

Workshop Title: Building the Organic Orchard from the Ground Up

Speaker(s) & their titles: Julia Reekie, Agriculture and Agri-Food Canada (NS)

Executive Summary

Julia Reekie provides an overview of her experimental honey crisp orchard planted at Kentville in 2006, detailing research projects exploring effective pest, disease, and weed management strategies for organic production.

Detailed Notes

It is critically important to choose the most appropriate site for a new orchard. Try to avoid an old orchard site as this may bring with it disease problems of the original orchard.

Ideally, choose sandy loam soil with a good pH; fruit trees don't want too acidic a soil. A windy site is also not good for the best apple production.

Brief History of Experimental Honey Crisp Orchard:

Julia started an experimental organic apple orchard in 2006– using the popular Honey Crisp Apple – in partnership with Scotian Gold, the largest NS apple growers cooperative

2006 – orchard area chosen (previously in hay for 30 years); hay was ploughed in

2007 – Early, applied 4-1-2 Nutriwave

Later same year, planted yellow mustard to act as a biofumigant. Note: Mustard must be chopped and integrated before it sets seed.

Late 2007, planted spring wheat as a cover crop.

2008- Early spring, integrated spring wheat and added compost made from pig manure. This was true compost, made with regular turnings and temperature monitoring to assure it reached adequate temperatures to suppress disease pathogens and weed seeds. Apple seed testing done in this same year.

1/3 of orchard was composted as test; remaining 2/3 was not; where compost was added, it was 5 inch of compost and incorporated to a depth of 35 cm.

2008 – Planted orchard

2010- First fruit (and first pests)

High density or free standing?

High density orchards must be trellised which involves additional expense; as funds were limited, this experiment did a free standing approach.

Masonova was selected as pollinator. Pollinator must be chosen to mature at the same time as the fruit trees.

WEEDS

When orchard is young, weeds can compete for nutrients, water and even light with the young, immature fruit trees. Keep weed free as much as possible until trees are better established.

Common weeds in apple orchards: cleavers, pigweed, lambs quarters, ragweed, chickweed, plantain, wild carrot.

INSECTS

Common orchard insects: codling moth, oyster shell scale, European apple sawfly, rosy apple aphid, white apple leafhopper, European red mite, San Jose scale, apple maggot. Be diligent to regularly scout the orchard for signs of insect presence and damage.

Took two years to see first fruits, with these came common pest: maggot. Apple Maggot is a quarantined pest – meaning you cannot export apples from orchard with apple maggot.

DISEASE

Common: Scab, fire blight, powdery mildew, bitter pit, water core, sooty blotch, cedar-apple rust.

Apple scab is a big problem and best solution is lime sulphur and copper, allowed in organics.

However, the very best control is by choosing scab-resistant varieties, although consumers often don't like these choices.

Most apple disease is fungal, but fire blight is bacterial. Biting insects can transmit disease. There are not many organic control products of Fire blight: recently "Blossom" was registered for organics and there are indications that it is quite good. This contains citric acid however, and will lower the pH. Cedar-apple rust is not common in NS.

PART 2

Organic Pest Management Projects

Three Organic Pest Management projects were undertaken. Two have wrapped up; one is still currently running.

1. Innovative herbicide and fungicide replacement strategies for organic apple product (Completed)

Using no pesticides or other chemicals – can weeds be controlled some other way?

- a. Compost alone – was not effective as it encouraged weeds
- b. Growing companion plants
- c. Application of organic hay as mulch
- d. Reflective mulch (trade name Extenday) (Note: Additionally, Reflective quality of the mulch increases photosynthesis and can help 'color up' the apples)

- e. Add reflective mulch with compost
- f. Control: painstakingly pull out every weed

All methods, except compost alone, work well to suppress weeds. However, companion planting competes too much with the fruit trees; and hay as mulch takes more time to breakdown to have the desired effect.

Most successful? Reflective mulch AND compost!

Conclusion: Control weeds early and properly

Reflective mulch also increases photosynthesis, which is beneficial in “coloring” up the apples.

