Inside

Crop Conditions

FFF 96-05
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Spring has finally arrived in Indiana. Fruit crops are beginning to develop quickly following last weeks warm temperatures and recent rainfall in some areas. Apples are at pink to early bloom in the south, at tight cluster to pink throughout central part of the state, and at half inch green to tight cluster in northern areas. Peaches are at petal fall to shuck split in the south. Grapes are at full budswell to 1 inch shoots in the south, and at early to full swell in central and northern areas. Blueberries are at pink tip in the south and budbreak in the north. Mummy berry mushrooms should begin showing up with the next warm spell. Strawberries are nearing bloom in the south, and just beginning to push in central and northern areas. Fruit crops have not endured any significant damage from the recent cold temperatures because of they delayed development. Most crops are still about two weeks behind normal.

In areas where there was a drought in the fall of 1995, return bloom is light in many orchards that carried a full to heavy crop in 1995. The dry fall last year coupled with a heavy crop resulted in less (or no) fruit bud formation for the 1996 crop. This has been seen most on Red Delicious but could be observed on a number of other varieties not usually considered to be strong biennial bearers. Where the 1995 crop was adequately thinned, the problem should be minimized. Hail has been a problem in some central Indiana orchards. Where hail marks break the epidermis, care should be taken to protect against fireblight and fungal problems.

Peach buds have been mostly killed in central Indiana. However Dick Hayden has seen a few live buds in the Purdue orchards - not enough to warrant spraying. Growers in more southern areas might want to check again before they write off the crop completely.

The blueberry crop appears fair at this point. Some varieties had a very low fruit bud set last summer due to the heat and drought. Jersey looks a little better than other varieties.

Weather: (From Purdue Crop and Weather meeting minutes, April 19) Temperature and precipitation trends for the past two weeks: Few places in Indiana received over an inch of rain in the past two weeks. Most places received .5 to .7 inches of moisture, less than one half of normal. Temperatures were 4 to 6 degrees below normal which is a continuation from March. Soil temperatures are not yet consistently over 50 degrees at the 4 inch depth. The low temperatures is 40 degrees for bare soil and 45 degrees under sod. The most frequently asked question this spring has concerned wind and wind damage. This likely stems from the large number of systems moving through the state in response to the position of the jet stream. - Ken Scheeringa

Weather Outlook: (From Purdue Crop and Weather meeting minutes, April 19) The current movement of systems through Indiana is expected to continue as the jet stream continues to flow through the Ohio Valley. Two more systems are expected to move through by

next week-end. One system will move through northern Indiana next Wednesday with colder temperatures moving in on Thursday. Temperatures on Thursday will decline into the 30's but no freezing temperatures are expected. The second system will move through central Indiana next Saturday. With the resulting precipitation, soil moisture levels are expected to increase significantly.

The 6 to 10 day forecast is for below normal temperatures throughout the state and above normal precipitation in southern Indiana with normal rainfall in northern part of the state. The 30 day forecast for the month of May is for normal temperatures and normal precipitation in Indiana — and most of the country. The 90 day forecast (May, June, and July) is for near normal temperature and precipitation. - Tom Priddy, UK

Risks of Freezing Temperatures: Spring has apparently finally arrived in Indiana. Frosts and freezes are always a major hazard in fruit production. Both tree fruit and small fruit are highly susceptible to freezing injury during the pre-bloom, bloom, and early post-bloom periods. Freezing temperatures occurring during these times may result in yield reduction, fruit deformity or russeting, foliage injury and twig killing. Air temperatures of 32˚F are seldom damaging to fruit crops, but when temperatures reach 28˚F for 1/2 hr or more, damage to fruit and flowers can be expected. Because of the cool, dry conditions of the past few weeks, fruit crop development is about two weeks behind normal. The delay in fruit crop development should help plants avoid potential frost/freeze damage as the chances of damaging frosts are diminishing.

Weather records from past years provide statistical probabilities of weather events. The "average" frost free date for an area is when there is a 50% probability that a frost will occur after that date. That 50% probability equates to number of years; i.e. in 50 out of 100 years a frost would occur after the "average" frost free date.

