PURDUE UNIVERSITY

PURDUE EXTENSION

FACTS FOR Fancy Fruit

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In This Issue

Crop conditions

Apples and peaches are at green tip in the northern half of the state and approaching tight cluster in more southern areas. Peaches are at green tip in the north but in early bloom further south. The rate of development at this point is purely dependent on warm temperatures.

Spring 2013

This spring could hardly be more different to last year. Last year in the April 6 issue of FFF we reported that apples were approaching petal fall, peaches were set but still in the shuck, grapes and raspberries had 2 inch shoots and strawberries were at full bloom. Of course this all has to do with spring temperatures. We measure the effects of temperature on plant growth using Growing Degree Days (GDD). This is simply the average daily temperature minus a base temperature below which we don't expect development to occur. This principle holds true whether we're talking about plant or insect development. A base temperature of 50 F works pretty well for many plants and insects. In Lafayette at this time last year, we had accumulated 278 growing degree days. This year the total is 33. Before the past very warm weekend, our total was six, all accumulated on March 11 when the average temperature was 56 degrees. While we are significantly behind compared with the last 3 years, we are pretty close to the long-term average (Figure 1). A quick scan of the data indicates that more southern regions of the state have also accumulated only a handful of GDD, again closely matching the long-term averages. If you want to look at the data from weather stations at different parts of the state, these are all available from the state climatologist: http://iclimate.org
(Hirst)

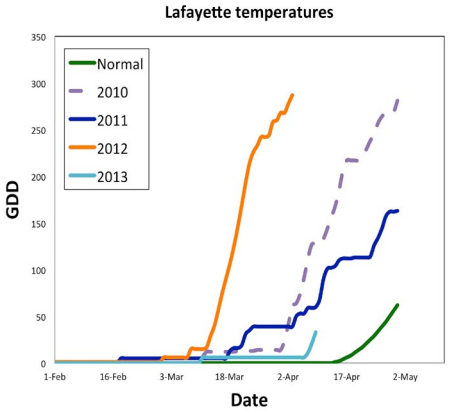

Figure 1. Lafayette, IN spring temperatures since 2010.

Apple flowering 2013

As many growers will painfully recall, one year ago from today the state was engulfed in a series of freezes that resulted in complete crop loss for some apple growers. Then a severe drought engulfed most of the state. The question then becomes "what affect will these events have on flowering and cropping this year?" I would expect heavy flowering in those orchards where crops were reduced by freeze last year. I doubt that the drought will have had much effect on flowering for this year. At the time flowers were formed in the buds last season, the drought hadn't really taken hold so I suspect the number and strength of flower buds wasn't affected too much. The bottom line is that if you had light crops last year because of freeze damage, expect heavy flowering this spring. Make sure you have plenty of chemical thinning materials on hand and be prepared to start early. We'll have more information on chemical thinning in the next issue of FFF. (Hirst)

Indiana Horticultural Congress

Once again the Hort Congress was a great success. Our attendance was about the same as the last few years, right around 800. The Trade Show was once again filled to overflowing. Thanks to all who participated and helped make the show such a success. We are always looking to make the Congress even more beneficial to participants, so we welcome your suggestions.

Hort Congress awards

Once again the competition at the Indiana State Cider Contest was fierce. Cider makers submitted their ciders and in a blind tasting ciders were judged by attendees at the Indiana Horticultural Congress. Our congratulations go to Beasley Orchard for producing the best apple cider for 2013. Also ranking in the top 3 were Adrian Orchard and Tuttle Orchard.

For the first time, we held a poster contest to highlight some of the excellent research conducted by our graduate students at Purdue. The inaugural winner was Amanda Stewart, Department of Food Science, for her poster "Yeast Assimilable Nitrogen Survey and Free Amino Acid Profiles in Hybrid Wine Grapes" (Hirst)

