

Problem Insects in Blueberry Fruit

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Blueberries are relatively easy when it comes to pest management (especially compared to apples!), but there are a few persistent pests that can be a major issue in some locations and in some years.

This past year (2006) Cornell Cooperative Extension's South Central NY agriculture team, along with 10 blueberry farms, set up traps to monitor for cranberry fruitworm, cherry fruitworm, and blueberry maggot. The goal of this project was to determine how widespread and problematic these pests were for the region, and to learn firsthand how to keep an eye on them using insect traps.

The Pests

The first thing we did was learn something about the background and life cycles of these insects. Cranberry fruitworm seemed to be the major problem, with cherry fruitworm a minor contributor. Both of these pests are moths as adults that emerge in the spring and lay eggs on the fruit right around petal-fall. Those eggs hatch and the larvae burrow into the green fruit. Cranberry fruitworm makes a mess while it feeds, tunneling between berries in a cluster, webbing them to-

gether, and leaving sawdust-like frass in globs outside the berries (Figures 1 and 2). Cherry fruitworm is much more subtle, living in one or two berries and not leaving much evidence of its whereabouts on the outside of the fruit. However, when a berry is infested with either larva, it will turn blue earlier than all the neighboring berries, and growers can see pretty easily how much damage they have by scouting the planting for clusters that are blue before the first healthy berries start to change color. Michigan State Extension has a very nice website with fact sheets containing much more life cycle details on these and many other blueberry pests. See <http://www.blueberries.msu.edu/>.

The blueberry maggot adult is a fly. These flies overwinter as pupae and start to emerge as adults when the fruit is turning blue. Adults will mate and lay eggs over a period of a month or so, starting in July. They also lay their eggs right on the berries, and the tiny maggots burrow straight into the fruit and gorge themselves until they're full grown (about three weeks), (Figures 3 and 4), at which time they exit the berry, drop to the ground, pupate, and wait until next summer to emerge as adults. A berry with a maggot in it looks nearly identical to a

Although blueberries have fewer economic pests than apple, the few persistent ones can be important in some locations in some years. Using insect pheromone traps in blueberry plantings can help NY growers manage three important blueberry pests with less pesticide in years with low insect pressure.



Figure 3. Blueberry maggot damage. Photo credit from NRAES Blueberry Production Guide.

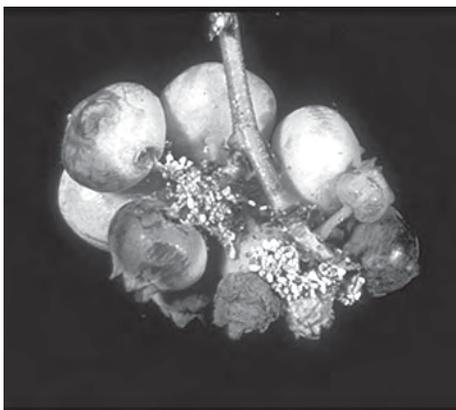


Figure 1. Cranberry fruitworm damage on a blueberry cluster. Photo credit from NRAES Blueberry Production Guide.



Figure 2. Cranberry fruitworm moth stuck to a sticky trap. Photo credit Queen's Printer for Ontario, 2005. Reproduced with permission.

healthy berry, and therein lies the problem. When the berries are picked and used, the maggots have a nasty habit of floating to the top of jams and crawling out into breakfast cereal. Again, see Michigan's excellent fact sheet on the blueberry maggot life cycle at <http://www.blueberries.msu.edu/>.

Variable Insect Populations

We set out traps on 10 farms located in Tioga, Tompkins, Cortland, Chemung and Schuyler counties. Each farm got at least one cranberry fruitworm trap, one for cherry fruitworm, and at least two for blueberry maggot, (Figures 5, 6, and 7).

We found that in the Southern Tier of NY, the populations of these insects were spotty. Only one farm had cherry fruitworm present. Six of the ten farms had cranberry fruitworm, with the highest trap count for the season being 447 at a location in the Finger Lakes, while several regional farms had zero moths



Figure 4. Blueberry maggot adult and some look-alikes that you may find on the traps but that are not blueberry maggots.



Figure 5. Wing traps baited with a synthetic female sex attractant were used to monitor both cranberry and cherry fruitworms (each species had a separate trap and lure).

trapped. Two of the ten had blueberry maggot. Population distributions didn't seem to follow a recognizable pattern. Sometimes one farm happened to have them while the farm down the road did not. Many farmers have had variable insect pressure over the years—one year they may be bad at a certain location, while the next year they could be almost non-existent.

