



## NH Integrated Pest Management Newsletter

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### Fruit Bud Stages

In Durham, fruit bud stages were as follows on Monday May 18: Pioneer McIntosh apple: bloom. Peaches: petal fall. European plums: fruit set. Japanese plums: fruit set. Pears: fruit set. Blueberries: bloom.

### Apple Scab

At the UNH Woodman Horticulture Farm, we are entering the final (slow-down) phase of ascospore development. As of Monday May 18 we had accumulated 727 apple scab degree days in Durham. Years back, we suggested that growers monitor for the presence of scab in their orchards shortly after the end of primary ascospore season. We still do that, but now suggest that you also check before then. Young scab lesions look like light olive green spots, which then become gray as conidia get produced. The conidia are spores that are spread by splashing, and start new infections on leaves and/or fruit.

### Fire Blight

We had some fireblight-risky conditions for parts of New Hampshire last week, and these may continue. Temperatures 60F or above, rain, and apples or pears in bloom are the combination that is worrisome.

### Plum Curculio --- Major Apple Pest

Plum curculio is abundant here, and it has the ability to eliminate most of your crop. The adults overwinter in leaf litter in the forest, and are attracted to apple orchards in the spring. Their behavior is significantly affected by odors produced from the tree and the fruit. When the fruit have set and swollen to 6mm diameter (1/4 inch), they become vulnerable (and attractive) to plum curculios.

The weather (especially temperature) also affects migration into the orchard, feeding, and egg laying. Predicted temperatures for May 20 - 22 are perfect for lots of plum curculio activity. In some years, it makes sense to apply a plum curculio insecticide just a day or two after petal fall. Other times (especially if there's cool weather) it makes better sense to wait a few days longer.

The heaviest period of attack typically starts from the time the first fruitlets swell to 6mm, and lasts three weeks. In some blocks with lots of wild trees and forest nearby, it can last four weeks. Some commercial growers use a predictive model to help them decide how long to provide insecticide protection. Glen Koehler's Orchard Radar tracks that, and is one source to guide you. The models have two different NH weather sites driving them this year (Nashua and Hancock). Here's that link again:

<http://pronewengland.org/AllModels/DecisionModels.htm>

## Controlling Plum Curculio --- Pay Attention. This One is Serious

Controlling plum curculio (PC) is different for backyard vs. commercial growers. For **backyard growers**, it is a bit tougher now. Formerly, we had an insecticide called Imidan that was registered for backyard growers. It is no longer available for that use, and the home fruit spray mixtures that are now available typically include a highly diluted (too weak for PC control) form of Permethrin. For backyard growers, I suggest trying Sevin at PC time. If you use an all-purpose mixture, add Sevin to the tank (full rate) at PC time.

**Organic growers** have a material called Surround. It can work, if you apply it properly, and keep re-applying it after every rain. Several years ago we tried Surround at UNH, and found it washed off immediately, in the slightest amount of rainfall. Interestingly, my colleagues at the University of Vermont tried it and had much less wash-off problem. It worked well. I still haven't figured out why we had such different results. I do not know of any other option for organic growers that works as well as Surround. Surround doesn't kill the insects. It basically protects the crop from being attacked, but requires several applications to get thorough coverage.

**Commercial non-organic growers** have quite a few options. I believe Imidan and Guthion are still options, with complicated caveats about their use. Calypso and Actara are neonicotinoids, very effective for PC and European apple sawfly. Avaunt is in a class by itself, another new, effective material for PC. Don't forget Sevin. In several tests last year, Sevin did as well as Imidan on PC. It has a much shorter residual effect, about 5 to 7 days, depending on rainfall. Battalion, Baythroid, Danitol, Proaxis and Warrior are all synthetic pyrethroids, and work well on PC. I rarely recommend them, because they are long lasting and toxic (= very rough) on many of our predators & parasites of aphids, leafminers and mites. We also have a new combination product, Voliam flexi, which I mentioned in issue #2. It is a combination product, and I don't know how it compares to these other materials.

## More on Leafminers on Apple



Assail is another option to control apple blotch/spotted tentiform leafminers on apple. I forgot to include it in the last issue. It is one of the materials targeted at the sap-feeding larval stage. For people who did not set out leafminer traps, you still have the option of counting sap-feeding mines. You do so around the time of petal fall to first cover. The sap-feeding mines look like tiny, slightly silvery patches when you look at the UNDERNEATH side of cluster leaves. Finding 13 or more mines out of 100 leaves makes it worthwhile to apply an insecticide.

## San Jose Scale

There are a few growers who have significant problems with San Jose scale. If you're one of them, the males typically fly and mate with females during bloom. Full bloom is the time to start measuring growing degree days (base 50, remember?) to predict when the crawlers will hatch. They are the most vulnerable stage for insecticides. Start measuring GDD's at full bloom, if you're heavily infested with San Jose scale. Crawlers start appearing roughly 3-4 weeks after petal fall. This is 310 degree days (base 50F) after the first males fly. I'll remind you when we get close to crawler time.

