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Crop Conditions

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Cool conditions over the past two weeks have slowed plant development. Apples are at petal fall or beyond in the south depending on variety, at bloom to petal fall throughout central part of the state, and at tight cluster to bloom in northern areas. Peaches are at shuck fall in the south and bloom to shuck split in other areas. Grapes have 3-5 inch shoots in the south, and are at full swell to bud break in central and northern areas. Blueberries are at petal fall in the south and early bloom in the north. Strawberries are in bloom in the south and central areas, and early bloom in northern areas. Pollination conditions have been good over most of the past week which should help offset the freeze damage suffered in April.

Time To Make the Thinning Decision: In many places around the state we have been surprised at how many live flowers we still have. This will probably mean that many people who were thinking they wouldn't have to thin, are now starting to wonder about this. The best guide of the optimum crop load for fruit size is your own experience on your farm. There are so many factors that influence the relationship between crop load and fruit size, therefore to try to come out with a recommended fruit number per tree would be misleading at best. Many trials have shown that thinning to a certain crop load on one property may have a very different effect (in terms of the response of fruit size) to the same thinning level on another property. If you've done a good job with your winter pruning so that the trees are open and have strong spurs on young wood, then less thinning will be required to achieve a certain fruit size than if the trees are dense, over-crowded and have weak spurs. Once again, this emphasizes the importance of keeping good records of past performance as a tool for making management decisions and fine-tuning.

One of the main factors influencing the effectiveness of chemical thinners is the weather conditions - not just at the time of application, but for about a week afterwards. Chemical thinners are absorbed best and have the most effect when they are applied when the temperatures at application time are 70-80°F, and when temperatures remain warm for a few days following application. If the weather forecast calls for 5 days of warm weather followed by a cool

spell, you may be better to go and apply your thinner even though it may be a little early in terms of crop development. If you wait until the crop is at the ideal stage, cool weather may mean you won't get much response. Obviously this is more of a problem for us here in Indiana than for the folks in Washington who can pretty much count on warm weather. So in deciding when to apply your chemical thinner, keep one eye on the stage of crop development and the other on the weather forecast.

5 A Day: The Produce for Better Health (PBH) Foundation is encouraging parents and children to choose fruits and vegetables as snacks. Different promotions include "Produce Playground", "The Original Fast Food: Fruit and Vegetables", and "Make it Fast, Make It Healthy, Make it 5 A Day". These promotions have resulted in an 8.8% increase in sales in produce department sales in participating stores. A recent USDA survey found that adult consumption of fruits and vegetables increased from 3.9 servings per day from 1989-1991 up to 4.4 servings per day in 1994. To learn more about these promotions contact Produce for Better Health at 302-738-7100. Our products are healthy and nutritious so let's tell people about that.

Sooty Blotch and Flyspeck: The label for EBDC fungicides (Dithane, Manzate, Penncozeb, Polyram) on apples allows growers to choose one of two schedules: either pre-bloom use (6 lbs/acre) OR an extended schedule up until 77 days to harvest (3 lbs/acre). We

suggest growers go with the extended schedule to take full advantage of the excellent control these fungicides provide for sooty blotch and flyspeck. This means calculating the 77 days to harvest date for each of your major cultivars. For Golden Delicious in the Lafayette area this would make July 18 the final spray date assuming harvest occurs October 3 (unless I counted my days wrong). See product labels for full details; also see pages 1 and 11 of ID-168, "1997 Indiana Commercial Tree Fruit Spray Guide".

Apple Scab: As I look out the window and see the rain coming down, with the temperature at 65° F, my reflections go to apple scab. At these temperatures it will take only 6 hours for infection to occur (using the revised Mills Table). In addition, the period when the number of ascospores reach their peak is generally pink through bloom. What this means for many growers in **central and northern Indiana** is that the current rainfall will likely be the peak infection period of the year for apple scab. Hopefully all growers are covered with a good protectant or plan to spray at the first opportunity with Nova or Rubigan.

Fire Blight: As weather conditions have cooled, and slowed plant development, there is an increased risk that the bloom period in **central and northern Indiana** will coincide with average daily temperatures above 65°F; which is fire blight weather remember Bloom + Warm Weather + Rain = Fire blight! Growers in southern Indiana should be monitoring their trees for the first symptoms of blight.

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, "1997 Indiana Commercial Tree Fruit Spray Guide", for further information.

