thought in the greenhouse industry: one group says they need to sterilize everything and the other group thinks they need to involve microbes in their systems so that these microbial communities reach their own balance. Both are right in their own minds.

Slide #42 shows a CO_2 recovery system. Generally, if we enrich air with CO_2 we can get a 30 to 40% yield increase. People use natural gas to generate heat and CO_2 for their systems. As long as you have a perfect combustion method, you'll have CO_2 as a gas byproduct without any other toxic gases. The offgases from these systems are monitored for toxic gases and are then fed to the plants. However, the boilers for these greenhouses usually produce a lot more CO_2 than can be used by the plants in the greenhouses. Maybe if you have 6 boilers, you would only need the CO_2 from one boiler for use in the greenhouse.

One problem is that most of the heating is needed at night but the CO_2 is needed in day. To solve this problem, producers operate the boiler in day to generate CO_2 and hot water, which is stored in tanks like these (Slide #44). Then the hot water is circulated at night. This setup makes economic sense and makes the operation more environmentally friendly. This grower (in Slide #44) also built boilers that will burn alternative fuel, like waste wood.

Grow pipes are shown in Slide #46. These pipes are filled with hot water and are positioned at the growth points of the plant to stimulate growth.

Slide # 49 shows a 1700 acre greenhouse of double poly.

Now, however, it is becoming more and more important to produce year round and people think they will get a bit of extra light with glass, so some growers have started building new, large greenhouses out of glass. Also the cost difference between glass and poly has diminished in recent years.

You can see in Slides #51 and 52 that the greenhouses are often very tall. There can be twenty feet of height above the gutter to the roof of the structure. Why are we building such tall greenhouses? Air within a greenhouse stratifies with warm air rising to the top and cooler air falling. The taller the greenhouse the more opportunity there is for very hot air to stratify away from plants in the summer. Also, the environments inside these structures have large buffering capacities due to their large air volume. As a result, the air temperature inside the structure remains fairly steady and does not as respond as rapidly to changes outside the structure. Plants like these more stable conditions. Some greenhouses also have

curtains for shading. Using curtains at night glass greenhouses can result in the same energy savings that would be achieve if a poly house were used.

Unlike tomatoes, peppers aren't bent down during production. Also, note that the gutters must be kept level for even growth. The pepers shown in Slide #52 are indeterminate peppers. These are different from field peppers. They tend to be sweeter, they grow to be 2 to 3 meters tall and the seeds for these plants cost 63 cents each! These seeds are sold only by two or three companies.

Idea of grafting has become more popular in recent years. The root stock and cultivar you want to produce are grow separately and then grafted together. The rootstock tends to be a variety that is more vigorous and disease resistance. Grafted plants will last later into the winter season than "normal" plants.

Recently the industry has had to expand the types of the three main crops that they produce because markets were becoming saturate. One example of a "new" crop that has been produced by the industry is cluster tomatoes. People really like them because the stem smells great and as a result people think the tomato smells good. This crop has recently increased in popularity.

Slide #62 shows a heating system that uses woodchips. It's a $3 million operation. They need 2 barns to store their wood chips so that if one barn burns down, their greenhouse won't freeze over.

Slides #64 and 65 show the idea of raising potted plants inside the greenhouse to provide extra income and shading.

Slide #65 to 67 show different types of tomatoes on market in France, including black tomatoes.

And that is the end to the introduction to the current greenhouse industry.

Q4: Is anyone looking at other types of alternative energy? Geothermal?
A4: Dr. Papadopoulos hasn't done energy research but he is aware of energy related research in Canada and in Leamington. Geothermal is of particular interest in regions with hot-springs but there are concerns about contaminates in the waters and gases of those springs.

Q5: Can tomatoes in greenhouses taste as good as tomatoes from the garden?
A5: The market speaks for itself. Greenhouse tomatoes are a successful crop and there are people who will pay higher prices for greenhouse tomatoes. In scientific terms, how do we compare a greenhouse tomato with garden tomato? It's so relative…everyone has preconceived notions, past experiences relating to tomatoes plus there are so many different tomatoes and different expectations of tomatoes should taste like. However, taste tests show they can be same.

Part 2:
The market opportunity is there for organic greenhouse crops and there is lots of room for growth. Tomatoes currently make up only 4% of organic produce grown in Canada.

In last 5 years, Canada has become a next exporter of tomatoes to the US because Leamington went from 200 acres of greenhouses to 2000 acres of greenhouses while the industries in Quebec, Alberta and BC have also grown. All that has resulted in concerns of how much more we can grow and how many more vegetables we can sell. And what if there is someday a food safety scare related to greenhouse crops from Canada? Overall, growers are starting to look for new and different marketing opportunities.

Scientists and growers get together a couple of times each year in southern Ontario to discuss research ideas and results. A few years ago there was not a lot of interest in organics in Leamington but now there is more interest.

Also, in the past, marketing to US was more successful due to the weak Canadian dollar. However, now that the dollar is stronger, a lot more produce is being imported to the US from Mexico.

