

## NH Integrated Pest Management Newsletter

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### **Fruit Bud Development**

As of Monday April 25, fruit development at the UNH Woodman Horticulture Farm:

Pioneer McIntosh: applequarter inch green (some buds at half inch).

Peaches: swollen bud. One tree is at half-inch green.

Japanese plums: green cluster.

European plums: burst.

Pears: burst.

Blueberries: swollen buds, loose bud scales.

### **Apple Scab Situation**

As of Monday April 25, we had accumulated 183 degree days (base 32) since the scab bio-fix in Durham. (Biofix date was when 50% of McIntosh fruit buds reached silver tip stage.

That was April 9 this year.) That translates into 5% of the season's supply of ascospores being

mature by the 25th in Durham. Many of those were probably released in Saturday's daytime rains.



**Tarnished Plant Bug on advanced green tip apple bud**

Raise your hand if you remember that the ascospores are released during DAYTIME rains, not during rain at night. Good for you! The spores have to land on susceptible tissue, and be wet long enough to germinate, in order for infection to occur. The number of hours that takes varies with temperature. The New England Tree Fruit Management Guide has details.

Several things contribute to the risk of apple scab infection in your orchard. The susceptibility of the variety is one variable. McIntosh and Jerseymac are examples of varieties that are pretty darned susceptible here. Less susceptible ones include Delicious and Macoun. Highly resistant varieties include things like Crimson Crisp, Enterprise, Akane, Goldrush and MacFree.

The amount of susceptible tissue is another variable. The fruit and foliage are both susceptible to infection, and young, newly-opening foliage is the most susceptible. At green tip stage, there is relatively little exposed susceptible tissue, whereas there is much more at pink stage.

The amount of inoculum is another variable. That's affected by the amount of infected dead apple leaves from last year are within 100yards or so of your trees. They are the primary source of the ascospores. The number of lesions on those leaves also affects the amount of inoculum. That is so important that we give detailed instructions on assessing the PAD (potential ascospore dose) for your orchard, in the New England Tree Fruit Management Guide. PAD assessment is done in the fall. The % of ascospores that are mature at any one time also affects the amount of inoculum released in a particular daytime rain. Bill MacHardy and David Gadoury created a model that predicts this, driven by weather information.

### **Apple Scab Management Options**

Basically, the threat is affected by the environmental conditions, the amount of susceptible tissue, and the amount of viable inoculum. Spraying a protectant fungicide works by reducing the amount of susceptible host tissue. But eventually new tissue expands, and/or the residue degrades, leaving some susceptible tissue again. Using a resistant variety also reduces the amount of susceptible tissue. Pruning to allow good air circulation (and quicker drying) helps by affecting the environment. It shortens the periods when leaves and fruit are wet. Spraying urea on the leaves in fall, or on the dead leaves in the spring reduces the number of spores that are produced on those leaves. Chopping up the dead leaves results in the same thing. Raking up and removing infected dead leaves reduces the number of spores that reach your apple trees.

Many of us first think of spraying fungicides, but you can minimize your dependence on spraying, and maximize the efficacy of your sprays if you keep these other factors in mind. For those of you with truly resistant varieties, you don't have to spray apple scab fungicides at all.

### **Leafminer Traps in Apples**

Apple blotch leafminers (ABLM) and spotted tentiform leafminers (STLM) are two nearly identical species that mine inside apple leaves here. They frequently occur in high enough levels to cause massive pre-harvest drop, especially on McIntosh. To tell whether or not they are at significant levels in your orchard, you could:

- 1) set out traps in the spring, and count adults, or,
- 2) count the sap-feeding mines soon after petal fall. The first option is simpler. I'll cover option 2 later this season.