Final Pruning and Shoot Removal in Grapes: Annual pruning of grapes is necessary to balance the amount of fruit production with the amount of vegetative growth to insure high yields of high quality fruit. Pruning severity is based on the strategy of 'balanced pruning' which dictates the correct number of buds to retain based on the vine's pruning weight and the pruning formula for the cultivar. It is a good practice to prune vines lightly during the dormant season in case there is a late frost or freeze, as occurred this April, that damages some of the buds and could result in low yields and high vegetative growth. This 'safe' pruning, leaving extra buds during the initial pruning, will hedge against late spring frosts or winter injury. Now that the danger of frost and freeze is mostly behind us and grape shoots are beginning to grow, growers can go back through the vineyard and

adjust the number of shoots per vine by shortening spurs or removing shoots. Either way is acceptable. New shoots are easily broken off by hand without the need for pruners.

Growers should pay close attention to shoot growth to determine if it is from primary or secondary buds. Shoots from primary buds have full fruiting potential, whereas secondary buds produce shoots with little or no fruiting potential, depending on cultivar. Typically, all secondary shoots are removed during final pruning adjustment or later at cluster thinning. However, in a year such as this one, where the late spring freeze cause damage to primary buds of some cultivars, it may be necessary to leave secondary shoots for fruit production and canopy development. Many French hybrid cultivars will produce a good crop on secondary shoots, and full yield is possible, even if few or no primary buds are alive. However, this requires that the grower leave many more shoots than normal, often resulting in shading problems and lower quality fruit. Shoots should be spaced evenly along the trellis if possible and at a density of about 6 shoots per foot. If only secondary shoots are retained, it may be necessary to have 9 to 12 shoots per foot in order to achieve a normal yield. The resulting shading problems would have to be controlled with leaf removal and shoot positioning. It takes more management on the part of the grower, but the rewards (a full crop) are worth the trouble.

Nitrogen Fertilization on Grapes: Active root growth is required for uptake of nitrogen and other nutrients from the soil. Root growth does not begin until a few weeks after bud break. Since nitrogen fertilizers are quickly available and prone to leaching, application prior to bud break is inefficient and may lead to ground water contamination. Mid- to late-May applications are the most efficient. Try to apply nitrogen when rain is expected in the day or two following application. This is especially important with urea, as it volatilizes into the air, especially under warm conditions. Ammonium nitrate is usually preferred for this reason. Avoid applications close to bloom as fruit set may be reduced. Split applications are generally better than a single application. Applying half to two thirds of the expected total in mid-May, followed by the remainder after fruit set (about 4 weeks later) allows more efficient nitrogen use and better assessment of the need for fertilizer. Often the second application can be skipped, depending on the crop load. Nitrogen can be banded or broadcast in mature vineyards, but should be banded on young vines. Banded applications are probably better on deep soils, where root growth does not extend laterally into the row middles. Rates of up to 100 pounds of actual N are commonly used and there seems to be little justification for exceeding that rate. On deep, fertile soils typical of Indiana vineyards, 50 pounds may be adequate. Foliar

analysis does not provide a good measure of nitrogen status unless samples are taken at full bloom (rather than 70 days after full bloom as is recommended for other nutrients). The best indicators of nitrogen status are shoot growth, vigor, leaf color, etc. Experience is the best guide. Excessive nitrogen fertilization leads to excess vigor, poor fruit set, poor fruit quality, and inadequate hardening off in fall. By splitting applications growers have more chances to adjust for various conditions and avoid over fertilization.

Strawberry Diseases: Strawberry gray mold and leather rot are most apt to occur under cool, wet, cloudy conditions. Conditions have been cool, but relatively dry so far this spring. However, growers should keep an eye on your prevailing weather conditions and act (spray) accordingly. Bloom is a key time to apply preventative sprays for these diseases. Apply Rovral, Ronilan, Benlate or Topsin-M at 5-10% bloom and again at full bloom for control of Botrytis. Neither Rovral, Ronilan, Benlate nor Topsin-M should be used alone for season-long control of Botrytis because of the potential for pathogen strains to develop resistance. Ronilan and Rovral should not be used with each other in an alternating spray program, and the same applies for Benlate and Topsin-M because of the similarity of these compounds to each other. Benlate cannot be used on strawberries once the crop has been turned into "U-Pick", "Pick Your Own" or similar operations.

Leather rot can be controlled with Ridomil or Aliette. Ridomil should be applied as a drench before bloom, and Aliette should be applied as a foliar spray between 10% bloom and early fruit set and continued on a 7-14 day interval. See ID-169, "1997 Indiana Commercial Small Fruit & Grape Spray Guide", for a complete discussion of strawberry disease control.