## **Codling Moth and Organic Growers**

Codling moth is easily controlled by the insecticides conventional growers apply to control plum curculio and apple maggot. For organic growers, controlling codling moth (and its close relative, lesser appleworm) requires applying something like *Bacillus thuringiensis*. Perhaps some of you try one of the neem formulations. Anyway, timing is quite important, and measuring degree days is one helpful method. Glen Koehler's orchard radar is one place to check for more information, and to see what the models predict (hopefully for a site near you). Typically, codling moth and lesser appleworm are laying eggs just after petal fall. The second generation comes in July. Both attack the fruit.

## **White Apple Leafhopper**

This insect sometimes creates problems for us. It has two generations a year, and the first one is starting now. If controls become necessary, it is easier to apply them to the first generation.

The insect overwinters as eggs laid just under the bark of last year's shoots and suckers. Eggs hatch at roughly petal fall time. If you've had past problems with this insect, it is worthwhile to check the undersides of cluster leaves in a number of spots for the tiny, elongated green nymphs. A few days after petal fall is usually a good time to check. Freshly hatched ones will appear almost clear. Older nymphs will look yellowish.

Finding an average of 25 nymphs out of 100 cluster leaves makes it worthwhile to spray. First cover is often a good time to treat. You can delay this to second cover, if the nymphs don't get too big. The little ones are the easiest ones to control. Many insecticides work on this pest, and most growers should be concentrating on plum curculio now as the main target.

## **Peaches & Cat-facing Insects**

Several species of insects with piercing-sucking mouthparts injure young peach & nectarine fruit, causing "cat-facing". The name comes from the appearance of the injury --- like scratches. Tarnished plant bugs do some of this, but most of the injury here is from several species of *Lygocoris* bugs collectively called "oak-hickory plant bugs". OHPB's look like pale, greenish or yellow greenish versions of tarnished plant bug. They are most common in blocks that are surrounded by oak and/or hickory trees. They start attacking about the time of shuck split, and typically peak in mid or late June. No one has figured out a threshold for these hit-and-run pests. They are winged, and feed a bit on the fruit, then move on. The 2009 New England Tree Fruit Pest Management Guide lists the insecticide options. I won't list them here, in part because many of us don't have peaches to protect this year. Shuck split through late June is generally the risk period. For some blocks, there is no need to treat.

## **Borer Treatments on Peaches**

We have two species of borers that attack stone fruit here. The more serious one is peach tree borer. It attacks low on the trunk, and can be a very serious pest. It is especially attracted to trees that have mechanical injury, or are already infested with borers. Lesser peach tree borer isn't as serious. It hits higher up on the trunk, and on the major scaffold limbs. It is especially common boring into black knot galls (another reason to prune and burn those). Peaches are the stone fruit most heavily attacked by borers, but nectarines, plums and cherries are also attacked.

For conventional commercial growers, there are trunk sprays and pheromone lures. To me, the most effective of the trunk sprays is Lorsban. Lorsban has gone through quite a few label changes, so if you use or buy some for this purpose, be sure you've got the correct form. You can check labels on line at <http://cdms.net>. Shortly after bloom is a good time to apply Lorsban. You're aiming at the trunk (especially lower trunk), not the tree canopy! Lorsban adheres to bark extremely well, and one treatment gives season-long control. Yes, there are LOTS of other pesticides registered. If regularly apply insecticides (for other pests), that will do some borer control as well. Most of the sprays are intended to kill the adults, or the just-hatched larvae. Once borers get inside, we don't have materials that can reach them.

I'm told the pheromone lures can work quite well, and some growers use them in combination with a trunk spray. The idea is to deploy them in a manner that fills the orchard with female borer odor. This confuses the males, so most females don't get mated, and they end up laying sterile eggs. I assume it works relatively poorly if you've got a long, narrow row or two of trees. A larger, more square block (or at least more square deployment of lures) would seem to be more likely to work well. The lures go up at or just after bloom, and release their odor over several weeks.

Organic growers have a tougher time with these pests. They need to focus on prevention, especially avoiding mechanical damage to the trunk by mowers, trimmers, and other equipment. There are several forms of neem that list borers on their labels. They may help, but I'd expect multiple treatments would be required, targeting mid-June through early August as the primary period. Sometimes growers try to impale borers by probing tunnels with a flexible wire. That doesn't work too well on peach tree borer.

Backyard growers also need to focus on avoiding mechanical injury to the trunk. Many of the all-purpose fruit sprays list borers on the label. Mid June through the end of July is probably the period of greatest egg-laying activity. That's when you'd want to spray.

## **Blueberries and Fruitworms**

I don't want another spell of really warm weather to surprise me, so I'll mention this now (better early than too late). There are two species of caterpillars of concern right after blueberry bloom ends. They chew into the green, immature fruit. They are very similar in habits, names, and controls. One is the cherry fruitworm, and the other is cranberry fruitworm. Some plantings suffer a lot of damage, so growers there benefit from applying an insecticide right after petal fall, and sometimes a second application 7 to 10 days later. Other plantings suffer only a little injury, and can go without treatment. You decide which category you're in, based on past observations of injury. Signs include one or more fruit in a green cluster turning blue & shriveling. If you look closely, you may see the caterpillar's entrance hole, some frass and/or a little silk holding them together.