Government policy changes that have made organic growing a new priority have contributed to the increase in interest in organics within the industry.

Dr. Papadopoulos was involved with submitting a proposal to Ontario, BC and Quebec growers to do research related to organic greenhouse production. It took one year to come to an agreement with all of the groups.

A list of groups that contributed funding to the research can be found on Slide #76.

The project had a 3 year plan and finished in the middle of last year, which was a bit later than expected. As part of the project the made their own growing media since appropriate media was not readily available.

The experiments involved liquid fertilizers, which were said to be essential to make sure the right nutrient ratios were provided to the plants. It is hard to get ideal nutrient release without liquid fertilizer applications. Nutrients can also be applied with side dressings and that was also looked into.

In beginning, they tried two liquid feeds. “Pure bled” liquid feed is not certified and in the end “Agro Chem” was certified for use in organics. There are also other desirable chemicals available.

They also tried incorporating different amounts of soymeal into their growing mediums. A big problem with organic medium is their inability to supply nitrogen to plants. Lots of soybeans are grown in the area where the experiment was taking place and are processed in Windsor. The processing company donated soymeal to the researchers. It was thought that the high protein in the soybean meal would provide extra nitrogen. The use of plant based materials in the preparation of the growing medium was considered desirable because they tend to have a consistent composition unlike manure.

Slide #84 shows the growing media mixes composting in a field. The piles were covered in plastic to reduce nutrient lost. The medium was turned each week and sampled for two months. After that point, the mix appeared to be stable. Some of the material prepared during this initial composting was used a year later and was still good.

The first planting in the experiment took place on Jan 17th, which is a typical date for greenhouse planting. However, sometimes it is easier to plant later. One needs to be more careful to unsure that there isn’t too much vegetative growth. If we start crops in the middle of winter, we need to restrict the water supply and nutrients to the plants in order to hold back vegetative growth in low light availability and to ensure the plants set. First fruit set is generally worth the most.

Slide #94 shows the first experimental layout. In each block, both of the 2 liquid feeds. Four growing medium (10, 20 and 50 kg soymeal and commercial medium) were also tested.

Slide #95 and 96 show the set up at the beginning of the experiment. Pots were set up in troughs to collect leachate (excess solution).

The tomato plants grew very well. On March 6th, leaves were removed from the plants to provide better air circulation and reduce disease pressure.

The plants appeared to be a bit nutrient stressed in late March but in April more that three or four clusters had formed, which was more than had been hoped for. In April the plants were laid down. Then in may they were laid down again.

Slide #126 shows some of the buckets used for nutrient solution capture. Pumps return the leachate to holding tanks.

In June, there were problems with some treatments, but overall the crop was not too bad.

Before starting the experiment, the scientists had been warned about problems with irrigation drippers clogging when used with organic medium. To solve this problem, they put a spigot in each pot but this probably wouldn't be practical for commercial scale growers. More work is currently being done in BC on this issue. They have found that better filtration can help prevent clogging.

The scientists originally thought the plant in Slide #135 to 137 had iron deficiency, but it was in fact a P deficiency.

This experiment also involved sidedressing with composted soymeal but it was found that side dressing didn't make much different so its use was eliminated from future experiments. In this first experiment, pots were only filled two thirds to allow for side dressing but in later trials the pots were filled completely.

In conventional production a high concentration fertilizer/water mix is used during the winter because the water in this mix will be less availability due to the high conductivity of the solution. The humidity in the greenhouse can also be reduced by cracking the greenhouse's vents in order to mildly stress the plants. Overall, heating and ventilating controls plant water uptake and can effect fruit set. But in organic operations, the nutrient contents of solutions and media are so low and more expensive so using more nutrient in solutions is not practical.

Another project looked at how changing nutrient solution conductivity affected tomato fruit quality. Higher conductivity resulted in higher fruit quality but their were environmental concerns about the environmental implications of those practices because at that time nutrient solution recycling wasn't commonly practiced. So, another alternative practice that was looked at involved adding salt to the nutrient solution and it was found ot also increase fruit quality. The results of this experiment are published.

The next set of experiments were conducted between spring 2006 and spring 2007. During these experiments, only the 20 and 40 kg soymeal media were used. The commercially available media was eliminated from the experiment because they wouldn't contribute funds (or their media) to the project and were secretive about their ingredients.
Agro-green (a liquid fertilizer) was also incorporated into the experiment because they donated liquid fertilizer for that year. Pure blend was included in the experiment in the second year because although it is not certified for use in organic growing it performed well. The original experiment was criticized because it did not have controls, so organic and inorganic controls were added.

In the second year, nitrate was higher than in the first year and this might have been due to starting the composting to make the growing media in June and July instead of August to September.

Slide # 152 shows the EC of leachate and fertigation fluids during the two experiments. These results indicate that there were plenty of nutrients available to the plants since the EC of the leachate was higher than the fertigation fluid. The solid line is the EC of an inorganic feed.