According to weather records, the probabilities of a 28˚F damaging frost on or about April 24 are: 10% in Southwest Indiana, 10-25% in Southcentral, 25-50% in the Brookville area of Southeast Indiana, but less than 10% along the Ohio River near Jeffersonville and Madison, 25-50% in East Central, 25% across Central Indiana, 10-25% in West Central, 25-50% in Northeast, 50% in North Central, and 25-50% in Northwest Indiana.

SAVE THE BEES: Do not apply insecticides or miticides during bloom since these pesticides are toxic to bees. Those bees that are not killed by direct contact in the orchard often carry the pesticide back to the hive where it may kill the brood. Remove bees from the orchard as soon as adequate pollination has been achieved, and certainly before the petalfall spray is applied. With current concerns about survival of bees over the winter and resulting low bee populations, be extra careful, please.

Apple Nutrition: In blocks or varieties where buds and/or spurs are weak, the use of foliar fertilizers may be desirable. Application of nitrogen and/or boron in the pink, petalfall and first cover sprays can be useful to help the spur leaves get off to a better start. These are the leaves that most affect fruit set and early development of the fruit. Without active cluster leaves fruit set is uncertain at best.

Solubor can help to improve fruit set, so in orchards where boron is low, growers may want to add Solubor to both the pink and petalfall sprays at 1 lb. per 100 gallons or a maximum of 2 pounds per acre. Check compatibility with pesticides, especially NOVA (apparently the water-soluble pouch is not compatible with solubor). Do not over-fertilize with boron since excesses can be injurious and can only be corrected with time.

Foliar nutrition with nitrogen is not a substitute for ground fertilization, but where trees are weak or spur foliage damaged, urea

(spray or feed grade that is less than 2% biuret) may be applied in pink and petalfall at 2-3 lbs. per 100 gallons, but not to exceed 12 lbs. per acre. Calcium nitrate can also be used for these applications at about the same rate; and could be helpful when calcium is being applied in the cover sprays for bitter pit and/or cork spot control. Check compatibilities with pesticides carefully, or apply separately. See the 1996 ID 168 and the Revised ID 60 for additional suggestions.

Apple Scab Resistance To Sterol Inhibitor Fungicides: In a recent edition of Scaffolds Fruit Journal, Drs. Wayne Wilcox and Wolfram Koller make the following points in regard to apple scab resistance to sterol inhibitor fungicides (Nova, Rubigan, etc.): "the anti-resistance strategies we've been preaching for years (maintain full SI rates, tank mix with a protectant, get good coverage, don't cheat on the intervals) really do work. Or, conversely, not following them really can get you in trouble." Wilcox and Koller further point out that: "we are probably somewhere between a resistance "watch" and a resistance "warning" in our commercial industry. That is, we have not reached the stage where resistance is imminent, but we appear to be moving in that direction if we don't watch out. The threat is real, and should be treated as such".

Fire Blight: Bloom + Warm Weather + Rain = Fire blight! An old refrain but one that needs repeating at this time of year. Blossom sprays protect only those flowers that are open at the time of treatment. Thus, the protective value of an application made too early can be lost quickly with the opening of many new flower buds. Paul Steiner points out the rate of flowers opening on a Jonathan apple is approximately 1 percent per 1.5 DD>40°F so that in just one or two warm days nearly 20% more buds may open. This poses a risk of approximately one unprotected flower per spur. Think about it!

EBDC Fungicides: The label for EBDC fungicides (Dithane, Manzate, Penncozeb, Polyram) on apples allows growers to choose one of two schedules: either pre-bloom use at the high rate of 1.5 - 2 lbs/100 (6 lbs/acre) OR the low rate of 3 lbs/acre (max 21 lbs/year) up until 77 days to harvest. See product labels for full details. We suggest growers calculate the 77 days to harvest date for each of their major cultivars and make their final application of EBDC on that date to take full advantage of the excellent control the EBDC fungicides provide for sooty blotch and flyspeck. In the Lafayette area this would make July 20th the final spray date assuming harvest occurs October 4th (unless I counted my days wrong).

Peach Scab: Early shuck-split and shuck-fall sprays are critical for peach scab control. The first spray should be applied about one week after petal fall. Do not wait until the shucks have slipped to begin this program. Continue to spray on a 10 day interval until 40 days before harvest. See ID-168, "1996 Indiana Commercial Tree Fruit Spray Guide", for further information.