Not just spring in the air

Spring is in the air, and soon, ascospores, basidiospores, and conidia will be as well--Now is the time for disease management! The importance of timing only increases as we enter tight cluster models, ascospores of the scab fungus are beginning to be released in central Indiana; depending upon which part of the state you live (from central Indiana southwards) infection will be visible in the next two weeks if you haven't stayed on top of your spring sprays. The severity of infection will remain high if the wet weather remains. As this is the Midwest, I wouldn't dare make a prediction (and my Magic Eightball informs me that the "Outlook not so good"). Instead of relying upon a Magic Eightball, consider the Mill's Table that is used to predict apple scab infection periods. This table shows the relationships between temperatures, duration of leaf wetting, and development of apple scab infections. (Beckerman)

Average temperature	Average temperature	Wetting period (hr)(b)	Wetting period (hr)(b)	Wetting period (hr)(b)	
Farenheit	Celsius	Light Infection	Moderate Infection	Heavy Infection	Incubation period (days) (c)
78	25.6	13.0	17	26	-
77	25.0	11.0	14	21	-
76	24.4	9.5	12	19	-
63 - 75	172. - 23.9	9.0	12	18	9
62	16.7	9.0	12	19	10
61	16.1	9.0	13	20	10
60	15.6	9.5	13	20	10
59	15.0	10.0	13	21	12
58	14.4	10.0	14	21	12
57	13.9	10.0	14	22	13
56	13.3	11.0	15	22	13
55	12.8	11.0	16	24	14
54	12.2	11.5	16	24	14
53	11.7	12.0	17	25	15
52	11.1	12.0	18	26	15
51	10.6	13.0	18	27	16
50	10.0	14.0	19	29	16
49	9.4	14.5	20	30	17
48	8.9	15.0	20	30	17
46	8.3	15.0	23	35	-
45	7.8	16.0	24	37	-
44	7.2	17.0	26	40	-
43	6.7	19.0	28	43	-
42	6.1	21.0	30	47	-
41	5.6	23.0	33	50	-
40	5.0	26.0	37	53	-
39	4.4	29.0	41	56	-
38	3.9	33.0	45	60	-
37	3.3	37.0	50	64	-
36	2.8	41.0	55	68	-
33 - 36	0.6 - 2.2	48.0	72	96	-

Table 1. The Mill's Table

Facts for Fancy Fruit is a newsletter for commercial and advanced amateur fruit growers. It provides timely information on pest control, production practices, and other topics likely to be of interest to fruit growers. All growers and interested persons are welcome to subscribe.

Subscriptions are $15 per year. Subscribers will receive 12-15 issues biweekly during the growing season and monthly otherwise.

To subscribe, send your name, mailing address, and check for $15 (payable to Purdue University) to:

Facts for Fancy Fruit
Attn: Tammy Goodale
Purdue University
Department of Horticulture & Landscape Architecture
625 Agriculture Mall Drive
West Lafayette, IN 47907-2010

This newsletter can be accessed free at www.hort.purdue.edu/fff/.

Current bud stages West Lafayette, IN		
Apple	Peach	Grape
		
at green tip	*at green tip*	*dormant*
Raspberry	Blueberry	Strawberry
		
dormant	*bud swell*	*first leaf emergence*

Table 1. The Mill's Table describes the approximate wetting period required for primary apple scab infection at different air temperatures, to estimate the time required for development of conidia.

a Adapted from Mills, 1944, as modified by A. L. Jones. From: http://www.caf.wvu.edu/Kearneysville/disease_descriptions/millstable.html

b The infection period is considered to start at the beginning of the rain.

c Approximate number of days required for conidial development after the start of the infection period.

The juniper rusts

We are still currently too cool for telial spore horn development to begin on the junipers, at least in central Indiana, but the development should begin in the next significant rain event (or two). Telial spore horns are produced for several weeks. Usually, rust spore release from these gelatinous spore horns coincides with the pink stage of apple development. The DMI fungicides used to control scab have excellent control of the rust pathogens, as well as powdery mildew. If you want to see a video on how the gall produces spore horns and releases spores, check out: http://www.youtube.com/watch?v=pfDp9cpA5jw

Powdery mildew

Last year was pretty bad, and it didn't get cold enough to kill any mildew overwintering in buds. If growing mildew susceptible varieties like Ginger Gold, Ida Red, Jonathan, Paula Red, and Rome, be sure to include a DMI like Rally or Procur to effectively control this disease. Captan and Mancozeb do not control powdery mildew! You can use a DMI for powdery mildew (and rust) control, or use a strobilurin. Sulfur is also an effective (low-cost) option.