When negotiating legal agreements with Ontario and BC to gain funding for this work, part of the deal was that the results could not be available to the general public for a period of time after the results were complete. The reports discussion these experiments and their results are only now available to the public.

Note on Slide #153 that the phosphorus levels for the treatments using AgrowChem were quite low.

Slide #154 shows the yield results for the experiments, which weren't bad. Experimental set-ups typically cannot match commercial yields because in larger operations the grower spends all of his/her time monitoring the crop and is always make adjustments to ensure optimal conditions for the plant were as a researcher typically isn't dedicating all of their time ot one project. Also, smaller experimental greenhouse have less buffering capacity, which also makes it difficult to match commercial yields.

The yield for the different soymeal levels in the growing media are not significantly different but there is an obvious trend: the more soymeal in the medium the higher the yields.

Q6: Are the differences between the marketable and total yields in this study normal?
A6: More information is available in the report.

The numbers in brackets on Slide #155 are the % of commercial yields achieved in trial.

Quality evaluations were also conducted as part of the experiment. A taste panel: 8 or 9 people, rate them 1 to 10 (best), Ontario specialist, surversivor or greenhouse crew, librarian, secretary etc.
Then evaluated crate on apperance: no significant difference, more infor available in the report

Diff due to process made due to more effective mediums etc.
Note fertilizer costs more than heating for organic

The emphasis has to be on the medium. Little hope in cost of ertilizer going down. So need to try to reduce amount used and supplement with media.

In 2006, an experiment similar to the tomato experiment was conducted using cucumbers. The home made medium was placed in pots with the control media were placed in small containers.

Buckets were again used to check that the plants received the right amount of water and to provide leachate that could be tested monitor for changes in nutrient availability.

Early in season, the plants were not green enough and then there seemed to be symptoms of disease in the fall. There was not much time left in their growing season to respond to the disease, so the scientists left them. Overall, yields were low in the whole greenhouse.

The last experiment that was conducted involved peppers and the crop remained healthy throughout the season.

Plants grown in homemade media all had similar yields. Note that three different liquid fertilizer mixes were made with a variety of Agrochem products. The Agrochem products were used in different combinations that resulted in similar nutrient contents

The economic analysis of the different production regimes tested in the various experiments are available in the final reports.

Question and answer period:

Q7: Have you tested media at the end of trial to see if it can be reused?
A7: The organic method of greenhouse growing has the advantage of not having disposal problems associated with rockwool, which is usually used in commercial operations. Reuse is a possibility in organic systems but you could be putting yourself at risk to mistakes or accidents that could result in crop failure. Is it worth the risk?

Comment: One farmer in the audience uses soil from cucumber production to grow lettuce and the soil is also sold for landscaping uses.

Q8: Did you look into the disease that you noticed on the cucumbers?
A8: In the greenhouse industry, some spraying is used to control fungal diseases and only as a last resort largely because bumble bees are used to pollinate greenhouse tomatoes and they are very sensitive to pesticides. So spraying is minimal. In this particular experiment, they're not sure what disease affected the cucumbers.

Q9: In first year you used a peat based medium?

A9: Peat based media was used in both of the experiments but after the first year coco peat was used as an organic control and rockwool as an inorganic control. But basis for other media was always peat.

Q10: So single biggest factor in the cost of production is liquid fertiliser? Did you look for alternatives to those products?
A: Yes. The scientists approached as many companies as possible but the fertiliser's used in the experiments were all they were able to access. In BC others have been tried.

Q11: What was your irrigation scheme?
A11: It was time based and was the same for all of the plants. Maybe different management systems would have had different results. Overall, they tended towards over-irrigation and also used recycling leachate recycling. The leachate wasn't monitored and was just reused as it was. There didn't appear to be any problems with that system.

Q12: So there are two camps in hydroponic community including one camp that advocates incorporating microbes. Is that method used?
A12: Yes, outside of Montreal in Mirabel is the world's largest hydroponic grow house. They produce lettuce in ponds of nutrient solution and have been in business for 25 years. They have never emptied the tanks, just adds water and nutrients. Their system is not sterile. They did research into alternative herb and medicinal crops and found that they were all successful in their system.

To view complete presentation click: http://acornorganic.org/pdf/green1.pdf and http://acornorganic.org/pdf/green2.pdf

Cold Storage ~ Norbert Kungl & Allison Grant

Step1: when you grow crops, look at each as a number of steps that run together (including storage and cooled transportation to market)

