UNIVERSITY of NEW HAMPSHIRE
COOPERATIVE EXTENSION

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Bud Stages at UNH Woodman Horticulture Farm

As of April 21st, fruit bud stages were as follows: Pioneer McIntosh Apple: quarter inch green. Pears: swollen buds. Japanese Plums: burst. European plums: swollen bud. Peaches: swollen bud. Blueberry: swollen buds with tight bud scales. Today's photo shows apple at the half-inch green stage.

Apple Scab

The threat from apple scab disease varies with time of year, amount of susceptible tissue that is exposed, weather conditions, variety, and the number of spores being produced. Work by MacHardy and Gadoury at UNH showed that a very small percentage of the season's supply of ascospores are mature and ready for release when the buds are at green tip. Of course, there's relatively little exposed green tissue then. If your orchard (and nearby unmanaged trees) had very little or no scab last year, there are few spores per acre then, as well. All that adds up to low (but not zero) threat. As the season progresses, the amount of exposed tissue increases, and more spores mature. Normally, we anticipate the heaviest spore releases will be around pink and/or bloom stage. Young foliage is the most susceptible tissue. Once leaves fully open, they are a bit less susceptible. Fruit is susceptible, too.

Daytime rains are when spores are released, and land on leaves & fruit to start this year's infections. We know that the number of hours of wetness necessary for spores to germinate varies with temperature. At cold temperatures (mid-30's) it requires 48 hours or more of leaf wetness for spores to germinate and start an infection. If leaves are wet for a shorter time, no infection results. The shortest period (6 hours or so of leaves being wet) occurs at about 60 – 75 F.

Experienced growers are aware of these patterns, and make sure that susceptible varieties (almost all the ones we grow) are protected with fungicide during vulnerable periods. Some fungicides are excellent protectants, while others offer several hours of "kickback" action – stopping an infection that has already begun.

For those growers with scab resistant varieties such as Liberty, MacFree, RedFree, William's Pride, Enterprise, Goldrush, Pristine… there's no need to apply fungicides to control scab.

Bud stages at Woodman Farm showed 50% of Pioneer McIntosh buds were at green tip stage on Wednesday April 16. That's the biofix (starting time) for apple scab degree day calculations. The biophenometer showed 108 SDD's at 3PM on April 22nd. That correlates with about 2% of the season's supply of ascospores being mature and ready for release.

Will We See Powdery Mildew on Apple This Year?

The fungus that causes powdery mildew of apple overwinters primarily in infected buds. It has to be in living tissue to survive the winter. Winter temperatures below -11 F kill infected buds. This winter, I suspect that many NH orchards have trees (or parts of trees) that didn't get that cold. So I'm guessing that we may see powdery mildew this year. What does it look like? Infected buds produce growth that is slightly abnormal in shape, and powdery in appearance. I noticed and photographed this only one year, and I'll include one of my photos to jog your memory. If you see this, it could be powdery mildew! It infects only young, immature tissue. Once the leaves have fully expanded and "hardened off," they can't get infected.

Early Caterpillars on Apple

We have several caterpillars that begin feeding on apple around the time of bud break. They are fairly easy to distinguish.

Eye-spotted bud moth is a very tiny caterpillar that chews holes in opening foliage. It is brown in color, with a dark head. I sometimes find significant numbers of them in wild trees, backyard trees, or organic trees. The caterpillars are fairly easy to kill with chemical insecticides. *Bacillus thuringiensis* insecticides (like Dipel) work well, too, if you get the spray to cover where the caterpillars are feeding. They usually don't do too much injury, so rarely are targeted for spraying.

Green pug is a tiny green inchworm that is obvious by pink stage. When nearly fully grown (bloom) most of them have a brick-red line down the back. Once the flowers begin to open, green pug caterpillars strongly prefer to feed on the pistil and anthers of the flowers (so no fruit grow from damaged flowers). I advise commercial growers to **check for green pug at early pink stage**, and treat right away if they find significant numbers. No one has figured out a threshold for them. I search by firmly tapping flower clusters against a large white pad of paper. The yellow-green caterpillars show up well against white.

Winter moth is something that we may get, but currently most of them are in coastal Massachusetts and Rhode Island. Basically, they are tiny green inchworms that start feeding when buds break. They eat foliage and young fruit, and look like green pug caterpillars that lack the brown-red line. In large numbers they could be serious pests, but they are vulnerable to the same pesticides that hit the other caterpillars mentioned here. Serious problems in the past have occurred when growers were not watching for injury. I'd use the same time and technique mentioned under green pug. Winter moth is unlikely here anywhere except the seacoast.