On the plus side, this cooler spring is slowing down fire blight development. This could change should the temperatures become suddenly warmer and wetter. See ID-168, "2013 Indiana Commercial Tree Fruit Spray Guide" available at: http://www.extension.iastate.edu/Publications/PM1282.pdf for a complete listing of suggested fungicides for tree fruit disease management. (Beckerman)

Apple proliferation phytoplasm in North America

The U.S. Department of Agriculture's Animal and Plant Health Inspection Service (APHIS) has been notified by the Canadian Food Inspection Agency (CFIA) that they have detected apple proliferation phytoplasma (APP) in an apple orchard near Kentville, Nova Scotia. The affected orchard has been placed under quarantine. This is the first APP detection in North America.

The affected trees are 'Pacific Gala' and were imported into Canada from the U.S. in 2008. It is important to note that no symptoms of APP have been observed in the source nurseries or reported in the U.S. at large, and the source of infestation is unknown at this time. APHIS has provided trace forward information to CFIA, and is currently conducting testing at the

source nurseries. At this time, CFIA has not imposed new restrictions on importation of apple trees from the U.S.

APP, or '*Ca.* P. mali', is considered to be a quarantine pest in both Canada and the U.S. It is present throughout Europe, where it is considered to be one of the most critical diseases of apple trees. APP is spread through propagation practices with infected material including budding and grafting. Long-distance dispersal of APP occurs through the trade of infected rootstock, scionwood, or budwood. Specific insects, including certain psyllids, froghoppers and leafhoppers also spread APP, however it is not transmitted through seed or fruit or pruning.

Symptoms of APP include:

- shoots around axillary buds, which create a broom-like appearance at the end of affected branches
- leaf rosetting
- enlarged leaf stipules
- reduced growth and smaller, less sweet fruit

For more information on APP, please contact Craig Southwick at Craig.Southwick@aphis.usda.gov or (970) 494-7578.

Straw removal on strawberries

The proper time to remove straw from matted row strawberries is when the bare-soil temperature at 4 inches averages about 40-43˚F. This usually coincides with mid to late March in central Indiana. Plants will begin pushing new leaves as the soil temperatures rise steadily through the month, so the straw should be raked off the tops of the beds and into the row middles. Leaving some straw on top of the beds for plants to grow up through provides a clean surface for fruit. Straw should be removed from strawberry beds before the plants grow enough to cause yellowing of foliage. Allowing the leaves to become etiolated (yellowed with long petioles) due to late straw removal can reduce yields by as much as 25%. However, uncovering the plants early may promote early growth and increase chances of frost or freeze injury. The difference between early removal and late removal may increased first harvest by about three days, so there is no real advantage. After the straw is removed the frost protection irrigation equipment should be set up and tested and made ready for frost during bloom. (Bordelon)

Spring weed management in strawberries

There have been several herbicide label changes for strawberries. There is a new formulation of Gramoxone, a revised supplemental label for Sinbar, and labels for Prowl H20, Aim, Blazer, Chateau, Solix 3, and Goal. Growers should read the 2013 Midwest Commercial Small Fruit and Grape Spray Guide (https://ag.purdue.edu/hla/Hort/Pages/sfg_sprayguide.aspx) to familiarize themselves with these changes. Changes that may influence weed management decisions for early spring are listed below.

Gramoxone Inteon is the new formulation for strawberries. This formulation is designed to be safer to the user. However it is still restricted use and the signal word is still "Danger". Gramoxone Inteon contains an "alginate" which is made from seaweed and slows absorption into the bloodstream. There is also an alerting agent that smells like decaying grass, and emetic and purgative, and a green dye. The new formulation also comes with some rate changes. With the old formulation (Gramoxone Max) the rate range was 1.7 to 2.7 pints per acre. Rates for the new formulation are 2.5 to 4 pints/acre.

