

**2017 ACORN Conference & Trade Show  
Best Western Glengarry - Truro, NS**

**Workshop Title:** Cover Cropping Options

**Speaker:**

Dr. Roger Henry-Agriculture and Agri-Food Canada PEI

**Executive Summary**

Dr. Henry has increased research over the past few years, increasing his practice of under-seeding and frost-seeding to investigate cover crops for weed control, soil building, and fertility management. He has been very impressed with the results. The research has taken place on PEI, at a site using +/- 100 acres. His colleague Dr. Christine Noronha is a wireworm expert, and has had success using cover crops to eliminate and manage wireworm.

**Detailed Notes:**

The most obvious use of cover crops is to rebuild soil, but they are only one piece of a puzzle for soil building. You can't re-build the soil until you stop the loss through erosion: keeping a heavy duty green manure crop does double duty in holding the soil, then adding to it.

Cover crops are also used to eliminate weeds as well as soil diseases and pests. Something new is a bee pasture-double duty cover crops, making profit from the cover crop.

Three key crops that are effective in all 3 areas of soil building, weed control, and pest management are buckwheat, brown mustard, and oil radish.

Buckwheat is a traditional cover crop choice. It is excellent for breaking up sod, getting rid of couch grass, and is almost as effective as brown mustard for wireworm control. It can grow on soils with poor fertility, and only takes 40-50 lbs of seed per acre. You can plant it a lot of ways; you just need to scuff it in. You can double crop without re-seeding - just disk it down when the flowers are there (though some farmers have struggled with too much volunteer buckwheat in following years by doing this). Buckwheat is frost sensitive, so it can't be planted early, and will not hold this soil well through winter. You can underside with red clover - it is shade tolerant enough that it will grow, then you could mow down or just let die down. The buckwheat has been effective in getting rid of couch/crab grass that was so bad that otherwise, only Roundup Ready crops could have been planted. To prevent too much volunteer buckwheat, disk about 10 days ahead of the next crop, to let it germinate, then disk again before you plant. If no frost, you want to plan to termination till.

Brown Mustard is the top choice for wireworm control. Unlike buckwheat, it needs fertility (it is a brassica). It is a bit slow to get going. If you planted earlier than late May, it would not grow fast, and cold tolerant weeds will grow in and you wouldn't get a good stand. If you plant Aug 20, you'll have a good stand with no seed formation. Wireworm feed in June and September. In order to get rid of an infestation, you want them to be able to only eat the brown mustard (or buckwheat) during those months, so you want a good stand of a single crop. There is an arsenic compound in the roots that does not deter the wireworm from eating, but kills them off.

Oil radish is more aggressive, bigger, and stronger plant than brown mustard. It has some of the wireworm-effective poison in roots, but not nearly as much as the brown mustard. Dr. Henry planted oil radish after plowing down red clover in the spring, and got a big root without adding any extra fertility. You can disk down oil radish lightly before it goes to seed, then let it come back up. If you have a source of manure it will soak up the nutrients, and it will release the nutrients back better than any other of 10 plants tested. The oil radish will hold better than buckwheat through the winter, but then be composted back in by spring.

#### **Wireworm control:**

- Big national research project from BC-PEI: can trap adults. Eastern research on PEI. This is an international pest. Europe has been working on wireworm for years due to high crop losses.
- The heaviest feeding time is in Sept. Wireworm will be in soil for about 5 years. Toxic roots need to be in fields exclusively during feeding time in order to kill them off (no other crop material available that could be healthy food for them).
- Both brown mustard and buckwheat roots are toxic.
- Soil temperature determines wireworm feeding.
- On a maintenance plan, brown mustard would go in once in a rotation cycle. For heavy infestations double cropping for 2 years.
- For general fumigation of nematodes, verticillium wilt etc, you want to get the green material in to the soil immediately-disk or flail it, then till it right in immediately. For wireworm, which just feed on the roots, leave it in till the spring, then they will eat in June feeding cycle.
- Brown mustard has been working better than chemical approaches for controlling wireworm.