Apple leafminer traps are dark red sticky rectangles, about 8 x 13 inches. Attach them to the south side of the trunk, at knee height. I use push pins in each corner, but some people prefer staples. The time to set them out is at ¼ inch green stage. Then check them weekly for the tiny black



**Leafminer adult on apple bark**

& silvery moths, removing them as you count. You reach a decision (treat vs don't treat) at the end of tight cluster stage. If you catch an average of 4 or more moths from quarter inch through TC, it is worthwhile to treat McIntosh. For other varieties, the threshold is 9 or more. WAIT. DON'T TREAT THIS MINUTE! This tells you **if** treatment is worthwhile. You have several choices as to **when** to do it. If you prefer, wait until the end of pink stage to make the decision. The threshold for that period (1/4 inch green through pink) is 8 (McIntosh) or 21 (other varieties) moths. When do you treat? Read below.

Trap sources: [www.greatlakesipm.com](http://www.greatlakesipm.com) or [www.gemplers.com](http://www.gemplers.com)

### Windows of Opportunity to Spray Apples for Leafminers

If you have enough moths to make it worthwhile to spray, you have your choice of several times, with different materials appropriate for different times. You should need only one application if you treat the first generation. If you decide to treat later in the year, it may take two sprays, because the insects are less synchronous then.

Some pesticides are designed to kill the adults, so they would be used early, when the adults are flying (often about half-inch green or tight cluster stage). Thiodan and Thionex are in this category. Occasionally this is an effective technique, but often leafminer emergence isn't synchronous enough to get most of them in one application. You aim the spray at the ground cover, lower trunk, and lower limbs for this treatment. This still appears on the Thionex label, with the instructions to begin as soon as moth flight begins. Technically, that is hard to do if you are counting the catch first. Anyway, we have more reliable options.

Insect growth regulators (like Intrepid and Esteem) are most effective on eggs and very young larvae, so they would be targeted at that time, which is usually at tight cluster or pink stage. Actara is targeted at this period. The Actara label reminds us that it penetrates the foliage a bit. Aza-direct is OMRI listed, and works by ingestion. I don't think significantly penetrates foliage, so the preferred timing would be in the egg stage (so they can consume the material before mining into the leaf tissue. Vydate is still in some growers' arsenals, and that material is effective on leafminers. The preferred timing would be at pink, because **spraying Vydate soon after pink can thin the fruit** (erratic, I think).

Materials that are effective on the young larvae ("sap-feeders") come next. For some, that's right at or after petal fall. Proclaim is one example. You use it with a surfactant, and it has some translaminar (foliage penetrating) action. The voliam flexi label has similar language --- apply right after petal fall. Other labels say just during the sap-feeding stage, so that could be a little after petal fall (watch for signs). Agri-Mek, Altacor, Belt, Calypso, Lannate, Leverage, Provado, Sherpa and SpinTor are in this category. Some require a surfactant to be effective, so check the labels! SpinTor is no longer available, but you can use up existing material. Delegate is its replacement. Entrust (organic version of Spinosad) is still available.

We have a number of pyrethroid insecticides that also work on leafminers. I believe they affect adults (or eggs, if you have high enough gallage to hit them), not the immatures, which are inside the leaf layers. Pyrethroids (in general) are quite persistent and broad spectrum, so they can be very harmful to beneficial insects. I usually downplay them as an option for leafminers: Asana, Baythroid, Danitol, Delegate, Pounce, Proaxis, Warrior.

Lastly, I'll mention Avaunt. It is registered to "suppress" leafminers.

If you apply an insecticide this generation for leafminers, you should need only one treatment. In the vast majority of cases, if you treat (correctly) for the first generation, you won't need to later in the season, when the second generation appears. I NEVER recommend spraying for the third generation, which typically occurs towards harvest time.

## **Tarnished Plant Bug Traps**

I covered this in the fruit pest update telephone. Buds have progressed too far to set out TPB traps now. We normally set them out at silver tip stage.

## **Apple Grain Aphids**

Don't be worried about a few tiny dark green aphids on opening apple buds. They are almost always apple grain aphids, species that do not cause economic injury.