- Ex. Strawberries need a cooler, pop coolers work very well and are cheap
- rule of thumb, one hour at room temp = 1 less day shelf life
- harvest at appropriate time, including ripeness and time of day
- can use water or fan room to remove field heat
- small scale solutions is challenge
- Norbert's is built in hillside, another farmers uses a large culvert
- Chest freezers are good vessels (better than fridges because don't like
- Thermostat control from beer and wine store by Johnson Control's is great for monitoring temperature in freezer, but don't put delicate things near wall because of cold blasts
- Things that don't like moisture can be problematic in freezers because they get very moist (water pools on bottom)
    - Newer freezers have plugs on bottom for drainage
- Domestic air conditioners hooked to "cool box" from NY are also good for insulated rooms (www.storeitcold.com)
- Vapour barrier and humidity control is important too
- Air cooling will dehydrate so good to bag items that need moisture, put in pail of water, misting systems
- Lots of resources online for building walk in coolers
- Ask neighbours who have root cellars to cool or store crops for you
- In ground storage does not need insulation
- 55F is ambient temperature in root cellar, some vegetables love that temp, some need close to 32F, can pipe to outside for cooler air to drop in
- constant temperature is important for long term storage
- vegetables are living, still breathing, they generate heat, at end of season when fewer crops, they do not give off as much heat so freezing is a concern

- Norbert has no vents, not a problem and can store carrots into May, traffic in and out is enough ventilation. No commercial units have vents
- What if froze 4x4 ice blocks in plastic bags over winter and put them in storage bins in spring could make own ice cooler, or could use for transportation
- Hydro cooler makes ice and makes cold water by adding ice to dip veggies in
- "100 year ld technology, it can't possibly work." "No, of course not, these people all died"
- wet blanket in shady spot helps during harvest
- park truck with back door facing away from sun when harvesting!
- Harvest, dip in cold water, lay in CSA bin. (Kent's system)
- Long term storage, basements typically too dry and warm, clay cellar or dirt floor better for home storage
- Carrots need high moisture and near freezing, high moisture
- Ethylene is natural ripening agent
- Onions and potatoes/apples should not be in same spot because encourage sprouting
- Bananas are notorious for ethylene production
- Evert fresh bag product for storage that let ethylene out, they are a godsend for preserving, the large one is better
    - Could get sheets of it to drape over crops in storage instead of wet burlap sack (if organic certification allows it), but technology could be as simple as air circulation
- Keep basil out of co storage, keep it in cool spot outside, might need to keep in insulated cooler in transport truck so does not get too cold
- www.Rootcellarsrock.ca
- can mound up for root cellars
- talk to elderly neighbours for ideas on root cellars
- when harvesting squash, handle like babies, heat squash to 80F for 2 weeks with air circulation for curing, then store at above 8C (don't like cold)
- some people spray with hydrogen peroxide, don't know concentrations. Copper hydroxide around stem can prevent rotting
- Kubota squash (looks like buttercup)
- burgess buttercup does not store as long
- sweet potatoes, potatoes, and onions needs curing too
- things that turn yellow quick are affected by nutrient balance of the crop. Well ripened, well fed crop will store longer than any other crop
    - If lot of weeds around crop, will be vulnerable
- Washing roots ahead of storage will be moist and will rot quicker. Storage must be perfect. But don't want big chunks of soil on them either
- In large quantities humidity control is not as hard
- Norbert has barrel washer 10 ft long with spray nozzle turns carrots and they come out very clean
- Kids swimming pool (9$) with broom (18in) to churn roots is low tech solution
    - "Think inside the pool!"
- turned partial carrots into cement mixture to make carrot juice
- warmer water washes much quicker than cold
- Occam's Razor theory: "the simplest idea that comes to your head first often best"

Money does grow on trees Parts 1 & 2 ~ Ken Taylor and Steve Leroux

Green Barn Nursery and Windmill Point Farm are based on a small family farm, they have no employees, can generate a good revenue to support themselves – they want that for everyone

Message: small farms can be profitable

Ken's a great observer – always challenging conventional agriculture. Steve owned the first organic lawn care company in Canada

On-farm store only open one day a week for 6-7 hours on Saturdays. They pick on Friday and sell on Saturday – it's fun and make some money (Ken and Lorraine are retired)

There's good money to be made from fruit – everyone should have at least a little as part of their farm

Steve is business and sales, Ken is research and development, have very different views…

3 Tips:

- Choose the right crop, otherwise not going to make $
- Implement systems (accounting, etc, from the beginning to make things easier)
- Dare to be different

Their field management is based on Zero Interference – instead of intensely managing the trees, they choose the hardiest strongest, tastiest varieties – although they can't do it so much for shrubs (need more interference)

Usually get 125-135 lb of marketable fruit per tree – less than hour to pick that much -
You must count picking time in costs. Steve doesn't prune for the tree, he prunes for him, like if a branch is sticking out too much and is in his way

Goal: to grow the business without growing costs

Innovation: always thinking as what's next

They use Permaculture techniques and principles whenever they can and plasticulture – weeding is a big cost

Steve says the fruit market at their farm alone could support a living

Huge produce potential as long as it looks and tastes good, as long as it has a competitive price – can market up, but don't need to if selling $1.20/lb for plums, etc.