Strawberries Insects: Growers should be scouting for tarnished plant bug, strawberry clipper, and eastern flower thrips in strawberries. Scout for tarnished plant bug from early bloom until the start of harvest. Tap flower clusters over a white surface and look for the green nymphs that drop out. Spray if more than 0.5 nymphs are found per cluster checked. Thiodan, Sevin, Methoxychlor, Danitol or Brigade should all give good control of TPB.

Scout for strawberry clipper once temperatures get above 65°F. Old, weedy fields that have had clipper in the past are will likely have clippers again. New fields should be scouted and only sprayed if they exceed the threshold of 2 clipped buds per meter of row. Recall from last week's issue that there is evidence that strawberries compensate for the loss of flowers so insecticide applications may not be economically justifiable. Lorsban or Brigade should provide control.

Eastern flower thrips were a serious problem across the Midwest in 1994. Since that time we have not seen serious problems with this pest. However,

growers should scout their plantings to avoid the major losses that occurred in 1994. It is the consensus of the fruit entomologists in the Midwest, after discussions with entomologists from around the country, that 10 thrips per flower is a reasonable threshold. We must admit, however, that this threshold is not based on hard data, but is our best guess. We all agree that it is important that growers not treat during bloom unless they have some evidence that an insecticide spray is needed. Our bee colonies are in serious trouble, so we need to protect them as much as possible. We strongly recommend that growers scout for thrips in their strawberry flowers and confirm that thrips are present before applying insecticides. Thiodan or Lorsban appear to be the best insecticides for thrips control. See ID 169 Indiana Commercial Small Fruit & Grape Spray Guide for more information.

Early Season Grape Disease Control: The most important time of the season for disease control in grapes during the early growth stages. The major diseases of concern during the early season are black rot, Phomopsis cane and leaf spot, downy mildew, and powdery mildew. Grape pathogens overwinter on grapevines and vineyard debris and become active between bud break and two weeks after bloom. Spores produced from these overwintering structures are the 'primary inoculum' for the new season. If these primary spores cause infections on the new growth, secondary spores can be produced throughout the growing season, causing a high level of disease pressure whenever environmental conditions are conducive. When vines are protected from primary infections by a good spray program during the early season, or if weather conditions are unfavorable for infection, the overwintering inoculum will diminish, no secondary spores will be produced, and there will be much less disease pressure during the remainder of the season. The basic rule is: it is much easier to prevent a disease outbreak than to stop one in progress.

There are many factors to consider when deciding on a spray strategy, including weather conditions, disease history of the vineyard, varietal susceptibility, canopy vigor, and so on. There are two main strategies growers can consider. The first uses the plant growth stage and calendar to determine when and what to spray, with little regard to the weather. The second strategy, called post infection spraying, has come about with the advent of newer fungicides, called Sterol Inhibitors (SIs), that have the ability to 'cure' an infection after an infection period has occurred, but before symptoms develop. Applications are timed based on weather related events. Weather must be monitored closely and sprays applied in response to specific conditions that signal an infection period. Post infection programs generally lead to a reduction in the number of sprays applied.

In the calendar strategy growers should start disease control measures once new growth reaches the 1 to 3 inch stage and continue those measures at 7 to 10 day intervals through two weeks past bloom. The interval should be relatively short during periods of rapid shoot growth and wet weather to keep the new growth protected. The period from budbreak through bloom usually lasts about 4 to 6 weeks, depending on the weather so 3 to 6 sprays may be required during this time. The early season disease control program should include a broad spectrum protectant EBDC fungicide such as mancozeb (Dithane, Penncozeb, etc.) combined one of the sterol inhibitor (SI) fungicides (Nova, Bayleton, Rubigan). Mancozeb provides good protection against black rot, Phomopsis and downy mildew, but no protection against powdery mildew. SIs provide excellent control of powdery mildew and, in most cases black rot. (Rubigan is not as effective as the others on black rot). Mancozeb is a broad spectrum fungicide that will provide protection for at least 7 days. It must be on all susceptible plant parts before infections occur. The SIs are systemic, protectant, and curative fungicides that give good protection against infection for up to 14 days. Since the SIs provide 14 days of protection, they can be used in every other spray if applying on a 7-day schedule.

