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Crop Conditions: The past couple of weeks have been a bit unusual. Two weeks ago we would have said that apples were in full bloom in the southern part of the state, but 10 minutes later they were past petal fall! Seriously though, the very warm temperatures certainly accelerated bud development after a slow start to the season. Then low temperatures, as low as 25°F, covered much of the state on April 17-18. Some damage occurred to apples and peaches, and the amount was largely dependent on the stage of development. In the northern part of the state, apple flower clusters were still tight and little damage resulted. In the south, apples were close to full bloom and damage was widespread. On the positive side, I have not heard of crop-limiting damage. Remember that one live bloom out of 20 means you will probably still have to thin. Early budding varieties of grapes were damaged in many areas. Damage was severe where buds were at full swell or had exposed leaves and temperatures dipped to 27°F or colder. Some leaf damage has been noted on brambles, but it is minor and should not affect fruit set and development. Currently apples are at petal fall in the west-central part of the state, peaches are at pink, and blueberries are at white tip. In the south, peaches and apples are past petal fall, brambles have 5 to 7 inch shoots, and strawberries are in bloom.

Fire Blight: Do not become complacent about fire blight! Even though fire blight has been at a low level in most areas of the state over the past few years you never want to let your guard down on this disease. Just look at the fire blight outbreak that occurred in Michigan last year! The best prevention for fire blight is the application of streptomycin during bloom. Apply streptomycin just as blossoms begin opening and repeat every 3-4 days if weather favorable for blossom blight infection persists. Be especially diligent in your fire blight program if you have M-26, M-9 and/or Mark rootstocks and/or interstems. Due to their high

susceptibility, fire blight prevention is mandatory in orchards containing these rootstocks. Especially if you have very blight susceptible varieties, eg. Ida Red, Jonathan, Gala, Rome, Lodi, etc. The "MARYBLYT" computer software program will help you in determining when and if an infection event occurred as well as predict the risk for future infection periods. We strongly recommend its use for those growers at high risk (see above information on rootstocks) for fire blight. (*Pecknold*)

Apple Scab: The peak period for scab infection is NOW! Primary scab spores are ripe

and ready to infect, all they need is a good scab rain. Are you prepared? For growers on a curative schedule, or for those who get caught with their pants down (unprotected), we suggest Nova, Flint, or Sovran. These fungicides will provide up to 96 hours “curative activity”. However, the sooner you apply them the better! Do not sit around thinking there is no need to rush. NOTE: see comments below on the Stobilurins. (*Pecknold*)

Rust Diseases: Cedar apple and cedar quince rust are now actively infecting foliage and fruit. Except for the northern areas of the state, we are now into the peak period for rust infection. The sterol-inhibiting fungicides, Nova and Rubigan, are excellent in preventing rust problems, as well as providing excellent control of powdery mildew...which is also infecting new leaf tissue, right now! (*Pecknold*)

Nova, Rubigan & Tank Mixes : All Nova or Rubigan applications should be tank-mixed with a standard protectant fungicide to avoid problems with resistance to apple scab. However, it is especially important that your final spray (petal fall or first cover) of Nova or Rubigan be combined with a protectant fungicide such as captan, ziram, mancozeb, or Polyram. The addition of a protectant fungicide at this time will help provide protection from summer diseases such as black rot, sooty blotch and fly speck and also give added protection from fruit scab. Refer to Rubigan and Nova labels for additional information on tank mixes. (*Pecknold*)

The Strobilurins: The new strobilurin fungicides, Sovran and Flint, are excellent in control of many apple diseases. Unfortunately they are also very prone to the development of resistance. Therefore growers should be extremely **judicious** in their use of these compounds. We suggest you consider the use of Flint or Sovran in **ONLY** the FIRST, THIRD and SEVENTH cover sprays (three times only) for control of fruit scab and sooty blotch and flyspeck

(SBFS). Our field trials this past year showed that Sovran, applied at the full rate, gave excellent control of both fruit scab and SBFS when applied at these three times (first, third and seventh cover). While the strobilurins are effective in precover sprays for the control of other diseases, we believe their real strength lies in the control of fruit scab and sooty blotch and flyspeck. So let's use them when they will do the most good and hopefully avoid future resistance problems. (*Pecknold*)

Strawberry Frost Protection: Strawberries are in bloom in southern and central areas of the state. Sprinkler irrigation equipment for frost protection should be set up, tested, and ready to go. Once flowers open they are susceptible to temperatures below 30°F. Application of water through overhead irrigation can prevent temperatures from dropping below 30°F even though the air temperatures may drop to 25°F or colder. The principle behind this method of frost protection is that as water freezes, heat is released. As long as an adequate layer of freezing water covers the bud or berry, the temperature will remain at or near the freezing point. It is important to remember that a layer of freezing water must be present at all times. Ice without the continued application of water will not protect the flowers from freezing temperatures. This means that the rate of application of water must be carefully monitored. The rate at which water freezes is dependent on several environmental factors including air temperature, humidity, and wind speed. Generally, the lower the air and dew point temperature, and/or higher the wind speed, the greater the rate of freezing. Application rates for frost protection are fairly low compared to normal overhead irrigation rates. Most growers install a smaller set of nozzles in the sprinkler head specifically for frost protection. The correct rate of irrigation can be determined from the following table.