Eastern tent caterpillar is rarely a problem in sprayed orchards, but is common on backyard trees. In Durham, egg masses usually hatch about April 15th. For the first week or so, the tents are very tiny, located in crotches. The caterpillars eat whatever foliage has opened, and is close by. Like the other two above, there are plenty of insecticides (including *B.t.* materials) that control them. If you do spray, the best time in Southern NH is late April or early May.

Green fruitworm is a name we give to a group of species. The moths fly early, and lay eggs on opening tissues. That means the young caterpillars appear before bloom. Left untreated, they get pretty large, and commonly chew large holes in young green fruit. Usually they are controlled by insecticides we aim at other pests. They are vulnerable to a large number of insecticides, including *B.t.* sprays. Green fruitworms are in the same family as cutworms and armyworms. The caterpillars are fat, not hairy, and…green.

Rosy Apple Aphid

Rosy apple aphids are not a problem on most varieties. On a few, their feeding causes stunting and ridging of fruit. Cortland is one of the very susceptible varieties. Golden Delicious, Gravenstein, IdaRed, Jonagold, Rhode Island Greening, and possibly Delicious are also affected.

The major point about rosy apple aphid monitoring is to **check early, no later than early pink stage.** Why? The feeding rapidly curls up the leaves, thereby protecting the aphids from the insecticide spray. Look on the fruiting spurs for small groups of aphids. They might still be greenish if small, but by tight cluster or early pink stage, some of the aphids should be yellow. The oldest individuals turn powdery pink or powdery blue (usually after the pink stage).

Treatment options include Lorsban or Supracide at green tip to tight cluster stage, Esteem (half-inch green is preferred time) or (at pink stage) Actara, Assail, Battalion, Diazinon, Lannate, Proaxis, Thionex…

A key management point for any block with rosy apple aphid problems is: <u>try to eliminate English plantain (aka buckhorn plantain or narrow leaved plantain) from the orchard.</u> It is a very important alternate host. Dock apparently is an alternate host as well, but I haven't seen it listed as being important. Of course, you could just opt to grow varieties that aren't susceptible.

Oil Sprays for Mites on Apple

Years ago, "dormant oil" was applied to smother scale insects and eggs of European red mite on apples. Eventually, more highly refined oils were used, and it was discovered that a more effective timing was after buds had opened. The oils didn't harm foliage when used properly. We continue this practice today, but the misnomer "dormant oil" doesn't apply to the way we now recommend it on fruit trees.

The most effective time to apply what we now call "superior oil" or "spray oil" to control European red mite is at tight cluster stage. If San Jose scale is the target, then half-inch green stage is better. But we also have to have proper weather conditions to use this, without injury. We'd prefer to have temperatures remain above the 30's for 24 hours after spraying. Even temperatures as high as 38 or 39F have sometimes resulted in some foliar injury. Of course, it can't be windy either, or you won't get proper coverage. In order to work well, you need thorough coverage, which means slow tractor speed, calibration, and high gallonage. When all these factors align, you can get 98 to 99% kill of the ERM eggs on the twigs. That's what we're aiming for.

For orchards with large acreage, there often isn't enough time to get all covered if you wait until TC stage to begin. When weather conditions are right and buds have reached half-inch-green, experienced growers go ahead.

With the price of petroleum as high as it is now, spraying oil might be an option that some growers skip this year. The fuel & spray material could be pricey. If you are thinking in this direction, look into the cost of miticides, too. You're more likely to require a miticide spray of you don't apply oil early for ERM eggs. With the mild temperatures we had this winter, I expect mites (and scales) have survived very well.

Phytotoxicity --- Oil & Captan, Oil & Delicious

Just remember that oil and Captan "don't mix". Applying spray oil to apple within 10 days before or after a captan spray can result in necrotic spots on the exposed foliage. Delicious is a variety (anyone still growing that here?) that easily shows phytotoxicity from oil sprays, especially if the sprays are concentrated.

Fireblight Management: Copper Sprays

I'm not as knowledgeable about plant pathology topics as I am about insect & mite pests, but growers who had a significant amount of fireblight in the orchard last year should have considered applying a copper spray no later than green tip stage. You may be able to get much more detailed information from Dan Cooley (U Mass Healthy Fruit Newsletter) or Glen Koehler (U Maine Apple Report), but spraying copper later than green tip will risk russeting the fruit. The copper spray is intended to kill fireblight bacteria that are on the surface of twigs, near cankers. It is not intended as a substitute for a streptomycin spray later. The riskiest time for fireblight is during a warm rain that falls in the bloom period.