Chateau (flumioxazin) is registered for pre and post emergence weed control in dormant strawberries. In dormant strawberries, the rate is 3 oz/acre. Also apply a crop oil concentrate at 1% or a non-ionic surfactant at 1⁄4% by volume. Chateau will control emerged chickweed, field pansy, and oxalis if sufficient contact is made with the weeds. Chateau will not control all emerged weeds. Scout the field and check the labels. 2,4-D amine may still be required to control other emerged weeds.

Select 2EC (clethodim) is a grass specific herbicide registered in strawberry. It is applied at 6 to 8 ounces per acre. It is effective on small, actively growing grasses. It has improved activity over Poast on cool-season and perennial grasses. Add 1 qt/100 gal spray of crop oil concentrate. Repeat application at 14 days for perennial grasses. Ammonium sulfate can be added at 2.5 lb/acre to improve activity on perennial grasses. Do not apply within 4 days of harvest. Select will not kill old established grasses. Avoid spraying on hot humid days or some crop burning will result.

Ultra Blazer 2E (acifluorfen) is registered for use in annual and perennial strawberries. In matted row plantings, applications can be made after renovation and when plants are dormant during fall or early spring. The PHI for matted row strawberries is 120 days, so growers need to carefully consider spring application dates. (Bordelon)

National resource for grape growers

eViticulture, the new national resource for grape growers has been developed by the Grape Community of Practice, a nationwide group of professionals with expertise in grape production. The site is designed for commercial grape growers who need solid, tested information about all aspects of grape production. There are over 200 featured articles, an *Ask an Expert* option, and much more. This new site is part of the national eXtension system. The project is funded by the USDA-NIFA Specialty Crops Research Initiative. Check it out at eViticulture.org, or www.extension.org/grapes.

Sign up for driftwatch

Growers of pesticide-sensitive crops should be sure to sign up for the Driftwatch pesticide

sensitive crops registry before the cropping season starts. Growers that are new to the program should visit www.driftwatch.org and follow the prompts to register as a producer. You will be able to map your site and enter information that will help commercial applicators and farmers avoid applications that might cause damaging pesticide exposure. Growers of perennial crops (grapes, blueberries, etc.) that have previously signed up on Driftwatch should have received an email from Driftwatch asking them to verify their plantings. A simple email reply is all that is required to stay in the system. Brightly colored NO DRIFT ZONE signs for displaying around your site are also available for a nominal fee. If you have any questions about the Driftwatch program, contact Leighanne Hahn at cropregistry@driftwatch.org or 765-427-3472.

Delayed or double pruning grapes to avoid spring frost damage

Spring freeze damage can be a significant economic problem for Midwest grape growers. Widespread damage occurred in 2007 and 2012 from warm weather in March followed by the freezing temperatures in April. Growers can avoid frost damage by using a technique called delayed or double pruning. This method is especially good for varieties that tend to bud out early. This type of pruning is only applicable to spur pruned training systems. The procedure utilizes the apical dominance of buds on a cane. The first buds to begin growing are those on the tip of a cane, while buds closer to the base begin growth later. To perform double pruning, select canes to be used for fruiting spurs during the normal pruning practice, but leave those canes long, with 10-15 more buds than desired. Spurs are normally pruned to 3 to 4 nodes for fruiting, but if they are not cut back, then the extra buds will help delay the development of the desired basal buds, which helps avoid frost injury. After the date of the last probable spring freeze has passed, the canes are shortened to the desired length to properly adjust the bud number for the vine. Growth of the basal buds can be delayed as much as two weeks if weather conditions are favorable. If significant freeze damage occurs, having the extra buds will provide more chance of producing a full crop. While this procedure requires an extra trip through the vineyard, it can mean the difference between a full crop and little or no crop. (Bordelon)

Early season sprays for grapes

There are some potential pest and disease problems that require early season sprays. Phomopsis is a major problem on many grape varieties in the Midwest. Recently colleagues in Michigan and Ohio have been conducting evaluations of dormant fungicide applications for management of this disease. Liquid lime sulfur, Sulforix, and fixed copper (copper hydroxide) fungicides have proven to be most effective. A single application can provide a significant degree of Phomopsis control (a 50 to 60 percent decrease in disease severity on the grape leaves as well as clusters), but will not reduce the need for the standard recommended fungicide sprays for Phomopsis control during the growing season. It is important to recognize that sanitation is part of a Phomopsis management plan. Prune out dead canes and stubs as much as possible since they are the main sources of Phomopsis spores.

