

Opening session with Kevin Jeffreys

Gary Ogle, vice-president of ACORN, presents the honourable George Webster, PEI Minister of Agriculture. Minister Webster thanks Gary and the participants and welcomes the ACORN delegates in the name of the provincial government. He commends the members for their participation in organic production, and tells us the province has dedicated half a million dollars to organic production.

ACORN vice-president Gary Ogle presents the speaker Kevin Jeffreys, first ACORN Executive Director.

Kevin Jeffreys:

Back in 1977, Kevin moved in a house at Point Prim. Their new neighbour was spraying his fields on a windy day, and Kevin thought he should do something about this practice. "If you have an idea, go for it."

He joined the only organic group on PEI at the time, OCIPEI, as a supporter. He saw farmers putting in a lot of time. The person in charge was stepping down and he was asked to take over. There would be long hours and no pay. The opportunity was irresistible.

He then met Janet Wallace of the Nova Scotia growers and they found common ground, started talking of having a common entity. The government needed a group to dialogue with. They saw groups with the need to talk together. The statistics were off and a crisis in agriculture seemed to be looming.

A farmer in Nova Scotia who knew how to talk business found funding for a study on organic growing. Kevin thought it would be good to get people together and convinced this farmer to spend \$400 of the funding to get farmers from the provinces to get together and talk. He hadn't yet realized there had been cooperation and discussion between farmers previously, but this was the first chance for growers to get together in a long time. (Kevin reads from the notes of this first meeting).

They called it the Maritime Organic Network. Following this meeting, they all had to go back and talk to the certification networks to get their buy-in. Just as they were going ahead, the 1999 growing season happened. The non-growers kept at it, and they met late in the fall. They started getting support from people from different sectors, various stakeholders. They had a meeting in Tatamagouche, Nova Scotia in December. They needed support from the provincial governments and these got on board. They realized this would now be a real group.

They got together again in April 2000 for a strategic planning session, hosted by the PEI Agricultural Department. They figured out their goals, mission, membership, etc. They found the name while brainstorming at Great Canadian Bagel. They created a business plan, a 10-page document filled with objectives. They came up with marketing. Newfoundland was not ready to get on board, but it was always the intention that the resources be there for when they were ready.

It became an entity in Memramcook, New Brunswick in late 2000. There were many representatives from the three provinces, agricultural college, health suppliers, etc. Kevin was named executive director. The fiscal year was ending in March 2001, so they had just 3 months to get things together. The provinces had different types of funding to help. They had to put together a conference, develop a website, etc. in this time. Everything worked out.

ACORN grew organically, from within.

Innovative Weed Management Strategies for Organic Cereal Crops with Dr. Ellen Mallory

Introduction:

Dr. Eric Gallandt (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 result 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 measures 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 dislodged 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 controlling 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 weeds desiccate and don't re-root. Note that if your soil has a lot of clods, it is harder for a harrow to dislodge weeds so 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 varieties to compete with weeds.

1.b. Increased Seeding Rate

An experiment 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 be seen in a table in the slideshow). Seed weights can differ by up to 75% so if you put out 2 bushels 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 in order to improve a farmer's 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 a 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 weeds 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 than 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 an 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 an 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 need 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 had 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 competitive

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 is 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 plants 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, then 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 aggressiveness of your harrowing you lower your weed pressure 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't 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 varieties 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.

Love, Money and your Small Farm Dream: strategies for getting started with Jamie Coughlin and Roxanne Beavers

www.saladbowlgardens.com

- 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

Composting for Field Crops with 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:
 - o Meat = 4:1 (fish wastes heat up quickly, can be used to fired up a stagnant pile)
 - o Molasses in liquid manure for stimulation
 - o Potatoes = 8:1
 - o Hay, 25:1
 - o Leaves/straw, 80:1 (more structure in final product than wood)
 - o Peat: nice texture to final product, 200:1
 - o 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
 - o 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 set 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 CO₂, 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 fit 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 with 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 rods.

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 waterer's? Not much experience, principle is great.

Solar Fencer's? Doesn't disrecommnd. 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.

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 unifoliolate 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 1 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 successionaly 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
 - o 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
 - o 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"
- Hullless 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

Increasing Small Farm Capacity: Introduction to Small Scale Farm Machinery/Equipment with 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 plastic 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 wettable powders. Also it's important to use sprayers in calm air (no wind).

Grass-fed beef with Ron Gargas

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.

Econological

Ecological importance of farming production /consumption

new wealth (agriculture) (agribusiness) specialist giving too much vested interest information, makes econological 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 ceulose.

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-evolved 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 drier 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 1/2 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.

erial 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 stave 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 erodible 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 with 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, cation 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
 - o 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.