Asana and Lannate are registered for cherry fruitworm control, and Imidan, Sevin, Malathion, Pyrenone, Spintor, Success, and Confirm are registered for cranberry fruitworm. In most cases, these insecticides should control both species. Organic growers can use Biobit, Deliver, or Entrust.

## **Strawberries and Tarnished Plant Bug**

Tarnished plant bug (TPB) is our most serious insect pest of strawberries. Both the adults and the nymphs attack the plant. The nymphs do most of the damage. The insects like to feed on flower buds and young fruit. Once fruit get about 1/3 grown, they are much less preferred. They have piercing-sucking mouthparts, and attack the seeds and the vascular bundles that support the seeds. With the seeds killed, the surrounding fruit tissue fails to grow, so it stays green and hard. I have seen several strawberry beds that were so heavily attacked, they weren't worth trying to harvest.

Strawberry beds that are largely or completely surrounded by forest tend to have relatively few TPB's. Those that have plenty of herbaceous, non-grass plants in the vicinity tend to have a lot. If you REALLY want lots of TPB's, growing strawberries adjacent to large alfalfa fields probably results in the highest populations. Over 500 plant species are recorded as TPB hosts. Plants in the Legume family seem to be especially important. Strawberries become vulnerable to attack as soon as flower buds become visible in the crown. Peak attack occurs during bloom. TPB numbers vary so much, it is a good idea to monitor for nymphs on the fruit. If there are enough, a spray is worthwhile. Nymphs are tiny, fast-running, and yellow-green. Their wings haven't fully grown, so they can't fly. Check for them by firmly tapping clusters of flower buds or green, immature fruit onto a large **white** pad of paper. **If 4 or more out of 30 clusters (actually called trusses) have TPB nymphs, it is worthwhile to treat with an insecticide.** If there are fewer than 4 infested trusses, it is helpful to do another examination a week or so later. Just before bloom is the preferred time to check (and treat if necessary).

Details on insecticide choices are in the 2008-9 New England Small Fruit Pest Management Guide. If possible, avoid spraying insecticides during full bloom. If the situation requires spraying when some blossoms are out, you can minimize harm to pollinators by spraying at dusk, and selecting materials that are less toxic to bees. Examples are Thionex, Pyganic, Pyrenone, and Dibrom. TPB materials highly toxic to bees include Danitol, Brigade and Malathion. Brigade is VERY rough on our predator mites, and can create mite outbreaks.

### Clipper on Strawberries and Brambles

Those people who read pesticide labels note that "clipper" goes by several names. Strawberry weevil is one. (Don't confuse it with strawberry ROOT weevil – that's something else). Strawberry clipper is another. The insect attacks strawberry, blackberry and raspberry. It overwinters as an adult. In May, the females start looking around for places to lay their eggs. They attack flower buds, before the buds open. The female lays an egg inside the bud, then uses her chewing mouthparts to cut the petiole (the stem of that flower bud). The bud usually drops to the ground, and over the next weeks, the egg hatches, and the tiny legless grub feeds inside. The new adult emerges during the summer, does a little feeding, and overwinters. There's just one generation per year.



Injury from clipper is heaviest towards the edges of the bed, and on sides adjacent to woods. Research in New York proved that some strawberry varieties can compensate for clipper damage. In other words, the remaining fruit grow a bit larger than they would have, so the amount of loss is relatively low. The catch is that only a few varieties have been tested for this ability. Some compensate well for clipped buds, including Jewell and Seneca. For those varieties, you might not bother to check or treat for clipper. Moderately compensating



varieties include Lateglow and Primetime. Varieties that show little or no compensation include Earliglow, Cavendish, Northeaster, and Honeyoe. If you grow the moderately or low compensating varieties (or others not named here), it is a good idea to check for clipper.

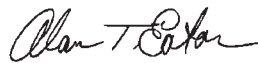
Here's how: at several places in the bed, get down on hands and knees, and look for clipped buds and the tiny weevils. My photos in this section should help you recognize them. They're about 1/16 inch long. In strawberries, the threshold is 1 clipped bud or one adult per two feet of row. I don't believe anyone has yet figured out a threshold for bramble fruit.

Pesticides: In strawberry, Brigade, carbaryl (Sevin), Danitol and Lorsban are registered for clipper control. Organic growers can try Pyganic or Pyrenone. In brambles, there aren't too many choices. Sevin XLR plus and Aza-direct are both registered. I don't expect the latter is very effective. Some growers just treat the edge few rows, if the center rows have few clippers. That makes sense. Brigade is something I don't often recommend. It is very rough on predator mites.

Prevention: destroying nearby unmanaged brambles can help reduce the number of clippers invading your planting.

### **Fruit Grower Twilight Meeting**

*Wed June 10, 2009. New Hampshire Tree Fruit Meeting* at Cardigan Mountain Orchard in Alexandria. 5:30 - 8:00 p.m. Hosts: Nancy, Steve and Steven Bleilor. As always, this twilight meeting is free. There are pesticide recertification credits offered for this session. To get them, you must sign in before 5:30.



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