Maximize value, minimize space – heartnut (sell nut for eating and for seed)
Sells heartnuts at $3/lb

Ken's been doing mad science for 30 yrs
Now documented, but not before…uncontrolled study

Cherry – has 32 varieties

Acclimatization over many years – make sure you buy a tree in your zone or colder

They bury the rootstock for trees that are less hardy – grafted cut is the weakspot

They have biofuel barn

As part of sustainability – everyone should be able to propagate their own trees

They have a small orchard and market garden and do consultations

Trees take better and grow faster under plastic, they haven't used irrigation for 8 yrs (since starting to use plastic mulch)

Lay plastic in fall, retains moisture, can get in early in spring. Trick – plant grape cuttings as soon as soil thawed - best cutting starter ever.

Believes that everyone should some fruit in their business

No commercial asian pear industry in Canada

How they price:
Kenko asian pear
Ship to buyers for samples
Always quote wholesale – 100/lb per tree – get $1/lb
$24,000 acre, can plant them in bigger space, etc.

Profit = income – expenses

Farming is business

Plan before plant, make sure you know what's out there, the numbers should lead you more than anything else.

Production can be something to obsess about, they've taken that out so they can grow the business by propagating instead of weeding (less work, more money…)

Simply accounting – inventory management

Grew sales last year by 10 times – 25,000 trees go out in 45 days this spring - systems are important to manage that

People willing to spend more entertainment on than on food

Wholesale – cleanest, easiest, less money

Direct sales – all Steve's done

Websites.ca will build website for free

Advertising: local papers, magazines, advertorials – write articles is best

Diversification is key –

Picking: example asian pears 6 hour days for 10 days, 240 trees – 1 acre picked by 2 people – reasonable amount of time – worth $24,000

Plant strawberries 1 ft apart, 3 in a row – propagate your own by replanting daughters

Asian pears come mid-october from china – They can beat china by having them in late august-September

Keep records while picking

Uses plastic (2-yr plastic) for all for vegetables too – onions, garlic, lettuce, sierra, Nevada butterheads, annuals so use foliar spray for fertilization, add compost under plastic when planting, could do succession planting for example tomatoes, onions, then plant strawberries

Shameful that better tress haven't been developed for farmers (ex. Bartlett poor variety)
Macintosh low value – 5-10 cents a pound

Apple discussion – what to plant for the future – honeycrisp may last a few years, but on the heals in red prince #1 apple now – high sugar low acid

1st criteria must be disease-resistant
get Nova Mac, will be successful on right rootstock and good systems

Ken cut down his apple orchard, tried all sorts of traps, surround, etc. but all costly difficult and not 100% effective, can't compete with conventional. Suggests something different – have reddish apple juice - plant red fleshed apple that you don't have to spray good profit market – pies with red apples, great dried product, consumer loves it

Watch rootstock, growing conditions, marketing (value-added)

Too many problems with blueberries – fine under plasticulture – but lots of competition in global martketplace

apple, blueberry, wine grapes, cranberries 95% of what's grown in Canada – lots of potential to diversify!

New trends/techniques becoming popular, some follow permaculture design principles
Example: silvopastoral agroforestry – fancy name for cows in the orchard – provides shade, etc.

Chefs love asian pears b/c they keep their crunchiness – amazing with chocolate after dinner

Black duke cherry – cross between sour and sweet cherries – Ken's selection to replace bing cherry - didn't have to net – tougher stem, harder for birds to eat, they go to other trees

Pears: Rusty other heritage variety that could replace Bartlett. 'So Sweet' early replacement for Clapp's could grow in zone 2

Pears could be ideal in pasture with cows – pear like clay soil, plums, pecans prefer over lighter soil heartnuts take heavy soil well

Cherry olive doesn't matter what soil it's planted in

In Quebec they're developing apple varieties that stay on tree for apple cider

Heartnuts – good future protein source – amazing storage, best compared to other nuts – origin: branch from mongolian walnut

Cross between pecans and hickories = hicans!

Korean pine nut – 200-300 pine nuts per cone, takes 15 years, grow very well requires proper mycchorizae (take soil from old pine tree or maple to innoculate)

Hazelnut trees used for wind breaks – blended genetics with a little Chinese hazelnut gives resistance to blight

Grafting: Seedlings are hardier, tree is half the size when grafted

Chestnuts – partially pollinated by Chinese chestnut make North American variety ore disease resistant chestnuts don't like clay soil, needs more sand, need long warm fall – no blight

Asian pears even when heavy crop year after year doesn't get into biennial cropping habit Varieties: 'Kenko' and 'Taylor apple pear' 'shinseeky' – tropical fruit flavour: 'Hayatama' but not good keeper. Can graft onto regular pear. Taylor apple pear yields 150lb/tree easily, stores in cold storage for up to a year without change in quality

Plums take heavy soil – 'Mountroyal' best adapted to Canadian conditions, self-pollinating, but gets blackknot. Can sell for $1.25/lb . without spraying they can get 80% marketable still. Because of lack of growers, no competition, charge what you want
Prunus nigra will take cold temperatures

Chums: cherry/plum cross (manor and kappa good varieties)