#### **Fall or Winter Rye:**

Winter rye is another crop for erosion control and cover cropping, but does not have the pest control qualities. Normally, you need it in by Thanksgiving to get any kind of growth and soil holding ability. Winter rye will start growing as soon as the temp is above 0! As an option, it can be grazed, then still provide (a reduced) grain crop. It will go dormant in the summer, so it can be spring planted for summer cover.

Dr. Henry has had very good luck frost-seeding: broadcast seeder in April or May on a 4 wheeler, 5-10 lbs of red clover seed over the rye, and you'll get a solid stand of red clover as well.

#### **No-till drill:**

Dr. Henry has had success using a no-till seeder with oats, pea, and black beans right on top of the dead mustard, or other cover crop. He has been able to plant on days that would otherwise be too wet to get on the fields.

In the tests of crop combinations, the highest yielding was oats and oil radish together. The organic oat yield was so good that he had a sign made up to put in the field so that conventional growers could see the result (see slide).

#### **Bee Pasture:**

There has been a lot of interest in bees lately, so Dr. Henry wanted to see if we can do dual duty with the cover crops and give food for the bees. In PEI, the bee colonies are used largely for pollination. The hive keepers get their money from that, then move hives to the back, and only produce 40-50 lbs of honey per hive, whereas the standard would be 200 lbs per honey, so how could we do that?

Bees need the temperature to be above 10 C to be active. Ideally, you'd have a new crop flowering every 2 weeks from May-November to feed the bees while they are active. Bees love brown mustard and produces a light honey - you can have flowers from mid-July to end of October. Provides two weeks of forage. Sweet clover provides 3 weeks of forage. A biennial crop, slow in first year (needs something else planted over it in year one), but can be 7 ft tall. A new crop for Dr. Henry is Phacelia: aggressive annual, interesting flavour to honey, and good weed control. Same as mustard, about 45 days to flower. Underseed with clover, which will feed the bees next year.

An aggressive bee pasture mix is oil radish, oats, crimson clover, and buckwheat.

Crimson clover grows the quickest of any clovers and can block out weed pressure.

#### **Cover crops for Organic Carrots:**

Dr. Henry has been able to get conventional yields by using sorghum sudan grass. It can be a healthy productive weed-free crop. Sorghum grows high to add lots of organic matter. It does not like frost at all (more sensitive than buckwheat). Dr. Henry finds it a tricky crop to get established, often has to sow a second time. He mixed with hairy vetch once and had a good crop. Excellent soil borne disease suppression; early indications are that it may be helping with wireworm control as well.

**Walton milling wheat experiment:**

In growing a winter wheat, Dr. Henry did some finger weeding but had a good crop. Winter wheat slide: red clover frost seeded worked, frost seeded alfalfa didn't work.

Fall growth in cereals is different; oat leaves are very broad, doesn't go in to seed.

Q) Tried red clover one year and couldn't plow it because it's a mat...

A) need right moisture level, good low, hit it with the disk

Managing cover crops profitably is a good resource

Q) Is anyone looking at using mustard seed powder during the critical June and September feedings?

A) The wireworm is the larvae of the click beetle and doesn't tend to come up out of the soil, but you'd have to ask Dr. Noronha. From the audience: work was done in NB using a meal over 4 days in the feeding time... but quite expensive compared to using the mustard as a crop.

Q) Re: the traps for catching adults (click beetle) to determine how bad a infestation - are growers finding them a useful tool?

A) Put them out in the field late May to early June. Dr. Noronha's is a light trap (solar powered LED) and a cup with soap solution in the bottom that you put in the soil. The click beetle goes in and drowns in the solution. A company in PEI is now making them. You have to have someone to go out and check them and dump them twice a week at a minimum. It would give you an indication of what is happening, as well as killing the females. The brown mustard is working better than the chemical for wireworm.