Anthracnose is a less common disease, but one that we are seeing more frequently. This may be due to warmer weather or susceptibility of new varieties. We have seen that Frontenac is very susceptible to anthracnose. The dormant lime sulfur or Sulforix sprays are very effective against anthracnose. While sulfur and copper can be toxic to certain varieties, there is minimal chance of phytotoxicity if the products are applied just prior to budbreak (at the bud swell stage).

Grape Flea beetle and climbing cutworm can be problems in vineyards. Grape flea beetle is most common in Indiana. Scout vineyards for this pest and its damage, holes eaten into swelling buds. If more than 4% of the buds show damage, apply an insecticide to prevent further damage. Carbaryl (Sevin) is generally recommended.

See the 2013 Midwest Commercial Small Fruit and Grape Spray Guide (https://ag.purdue.edu/hla/Hort/Pages/sfg_sprayguide.aspx) and Midwest Small Fruit Pest Management Handbook for a complete discussion of grape pest management. (Bordelon)

Spring weed management in grapes and berries

Early spring is a good time to make the first herbicide application of the year. There are several options for grapes, brambles and blueberries including both pre- and post-emergent herbicides. In most situations, there will be some emerged weeds present in the planting at this time of the year. That means a post-emergent herbicide will need to be used to kill those established weeds. A pre-emergent material can be tank mixed at this time to provide residual weed control. Most pre-emergent herbicides will provide only 6 to 8 weeks of control. So, if applied in the early spring, they may not provide sufficient control of summer grasses (foxtail, barnyard grass, goosegrass, crabgrass, etc.). If those are the main weeds on concern, growers may want to delay application of pre-emergent herbicides until a bit later in the season. A good option is to apply a broad spectrum post-emergent herbicide such as glyphosate (Roundup, Touchdown, etc.) now then come back in about 4 weeks with a second application of glyphosate tank mixed with a pre-emergent herbicide. That should provide reasonably good season-long weed control. Growers should review the weed control chapter in the 2013 Midwest Small Fruit and Grape Spray Guide (https://ag.purdue.edu/hla/Hort/Pages/sfg_sprayguide.aspx) and Midwest Small Fruit Pest Management Handbook for a

complete discussion of weed management in small fruit crops. (Bordelon)

Effect of water quality on pesticides

Water quality has a profound impact on the performance of pesticides used by fruit growers. Purdue Pesticides Program recently published a very nice guide, The Impact of Water Quality on Pesticide Performance PPP-86, available at the Education Store, 1-888-EXT-INFO or www.extension.purdue.edu/store/. I highly recommend this guide to all growers.

Fruit growers often apply a post-emergent herbicide beneath the tree or vine row in spring to control winter annuals and other weeds. A pre-emergent herbicide may be included in this application. Glyphosate (Roundup) is the most common post emergent systemic herbicide used in fruit crops. In order for glyphosate to be effective, it needs to be absorbed into the weed plant. In soft water weeds readily absorb glyphosate. However in hard water glyphosate will be 'tied up' and not absorbed as readily. Hard water, common in many parts of Indiana, contains high concentrations of soluble salts, calcium and magnesium. When these cations are present they react with the negatively charged glyphosate to form compounds that are not readily absorbed by plants. This results in poor uptake and poor weed control.

The solution to the hard water problem is to add ammonium sulfate to the spray water **before** mixing with glyphosate. Ammonium sulfate ions tie up the calcium and magnesium ions forming conjugate salts. Additionally, some of the glyphosate reacts with ammonium to form a compound that some weeds preferentially absorb. Sprayable ammonium sulfate (AMS) is available in granular and liquid formulations. Follow the label recommendations on the amount of ammonium sulfate to add.