Grapes – we need more table grapes – early blue ready mid-august in his climate, 'polar green', 'Reliance' a bit of Muscat flavour, vigourous
Yield 5-6lb for a vine – pruned at bottom 1,000 vines per acre (3 ft spacing) – wholesale price $1.25/lb.
Best conditions: sunny and dry – needs wind

Black raspberries could take shade (ie. Under nut tree) make best raspberry jam. Has thorns on sepals

Mulberry – trap crop for pests, birds, leaves are high in protein, good for animal feed – self pollinating, no acidity

Tehranivee cherry – from agricultural station in Vineland, ON – released 1996 sweet cherries

Artic kiwi – plant on fence, can grow in shade, $1.25 half pint – thinks his kiwi developed both male and female parts – 'bi-sex kiwi' – prune them like grapes – prune a lot or not at all. (if not pruned, less yield and hard to pick)
Book by Reich: 'uncommon fruit worthy of attention' for kiwi advice

Using new media technology to capture customers ~ Shelley Rogers

Parallels between agriculture and independent media
- independent producers forced to take all the risks
- intensively consolidated marketplace = limited market access
- broken distribution system

Solution = utilize new media and form grassroots partnerships
- identify your personal strengths
- find ways that you will enjoy using new media
- engage partners who share your mission & cross promote
- no more DIY now its DIT – (Do it together)

Traditional Marketing
- Direct response
- mail marketing
- off-line publicity (print, radio, TV)
- Yellow Pages – phone books
- promotions

(All Expensive...)

Non-traditional marketing
- internet marketing
- social networking
- social media marketing
- search engine optimization

(time & effort...)

Easy Website Creation
- Wordpress.com
- the features you'll love: user friendly, customizable, almost foolproof
- create content that will engage people – people spend about 30 seconds on each website

Basics of Internet marketing
- understand how citizens use the internet to produce and service discoveries
- optimize your website for search engines

- social networking via internet
- viral marketing
- spend less money on 'traditional' advertising

Beneifts of SEM (Search engine marketing)

- drive traffic to your site
- links to your site
  - get links from other pages to link to your, link exchanges, this makes your page rank go up
- page rank lift
- SERP list (Search Engine Results Page)
- Develop relationships
- create buzz
- make sales

Test your Search visability

- type your keywords into google
- see what comes up
- do people know your farm, your business, etc.
- People need to be able to find you and understand your business
- Ask questions like: what makes my operation special, what is different about my farm?

Understand your Customer

- Where do they work, live, play?
- What are their needs?
- Married, children?
- What social class?
- Age?
- Gender?
- Religion?
- Language?
- Interests?

Once you ID your customer

- Target their groups
- participate with their communities
- become a part of their community of “friends”

Keyword research

- be specific about your keywords
- pick ones to narrow it down to reduce the noise
- What is the user intent?
- Build a keyword list that will help your content be found (website, audio, video, & images)
- start with a basic keyword list
- use a keyword tool (wordtracker, keyword discovery, google adwords).
- Generate new related keywords and long tail words

Create content

- 3 U's – useful, updated, unique
- place content on your site, blog, networks, & everywhere applicable
- content is King!
  - Keep things updated because people will see your site not updated and stop coming back.
- conversation is Queen!
  - Not enough to just have interesting content, need a dialogue to keep people engaged

Define Silos (groups)

- Create a marketing plan for each silo
- Target silos based on keywords
- if silo is competitive or has a lot of “noise”, select tier 2 keywords

Organic Agriculture Silos

- Food
- Farm
- Maritimes community
- Children, Babies, Family

- Health
- Environment

Simple SEO
- Content place on your website will affect your SERP
- Having food relevant content is the baseline for directing traffic to your site

Title Tags
- Create unique title tags for each of your pages using keyword research
- positions is weighted for importance
- how you can integrate all of your media back to your website – put tags to facebook, flikr, twitter, email list. People should have different ways of interacting with you

page content
- use keywords in bold headlines
- use keywords in anchor text (hyperlinks)
- surround images and video with content
- create and add new content constantly

Link building
- get links from sites read by your audience
- links affect your page rank & position on SERP
- Search traffic usually comes from google, then yahoo, then MSN

Video & image optimization
- text heavy wrbsites are borind
  - dont overwhalm audience with text they wont read
- title, description & keywords are key
- use keywords in filenames
- avoid flash & pop players (they don't appear in search engines)

Social Media Marketing & Networking GOALS
- branding
- Traffic
- Generate Links
- new contacts (not just customers, but community)
- generate sales (though you must redirect)
- authority building
- identify influencers and authorities for your targets

Examples of Social Media
- Twitter
- Facebook
- Grant Farms
- HomeGrown
- Craigslist/Kijiji
- Flikr

Software Tip from Grant Family Farms
- “Farmigo”
- online tool to let you figure out your accounts and what will go in the boxes etc.

