

Workshop Title: Cover Crops in Potato Production

Speaker(s) & their title(s): Ruth Knight, Organic Consultant Inc. (Ontario)

Executive Summary:

In this workshop, Ruth describes some basic ideologies and principles which can be applied to any geographic area to further improve soil quality and life around crops to further their health and production capacity. Cover crops were the main topic, with case examples in potato production.

Detailed Notes

Ruth started this presentation noting that cover crops are great, for:

- Pest, weed, water and disease management
- Pollination
- Soil enrichment, fertility, erosion control and soil structure
- Biodiversity

Next, the Humification Pathway was discussed as a stable way to add carbon to the soil, as compared to the Decomposition Pathway. Some notes about this process:

- Allows us to gain more photosynthetic energy from the sun
- Gathers carbon and nitrogen from the atmosphere
- Creates more life within our soil
- Microbes encapsulate the energy, and form long-term humus
- Carbon increases through humus production

Ruth also recommended a short video by Kiss the Ground, titled “Soil Story” which is about 4 minutes long and does a great job illustrating the cyclic patterns being described here.

In addition, some principles of soil regeneration are:

- Emphasis on the Carbon Cycle
- Minimize soil disturbance
- Soil covered 24/7; reduce erosion potential and harm from wind and water
- Soil microbes benefit from cover as they’re not as exposed to heat
- Living roots for a long time
- Integration of livestock
- Diversity: different plant species within a crop, between rotations, etc.
- Manage the farmscape: there are many ecological services like pollinators (bees), wildlife, and community

Ruth used a case example for the remainder of the presentation to present some important principles. Rocky Potatoes is located and operated in Center Colorado, by Brendon Rocky. Here are some points (taken from the presentation):

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- Speciality potatoes, certified potato seed, fresh market fingerlings
- 2 year rotation, multi species green manure, center pivot irrigation
- Focus on quality, reach quality get quantity
- No inorganic fertilizers, no pesticides
- Green manures, companion cropping, compost, fish based fertilizers, biological soil amendments
- Decreased pest and disease pressure, water savings, decreased soil erosion, lower inputs, higher quality and more profitability
- Principles apply to any crop

Their pro-biotic approach entails:

- How are all aspects of the ecosystem interconnected?
- Inorganic fertilizers are high in salts which is bad for bacteria and fungi and therefore not good for soil
- Holistic system
- Green manures, and carbon based fertilizers (like fish)
- Insects like aphids, etc
- Parasitic nematodes impact soil biology. Only 1% are bad for plants.
- Carbon is the base of life. Rather than trying to control ecological aspects of the ecosystem, create an environment which supports the crop and eco services that interact with it.

Q: What about in wetter climates, with all of this moisture? (Much of Ruth's work is based in Ontario)

A: There are lots of things which we can't control. Areas of high rain (like the Maritimes) can be affected by more disease. Ruth says to focus on what we can create, to make a better environment. These concepts are universal, however specifics will vary in each geographical area.

A good note is to ask, are we adding life to the system, or taking it away so that only one species can function? (e.g. conventional pesticide use)

Some notes on companion planting at Rocky Farms:

- Peas, chickling vetch, and buckwheat
- Potato Seed 6", and also plant other crops at the same time on the planter
- Diverse system helps feed different biology with nitrogen-fixing plants and more flowers to attract predators
- Want to create diversity rather than monoculture
- Only one disturbing tillage every 2 years maximum, during the rotation
- Peas grow within the potatoes, and don't really bother them; same with buckwheat, which is food for predatory insects
- Cover crops can have lower seed rate as they are not for harvesting, but just for helping the other crops with pollination

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Ruth also presented some information on cover crops, as green manure. Rocky Farms eventually branches out to 10 species throughout the growing cycle. For selection, ask how we can start and terminate them? Frost and livestock are good resources for killing them. Some require tilling, which should be avoided. Some examples are no-till soybeans in winter rye. With cover crops, these aspects are important:

- Seed to soil contact
- Seed can't get stuck in hairpin of rye, created during crimping

When considering agro-ecosystem management, it's not a black and white science. We're looking for ways to integrate more diversity into rotations, using methods such as cover cropping. Shelter belts are another example: they may take away available space for crop production, but this space is used as a valuable resource in creating an ecosystem which supports pollinators (as an example), which in return will help crop yields surpass their original capacity.

The presentation ended with some inspiration for change, noting that nature is a great teacher, imagination is a great resource, and we need to shift our thinking (from conventional) if we want to see real change.

Brendon Rocky also provided some advice:

- Face problems, don't deny them
- Focus on quality, and quantity will come
- Eliminate needless processes on farm, and invest in the soil
- Commit to form new habits, and break the bad ones

Q: During the first year, how much fertilizer did they (Rocky Farms) apply?

A: Significantly decreased the amount of water, and fertilizer used after 1st year

Q: How does harvesting potatoes work with the addition of other crops? How to separate?

A: Buckwheat would be dead with frost. There is likely more load on the potato digger and equipment. Some comments in the room from organic potato farmers mentioned that tops must be cut off before harvesting; and wet years are difficult. This may be easier in Ontario, where Ruth mentioned they stop irrigation supplies (N/A in Atlantic Canada where it is usually very damp).

In conclusion, it was difficult to present specific solutions to problems faced in Atlantic Canada, as they differ a lot from the Ontario climate presented here.