Another problem associated with spray water quality is that many fungicides and insecticides break down quickly in high pH water. Captan, Imidan, malathion, and Omite are examples of compounds that are especially vulnerable to alkaline hydrolysis. Both the Midwest Tree Fruit and Small Fruit and Grape Spray Guides have a discussion of spray tank pH. Spray water can be acidified by adding a specific acidifant, or with food grade citric acid. About 2 ounces of food grade citric acid per 100 gallons of water will lower the pH from about 8.0 to about 5.5. (Bordelon)

Raspberry anthracnose

The most important spray of the season for control of anthracnose on brambles is the delayed dormant spray of lime sulfur, Sulforix or copper hydroxide. This is one spray that you can't afford to miss. One of these materials should be applied when new leaves are exposed 1/4 to 3/4 inches; if you are late in your application and don't spray until a few leaves have unfolded, cut the rate to reduce the risk of leaf burn. See the 2013 Midwest Commercial Small Fruit and Grape Spray Guide (https://ag.purdue.edu/hla/Hort/Pages/sfg_sprayguide.aspx) and the product labels for complete information on rates and timing. (Bordelon)

Pheromones and pheromone traps

One way insects communicate with individuals of the same species is with pheromones. Pheromones are volatile chemicals released by an insect that usually can be detected only by individuals of the same species. There are a number of different types of pheromones, but the most common type is the sex pheromone. Usually the females will emit a tiny amount of a chemical that attracts the male to her and increases the likelihood of mating. Because the chemical is volatile, air currents carry it. The male detects the pheromone in the air with receptors on his antennae. He then flies upwind to find the source of the pheromone, a prospective mate.

The chemical compositions of pheromones for a number of pest species have been identified and synthetic copies can be produced in the laboratory. Synthetic pheromones can be used in conjunction with traps to catch male insects.

There are a number of fruit pests that can be monitored with pheromone traps. For growers who have not used traps before, I suggest starting out by trapping for codling moth, spotted tentiform leafminer, or peachtree borers. As you gain experience with the traps and learn how they can improve your pest management practices, you may want to begin trapping for additional pests.

The proper timing for setting out pheromone traps for fruit pests are:

Pest	Start Trapping
Redbanded leafroller	Green tip
Spotted tentiform leafminer	Green tip
Oriental fruit moth	Pink (in peaches)
Codling moth	Pink
Fruit tree leafroller	Pink
Lesser peachtree borer	Late April
Obliquebanded leafroller	Mid-May
Peachtree borer	Late May

Monitoring with pheromone traps lets you know when the insect is active. This allows you to better time control practices or, in some cases, to determine if control is even necessary. If you choose to control spotted tentiform leafminers with sprays targeted at the adults, having pheromone traps will help you know when the moths are flying in large numbers. For codling moth control, we can use a combination of pheromone trap catches and degree day accumulations to better time sprays. This will be covered in more detail in the next issue of Facts for Fancy Fruit.

Listed below are some, but certainly not all, of the suppliers of pheromones and traps.

Gempler's; P. O. Box 270; 100 Countryside Dr.; Belleville, WI 53508; 800-382-8473; www.gemplers.com

Great Lakes IPM; 10220 Church Rd., NE; Vestaburg, MI 48891-9746; 989-268-5693; www.greatlakesipm.com

Scentry Biologicals Inc.; 610 Central Ave.: Billings MT 59102; 800-735-5323; www.scentry.com

Trece Incorporated; P.O. Box 129. 1031 Industrial St.; Adair, OK; 866-785-1313; www.trece.com

Just a few notes about using pheromones.

1. It is preferable to use more than one trap for each insect pest for which you are trapping. Sometimes for reasons we don't entirely understand, a trap placed at a particular location may not catch many moths, which could give you misleading information. If you have two or three traps, you can be a lot more confident in the results.

2. Pay attention to how frequently the lures need to be replaced. When you replace a lure, don't throw the old lure on the ground. If you do, it may compete with the lure in the trap and lower your trap catch.

3. If you are trapping for more than one insect, don't handle more than one type of lure with your bare hands. You can contaminate the lure with the other pheromone and it will lose effectiveness.

