

## NH Integrated Pest Management Newsletter

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### Bud Stages This Week

Fruit bud development at the UNH Woodman Horticulture Farm was as follows on Tuesday May 20: Pioneer McIntosh: Bloom; Red Haven Peach: Bloom; Sam Sweet Cherry: Bloom; Methly (Japanese) Plum: Petal fall; Bartlett Pear: Bloom; Blueberries: Pink Bud to Bloom.

### Apple Scab Degree Days

We are still in the accelerated phase of ascospore development, but things will slow down soon. Thank you to Alan Rollins for the following data, from the weather equipment at the Horticulture Farm. As of the 19th, we had a cumulative total of 626 scab DD, with 80% ascospore maturity.

### Time To Check on White Apple Leafhopper

WALH overwinters in the egg stage. The eggs hatch at about petal fall, so shortly after petal fall is a good time to look for leafhoppers. Freshly emerged nymphs are clear or nearly so, while older ones look yellow-green. They are elongated, and don't yet have wings. Look at **the undersides of cluster leaves** for the young leafhoppers. I'd suggest checking several leaves per tree, for at least 100 leaves in each block where you might have problems. If you have small trees, you may wish to check only 1 or 2 leaves per tree. You may not need to check every block. At least check where you had WALH problems last year. I'd suggest considering an insecticide if you find 50 or more nymphs, out of 100 cluster leaves.

Leafhoppers are easiest to kill with insecticides when they are young. Also, the first generation is synchronous, so they're all about the same stage. They are more spread out in their development in the next generation, making treatment a little harder with just one spray.

WALH injury appears as white stippling of the leaves, and shiny brown specks (poop) on leaves and fruit. Heavy injury degrades the fruit appearance, weakens foliage, and can cause premature fruit drop. I learned from the New England Apple Pest Management Guide that heavy early-season feeding can affect bud formation. The nymphs are fairly vulnerable to insecticides for a while. As nymphs, they can't fly off and disperse. The New England Apple Pest Management Guide can give you tips on insecticide choices.



A little later in the year we may encounter rose leafhopper and/or potato leafhopper in the orchard. Neither of these species overwinters on apple here. Rose leafhoppers overwinter on rose, and shift to apple when the winged adults appear, probably in June. Potato leafhoppers overwinter far to the south, and their arrival time and numbers are variable. Usually they get here some time in June or July.

## Take Down Those TPB and Leafminer Traps!!

Take down the TPB and leafminer traps, once you have made your decisions about managing them. For most of us, the traps are done helping us once bloom begins. If you remove them now, they won't be in the way later! Go on. You don't have anything else to do now.

## Plum Curculio Time's A-Coming

Although plum curculios often move into an orchard during bloom or at petal fall, they can't do any injury until the first fruit have begun to swell slightly, in response to pollination. Research has shown that young fruit produce chemicals that volatilize and attract curculios. Dr. Ronald Prokopy is continuing his research on plum curculio attraction to monitoring stations, and has recently set up more sites in Mass and NH.

For those who don't have these odor-baited sampling stations to check, there are several choices about curculio control. One option is to automatically spray with an insecticide at petal fall, then again about 10 days later, and possibly a third time after that. That is simple and straightforward, but might require more spraying than one of the other options. Three (or four?) treatments might be required.

You could rely on the degree day model. Most of the work on this was done by entomologists in New York, and they seem to have had more success with it than we have. Limited application of this in NH has had mixed results. Basically, you treat the whole orchard at petal fall. You also record the number of degree days that accumulate, beginning at petal fall. Use 50°F as the base. Another treatment is required roughly 10 or so days after the first (depending on rainfall and choice of insecticide). No more plum curculio spraying is required after 340DD. When we tried this in NH, it worked fairly well for some blocks, and predicted extra spraying on others (beyond what we used to get excellent control). One (a tough, weirdo) block still got injury well after the 340DD.

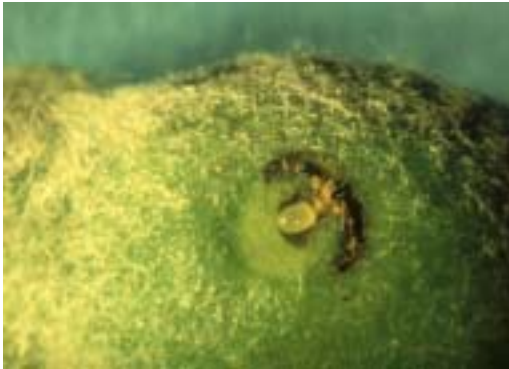
Do you remember how to calculate degree days? Take today's max temperature, add it to today's minimum temperature, and divide by two, to get the average. Then subtract the base temperature from the average, to get the accumulated DD for 1 day. (If base is higher than today's avg., the answer is zero DD for today, since you can't have a negative number.) Keep doing this for each day, using temperature data from your orchard, and adding up each day's DD to get the cumulative total. Simple, huh?