Apple Growth Regulators: Promalin for Red Delicious "apple stretching" may be worth considering if your fruit must compete with western fruit on "type" or shape. Applications should be made during early bloom, and timing is critical. Apply when most of the Red Delicious king blooms have opened. Promalin has some thinning properties, which is not a problem where bloom is good. Where the bloom is light, do not use Promalin. Follow label directions closely concerning timing and precautions. The amount of water applied per acre is also somewhat critical. Results have been best where about 100 gallons per acre has been applied. Additional suggestions are given in ID 60.

"Provide" is a growth regulator that in Illinois tests has been shown to reduce the amount of russetting on Golden Delicious. Provide is a mixture of GA_4 and GA_7. The

label calls for three or four sprays at 7-10 day intervals beginning in late bloom to petalfall. The rate is 10 to 13 ounces per acre applied in about 100 gallons of water. The total amount that can be applied per acre per year is 40 ounces. This program may reduce, but cannot be expected to eliminate russet. In the midwest the degree of russet varies with the weather. The 30 day period after bloom is the critical period for the beginning of russetting. Growers who have been troubled with rusty Goldens may wish to try Provide.

Accel is benzyladenine (BA) with a very small amount of Gibberellic Acid(GA). Used according to label it has improved average fruit size, and thinned moderately. Used in combination with Sevin, thinning has been enhanced on certain varieties. Do not use in combination with NAA since more than usual pygmy fruits may be produced. Accel is expensive, but where fruit size is critical, it may be cost-effective. Note that for 1996 the label rate has been increased to 30 grams active ingredient per acre. Follow label instructions carefully. If you try Accel, do it on a limited scale.

Tree Training: Training of young apple trees to orient scaffold limb angles to 45-60° from the vertical is best done by the end of bloom. The degree of spreading depends on the spacing/rootstock combination. The wider the spacing, the more shoot growth is necessary to fill the allotted space. Thus the angle to which the scaffolds are trained should be smaller, i.e., more vertical.

Where tree spacing is close and the rootstock is more dwarfing, the angle of scaffolds should be larger to promote early fruiting. Do not train scaffolds completely to the horizontal, since that will stop extension shoot growth, and promote undesirable vertical growth from the top of the scaffolds. A 60° angle is about right to promote fruiting and minimize the vegetative growth. Limb spreaders and rubber bands are useful tools to accomplish this task.

Training crotch angles must be done by the time the shoots are 4-5 inches long, which will usually occur by mid May, depending on when the trees were planted. Select the 5-6 most desirable shoots per tree and train to near horizontal with toothpicks or clothespins about the time that shoot growth reaches 4 inches long.

Training helps to bring trees into production earlier, while pruning promotes vegetative growth at the expense of production. Therefore prune as little as possible until the trees come into production. Obviously, corrective pruning must be done to eliminate little problems before they become big problems. Time spent training young trees is probably the most worthwhile time spent in the season.

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, 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 Reminder: Grapes are in the various stages of bud swell to early shoot growth across the state, depending on location and cultivar. Development progressed rapidly over the past few days as temperatures reached the 70s. Insect activity has also increased. Scout vineyards for flea beetle or climbing cutworm damage and control if necessary. Left uncontrolled these pests can cause considerable reduction in yield. Incidence often occurs in outer rows adjacent to fence rows or woods making spot spraying an option. 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.

Prevent Ground Water Contamination with Pesticides: Ways to prevent contamination include:

1. Read all pesticide labels carefully. Many labels contain ground water information. Read the label before you buy the pesticide, before it is mixed and applied, before it is stored, and before disposing of excess pesticide or the container.
2. Avoid mixing pesticides near wells, streams or other natural water sources. Inspect wells regularly for leaks and be sure that surface drainage is away from the wellhead.
3. Measure and apply pesticides carefully, to stay within the per acre label rate. This will avoid excess application and decrease potential environmental contamination. Concentrate spraying can be accompanied by a reduction in per acre rate of application, which will further reduce potential for contamination without affecting pest control.
4. Use care in disposing of leftovers. Ideally, measure materials closely, so that there are no leftovers. Rinse pesticide containers thoroughly three times, putting the rinsate into the sprayer, and dispose of containers carefully, according to label instructions.