Since these pests aren't present at every farm, and since they show up at slightly different times each year because of weather variations, monitoring for their presence makes sense. Knowing what's going on with the insects can save insecticide sprays and can improve spray effectiveness by allowing the timing to be more precise.

Who the Traps Would Help

We found that three types of farms in particular would benefit from setting out traps to monitor for these insects:

1. *Growers who spray every year assuming they'll have a problem, but who never see insect damage in the harvest.* Two growers in this group realized that they could use the traps to decrease their insecticide applications, and maybe eliminate insecticides all together when adults were not present in the traps.
2. *Growers who have variable levels of damage, and would spray if in a particular year a high number of moths were trapped.* There were three growers in the study in this group. They had enough damage from



Figure 6. The Pherocon AM trap comes already baited with an ammonium acetate smell. Flies are lured by both the smell of food and the yellow color.

cranberry fruitworm in the past that if the adults showed up in high numbers in their traps (this "high number" is arbitrarily set by the grower, there is no established threshold), then they will spray an insecticide for control. But if few moths are in the traps, they will not spray and they'll tolerate a low level of damage in the harvest.

3. *Growers who do not spray insecticides at all, no matter the extent of the damage.* Whether it's for personal safety reasons or philosophical convictions, they will not apply insecticides. There were five growers in the study in this group, and while

it was useful for them to monitor for the insects for one year to learn their life cycle, it wouldn't be worth their while to trap for years to come because the results would not affect their management decisions.

Learning How To Use The Traps

There are two fact sheets that will help growers learn how to use the traps to make management decisions. First, read about the life cycles of the pests from the Michigan State Extension website (<http://www.blueberries.msu.edu/>). It's



Figure 7. This 6"x12" sticky strip baited with an ammonium supercharger (hanging at top) was another type of trap we used to catch blueberry maggot flies.

important to understand the pests' life cycles before trying to control them. Second, the trapping instructions and other information can be downloaded from our Tioga county extension website (<http://counties.cce.cornell.edu/tioga/tcag.php>)

or you can ask for a copy to be mailed to you by calling Molly Shaw at 607-687-4020 x 319 or e-mailing her at meh39@cornell.edu. The fact sheets provide details about where to buy supplies, how to set the traps in the field, and what to look for in the traps. If you choose to spray for insect control, the fact sheets also help you figure out when to spray.

Using The Traps to Make Spray Decisions

Michigan State recommends using the traps for the cranberry and cherry fruitworms to determine when to start scouting for eggs laid on the fruit, and to scout for eggs in order to determine the optimal spray time. Scouting for eggs provides more reliable spray timing than trap counts alone. At one farm that had a history of high cranberry fruitworm damage we did scout for eggs and found that nearly 30% of the clusters had eggs on them. With a little practice you can even tell which eggs are just about ready to hatch, since they change color as they mature. Determining when the eggs are ready to hatch pinpoints the optimal first spray coverage timing. However, this same grower had been using the traps for the past few years to help time his sprays without ever scouting for eggs, and he still got satisfactory control. In a u-pick situation (like we have for the most part in NY but unlike the wholesale markets in Michigan where berries are mechanically harvested), using the traps alone may be good enough, because growers generally tolerate some level of damage at harvest. By just using the traps this grower found out that he could start his sprays later than his usual late bloom tim-

ing (and therefore apply one less spray that season) and still get satisfactory control of the fruitworms.

Blueberry maggot is no fun to deal with. Since flies emerge over a two-month period and lay eggs on ripening fruit, spraying for maggot control involves multiple sprays with a low residual/short days-to-harvest product (refer to the Cornell Guidelines for registered materials). The recommendation is to apply the first spray within a week after the first sustained catch of flies on the traps ("sustained" means several flies per week, not just one or two flies), and to continue spraying according to the label directions. The sprays target the female fly as she tries to lay an egg in a berry, so the insecticide has to be present on the berry surface to work.

Many growers do not want to spray insecticides on blue fruit, so they tolerate the maggots in the late season pickings rather than spray. We checked the percent infestation at two farms late this summer and the results showed that from 1.6% to 4.5% of the berries contained a blueberry maggot.

It may be possible to "trap out" blueberry maggots from a blueberry planting by putting out enough traps so that over several years the population declines and eventually disappears. We are going to try this next year on one blueberry farm in South Central NY, if we get promising results, we'll make sure to get the word out!

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