	<u>Air temperature at canopy level (°F)</u>		<u>Wind speed</u>	
	<u>0-1 mph</u>		<u>2-4 mph</u>	<u>5-8 mph</u>
At 50% relative humidity				
27	0.10 inches per hour		0.20	0.30
24	0.10		0.30	0.35
<u>20</u>	<u>0.15</u>		<u>0.35</u>	<u>0.45</u>
At 75% relative humidity				
27	0.05		0.10	0.20
24	0.10		0.20	0.30
<u>20</u>	<u>0.10</u>		<u>0.25</u>	<u>0.40</u>

Irrigation should be started before damaging temperatures occur. Start irrigation when the temperature in the lowest part of the planting reaches 34°F at canopy level. Continue irrigation until ice begins to melt after sunrise. Irrigation can be very effective for frost protection, but it can also create problems such as excessively wet soils, nutrient leaching, and fruit rots. Misuse of irrigation for frost protection can cause more harm than good. (Bordelon)

Strawberries and Botrytis Fruit Rot: The most important sprays for control of Botrytis fruit rot of strawberry are those applied at bloom - starting at 10% bloom. There have been some major changes in fungicide registrations for Botrytis control in strawberries. Ronilan can no longer be used on strawberries. The current Rovral label states “do not make more than 1 application per season and do not apply after the first fruiting flower” therefore, it is no longer recommended for control of Botrytis on strawberries. A new fungicide, Elevate, received registration last year, so the only options for Botrytis control are Elevate, Benlate, and Topsin M. None of the three should be used alone for season-long control of Botrytis because of the potential for development of resistant pathogen strains. Benlate cannot be used on strawberries once the crop has been turned into “U-Pick” or “Pick-Your-Own” or similar operation. However, it can be used preharvest (bloom) and post-harvest as long as the field is not open to U-Pick. See ID-

169, 2001 Indiana Commercial Small Fruit & Grape Spray Guide, for the complete strawberry spray recommendations. (Bordelon)

Eastern Flower Thrips: One of the factors we believe may be associated with problems with eastern flower thrips on strawberries is having sustained, strong southerly winds early in the growing season. If any of you have been outside lately (or tried to spray), you know that we have had a number of days of nearly continuous strong winds from the south. These winds may well be blowing eastern flower thrips to Indiana from southern areas. It would be prudent for strawberries growers to watch for thrips as we approach bloom. (Foster and Bordelon)

Wanted: European Red Mites: Last year I asked you to let me test Apollo as a rescue treatment for mites in your orchards. I got about 5 calls and we were able to collect some valuable information. I would like to continue these studies again this summer. If you have not used Apollo or Savey and develop a mite problem, please give me a call at 765-494-9572. I will then come to your orchard, set up the plot, take mite samples, and provide you with the Apollo you need to spray the problem area (courtesy of Aventis). I will then come back two weeks later and take additional mite samples to determine how well the application worked. All that I ask is that you leave some of the trees untreated during this two week interval. I can then provide you with Apollo to treat

the remaining trees after I have evaluated the level of control achieved. Obviously, there will not be enough days in the summer to put out a trial at every orchard that runs into a mite problem. I will try to put out as many as I have time for, and I will probably have to go on a first come, first served basis. I would like to get about 4-5 good trials out this summer. Combined with the data we collected last summer, this will give us a good indication of just how well we can expect Apollo to work as a rescue treatment. As always, thank you for your cooperation. (*Foster*)

Codling Moths: In Lafayette, I reached biofix in my codling moth pheromone traps on April 23, which is almost identical to last year. In the four days since I put the traps out, I caught an average of over 30 moths per traps at the Hort Farm here in West Lafayette. If that is any indicator, I should have plenty of pressure in my trials this year.

Remember that biofix is defined as the first sustained catch of moths, which we have established as when 5 moths have been caught in a pheromone trap. I have now started to accumulate heat units to estimate when the first eggs should begin to hatch and, therefore, when I should apply my first insecticide spray for codling moth control. The instructions for calculating heat units follows.

1. Find the high and low temperature (Fahrenheit) for the day.
2. Add the high and low temperatures together and divide by 2 to get the average temperature for the day.
3. Subtract 50 from the average daily temperature to get the day's heat units. Codling moths don't develop below 50 F, so we are only interested in temperatures above their developmental threshold.
4. Add the day's heat units to the previous total to get the updated accumulated heat units. (On the first day you will be adding to zero.)