In a post infection program, sprays are timed according to the occurrence of an infection period. An infection period for powdery mildew occurs when 0.1 inch or more of rainfall occurs and the temperatures are equal to or above 50°F. Infection periods for black rot are determined by the number of hours of leaf wetness at various temperatures. See the 'Spott's Chart' on page 9 of the 1997 Indiana Small Fruit & Grape Spray Guide. In short, approximately nine hours of leaf wetness are required for infection to occur at temperatures between 60°F and 85°F. Once an infection period for either black rot or powdery mildew has occurred, an application of SI fungicide must be made within 72 hours after the start of the infection period. The higher labeled rates of Nova (4-5 oz/A) or Bayleton (at least 4 oz/A) should be used to insure control. The first application provides 14 days of protection. There is no need to respond to another infection period during that time. However, once the 14 days is up, weather monitoring begins again and an application is made when the next infection period occurs. In order to follow a post infection program, growers must have the ability and dedication to accurately measure rainfall and maximum and minimum temperatures daily.

Lots of information is available to growers on disease control in grapes. ID-169, the 1997 Indiana Small Fruit & Grape Spray Guide has recommendations for the standard calendar approach to grape disease and insect control, as well as comments on post infection programs and specific diseases. The recently published

manual Grape IPM in the Northeast (NYSIPM No. 211) contains complete descriptions of post infection and traditional approaches to disease and insect control and information on weather monitoring equipment. Though the manual was specifically developed for the Northeast US, growers in Indiana should find the information very useful. This is an excellent collection of information for grape growers throughout the US east of the Rockies. The manual is available through the Finger Lakes Grape Program office for \$30. For information on ordering contact the Finger Lakes Grape Program, 110 Court Street, Penn Yan, NY 14527-1130 Phone: 316-536-5134 Fax: 315-536-5117

Summer Grape Vineyard and Winery Tour: The Kentucky Vineyard Society and the University of Kentucky Extension Service are planning a tour of vineyards, wineries and grape research in Illinois and Missouri. Tentative plans for the tour, which would leave from Western KY, include stops at: a vineyard and winery in Alto Pass, IL; vineyards and wineries in the Augusta, Hermann and St. James areas, MO; and the State Fruit Experiment Station Mountain Grove, MO, where research on grape production and wine making will be featured. This will offer an excellent chance to see equipment used in small wineries. The tour is tentatively set for August 4-6, 1997. Travel would be by chartered bus and the cost is expected to be about \$100 per person for transportation. Contact Jerry Brown, 502/365-7541 ext. 204 if you are interested.

Facts for Fancy Fruit Available Electronically: This newsletter is available electronically through the world wide web at <http://www.hort.purdue.edu/fff/fff.html> or by email. You may subscribe by sending a message to "almanac@ecn.purdue.edu". Your message should consist of this single one-line message in the body: "subscribe FFF_L <your name>" without the quote marks.

Coming Meetings/Events:

May 15 — Commercial Apple IPM Meeting, Browning Orchard, Wallingford, KY (Fleming county) Owners Frank and Shirley Browning, Farm Manager, Dave Clark, Phone (606)849-2881. Contact Jerry Brown at 502/365-7541 ext 204 or John Strang at 606/257-5685.

May 29 — Tennessee Orchard Show, Jack Flippin's Fruit Farm, 3734 W. Shawtown Road, Troy, TN 38260. For more information, call Dave Lockwood at 901/974-7208 or Flippin's at 901/538-2933.

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

June 7-9 — Wine and Juice Production and Practical Monitoring Workshop. A regional meeting of the American Society for Enology and Viticulture/Eastern Section. Holiday Inn Dulles, Dulles, Virginia. Contact Cynthia Wood at 209-278-2089 for more information.

June 10 — Blueberry Growers of Indiana Summer Meeting. Pruitt's Farm, Wheatfield, IN. Contact Pat Goin 219/896-2283.

June 23-26 — Kentucky and Tennessee Cooperative Summer Apple Tour. Contact Jerry Brown 502/365-7541 ext.204 for additional information.

June 23 — Indiana Winegrowers Guild Summer meeting and vineyard tour. Chateau Pomije Winery, Guilford, IN. - Contact Bruce Bordelon 765-494-8212.

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).

July 9-11 — American Society for Enology and Viticulture/Eastern Section Annual Meeting and Riesling Symposium, Corning, NY. Contact: E. Harkness, Dept. Food Science, Smith Hall, Purdue Univ. W. Lafayette, IN 47907-1160, Phone 317-494-6704, FAX 317-494-7953 Email: Harkness@foodsci.purdue.edu.

July 23 — Commercial Apple IPM Meeting, Robert Rudd's Orchard, East Bernstadt, KY (Laural county). Contact Jerry Brown 502/365-7541 ext.204 for additional information.

July 24 — Robinson Substation Field Day, Quicksand, KY. Contact Terry Jones 606/666-2438.

August 4-6 — Grape Vineyard and Winery Tour. See article above.

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