

**2015 ACORN Conference & Trade Show
Delta Prince Edward Hotel, Charlottetown, PE**

Workshop Title: Crop Rotations for Soil Health (Field Crops)

Speaker & their title: Jeff Moyer, Executive Director Rodale Institute

Executive Summary:

If soil health is the goal then crop rotations are the key to success. Without properly planned rotations, cover crops won't work, crops fail and frustration builds. This presentation discusses simple concepts tailored to soil techniques for the horticultural crops that help us all make the right decisions and plan for a bright organic future.

Detailed Notes

It is difficult to talk about soil health, no-till, and crop rotation separately because they are all so related to one another.

Our goal is to use crop rotations to improve soil health. We can indeed change the soil's health - for example, examine the effects of rain on crops planted on organic soil and those planted in conventionally managed soil. Organically managed soils handle heavy rain well. A huge mass of organic organisms live in the top six inches of soil and organic soils have a much more active soil biological community than conventionally managed soil. Organic systems generally handle drought better than conventional systems as well.

Soil tests provide only a snapshot measurement in time of a very dynamic system. The more opportunities we have to look at samples the better picture of our soil we will have. One test doesn't tell you a great deal.

Plants are a proven means of carbon sequestration. To increase this affect our goal is to have something covering the ground every minute of the day, every day of the year. Whatever you see above ground, there is a lot going on underground as well. Plants stimulate a great deal of activity around their roots with fungi and bacteria working in a symbiotic relationship.

How can we integrate small food grains into our crop rotations?

Nature likes complexity. Make our rotations as complex as possible:

- As long and as diverse as possible
- Consider impact on whole ecological system
- Ensure that they are sustainable
- Cost effective
- Make use of the resources available

Crop rotations must be carefully planned and planned for a long period. If you can't say what crops will be in what fields in five years time you don't have a plan.

No matter what farming system you are using - organic or conventional - find the gaps in planting systems to plant cover crops. Jeff encouraged people to experiment with different varieties. There can be tremendous differences in outcomes because of the unique conditions on your farms.

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Cover crops should meet the six characteristics noted in the keynote presentation:

- Moderately priced
- Easily established
- Highly productive
- Easily killed mechanically
- Not allelopathic to the main crop
- Nitrogen fixing

A cover crop with canola accumulates more nitrogen than a legume, reduces nitrate leaching and suppresses weeds. A diverse mixture will adapt differently to different soil fertility levels and soil conditions.

The timing of planting and seeding rates is very important. Leave cover crops in the ground for as long as possible so that nitrogen levels go up.

Jeff used as an example a four-year rotation with bahia grass (x2), cotton and peanuts. This doubled productivity in the cotton and peanut yields as well.

Obviously animals can help to improve soil and can be used in a field crop rotation by pasturing animals in one phase of the rotation cycle.

Two crops can also be combined in one field as part of a planned rotation - wheat and soybeans for example. This can result in two good yields.

We add mulch to our gardens to control weeds. We can also mulch a 200-acre grain field with a cover crop. Jeff explained the no-till process integrated with cover crops and compared corn yields. Cover crops in a diverse rotation will stop weeds from growing.

If using a no till system you must ensure that the seeds get in the ground. Residue slicers are sometimes required. Machinery needs to be modified to service this system.

If done properly no till soil management systems will out perform and out yield conventional systems. Jeff gave numerous examples of farms that have experienced superior results.

Jeff's book on no till is available. Check out the publications of the Rodale Institute.