4. When monitoring for the clearwinged moths such as the peachtree borers, remember that these pheromones are not as species specific as most pheromones. Therefore, you may catch some moths that are not pests of fruit trees. So, you will need to identify the moths in the trap to make sure they are peachtree borers.
(Foster)

Oil Sprays

One of the first and most important parts of a good insect and mite management program is the application of an early season oil spray to control European red mites, San Jose scale, and several species of aphids. Scales overwinter on the tree as nymphs and European red mites and aphids overwinter as eggs. Because two-spotted spider mites do not overwinter on the tree, oil sprays are not an effective control measure for that species. Although scales, European red mite eggs, and aphid eggs may appear to be inactive, they are living organisms and, therefore, must respire, or breathe. The application of the oil creates an impervious layer over the pests that will not allow the exchange of gases, causing the pest to die of suffocation. We have seen a resurgence of San Jose scale in recent years in some orchards. If you had scales on your fruit last fall, then a well-timed oil spray is highly recommended. Earlier oil sprays are more effective than late sprays for San Jose scale control.

Oil sprays should be applied between 1/2-inch green and tight cluster. Apply a 2% rate at the 1/2 inch green stage or a 1% rate at tight cluster. Oil sprays should not be applied during, immediately before, or immediately after freezing weather. For best results, apply when temperatures are 45oF or above, and not just before rain showers. Remember that oils are not directly toxic to the pests. They only work by suffocation. Therefore, the better the coverage, the better control you will receive. Our data have shown that mite control is improved if oil is applied at tight cluster rather than at 1/2 inch green.

One question that has arisen as a result of our research that showed that predator mites overwinter on the tree is: What effect will early season oil sprays have on predator populations? In other words, will the oil sprays kill the predators and create more serious European red mite populations? Our research showed that oil sprays, whether applied at green tip or tight cluster, had no detrimental effect on mite predators. Therefore, we recommend the use of early season oil sprays as a good management practice.

If you plan to use a preventive miticide this year, a reasonable question to ask is: Is it still necessary to apply an early season oil spray? I believe that the oil application is still a good idea, for two reasons. First, it will provide control of aphids and scales, as well as European red mites. Secondly, I believe that the use of oil will reduce the likelihood of developing resistance to these miticides. Therefore, I still recommend oil sprays even if other miticides are going to be used. The addition of an insecticide with your oil spray will give some increase in aphid control but will not improve control of mites or scales.

Don't apply an oil spray within two weeks of using Captan to avoid phytotoxicity. If your early season scab management program includes Captan, I think it is reasonable to skip the oil spray. We are fortunate to have a number of effective miticides and insecticides to use for management of mites, aphids, and scale, but the choices of fungicides are much more limited. Make sure that you have a good scab management plan in place and, if it includes early season Captan, don't use oil. (Foster)

European Red Mite Management

It's not too early to begin thinking about how to manage European red mites this year. The first step is to apply a timely oil application (see the previous article).

Based on my observations of grower success in managing mites and conserving the predator mites that are crucial to keeping ERM numbers low, I am changing my recommendations. Previously, I suggested that growers alternate between using a preventive miticide (Apollo, Onager, AgriMek, Zeal) one year and the following year scout and apply a rescue miticide if needed. Because you have been

doing such a good job conserving predators and because we have so many good miticides available, these are my new recommendations.

Only use a preventive miticide if you had a mite problem last year.

1. If you did not have a problem last year and did not apply a preventive miticide this year, start looking for mites (not formal scouting) in late May or early June. Of course, if you see anything that looks like mite damage sooner, check it out too. If your start seeing more than a few mites, do some more intensive scouting and make decisions based on the threshold listed on the website below.

2. Choose an effective miticide that has a different mode of action (different IRAC code) than the one you used last year. Each year, if you need to treat, use miticides with different modes of action. Try not to use the same mode of action more frequently than once every 3-4 years. I know this is a hard one. If Product X cured your problem last year, the natural instinct is to use it this year if the problem re-occurs. But, to preserve these excellent miticides, you need to change modes of action to avoid resistance.

3. After you treat, wait a few days and assess the level of control you received. If the population is suppressed below the threshold, continue to scout until you are sure the problem is solved. Mite populations usually peak about July 20, so they will probably decline after this date. If you need to treat again, consider the effectiveness of the first treatment. If it seemed to work well, but your populations were so high that another treatment is necessary, you can use the same product if the label allows multiple treatments in the same year. If the product did not work well or the label won't allow multiple applications, you should switch to another mode of action.

