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**FFF00-05**  
**May 3, 2000**

**Crop Conditions:** In southern parts of the state, petal fall on apples has come and gone, and fruit are up to about the 12 mm stage of growth. Here in Lafayette we are approaching petal fall on most varieties and full bloom in the north. Pollinating conditions in most places have been reasonable with some good bee activity observed. Peaches are done flowering across the state and crops are variable. Some growers are reporting total crop loss due to the early April freeze, whereas others are looking at good crops. Grapes in southern areas are at the 4-6 inch shoot stage and some minor damage occurred from recent frosts. Strawberries are in full bloom in central and northern areas. Strawberry and blueberry growers in northern Indiana have experienced several late frosts and freezes, 3 last week. Most are irrigating for frost protection. Now that May has finally arrived, the chances of damaging frost are fairly low for most parts of the state.

**Frost Damage and Thinning:** Now that the flowers are open, it's much easier to see the state of the crop. In many cases, severely damaged flowers won't open at all, and many are surprised to see so many healthy open flowers. Look carefully at the open flowers to check that the pistils look green and healthy. The pistils (stigma, style and ovary) are the thread-like structures in the center of the flower. These are the female parts and the pollen is transferred to these by the bee (or other pollinator) and the pollen grains grow down the style to reach the ovary where it fertilizes the egg and forms seeds. If any part of the pistil is damaged, the bee can do its thing and transfer the pollen, but the pollen can't grow down to fertilize the egg so the job just doesn't get done. Look carefully at open flowers to check that the pistil is green and not brown.

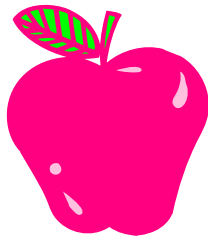
Around the state, damage on most varieties is limited – remember even 10% of live buds can result in a full crop. Red Delicious seem to be the worst affected, with significant damage in some places. Many have lost their king blooms but probably have enough surviving side blooms to carry a crop. Mutsu are also badly damaged

OK, so you have some damage and need to make a thinning decision – what do you do? Well assuming you have some frost damage, this effectively

achieved some early thinning. Many across the state have seen heavy fruit drop this year, so I'd suggest holding off on your thinners for a while yet to see what sticks, and then try a late application of Sevin or NAA if needed. Although you'll often hear me talk about being more aggressive with your thinning, this is not the year to do it – the freeze has been aggressive enough!

**Powdery Mildew of Apple:** This fungus overwinters as mycelium in the terminal buds. Although the disease is present every year, it is more prevalent during years when weather is dry and the previous winter has been mild. Keep a close watch for the first symptoms of powdery mildew, especially on those inner, shaded, water sprouts. Growers of mildew susceptible varieties, eg. Jonathan, Rome Beauty, Ida Red (my favorite disease apple), Cortland, etc. should be especially diligent in their watch for mildew. Apple fruit can become infected with mildew at pink. Fruit infections become evident later in the season, as netlike russet lines on the fruit surface. The tight cluster, pink, bloom, petal fall and first cover sprays are most critical for controlling mildew, but fungicide protection is needed until terminal buds are set. Your best mildewcides are the SI fungicides (Bayleton, Nova, Rubigan and Procure) and the new strobilurins, Sovran

and Flint. Good old captan, Vanguard, Polyram and mancozeb products do not provide adequate control of powdery mildew. -*Pecknold*



***Nova, Procure & Rubigan Resistance:*** Speaking of Nova, Rubigan and Procure. A number of commercial Indiana apple growers have been using sterol inhibiting (SI) fungicides (Bayleton, Nova, Procure and Rubigan) for 7 years... or more. As reported last year, research out of Geneva, New York, indicates that in orchards where SI fungicides have been used for 7 to 8 years there is a significant increase in the potential for strains of the scab fungus resistant to SI fungicides to be present. The researchers, Drs. Koller and Wilcox, ask the question: "Where do we stand right now on SI resistance to registered SI fungicides in New York apple orchards?" Their answer is as follows:

- SI resistance has increased in New York over the past 10 years, but in most orchards, resistance remains at a low and manageable level. In the vast majority of commercial orchards, SIs will remain effective, if they are used carefully according to the "rules."
- The first rule. Use full rates of the SI. Do not "cheat" on the rate, the coverage, or the spray intervals. Alternate row-middle spraying may spell disaster with the SIs. Using full rates is even more important with continued use and as the scab fungus becomes less sensitive.
- The second rule: Mix the SIs with a protectant.

Proper use of SI fungicides is becoming even more important the longer we continue to use them.

