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FFF 97-04
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Crop Conditions

Temperatures in the upper teens and low 20s occurred across the state April 8-12. This has caused significant damage to most fruit crops, but it is too early to determine the full extent of the damage. We'll know more as the season progresses. Peaches and apples appear to be the most severely damaged, with strawberries, blueberries, and brambles also hurt. Grapes were not seriously damaged in most areas.

Cold Injury: Freeze damage occurred to most of the state's fruit crops from the recent cold weather. The extent of the damage depends on the temperatures that occurred and the stage of plant development. Unfortunately, the average date of last 28°F hard frost has not passed in all parts of the state so there is potential for additional damage. The average date for the last hard frost of spring ranges from March 26-31 for the southwest corner of the state to April 26-30 for the Kankakee valley in the north central region. See the figure from AY-231 'Determining Spring and Fall Frost-Freeze Risks in Indiana' at the end of this issue.

The following is a rundown for fruit crop damage across the state and region. If you have additional information, please contact Peter Hirst or Bruce Bordelon.

In southern Indiana (Spencer County), temperatures reached 25°F on April 9. Although there was some damage to peaches, most seem to have survived reasonably well and there should be enough buds left for a good crop if we get good fruit set. Red Delicious is another story entirely with almost complete crop losses reported. Other apples

varieties suffered some damage, but there should still be at least a partial crop.

In the Vincennes area, temperatures as low as 18°F were reported on April 8, with several other nights down to 25°F or so. At the stage of development there, they got hurt pretty bad. Red Delicious are expected to be a total wipeout, although with Golden Delicious and Winesap there may be enough lateral or side blooms left for a partial crop. Peaches were severely damaged.

Near Cincinnati, they had 19°F, with peaches in bloom and apples showing pink. They have apparently lost the peaches and have had extensive damage on Red Delicious apples. In central Indiana, temperatures as low as 17°F were recorded, resulting in severe losses of many apple varieties, especially Jonagold and Fuji.

In Lafayette, it looks like most of the king flowers of Jonagold were killed and Liberty suffered quite badly also. Jonathan, Red Delicious and Gala look okay. About a third of the buds on Newhaven peach and Honeysweet pears were killed. Minimal damage was found on Stanley plum.

Up in LaPorte county, the stage of development of most crops was far enough behind that even though temperatures got into the teens, there was probably not too much damage.

Widespread damage has also been reported from other areas. Red Delicious were lost in Columbus OH, damage was reported in SW Wisconsin with temperatures down to 13°F, and in West Virginia severe damage has been reported in the panhandle area, especially with Empire. In Southwest Michigan, the passage of several cold fronts with dry air behind resulted in temperatures from 14 to 18°F in the fruit growing districts Wednesday morning. Apples were at green tip to 1/4 inch green and there was some damage to king bloom. Sweet cherries were at green tip and were virtually wiped out. Tart cherries did much better with about 50% loss of flower buds (still plenty for a crop). Peaches were at calyx green and suffered little damage. European plums were damaged a little, and there is a lot of variation between the Japanese plum varieties - some were severely damaged and other are unscathed. Blueberries were hit hard with wide variations among the varieties. In central Missouri, Tuesday night lows hit 20°F. The king bloom of many Red Delicious, Goldens, Fuji, Braeburn, Gala, etc. were fully open. There will be major losses not only on apple, but peaches, apricots, and blueberries also.

It may be cold comfort (excuse the pun there!), but in Indiana we're obviously not the only ones hit. Even as far away as Europe, some damage has been felt, with 22°F on April 8. Damage is estimated at 80% on peach and plum (at fruit set stage), 90% on apricot, 60-70% on common pear (end of bloom) and 80% on strawberry. Apples were in full bloom so severe damage is expected.

Obviously the events of the last week will make us re-evaluate our apple thinning strategies for this year, and certainly in many cases reduces the need for aggressive thinning. Once the damage becomes clearer we'll be in a much better position to assess the need for

thinning. There's no hurry to do anything just yet with regard to thinning, so let's wait for things to shake out and hope for warm weather over the pollination and fruit set periods.