When you have accumulated 250 heat units, it is time to spray. The eggs will have developed to the point where they are almost ready to hatch, so if you put on a spray at this time, you will have the maximum amount of residue present to control the young larvae before they enter the fruit. Proper timing is especially important if you are using some of the newer insecticides for codling moth control, in particular the insect growth regulators like Intrepid. (*Foster*)

European Red Mites: Shortly after petal fall, growers should begin looking for European red mites in those blocks of trees that were not treated with Apollo or Savey. Initially, sampling does not need to be very intensive. Just look at the underside of leaves in areas where you would normally expect to see your worst mite problems, such as in Red Delicious blocks. Using a 10X hand lens will make the mites a lot easier to see. Until you start to see a fair number of mites, there is no point in counting mites on a large number of leaves. However, there is a lot of tree to tree variation, so look at leaves from several trees. After mite populations start to build up, I recommend counting mites on 4 leaves from each of 5 trees per block. This will take you about 10-15 minutes and should be repeated every week or two. I know that you are all busy, but this can be a valuable use of your time. The generally accepted thresholds for European red mites are 2.5 mites per leaf in early season, 5 mites per leaf in mid season, and 7.5 mites per leaf in late season. (*Foster*)

Changes to Savey Label: On April 18, 2001, the EPA approved the use of Savey 50DF for control of mites on plums and prunes and on caneberries, including black and red raspberries and blackberries. The preharvest restrictions are 28 days for stone fruits and 3 days for caneberries. If you need a copy of the supplemental label, either contact your Gowan distributor or me. (*Foster*)

Apogee for Growth Control: Many of you have heard of a new growth regulator from BASF called Apogee. This new material can dramatically reduce shoot growth but it must be applied early in the season. The recommended time of application is 1-3" of shoot growth. If it is applied too late, it will probably have minimal effect. Here at Purdue, one application of 250 ppm did a great job last year, but in other places 2 applications spaced about 14 days apart was beneficial. If you have blocks of trees that are too vigorous, this may be a tool you want to consider. Depending on your outlook, it may be worth trying this material on a few trees this year and assess its effect.

This is a fairly new material and we're still learning about it. From very limited trials, it seems that Apogee does not affect the action of Promalin or Provide applications. In some instances, Apogee has resulted in increased fruit set and therefore trees to which Apogee has been applied may require additional thinning. Read the label carefully, particularly regarding the pH of spray water and addition of an adjuvant. (*Hirst*)

Encourage Return Bloom: If you have blocks of trees that exhibit biennial bearing, then the "on" year is the time to do something about it. The most obviously and effective thing you can do, is early and aggressive thinning (more on thinning in the next issue of FFF). In addition to thinning, scoring (also called ringing or girdling) may be a useful technique. Scoring is where the bark is cut, usually on the trunk about 12-24" above the ground. This can be done with a sharp knife or blade either all the way around the trunk, or half way around and then do the other half 6" above the first with 2 C-shaped cuts. A word of caution: make sure the cut is only the width of the blade (maybe one eighth inch), DO NOT REMOVE A WIDE STRIP OF BARK, as this will probably kill the tree. Because the cut is very narrow, it will heal over in a few weeks, but in that period of time it should encourage the tree

to produce more flower buds for the following years crop. The best time to score trees is from about full bloom to petal fall. (*Hirst*)

Upcoming Meetings:

- April 26 -** Twilight fruit meeting, Kercher's Sunrise Orchards. Goshen, 6.30 pm. Contact Jeff Burbrink (219-533-0554).
- May 1 -** Twilight fruit meeting. Garwood Orchard, LaPorte. 6.30 pm. Contact Walt Sell (219-326-6808 ext 271).
- May 2 -** Twilight fruit meeting, East Indiana Fruitgrowers Society. Tuttle Orchards, Greenfield. 6.00 pm. Contact Harold Brown (phone 765-747-7732).
- May 10 -** Northeast fruitgrowers meeting. Location to be announced. 6.00 pm. Contact Ricky Kemery (phone 219-481-6826).
- June 5 -** Twilight fruit meeting, East Indiana Fruitgrowers Society. Delaware Co (exact location to be announced later). Contact Harold Brown (phone 765-747-7732).

Department of Horticulture &
Landscape Architecture
Purdue University
1165 Horticulture Bldg.
West Lafayette, IN 47907-1165

Bruce Bordelon
1165 Dept. of Horticulture &
Landscape Architecture
Purdue University
West Lafayette, IN 47907-1165
765/494-1301
e-mail: bordelon@hort.purdue.edu

Paul Pecknold
1155 Dept. of Botany & Plant Path.
Purdue University
West Lafayette, IN 47907-1155
765/494-4628
e-mail: Pecknold@btny.purdue.edu

Peter Hirst
1165 Dept. of Horticulture &
Landscape Architecture
Purdue University
West Lafayette, IN 47907-1165
765/494-1323
e-mail: hirst@hort.purdue.edu

Rick Foster
1158 Dept. of Entomology
Purdue University
West Lafayette, IN 47907-1158
765/494-9572
e-mail: Rick_Foster@entm.purdue.edu

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