New Thinning Guide Available for Apple Growers: (This information is from Applecrop mailing group, applecrop@orchard.uvm.edu) The first new thinning manual published in nearly two decades for commercial apple growers in the Midwest and Eastern United States is now available. The Apple Thinning Guide is authored by Phil Schwallier, Michigan State University district horticulture marketing agent. His district includes the "Ridge" fruit growing area north of Grand Rapids that produces over 40% of Michigan's apple crop. "I felt that thinning is very complicated and a confusing necessary practice that growers were always unsure of what to do," said Mr. Schwallier. "Much of the confusion was over all the factors that influence fruit set and thinning. I've tried to condense the thought process into steps that need to be considered by growers before, during and after thinning." The recent release of some new thinning materials including Sevin XLR and Accel have further confused the issue. Mr. Schwallier reviews how these materials and the older materials work to help growers understand the thinning response to them when used alone or in tandem. "Understanding what thinning materials are available and how they work will help growers make decisions on which ones to use and when to use them," Mr. Schwallier said. "Knowing the responses that can be expected from different varieties will greatly increase the success of thinning." The in-depth book looks at the factors that involve fruit set and thinning, and reviews variety sensitivity to help serve as a guide to thinning decisions with an eye on thinning that will help growers meet the needs of today's marketplace. "The current thinking is to thin earlier and more aggressively starting at petal fall," Mr. Schwallier said. "The manual encourages growers to thin earlier for successful thinning and return bloom, and aggressively for larger fruit size." To make the subject easier to understand there are many colorful graphics, tables, charts and check off lists. Sections of the book include an introduction, thinning windows, thinning factors, weather factors, apple thinning rates and timing, and thinning materials. The tables cover thinning and fruit set factors, and varieties and thinning rates. The charts include fruit set and thinning planner, the fruit set evaluation checkoff and a final pre-spray checkoff. The fruit set and thinning planner combine the factors that influence fruit set and response to thinning, including predicted set, bloom factors, weather conditions, pollination factors, grower management factors and tree and orchard factors. The final pre-spray checkoff is designed to be used by growers just before making any thinning applications and considers weather conditions for the next five days, predicts thinning response and makes recommendations on the thinning action. "This is something all apple growers will find useful during this important decision time," Mr. Schwallier said. "This manual will help growers thin aggressively and early to provide the best success of annual fruit production and fruit quality." The Apple Thinning Manual is available from The Great Lakes Publishing Company, P.O. Box 128, Sparta, Michigan 49345. Cost is $10 plus $1.50 for postage and handling for each book. For more information call (616) 887-9008.

Commercial Spray Guides Available on the Internet: For those of you who don't have a copy of ID-168, Indiana Commercial Tree Fruit Spray Guide, and ID-169, Indiana Commercial Small Fruit & Grape Spray Guide, these publications are now available electronically. You can access them at the following URL (address): http://hermes.ecn.purdue.edu:8001//http_dir/acad/agr/extn/agr/acspub/ACS.html

Facts for Fancy Fruit Available Electronically: We hope to have all 1996 issues of Facts for Fancy Fruit available through the Plant & Pest Diagnostic Clinic, and Horticulture worldwide web homepages in the near future, but until then we can send you the

electronic version of the newsletter by email. If you would like to receive the electronic version, send an email message to Bruce Bordelon at bb@hort.purdue.edu and I will see that your address is added to the list.

Coming Meetings:

May 6 —- LaPorte area fruit growers twilight tour. 6:30 p.m. Sunacre Fruit Farm, LaPorte Co., 8711 N. 300 E. Rolling Prairie, IN. 4.2 miles N of Hwy 20 on 300 E. Contact Walt Sell (219-326-6808 Ext. 271)

June 19 —- Southeast Indiana Fruitgrowers Summer Tour. Apple Junction, Batesville, IN. Contact Karen Witt (317-647-3511) or John Ewart (812-926-1189).

June 22 — Indiana Horticultural Society Summer Meeting. Dave McAfee's County Line Orchards. Hobart, IN. Program details later. Contact Dick Hayden, 317-494-1301.

June 23-25 —- International Dwarf Fruit Tree Association Summer Tour. Central MI. Contact Dick Hayden, 317-494-1301.

September 15, 1996 —- Ohio Valley Harvest Festival. Louisville, KY. Contact Roy Ballard (812-948-5470).

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