## **San Jose Scale on Apples**

One type of injury that was significantly higher than unusual, in my 2010 apple harvest evaluations was infestation of the fruit by SJS. A fair amount of it was on larger trees, but I saw examples on trees of all sizes. San Jose scale is most vulnerable to insecticides in June, when the crawlers hatch from the eggs. That is predictable in your orchard by degree days, and I plan to incorporate the degree day prediction information in the June newsletter, plus June fruit pest update telephone messages.

The other vulnerable time is at about half inch green stage, when the young scales can be smothered by oil. If your primary target is European red mite, then using oil slightly later is more effective, but if SJS is the primary target, then half inch green is the time. As usual, you need the weather to cooperate, too. Ideally, we would want the temperatures to stay above the 30's for 24 hours after applying oil. When applying oil, VERY GOOD coverage is required. If you can't get thorough coverage, don't bother applying it. That means dilute application rate, high gallonage, low sprayer speed.



(San Jose Scale damage)

## **Oil Sprays on Apples**

Usually when we spray superior oil on apple trees, it is to smother the eggs of European red mite. If San Jose scale is present, that is a target as well. In order to be really effective, we need to get 98 to 99% kill of eggs with oil. If we get significantly less than that, it is questionable if the treatment was cost effective. There are three points I'll make. 1) As mentioned above, excellent coverage is required. 2) we want temperatures to remain above the 30's for 24 hours after spraying oil (reduces risk of injury) 3) the ideal time, if ERM eggs are the target, is tight cluster stage. If you have lots of acres to cover, you'll have to start before that, to get everything done. Once pink stage arrives, it is too late to effectively use oil on ERM...they have started hatching, and tend to walk out of the oil.

## **Oil on Backyard Fruit Trees**

In general, don't bother to apply oil unless mites (or scales) are building up. If you decide to apply it, it should be before pink stage. (It is called white bud stage on pears.) If you really need it, it could be applied to pome (apples, pears) or stone (plums, peaches, cherries) fruit.

## **Stone Fruit Pruning Tips Relating to Fungal Diseases**

There are two stone fruit diseases that can leave obvious sources of inoculum on the trees, that can be addressed during pruning. I'm thinking of brown rot and black knot. When pruning peaches, it is common to find

fruit mummies (which are infected with brown rot fungus). I asked Dr. David Rosenberger about removing the mummies. I asked: is it necessary to burn and/or remove them... or can we just drop them to the ground? Dave said that here in New Hampshire, it is just fine to drop the mummies to the ground. They contain conidia, which spread the disease by splashing. Somewhere around the mid-Atlantic states it is warm enough that the fungus produces ascospores from those fruit, and those spores travel much farther.

I asked about black knot, the disease of plums that makes the affected sections of twigs grow gnarled and black. For those, he suggested removing and burning. He also pointed out that the cankers (knots) often occur high in nearby trees, black cherry included. If you grow plums, it is worthwhile to check for such sources of inoculum.

### **Mummy Berry on Blueberry**

Mummy berry is a blueberry disease caused by the fungus *Monilinia vaccinii-corymbosi*. The fungus overwinters in last year's mummified blueberries lying on the ground. About the time that blueberry buds are swollen and starting to open, the fungal stipes begin to grow out of the mummies. They are dark brown, and the tips swell and open into light brown "mushrooms". When the tips of the stipes (stalks) begin to open (they look a bit like a finish nail then) they are ready to release ascospores to spread the infection.



**Mummy berry fungus stalk emerging**



**Opening mummy berry fungus "mushrooms"**

Ascospore release occurs during **cool wet weather**, and the spores that land on tender blueberry leaves cause primary lesions. These cause the affected leaves to turn grayish-brown, shrivel, and release thousands of secondary spores (conidia). These are the spores that infect the fruit. They are spread by splashing. Infected fruit show no symptoms at first. When the fruit approach maturity and should begin ripening, the infected ones become noticeable. They turn a gray-salmon color, start to shrivel, and drop to the ground. They eventually turn black and become ridged, like a tiny black pumpkin. There they sit, and wait for next year to start the cycle again. Rainy springs are ideal for spread and development of mummy berry. The disease can be severe in rainy years, and relatively light in dry years (especially dry springs).