Datebases
- ACORN database
- Find local organic food
- Farmer girls – washinton DC
- food hub – northwest US
- FarmOn.com – based in BC – still in progress

Open Source Technology
- group in vermont developing a new food currency
  - city planner in vermont using open source based on cyclos (developed in the netherlands)
  - like a time bank, use time shares to trade for something else.
  - You can use food storage credits (currency backed by food thats in storage in a root cellar)

- For example – if a farmer needed compost, he can look in the search and and see someone who has a truck, in exchange you can get food credits in exchange. Rather than using money its using energy and sweat equity
- Also, there is a LETS (Local economic trading system) based in Nova Scotia that local folks can get involved with.

To view complete presentation click: http://acornorganic.org/pdf/newmedia.pdf

Working the Numbers ~ Gwen Simpson

We often don't know what farming really is:
- work at understanding exactly what it is you are trying to do with your farm
- understand what methods and philosophies you are guided by

Small farms are still the majority

Small Farms are often not profitable
- they are being subsidized by off farm work

How do we make small farms profitable?
- diversifying isn't the answer. We should focus on a couple profitable operations
- if we are careful about what we grow, we can make a living off 40 acres or less
- the key is good management: we have to have a good, clear idea of what we are doing

Reasons for not managing business properly
- too busy
- we've always done it a certain way
- too burnt out
- feel we instinctively know better

Things that make us finally change

- personal crisis
- desperate financial circumstances

The Answer: "Down to Earth" Management
- we have to know what we want from our business!

Personal Goals need to be taken into account:
- what are we willing to grow?
- what quality of life do we want?

Management Planning
- must take into account what could go wrong
- you must have a contingency plan which allows for a potential 20% loss in sales
- what could go wrong? - it's important to take into account every possible circumstance
- what limitations do we have in terms of our infrastructure on the farm?

Simple Business Management Systems Vital
- for organizing money, resources, people, equipment
- am I making the most of the equipment/ resources that I already have?

Money Management:
- simple accounting package necessary! For pay roll, printing T4 forms etc.
- generally, simple systems are by far the best ones (more efficient)

-

The Cost of One

- You have to know the cost of producing one chicken, cow, bushel of potatoes etc. If you don't know the full cost of producing one unit of what you are growing you don't actually know if you are making any money on it.

- Example: making salads. Gwendolyn was selling salads - there was a ready market for this- but the greens needed to be cut by an experienced gardener (Gwen Simpson)

- adding her labour to the total cost, it was costing Simpson $21 a pound to produce a salad mix that she was selling for $15 a pound. If she had looked at the total costs before starting, Simpson could have realized this earlier.

ATTRA (www.attra.org)

Amazing source of information for all aspects of organic farming including appropriate marketing techniques - from the U.S. but applicable internationally.

Pareto's Principle

- 80% of your energy goes towards tasks that produce 20% of your results

- 20% of your energy produces 80% of your results

-**You can't manage what you don't measure**

- which products are making you money - which ones aren't?

- average sales per team member- are you maximizing each worker's possibilities and potential

- Go out in the field regularly and be observant : this way you can answer questions that invariably arise and personally monitor and control the growing/harvesting to optimize productivity

- there is no substitute for being available for your workers

- you need to be visible to your customers as well - you are the face of your products and people will recognize you and respond to you much more than to your employees.

Persuading the Public to Pay More…For Your Food ~ Gwendolyn Simpson

[A lot of facts were presented fairly quickly during this presentation and not all of them were recorded in these notes. If you would like more facts about the health and environmental benefits of organic food, please contact Gwendolyn Simpson]

Gwendolyn was talking to her mum last night, who remembered the Maratimers as being friendly. Plus Gwendolyn loves working with organic farmers in general. So it has been great to be working with Maritime organic farmers.

In general, the presentation was meant to be a collection of images to inspire.

We need people to pay more for food. She doesn't believe we can badger the public, no one wants to preached at, but we can romance and cajole. We can talk about how much we love what we do. People respond to passion. Plus telling folks things they might not know could be helpful.

The frog image: An article in Tuesday's Globe and Mail discussed research in Berwick California that showed male frogs can be made into females by exposure to atrazine that was at a concentration 50% lower than Canada's guidelines for water quality. Atrazine is widely used in corn production in Canada. Here's an idea: put picture of a frog up at your market and get folks to ask you about the frog. It will be an opportunity for you to talk with people about why organic agriculture is so important.

A video called "John Ikerd on the Cost of Cheap Food" was shown:
http://www.youtube.com/watch?v=uAPskYn72i4

A quote from Micheal Pollen: "But imagine for a moment if we once again knew, strictly as a matter of course, these few unremarkable things: What is it we're eating. Where it came from. How it found its way to our table. And what, in true accounting, it really cost."

It's important to share that with your customers without preaching.

The OCD asked folks what they would prioritise spending their money. These were the answers given:

1. communication
2. health
3. education
5. recreation
7. restaurants
11. food

And folks don't seem to be making connection with 11, 2 and 3

The burger: Raj Patel, author of "Stuffed and Starved" and "The Value of Nothing", says if we took into account the true price of hamburger it would cost $200. Sounds high but it isn't. The job of big corporations it to return big profits and they do that largely due to what the call "externalities." If a corporation can externalize costs, such as environmental costs, they save money.