A third method is to check your trees for fresh curculio injury, and use this to tell when to start, and when to stop treatments. Start checking at petal fall, and check at least every day. Look (especially in trees at edge of orchard) for any fresh curculio injury. When you start finding it, it is time to haul out the sprayer. This method typically starts you spraying 3 to 8 days after petal fall, and can result in your needing only 2 applications. There are pitfalls, however. You really need to check often, to learn when to start. If you slack off and do it every 3 or 4 days, you could get serious injury before you noticed. **WARM** weather is good for lots of curculio action, especially if it extends through the night.

Oh, yes. Option # 4 is to ask around and see what others are doing! That might work... For trees of bearing age, I do not recommend option 5, which is to not apply controls for curculio. That could very well leave you with very few bushels of virtually unsalable fruit

## Fresh Curculio Injury Looks Like This

I just lifted this from what I wrote in last year's newsletter, since it fit my needs today. Since it has been a whole year since you saw the first fresh curculio punctures of the season, I have



three photos this week. The first shows a fresh curculio scar under the microscope. Note the curved shape, and the darkening flap of skin. When it is really fresh injury, the flap and exposed flesh have not yet started to darken. Photo number two shows the same fruitlet, with the surface carefully removed, to show the plum curculio egg that was laid just under the flap. (For those who haven't yet checked out the newsletter via our website, these photos look better in color.) The third photo this week is of a fruitlet that sustained several curculio punctures. It had been oozing for a couple of days.



## Green Pug Moth Finishes During Bloom

I won't deduct any points if you don't remember about green pug moth. It is still fairly new to us. The caterpillar is a small green looper, and in its last instar, it has a thin red-brown line down the back. The caterpillars are fairly small — about 1/4-inch long at the most. They finish feeding by petal fall, and they especially like to eat the anthers of the flowers. There aren't enough to really be a major problem, but if you see caterpillars matching this description during bloom, you'll sleep better, knowing what they are. Trust me.

## Apple Blotch and Spotted Tentiform Leafminers

Soon we should begin to see the sap-feeding mines of the first generation of leafminers. They are a bit hard to see at first, but get easier to spot as they enlarge. The sap-feeding stage is when the tiny larvae separate the lower epidermis layer from the spongy inner layers of the leaf. This is visible (looking at the leaf undersides!!) as a slightly silvery region. Sometimes you have to turn it a bit in the light, to be able to see the mine. Later, the larvae will feed on the inside layers, making the "spots" in the name spotted tentiform leafminer.

It is easy for new apple growers to confuse "frost" injury with sap-feeding mines. Mines will not be puckered, while frost-injured leaves will be puckered and crinkled. The acid test is to get a magnifying glass and remove the lower epidermis of the leaf, in the suspect area. If it is low temperature injury, you won't find the tiny, almost transparent caterpillar.

## European Red Mites Have Hatched

I didn't think to mention this in the last newsletter, but ERM eggs usually hatch during the pink stage. Even growers in the cruel North have reached that point by now. If you did a good job at smothering eggs with oil, then there will be relatively few ERM's now, and buildup will be slow.

## Rust Still Threatens Apples

I'm confident that most of you remember that common juniper and red cedar are hosts for cedar-apple rust and quince rust. Raise your hand if you remembered that some landscape junipers can be hosts of quince rust, too. (Yes, Chip, I'm asking you!) Varieties of *Juniperus communis* that are quince rust hosts include *depressa*, *hibernica*, *montana* (=sibirica), and *scopulorum*.

Arborvitae is a common landscape plant here that looks similar to red cedar, but is NOT a host of either cedar-apple rust or quince rust. Arborvitae has flat foliage, with no spines or prickles.

If the galls on your red cedar or juniper trees are still exuding fleshy orange telial arms during rainy periods, then the rust season is not over for you. A co-worker saw these orange "flowers" and took a photo last week. They're still out in Durham.

## Organic Growers: Carefully Time Codling Moth B.t. Sprays

The standard way to time Codling moth sprays with *Bacillus thuringiensis* is to measure degree days. Treatments should start 240DD after the beginning of codling moth flight, which is usually right at petal fall. The base temperature for codling moth DD calculations is 50 F. By 465-470DD, half of the eggs are predicted to have hatched.

## Mullein Bug

Most of us don't see mullein bug injury on apples, but in some years we find it here, especially on red delicious fruit. Mullein bug eggs hatch at about petal fall, and sometimes the bugs are numerous enough that a spray would be helpful. This can present a problem, because the insecticides we usually use for curculio (a MUCH more serious pest) don't work well on mullein bug, and the reverse is also generally true.



Young mullein bug nymphs look a bit like fast moving green aphids. This drawing comes from the New England Apple Pest Management Guide. They feed on young fruitlets, and later switch to feeding on mites. Red delicious, golden delicious, and Northern Spy are the varieties most heavily hit. If you want instructions for monitoring, see the New England Apple Pest Management Guide. There aren't many of us who need to check.

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