**Fruit infected with mummy berry fungus**

## Management of Mummy Berry

There are several tools at your disposal to fight this disease. Good pruning & good air circulation are probably the most important factors you can affect (shortens drying time, so fungal spores have a harder time infecting). Eliminating nearby wild blueberries can be helpful, since they are often the source of inoculum. Some growers give their customers a small second picking container, and ask them to place the salmon-colored or mummified berries in it (then they remove them from the planting). Some people have good success with this approach, and others don't. Growers that can bury most of the mummified fruit are the ones that have success with this method.

Some varieties are quite susceptible, including Berkeley, Bluetta, Blueray, Collins, Earliblue, and Northland. Bluejay, Duke, Lateblue and Northblue are described as resistant, while Bluecrop, Coville, Jersey and Spartan are listed as somewhat resistant.

In early spring, before buds show any green color, you can bury last year's mummified fruit with a new 2 inch layer of mulch. Two inches is critical here. The tiny fungal stipes can't grow long enough to penetrate a 2 inch layer. If your blueberry buds are showing green, it is probably too late to try this, this year.

Some growers use urea to burn the growing fungal cups, before they release any spores. To effectively do that, you have to have a spot where you can examine last year's mummified fruit on the floor of the planting. When the first brown fungal stipes grow out of the mummified fruit, they look like short, dark brown sticks. Then the tip develops a dimple, a bit like a finish nail. Slowly that flattens and opens unto a cup. As the first stipes start to open, that's when to apply the urea.

Urea burns back any fungal cups it touches. The application rate is 100 lbs of urea prills per acre. For this method, accurate application and timing is crucial; one way to ensure contact with the fungal cups is to rake (or drag a piece of chain link fence) the ground after application. Note that this is providing over 45 lbs/A nitrogen, which may be a significant portion of your needed nitrogen for the year. Don't apply it to spots with standing water. That can result in burn on your plants.

Some growers drag a heavy chain across the floor of the planting, to break off the opening fungal cups. This can help if the other techniques don't fit your situation. I saw a planting in southern NH on April 21st that was at the perfect stage for this technique.

Fungicides are another tool. The key is to protect the plants from primary infections. In wet springs, this may be from bud break through bloom. In dry springs (and/or where there is little fungal inoculum) you may need only one application, about 2 weeks after bud break, (or none at all). The fungicides that we use are designed to prevent both the primary and secondary infections. I understand that Indar (fenbuconazole, MOA group 3) is the most effective fungicide, and it should be used to prevent primary infections (in other words, protecting from bud break until shoots are about 1 inch long). It is important to make no more than TWO applications of the same fungicide, before switching to a different fungicide, with a different mode of action (MOA). Why? This is to prevent the fungi developing resistance to our fungicides. Once resistance develops, that fungicide is useless for that purpose. **Tilt** (MOA group 3) was formerly called **Orbit**. The active ingredient is propiconazole, and is supposed to be very effective. So, you wouldn't rotate rotate Orbit with Tilt or Indar. They all have the same MOA.

Other fungicides labelled for mummyberry, with their mode of action groups, include:

**Pristine** (MOA groups 11& 7) and **Switch** (MOA groups 9 &12) - these both have some activity on mummyberry, but Switch is better against primary infections. Both are very effective against anthracnose and botrytis, so would be a good choice for bloom time sprays.

**Captevate** (MOA groups 17&M4)- depending on which study you look at, this has poor to good control

on mummyberry, but is good on both anthracnose and botrytis. Assuming you had good control of primary mummyberry infections, this should be a fine choice for later (bloom time) sprays.

**Serenade** - a biopesticide, approved for organic use. If a growers' cultural controls are insufficient, this is a low-toxicity material that has shown decent efficacy in at least one trial. It may not provide adequate control under heavy disease pressure and favorable conditions for infection.