[More facts were presented on corporations externalizing costs]

Part of the film "King Korn" was then presented

Carrot vs. pill: Carrots are excellent source of anti-oxidants, they're high in Vitamin A, they can reduce your risk of heart disease etc. People complain about price of carrots but they don't complain about the price of synthetic carrots. Carrot pills don't have all the benefits of carrots but people are will to pay $21.95 for a bottle or carrots pills or $33 for a "just carrots" drink supplement when carrots only cost about 15 cents each. So why not sell you produce to people as vitamins?

Tomatoes: There are over 6000 varieties in world but only 5 varieties are generally found in supermarkets. What's special about those five varieties? Do they taste good? Do they have high nutritional value? Nope, they were bred for yield, size, firmness and uniformity. We're told tomatoes are high in Vitamin A, Vitamin C and many other nutrients but a lot of nutrition has been bred out of many varieties. Tomatoes today contain 60% less Vitamin C, less calcium and overall 9-11% vitamins and minerals than in 1960s. What's replaced the lost vitamins? Tomatoes now have 65% more fat and 200% more salt than earlier tomatoes.

She also mentioned Thomas Pawlick's book "The End of Food."

Why is organic food so healthy?
1 in 3 pieces of non-organic pesticides have pesticides on them. Far fewer pieces of organic produce have these residues. Studies show children susceptible to negative health effects from pesticide residues. Children who eat organic produce have been found to be exposed to less than 1/6 of the pesticide residues that children not eating organic food have been exposed to. Exposure to pesticide residues has been linked to lower levels of mental ability, more aggressive behaviour etc.

Organic food is 10-50% higher anti-oxidants. Why? We let plants defend themselves and build up their immune systems. Organic foods also have more trace minerals and more antioxidant phyto-nutrients. Grass fed beef contains twice the beat carotene of grain fed beef and our bodies process the nutrients from grass fed beef differently.

We need to know these things so we can tell people about them.

64% of people believe somewhat or very much that organic food is better. They want it! We need to explain why it's so good for them?

Why is it so expensive? Everyone needs to have a 30minute elevator speech ready to answer that question when it comes along! Customers are weighing the cost and value constantly so get it so that your response to their questions about prices rolls off your tongue.

Another good idea is to pick up feedback from other customers. For example, if two of my customers told me this morning "this is the best tasting salad I've ever tasted," I'll tell other prospective customers that they said that. Give your customers testimonials.

Also, don't worry about lowering your price. As the old saying goes, "If no know is complaining about your prices you're too cheap." Your price comes from what you say, how you talk about it and how much you know about it. We should try to give customers as much information as we can so that they understand the prices and feel that they're justified.

Like Micheal Pollen says we need to do full cost accounting. And when you buy organic, you're paying the full price for it now. It's not your children who will have to pay for it. Buying organic can play a part in ensuring you will not have water issues in the future, that soil depletion and residual chemicals will be reduced etc.

We have to persuade public to buy more because what is it alternative? More king corn and I don't think they want that. And we need to give them the information they need.

Agricultural Justice Project Workshop ~ Marty Mesh

The Agricultural Justice Project is a coalition of organizations that each has a long history of community organizing and affecting local grassroots change. The idea to pursue fair labour standards for agricultural workers in the USA grew out of a concern for what the organic label really meant. The organizers for the Agricultural Justice Project felt that a US organic label could not truly uphold its high standard if it did not look after the labour component.

When the AJP approached the Fair Trade Labeling Organization, they found out that the organization was not interested in workers in the USA.

The AJP was interested in setting up standards and publishing standards on fair treatment of US agricultural workers which would include how wages are agreed upon.

The AJP launched pilot projects in several places including in Saskatchewan, in a coop.

The standards were set high because pressure in standards is always downward. Market industry will try and force the standards down.

It was found out from the pilots, that the standards are reachable. The way it works is that farmers read the piece of the standards that applies to them.

The AJP found that consumers wanted to support fair trade, but consumers wanted to know they are getting what they are paying for. This fair labour label adds value to organic certification and further differentiates organic products in the marketplace.

The next step was to launch a domestic fair trade association to be a part of the larger fair trade movement, from which to have a larger platform for discussion.

What was necessary to prove was that this label held water?

The Domestic Fair Trade Association came up with 14 Domestic Fair Trade Association principles including family scale farming, capacity building for producers and workers, democratic, participatory ownership and control. The standards are in draft form and feedback is solicited every five years (next year being 2014) to prove the credibility of the fair labour label.

Why do you need a standards toolkit?

The standards toolkit is a written agreement between farmers and workers. A standards toolkit is needed because farm workers should have a written agreement. The standards toolkit explains the relationship between farmers and workers.

You can find a copy of the draft here: *www.agriculturaljusticeproject.org*