2. Using organic pesticides for Apple Maggot (Completed)

APPLE MAGGOT CONTROL EXPERIMENT

Background: Early July, apple maggot pupa emerges into adult, mates, and eventually lays eggs under the skin of fruit. In this geographical area, only one cycle per season. Until 2007, Surround was the only control available, and not very effective.

This research strategy was to explore effectiveness of GF-120, which is already registered to Cherry fruit fly, and proven effective there. Active ingredient of GF-120 is spinosad, which is already a registered ingredient in Entrust and other products.

To allow this product, it was necessary to cooperate with an orchard in Ontario, and conduct experiments to see if it is effective.

Note: Spinosad is proven to be detrimental to bees. However when used for apple maggot control, it is applied on fruit after the flowers are long gone.

Strategy:

Orchard must be “clean”. That is, apples must be picked up as soon as they fall to the ground and not allowed to rot. You can then use less of the product ---and can do “perimeter” spraying only.

Or, it is possible to do alternate row spraying. Ex. Row 1, 3, 5 one week; Rows 2, 4, 6 the following week.

Important to have CONTROL trees to indicate if you have a problem or not. Trees that are not treated that will indicate whether there is in fact a pest problem in the orchard at all.

GF120 has to be applied as soon as adult flies emerge at a rate of 1.5 liters per hectare. Dilution 1:4, application of large droplets is best.

Drawbacks:

Application may have to be repeated as both sunlight and rain can dilute the product.

Assessment

6-10 trees from each experimental plot, with 20 apples collected from each tree

For each orchard, 20 apples were also taken from control trees.

Apples allowed to sit at room temperature for several days to see if worms emerge.

Local orchardist Brian Boates has participated in the research project and has created a simplified spraying device. His simple approach proves it is not necessary to have a ride-on vehicle and sophisticated spraying devices to apply the product. Boates Conventional Orchard did an experiment with GF-20 that greatly resolved problem with apple maggot.

It should be noted that the Apple Maggot is still flying and carrying eggs into September. While the product "Surround" was applied up to 3 times during the season, then washed off, damage continued to be seen through out -- up until September.

3. Field testing for control of European Apple Sawfly in collaboration with pesticide manufacturers (On-going)

Background: European Apple Sawfly was discovered In BC and NY state in the late 1930s, and has more recently become a problem in NS. The body of the fly is distinctive—yellow head and large saw on tail of female. The pest arrives when apples start to open, and saws into the stamen of the flower and deposits eggs. It may over-winter in soil and then re-emerge in May. Reekie first saw them in 2006 but they had become problematic by 2010.

Monitoring:

Hang fly traps.

Watch for primary and secondary damage. (Fruits when they drop are small.) Damage can be confused with other insect damage.

Can be as much as 75% crop loss.

Toxicity of Quassia – a potential control for the sawfly

- Is approved as food additive
- No toxicity to other mammals, fish, beneficial insects or pollinators.

This product is in use in Europe, where this fly originated.

Does it work in Atlantic Canada? How? And when to apply?

Trial at Broomholm Orchards, Middle LaHave

23 different cultivars tested. For every cultivar, there is a control tree. Different cultivars react differently ---some may be resistant. But only over one year of research.

As well, various cultivars have different flowering times.

Concentration Study

Separate 3, 6, and 9 g experiments: 9 g seems to have best results. However, again, only conducted over one year. If pest pressure is high, 9 g might be required but less with less pest pressure.

When to apply?

Conclusion: Quassia is quite effective.

With less pest pressure, less product required. Range 6g-9g

Critical timing of application not important.

Questions and Discussions

- Honey Crisp is generally scab resistant. Virosoft for codding moth.
- Sticky red balls can be used for attracting apple maggots. Most important thing though is to keep the orchard CLEAN!
- Audience member suggested the effectiveness of pigs in cleaning the orchard. Yes small pigs will also pick up apples – but it does create a manure issue.
- How to pick up apple drops most effectively? Use a 'clean' manure fork to pick up apples. Also, LLBean has a lacrosse type net.

In Summary:

Back to essentials: choose the best site, choose the best root stock, decide on trellised or free-standing.

Young orchards are most susceptible to weed pressure. With time, the trees can more effectively compete.