Maine Apple Newsletter
Wednesday, July 13 update.

Apple scab, European red mite, and Leafminer counts remain low in almost every scouted orchard. Mite counts may rise soon as second and third generation mites hatch out.

Apple Maggot - Growers who are not using apple maggot traps should begin protective insecticide coverage against apple maggot now, and reapply at approximately two week intervals or as needed after heavy rains.

Fire blight has appeared suddenly in at least one location, but I do not know of extensive orchard infestation. Keep a lookout for rapidly dying shoots and prune out promptly.

Fungicides and Weather, Annemiek Schilder, Michigan State University
(From Michigan Grape & Wine Newsletter, June 2, 2011 Vol 2, Issue 4. Written for grapes, but same principles generally apply to apples.)

Fungicides can be divided into two broad groups: protectant and systemic fungicides. Protectant fungicides are contact materials that remain on the outside of the plant surface and kill fungal spores and hyphae upon contact, thereby preventing infection from occurring. Systemic fungicides are absorbed by the plant cuticle and underlying tissues and can act by killing spores as well as hyphae that have penetrated the plant surface. When they stop incipient infections and prevent symptoms from developing they are called “curative” and may be described as having “post-infection activity” or “back action”. However, symptoms that are already present will not be removed by the fungicide in question. After symptoms appear, some fungicides can reduce or inhibit fungal sporulation: these are called “anti-sporulants”. The term “eradicant” is often used for products that kill overwintering spores and fungal structures on woody plant tissues (e.g., lime sulfur) or for fungicides that seem to eradicate the disease from a vineyard (e.g., Ridomil Gold, which is very effective at stopping downy mildew in its tracks). The term “translaminar” refers to the movement of a fungicide from one side of the leaf to the other, providing disease control on both sides of the leaf. Some fungicides have “vapor action”, that is, they are present in a (partially) gaseous phase around leaves and other plant parts. The way a fungicide behaves on or in a plant is determined by its chemical affinity for the wax layer on the plant surface and underlying cell layers. Low temperatures may decrease the mobility of systemic fungicides.

Systemicity. Both systemic and protectant fungicides are effective when applied before infection occurs, but only systemic fungicides have efficacy after the fungus has penetrated the plant surface (for a limited time, e.g., 24-96 hours, depending on the fungicide and the disease. Systemic fungicides are not all the same, with some fungicides being locally systemic (they move only a short distance away from the droplet, e.g., Elevate), others moving to the
tip of the leaf (e.g., Elite, Abound) or new leaves (e.g., Ridomil), and yet others being able to move throughout the plant including the roots (e.g., ProPhyt). Most systemic fungicides are highly effective against their target pathogens regardless if they are locally systemic or systemic. However, products that are more systemic tend to have longer post-infection activity. When relying on post-infection activity, use the highest labeled rate.

Wash-off by rain. The main way in which fungicides are lost from plant surfaces is through wash-off by rain. Fog or dew usually are not sufficient to remove fungicide residue and may actually help to redistribute fungicide residue over plant surfaces. Since systemic fungicides are absorbed by plant tissues and get redistributed in/on the plant, they tend to be less susceptible to wash-off by rain compared to protectant fungicides which remain on the outside of the plant. However, this depends on the type of fungicide and our research has shown that even systemic fungicides are affected by rainfall. A general rule of thumb that is often used is that 1 inch of rain removes about 50% of the protectant fungicide residue and over 2 inches or rain will remove most of the spray residue. Newer “sticky” formulations (e.g., Dithane Rainshield) and fungicides applied with spreader-stickers may be less susceptible to wash-off by rain. Most systemic fungicides are rainfast after 2 hours (Revus Top even after 1 hour), but a longer period (up to 24-48 hours) will help the fungicide fully penetrate the plant surface. During rainy periods, it is better to rely on systemic than protectant fungicides. In addition, spreader-stickers can improve adherence of protectant fungicides, while penetrants (e.g., oils) may speed up penetration of systemic fungicides. Care must be taken to use appropriate adjuvants or phytotoxicity may result. For instance, copper should not be applied with penetrants, as copper is toxic to plant cells when inside the leaf. Advances in fungicide formulation technology ensure that many newer fungicide products have excellent adhesive or absorption properties and may therefore not need any adjuvants. Read the fungicide label to see whether and what type of adjuvant is recommended. Sometimes adjuvants are prohibited.

Other ways in which fungicides are lost. In addition to wash-off by rain, protectant fungicide residues naturally decrease over time due to degradation by sunlight (UV radiation), heat or microbial activity, and redistribution over the plant surface. Fast plant growth may result in some plant surfaces not being protected if no new sprays are applied. In contrast, the concentration of systemic fungicides may be reduced due to redistribution and dilution in (growing) plant tissues as well as possible breakdown by the plant itself. A high pH of water used in the spray tank can result in alkaline hydrolysis (breakdown) of some fungicides, e.g., Captan, before they are even applied. However, most other fungicides are not affected by water pH to any great extent. Most

Rainfastness. Since fungicides and formulations differ a lot in their ability to stick to or penetrate plant surfaces, more research needs to be done to describe the effect of rainfall on wash-off of specific products. Recent research at MSU with fungicides against Phomopsis in grapes showed that 1-day-old residues of fungicides are removed from the plant surface by rainfall at different rates: for instance for Ziram, 0.1 inch of rain removed 25% of the residues, 0.5 inch of rain 30% of the residues, 1 inch or rain 65% of the residues, and 2 inches of rain 75% of the fungicide residues. However, fungicide activity remained moderate despite low residues remaining even after 2 inches of rain. In comparison, Captec tended to stick better, with a 50% reduction after 2 inches of rain. Efficacy was reduced slightly but was still good with whatever residue remained. Surprisingly, even residues of Abound and Pristine, which are systemic fungicides and considered rainfast, were reduced by rainfall, which suggests that
a certain proportion remains on the outside of the plant, probably in/on the cuticle. However, disease control efficacy was barely reduced. Efficacy may be reduced more with older (e.g., 1-week-old) fungicide residues where less active ingredient remains.