Damage will continue to show on all crops over the next couple of weeks as plants continue development. Once damage is fully assessed, growers will be able to make management decisions concerning this year's crop.

Fire Blight: The late spring has significantly increased the potential for this to be a bad fire blight year. Odds are now even higher that bloom will coincide with warm temperatures, and as you know, warm temperatures (daily average temperatures above 65°F) accompanied by rain can result in severe blossom blight. 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. 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. If you are interested in obtaining MARYBLYT contact Gempler's at 1- 800 - 382 - 8473. (Pecknold)

Apple Scab: The peak period for scab infection will occur within the next month. 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 either Rubigan or Nova. Both fungicides will provide up to 96 hours "curative activity". However, the sooner you apply these fungicides the better! Do not sit around thinking there is no need to rush - apply Rubigan or Nova as soon as possible after an infection period. (Pecknold)

Bee Update: In the last ten years we have lost more than half of the managed hives because many people have gotten out of beekeeping. This is probably due to economics and the

arrival in the last 10-12 years of two new mites that are parasitic on honey bees (Varroa and tracheal mites). Colonies infested with Varroa mites eventually die unless they are treated with Apistan strips. The strips release a small amount of a synthetic pyrethroid, called fluvalinate. The mites have virtually eliminated the feral honey bee colonies that live in hollow trees and other cavities. During the winter of '95-'96 we had 60% mortality of honey bee hives according to the Purdue survey. The losses were caused by parasitic mites and the cold weather.

This year, there has been good winter survival. Mite populations were low last summer and the weather was mild into October, allowing the bees to store adequate pollen and honey for the winter. Beekeepers are reporting low winter losses so we expect that growers will be able to contract with beekeepers for pollination. We are also seeing some renewed interest in beekeeping because of higher honey prices and a concern for local pollination. Most new beekeepers seem to be people that have a garden and some fruit trees and want to insure adequate pollination. The state beekeeper meeting at Purdue this spring had high attendance in comparison to past years and many new beekeepers were present. (G. Hunt)

Changes in Sevin Label: As a result of the re-registration process, there have been a number of changes on the Sevin (carbaryl) label. Some of the more important changes involve the pre-harvest interval. The PHI has been lengthened for a number of crops, meaning that you must wait longer to harvest after making an application.

Crop	Old PHI	New PHI
Blueberry	0	7
Strawberry	0	7
Apple	1	3
Pear	1	3
Peach	1	3
Cherry	1	3
Plum	1	3

There have also been a number of changes in the number of applications or total amount of product allowed per acre, so be sure to check the label of the product you are using. If you are using older product that does not have the changes on the label, you do not have to conform to the new restrictions. You must adhere to whatever restrictions are listed on the container of the product you are using. Again, be sure to check your labels before using the product. (Foster)

Codling Moth: Codling moths, the proverbial 'worm in the apple', will soon be emerging from overwintering sites and moths will mate and begin laying eggs. Codling moths are one of the primary insects that apple growers must control to produce marketable fruit. The strategy for preventing the newly hatched larvae from entering the fruit is to have a lethal dose of insecticide present when the eggs hatch. Codling moths usually are controlled well by routine cover sprays of broad spectrum organophosphate insecticides such as Imidan or Guthion. However, control can often be improved by using pheromone traps and the accumulation of heat units to better time the application of the insecticide. You may hear the terms heat units and degree days used interchangeably, but I will stick to heat units to avoid confusion.

Pheromone traps baited with codling moth lures should be placed in the orchard at bloom. Traps should be checked daily and catches recorded. When the third moth is caught in a trap, start to monitor the accumulation of heat units. Insect development is driven mostly by temperature, so we want to use heat unit accumulations to predict when the eggs will begin to hatch. There are several ways to measure heat units but the simplest uses daily high and low temperatures.

To monitor the accumulation of heat units, follow these steps daily.

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.