***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, "2000 Indiana Commercial Tree Fruit Spray Guide", for further information. -*Pecknold*

***Codling Moths:*** In Lafayette, I reached biofix in my codling moth pheromone traps on April 24. This is 9 days earlier than last year. Remember that biofix is

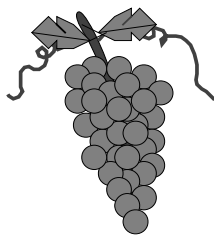
defined as the first sustained catch of moths, which we have established as when 5 moths have been caught in a pheromone trap. I have now started to accumulate heat units to estimate when the first eggs should begin to hatch and, therefore, when I should apply my first insecticide spray for codling moth control. See the April 5 issue of Facts for Fancy Fruit for instructions on calculation of heat units for codling moths. -*Foster*

***European Red Mites:*** Shortly after petal fall, growers should begin looking for European red mites in those block 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 is 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*

***Eastern Flower Thrips:*** Strawberry growers should be scouting for Eastern Flower Thrips in blossoms and on developing fruit. Scout closely for this pest. As you may recall, Eastern flower thrips have been a serious problem across the Midwest off and on since 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 complete information regarding this pest. -*Foster*

***Grape Spray Recommendations:*** The following is a small part of an article written by Wayne Wilcox, Cornell University plant pathologists, for the Finger Lakes Vineyard Notes Newsletter. It is applicable to Indiana and other areas of the Midwest. The differences

are that the Midwest probably has less powdery mildew pressure, and more black rot and downy mildew pressure than New York, and the use of sulfur for powdery mildew control. Many French hybrid and American varieties are sensitive to sulfur (phytotoxicity) especially if the temperature is above 85°F. I suggest trying sulfur on a few vines before spraying the whole vineyard. If in doubt, leave it out. -Bordelon



From Finger Lakes Vineyard Notes, April 5, 2000: We all know that there are many good programs for controlling these diseases. Here are a few considerations. As always, just because it isn't listed here doesn't mean it's a bad idea. Only products currently labeled in NY State are listed. Readers in other states (such as Indiana) have the option of substituting Elevate into the mix for Botrytis control.

1-INCH SHOOT GROWTH. A **Phomopsis (Ph)** cane and leaf spot spray may be warranted if wet weather is forecast and the training system or recent block history suggests high risk. Option A: Nothing. Option B: Captan or mancozeb.

3-5 INCH SHOOT GROWTH. A traditional time to control **Ph** shoot infections; early rachis infections also can be important under rainy conditions, once clusters emerge. Time to start control of **powdery mildew (PM)** on *vinifera* varieties if temps consistently remain above 50°F; also in highly susceptible hybrid blocks if crop value justifies it. A possible time to experiment with "alternative" PM materials (salts, oils) if you're so inclined. **Black Rot (BR)** control is seldom justified unless you're trying to clean up a problem block AND weather is wet. Option A: Nothing. Option B: Mancozeb (BR, Ph). Will also control angular leaf scorch (**ALS**) on susceptible varieties if very wet. (Note: ALS has not been observed in Indiana.) Option C: Captan (Ph). Easier on predator mites than mancozeb (or ziram), but not as effective against BR (not usually an issue this early). Option D: Nova or Elite (PM, BR). Use 3 oz/A for economy with so little foliage now. Option E: Rubigan (PM). At 2 fl oz/A, cost is only about \$4. Cheaper than Nova and Elite, especially if BR control isn't an issue. Option F: Sulfur (PM). Not very active at temps below 60°F, but neither is the PM fungus. Doesn't control other diseases. Option G: JMS Stylet Oil (PM). Should eradicate young infections IF thorough coverage is provided. Can use with mancozeb

(or ziram), but not with captan (phytotoxicity). Option H: eKsPunge (PM). Should eradicate young infections IF thorough coverage is provided. Option I: One of the PM products plus mancozeb or captan for Ph.

10-INCH SHOOT GROWTH. Traditionally, we've recommended not to wait any longer to control **BR**. Continued experience tells us that this recommendation is conservative (the spray generally isn't needed) unless BR was a problem last year and/or weather is unusually wet. Don't wait any longer to control **PM** on susceptible varieties (but wait until immediate prebloom on Concord). One of the best times to use an SI, but these aren't the only options. **DM** control will be needed on highly susceptible varieties if disease was prevalent last year and rains of at least 0.1 inches at temps >50°F occur. Rachis infections by **Ph** are a possibility, particularly if weather is wet and inoculum is present. Option A: Abound, Sovran, or Flint (PM, BR, some Ph; also, variable DM [Abound, excellent; Sovran, fair to good; Flint, poor to fair]. Not the most efficient time to apply these expensive and limited-use materials unless disease pressure is high. Option B: Mancozeb (BR, Ph, DM, ALS). A broad spectrum, economical choice if PM isn't a serious concern. Or tank mix a PM material. Option C: Nova or Elite (PM, BR). Option D: Rubigan (PM). No BR but cheaper than Nova and Elite. Option E: JMS Stylet Oil (PM). *If (and only if) coverage is thorough*, this spray should eradicate early PM colonies that may be starting because previous PM sprays were omitted. At a retail cost of \$11/gal, a use rate of 1% (1 gal oil / 100 gal water), and 50 gal/A spray volume, cost is about \$5.50/A. But don't waste your money if you can't cover thoroughly. Also may help with mites. Option F: sulfur (PM). Reduced activity at low temperatures is still an issue at this time of year. Option G: eKsPunge (PM). Short residual activity, but has eradicated activity against recent infections. Same need for thorough coverage as JMS Stylet Oil. Option H: Mancozeb (BR, Ph, DM, ALS) + a PM material (SI fungicide, sulfur, JMS Stylet Oil, eKsPunge). Choose PM material based on previously-discussed characteristics and cost.