For more information on managing European red mites, please visit this web site: http://extension.entm.purdue.edu/eseries3/view.php?article=articles/european_red_mite_management.txt&id=1&section=Fruit.
(Foster)

Upcoming meetings

Aug. 19 - 24, 2013.
1st International Symposium on Horticulture Economics, Marketing and Consumer Research. Please join us as we bring together researchers and industry from the international community for a two-day symposium to promote the investigation of horticultural marketing and economics, as well as industry profitability and competitiveness. For more info, see our website at http://hort.purdue.edu/ismcrh or contact Tammy Goodale, tgoodale@purdue.edu 765-494-1296.

Facts for Fancy Fruit

Subscription Notice for 2013

Facts for Fancy Fruit is a newsletter for commercial and/or advanced amateur fruit growers. It provides timely information on pest control and production practices that should be of interest to all growers. The information is not intended for home fruit growers unless those growers wish to follow commercial practices. All growers or interested persons are welcome to subscribe.

Approximately 12-15 issues will be published during 2013, bi-weekly during the growing season and monthly otherwise. The subscription price of $15.00 includes only the basic costs of printing and mailing at first class rates. The newsletter is also available free of charge electronically through the World Wide Web at http://www.hort.purdue.edu/fff/ or by e-mail. If you have e-mail and would like a copy sent electronically, send your name and e-mail address to hirst@purdue.edu and we will include you on the list, or subscribe yourself through the web at http://www.hort.purdue.edu/fff/fff.html.

If your mailing label on the reverse side of this page has a 12/$15 in the upper right hand corner, we haven't received your renewal subscription for 2013. If you wish to receive the printed version of the newsletter in 2013, please fill out the form below and send it to the Department of Horticulture, along with a check for $15.00 (tax included).

We hope that you will benefit from the information contained in the newsletter. We welcome your comments and suggestions.

Peter M. Hirst

Please send me "Facts for Fancy Fruit" for the 2013 season. Enclosed is my check for $15.00 (tax included). Make checks payable to Purdue University.

Name _____ Please Check:

Address_____ _____Grower

City _____ _____Sales

State_____ Phone#_____ _____Other

Zip_____ County_____

I would like to see information on the following fruit crops:

_____Apple	_____Blueberries	_____Grapes
_____Peaches	_____Strawberries	_____Cider
_____Pears	_____Raspberries	_____Other

Please Return to: Facts for Fancy Fruit

Attn: Tammy Goodale

Purdue University

Department of Horticulture and Landscape Architecture

625 Agriculture Mall Drive

West Lafayette, IN 47907-2010

Janna Beckerman
Purdue University
Department of Botany & Plant Pathology
915 West State Street
West Lafayette, IN 47907-1155
(765) 494-4614
jbeckerm@purdue.edu

Bruce Bordelon
Purdue University
Department of Horticulture & Landscape Architecture
625 Agriculture Mall Drive
West Lafayette, IN 47907-2010
(765) 494-8212
bordelon@purdue.edu

Jennifer Dennis
Purdue University
Department of Horticulture & Landscape Architecture
625 Agriculture Mall Drive
West Lafayette, IN 47907-2010
(765) 494-1352
jhdennis@purdue.edu

Rick Foster
Purdue University
Department of Entomology
901 W. State St.
West Lafayette, IN 47907-1158
(765) 494-9572
rfoster@purdue.edu

Peter Hirst
Purdue University
Department of Horticulture & Landscape Architecture
625 Agriculture Mall Drive
West Lafayette, IN 47907-2010
(765) 494-1323
hirst@purdue.edu

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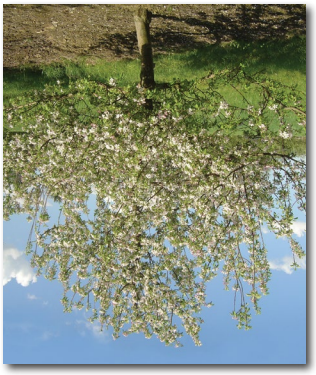

Facts for Fancy Fruit
Purdue University
Department of Horticulture & Landscape Architecture
625 Agriculture Mall Drive
West Lafayette, IN 47907-2010