Example: Let's say that you catch the third moth in your pheromone trap on May 8. The next day, you check the newspaper and find that the high temperature on May 8 was 82 degrees and the low was 64. When you add 82 and 64 together you get 146 and when you divide that by 2 you get 73. Subtract 50 and you accumulated 23 heat units on May 8. If the high and low on May 9 were 74 and 56, you would accumulate 15 heat units. Adding the heat units from the two days gives you $23 + 15 = 38$. If on May 10, the high was 56 and the low was 42, the average temperature would be 49, so no heat units would be accumulated for that day.

Second generation moths will begin to fly about 30 days after petal fall. Because there are relatively few pests attacking apples at this time, monitoring the second generation may provide the best opportunity for reducing the number of sprays necessary. Be sure to replace your pheromone lure for the second generation.

Grape Flea Beetle: Flea beetles can be a serious pest of grapes because they feed on developing buds after final pruning. Grapes are in early swell to budbreak across the state,

depending on location and cultivar. Early to full swell stages are most likely to be damaged from flea beetles. Scout vineyards for these insects or their damage and control if necessary. Incidence often occurs in outer rows adjacent to fence rows or woods making spot spraying an option. Scout the planting carefully and apply insecticides only where needed. Damage from flea beetles usually decreases as buds break and shoots become 1/2 inch or longer. Sevin or Penncap-M will provide excellent control of this insect. Refer to the label or ID-169 for complete recommendations.

New Publication: The Midwest Small Fruit Pest Management Handbook has recently been published by Ohio State University (OSU Bulletin 861). The handbook is a cooperative effort among nine midwestern states; Arkansas, Illinois, Indiana, Iowa, Kansas, Kentucky, Missouri, Ohio, and Wisconsin. The handbook contains pest management strategies for diseases, insects, and weeds in strawberries, brambles, blueberries, and grapes, and has chapters on pesticide use and foliar analysis. It is designed to complement the annual Small Fruit and Grape Spray Guide. This will be an invaluable resource for growers, extension specialists, students, and professionals. Soft bound copies are \$5.50, and hard bound copies are \$11.00 each. They can be ordered from Media Distribution, 385 Kottman Hall, 2021 Coffey Rd., Columbus, OH 43210-1044. Phone 616-292-1607.

Coming Meetings:

April 24 — Northeast Indiana Fruitgrowers Twilight meeting. Bruick Brothers Produce, 12818 Edgerton Road, New Haven, IN. Contact Ricky Kemery, Allen Co. (219-481-6826) or Bruit Brothers (219-749-0891).

April 30 — Wabash Valley Fruitgrowers twilight tour and program. Nesbitt's Orchard, Vincennes. Contact Peter Hirst (765-494-1323) or Dave Byers (812-279-9721).

May 6 — Elkhart County Fruitgrowers meeting at Tom Kerchers Orchard. Contact Jeff Burbrink (219-533-0554) for more information.

May 7 — Eastern Indiana Fruitgrowers twilight orchard tour and program. Contact Harold Brown (317-747-7732) for further details.

May 8 — Southeast Indiana Fruitgrowers twilight tour. 6:30 p.m. -dark at the Paul Juhasz farm just a couple of minutes off of interstate 64 in Georgetown, IN. Contact Roy Ballard (812-948-5470) for further details.

June 3 — Eastern Indiana Fruitgrowers twilight orchard tour and program. Contact Harold Brown (317-747-7732) for further details.

July 1&2 — Indiana Horticultural Society Summer Meeting. Applacres, Inc. in Bedford, and Beiersdorfer Orchard in Guilford. Emphasis on cider. Mark your calendars, more details will follow. Contact Dick Hayden (765-463-6587).



Average dates of the last 28°F (hard freeze) in the spring.

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

First Class
Presort Mail
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Lafayette, IN
Permit No. 221

Bruce Bordelon
1165 Dept. of Horticulture
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@btpny.purdue.edu

Peter Hirst
1165 Dept. of Horticulture
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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