Cedar-Apple Rust and Quince Rust

Once apple flower buds open and show some green, the time for cedar-apple rust has begun. The fungus that causes this disease requires two different hosts to complete its life cycle. It has to have both in the vicinity, or it cannot survive. This is a weak point in its defenses --- one we exploit in management. Eliminate red cedar trees within about 500 feet of your apple trees, and you won't have this disease.

For those who can't eliminate red cedar, the disease usually isn't serious on apple. It causes rusty orange lesions on the leaves. But I digressed from my main point. The time when cedar-apple rust threatens is about to begin. On red cedar, there are tiny roundish, hard red galls with dimpled surfaces and a few short, dark stubs sticking out. From about late April until early June, those galls change during rainy periods. When the galls are soaked by rain, the stubs swell into long fleshy orange spikes that release fungal spores. Some people describe them as orange, spiky Christmas ornaments. That's cedar-apple rust, which hits apple and red cedar, *Juniperus virginiana.*

Quince rust is very similar. It, too requires two hosts, common juniper, and apple. On apple, quince rust causes fruit infections. On *Juniperus communis,* it creates very slight swellings of the branches that are very hard to notice unless it is spring, and the orange, fleshy spikes are out. Here's a photo of quince rust galls I took in Durham a few years ago.

Early Season Insects on Peach

This is fairly easy to write. There really aren't too many early season insects on stone fruit. Tarnished plant bug is the most obvious. It feeds on swelling buds, and continues to feed until and after bloom on peach. Later in the season we have some of its relatives (oak and hickory plant bugs) but not much is happening in the insect department now.

Sweet Cherries --- Black Cherry Aphid

Black cherry aphid is a problem primarily on **sweet** cherries. Now that we are starting to grow sweet cherries, I should remind growers about this pest that may sound new. The eggs were laid among the buds last fall. They hatch about the time of bud burst. The aphids are found on the undersides of new leaves of shoots. Feeding causes the leaves to curl up. As with rosy apple aphid, we urge growers who have problems to spray at

the pink stage, because it is usually difficult to get pesticides to reach to the undersides of leaves that are already curled up. Heavy infestations reduce crop yield and quality, and can affect fruit set next season. Sooty mold grows on the honeydew they secrete, making more problems.

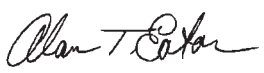
If you see a shiny black aphid on sweet cherry, it is this species. It has a complicated life cycle. After a few wingless generations on sweet cherry, winged adults appear. It is mid-summer by then. The winged aphids move to plants in the mustard family. They live there for several generations, and return to cherry in the fall, and reproduce there. Their progeny have no wings, yet produce eggs that they lay on cherry, and overwinter. Weird, huh? By the way… there is another black aphid (different species) on peach. Don't ask.

Some Upcoming Twilight Meetings

Wed. May 21, 2008. 5:30 - 8:00 pm. Joint **MA/NH Tree Fruit Meeting** at Kimball Fruit Farm, Hollis, NH & Peperell, MA. Host: Carl Hills. Since the University of Massachusetts Cooperative Extension is sponsoring this twilight meeting (also located mostly in Mass), there is a $20.00 per person registration fee. Speakers: UMass Extension and UNHCE. For more information, contact George Hamilton at george.hamilton@unh.edu or 603-641-6060.

Wed. June 11, 2008. 5:30 - 8:00 pm. **New Hampshire Tree Fruit and Berry Twilight Meeting** at Butternut Farm, Meaderboro Rd, Farmington, NH. Hosts: Giff and Mae Burnap. For more information, contact George Hamilton at george.hamilton@unh.edu or 603-641-6060.

Wed. July 9, 2008. 5:30 - 8:00 pm. **New Hampshire Tree Fruit Twilight Meeting.** This meeting was scheduled in response to a request made by Tracy Leskey. Dr. Leskey will have research projects going on at both Poverty Lane Orchard (West Lebanon), and Apple Hill Farm (Concord). We will be finalizing which site for the meeting later. Speakers: Dr. Tracy Leskey, Research Entomologist at the USDA-ARS Appalachian Fruit Research Station in Kearneysville, WV and Dr. Starker Wright, Support Scientist at the USDA-ARS Appalachian Fruit Research Station in Kearneysville, WV. For more information, contact George Hamilton at george.hamilton@unh.edu or 603-641-6060.



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