**Bravo** (MOA group M5) - more effective on primary than secondary mummyberry infections.

**Cabrio** (MOA group 11), **Ziram** (MOA group M3) - weak on mummyberry, should be used for suppression only.

**Abound** (MOA group 11) - effective against primary infections, but highly phytotoxic to apples, and should not be used if apples are close by, or if you EVER expect to use that sprayer on apples. It cannot be washed out of a spray tank well enough to prevent it damaging apples later.

*Thank you to Cheryl Smith for help in these comments on mummyberry!*

### **Emergency Assistance to Producers of Honeybees, Livestock, and Farm Raised Fish (ELAP)**

The US secretary of Agriculture announced this program, April 6th . It provides assistance for producers who suffered losses in 2010. You can get more details from the Farm Service Agency website, at [www.fsa.usda.gov/elap](http://www.fsa.usda.gov/elap) If I understand it correctly, steps are also listed for those who have 2011 losses. If you're interested, check it out. You might qualify for some \$

### **Update on Clothianodin**

My alert colleague in Connecticut (Lorraine Los) pointed out that Clutch is no longer marketed. Belay is still registered (supplemental label) on pome fruit and peaches. We are still nervous about the possible risks to honeybees from the chemical.

### **Tree Fruit Pesticide Update (courtesy of Lorraine Los, Univ Connecticut)**

Lorraine Los, Fruit Crops IPM Coordinator, Department of Plant Science and Landscape Architecture, University of Connecticut

The Extension Specialists from New England have finished the revisions for the 2011 New England Tree Fruit Management Guide. The guide will be available in April from the UConn Communications and Information Technology Resource Center, 1376 Storrs Rd., Storrs, CT 06269-4035 or (860)486-3336.

**A number of changes were incorporated into the revised guide and are summarized [here](#)**

### **Meetings**

*Tuesday April 26, 2011. **High Tunnel Berry Production Workshop.** Manchester NH. 9AM to 4 PM. This workshop will provide growers with up-to-date information on producing berry crops in high tunnels, and will provide research and extension personnel with information on grower's needs. Pre-registration required.*

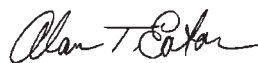
*Tuesday April 26, 2011. **Managing Insect Pests – 2011 Fruit and Vegetable IPM Projects.** Hillsborough County Cooperative Extension office, 329 Mast Rd, Goffstown, NH. 6 - 9PM. George Hamilton and I have planned presentations on these IPM projects, that were partially funded through grants from NH Department of*

Agriculture, Markets and Food: Oriental fruit moth, peach tree borer, squash vine borer, sweet corn insects, and blueberry fruit fly. For more information contact George Hamilton at 641-6060 or [george.hamilton@unh.edu](mailto:george.hamilton@unh.edu). Three P.A.T. recert. credits are available to those who sign in on time.

*Tuesday May 10, 2011. **Apple Grafting Workshop II.** 5 - 7PM. Windy Ridge Orchard, 1775 Benton Rd, North Haverhill. Bill Lord will be conducting this workshop. This is a free event, but pre-registration is required. To register or for more details, call 787-6944*

*Wednesday, May 18, 2011. **Joint Massachusetts/New Hampshire Tree Fruit Meeting.** Lavoie Farm, 172 Nardoff Rd, Hollis, NH. Registration is at 5:15 PM PM. (George has applied for pesticide applicator training recertification credits). For more information contact George Hamilton 641-6060 or [george.hamilton@unh.edu](mailto:george.hamilton@unh.edu). Visit the Lavoie Farm website. <http://www.lavoiesfarm.com/>*

*Wednesday, June 8, 2011. **New Hampshire Tree Fruit Meeting.** Appleview Orchard, 1266 Upper City Road, Pittsfield. 5:30 - 7:30PM. For more information contact George Hamilton 641-6060 or [george.hamilton@unh.edu](mailto:george.hamilton@unh.edu). Visit the Appleview Orchard web site <http://www.applevieworchard.com/>*



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