The question sometimes comes up if it is better to apply a protectant fungicide before or after rain, since it can wash off during the rain event. As you can see from the grape study, fungicide efficacy was still decent even after 2 inches of rain in grapes. However, this only applies to “new” fungicide residues. Older residues may not be as robust. The other problem is that if extended wet weather or windy conditions prevent fungicide application soon after the rainfall event, it may be too late to obtain disease control. I would suggest that a fungicide should be applied before a rain event and re-applied if more than 2 inches of rain have occurred. A little bit of rain is not all bad, as it can help to distribute the fungicide residue over the plant surface. Be sure that the fungicide has dried well before rain occurs, otherwise it will be lost immediately. It may be best to apply fungicides a day before rain is predicted to allow for “bonding” to occur.

Protectant/Contact fungicides: Armicarb, Captan, Copper, Bordeaux mixture, Dithane, Penncozeb, Manzate, Ferbam, Fungastop, Gavel, JMS Stylet Oil, Kaligreen, Lime sulfur, ManKocide, MilStop, Prev-Am, Regalia*, Saf-T-Side (oil), Serenade, Silmatrix, Sonata, Sporan, Sulforix, Sulfur, Tenet, Trilogy, Vegol, and Ziram.


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**Highmoor Farm Field Day**

Highmoor Farm Field Day & Maine State Pomological Society Meeting  
Thursday, July 21, 2011  
8:30 AM to 3:30 PM  
52 U.S. Route 202, Monmouth, ME  
Registration fee: $15.00. No pre-registration required.

The Maine Pomological Society and the Maine Vegetable & Small Fruit Growers Association will be joining with the Maine Agricultural & Forest Experiment Station and the University of Maine Cooperative Extension to hold a public field day at Highmoor Farm in Monmouth on Thursday, July 21, 2011. Highmoor Farm is the Field Research Station for Fruits and Vegetables, and has been working with Maine farmers to improve crop production since 1909, when the farm was purchased by the state to carry out research on orchard practices. For more than 100 years, researchers at Highmoor Farm have helped to develop cultural techniques, new varieties and pest management practices to improve the success of Maine’s vegetable and fruit farmers. This year’s field day will include tours of current research projects in tree fruit, including apples and plums, and projects in vegetables and berries, including new strawberry variety testing, sweet corn evaluations, pumpkin trials, summer squash and cucumber evaluations, as well as vegetable production under plastic tunnels, and new biodegradable mulches.
The day will start with visitor registration and coffee at 8:30 a.m. The Maine State Pomological Society will hold its business meeting at 9:00 a.m., followed by a speakers program beginning at 9:30 a.m. which will include a discussion of marketing using social media outlets and employment law for farmers hiring workers. Concurrently, there will be a morning tour of the vegetable and berry research plots. A catered lunch will be served at 12:15 p.m., during which there will be informal greetings and updates from state officials. At 1:00 p.m. there will be a tour of the orchards and current tree fruit research plots, and the vegetable and berry research tour will be repeated. Growers are welcome to attend the whole day, or may come for just the morning or afternoon programs and tours. Whichever you decide, please plan to be there for lunch to share some time and informal discussion with fellow farmers, research and Extension staff and state officials. Cost for registration (including lunch) will be $15.00. Please make checks payable to University of Maine Cooperative Extension or UMCE. For more information call the Highmoor Farm office at (207) 933-2100.

Directions
Traveling North on I-95: Drive north on the Maine Turnpike (I-95) and take the Sabbatus exit (Exit 86). Travel about 2 miles, then turn left onto Route 132. After 4.5 miles, turn left onto Leeds Junction Road. Travel about 2.8 miles, then turn right onto Route 202 and travel about 1.3 miles up the road until you see Highmoor Farm on the right side.

Traveling South on I-95: Take Exit 109B in Augusta. Continue west on U.S. Route 202 and travel about 15 miles. Highmoor Farm will be on the left.

Any person with a disability who needs accommodations for this program should contact Pam St. Peter at (207) 933-2100 or call 1-800-287-8957 to discuss their needs at least 7 days in advance.

Where brand names are used it is for the reader’s information. No endorsement is implied nor is any discrimination intended against products with similar ingredients. Always consult product label for rates, application instructions, and safety precautions. Users of these products assume all associated risks.

Orchard Radar weather and pest tracking models at http://pronewengland.org/AllModels/DecisionModels.htm

Glen W. Koehler  
Associate Scientist IPM  
Email: glen.koehler1@maine.edu  
Voice: 207-581-3882 (within Maine: 800-287-0279)  
Pest Management Office, 491 College Avenue  
Orono, ME 04473-1295  
http://pmo.umext.maine.edu/apple/

Dr. Renae Moran  
Extension Tree Fruit Specialist  
Email: rmoran@maine.edu  
Voice: 207-933-2100 ext 105  
Highmoor Farm Ag. Exp. Station, P.O. Box 179  
Monmouth ME 04259-0179  
http://extension.umaine.edu/agriculture/programs/tree-fruits/

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