IMMEDIATE PREBLOOM (OR VERY EARLY BLOOM). **A critical time for PM, BR, DM, and Ph (rachis and fruit infections).** Also important for ALS on susceptible varieties. A good time to use a strobilurin on PM susceptible varieties. **This and the first postbloom spray are the most critical sprays of the season—DON'T CHEAT ON MATERIALS, RATE, OR COVERAGE!** Option A: Abound, Sovran, or Flint (PM, BR, some Ph; also, variable DM [Abound, excellent; Sovran, fair to good; Flint, poor to fair]. The best choice if SIs have been used for a number of years against PM, particularly if multiple disease control is needed. May provide some Botrytis control if a wet

bloom period. Option B: Nova, Elite, or Rubigan + mancozeb (PM, BR, Ph, DM). Nova and Elite are the biggest guns against BR, so might be the best choice if pressure is high and BR control is more important than PM. (Note: This is the situation in Indiana) Nova and Elite provide postinfection activity against BR if significant unprotected infection periods occurred within the previous 4 days. Rubigan is (was?) cheaper than Nova or Elite, but doesn't provide the same BR control; however, mancozeb should be adequate if postinfection control isn't required. Option C: Mancozeb + sulfur (PM, BR, Ph, DM). Cheap and reasonably effective but not the strongest choice at a time when the strongest choice is most justified.

**BLOOM.** Rovral or Vangard (or Elevate in Indiana) for Botrytis control may be beneficial in certain years, particularly in problem blocks if weather is persistently wet. Abound, Sovran, or Flint applied recently may be adequate.

**FIRST POSTBLOOM** (10-14 days after immediate prebloom spray). **Still in the most critical period for PM, BR, DM, and Ph (rachis and fruit).** Same considerations and options as detailed under IMMEDIATE PREBLOOM. Juice grape growers (and Indiana growers under our Sec. 24 Special Local Needs label) can substitute Ziram (very good BR and Ph, only fair DM) for mancozeb if necessary.

**SECOND POSTBLOOM.** **BR** control still may be needed if disease was present last year and a spray is strongly recommended if berry infections are evident this year, particularly if weather is wet. Fruit are less susceptible to **PM** now, but *vinifera* varieties (and susceptible hybrids?) still need PM protection, particularly on varieties susceptible to PM. Avoid SI fungicides if more than a little PM is easily visible. **Ph** danger is mostly over unless very wet. Primary **DM** should be over, but continued protection may be needed on susceptible varieties if weather is wet, especially if disease already is established. Option A: Abound, Sovran, or Flint (PM, BR, some Ph; also, variable DM [Abound, excellent; Sovran, fair to good; Flint, poor to fair]. Provides good residual control of the listed diseases if used now. May provide some Botrytis control as bunch closure approaches. Option B: Nova or Elite (BR, PM) + captan or mancozeb (66-day preharvest restriction) if DM and Ph control are needed. Option C: Rubigan (PM) + either (a) mancozeb (if more than 66 days before harvest) for BR, DM, and Ph; or (b) captan (DM, Ph, some BR); or (c) ziram (BR, Ph, some DM). Option D: Sulfur (PM) + either (a) mancozeb (if still allowed) or (b) captan. In most years, lessening disease pressure makes this economical option increasingly practical as the season progresses. Option E: Copper + lime (PM, DM). Adequate for Concord, not

enough PM control for *vinifera* and susceptible hybrid varieties.

**ADDITIONAL SUMMER SPRAYS.** Check the vineyard regularly to see what's needed, the main issues will be **PM** and **DM**. On *vinifera* and other cultivars requiring continued **PM** control, use sulfur as an economical choice to maintain control; SIs and strobilurins are options if they haven't been overused earlier AND little disease is evident. Both provide the advantage of longer residual activity than sulfur, especially in wet weather. Copper + lime will work for Concord. For **DM**, copper + lime or captan are economical standards; Abound is a viable option if general disease pressure or other conveniences justify its cost; Ridomil can be used in case of emergency. **BR** should not be an issue after the second post-bloom spray, except in unusual circumstances (disease is established in the clusters, wet weather is forecast, and it's possible to direct sprays onto the clusters). **Ph** should not be an issue.

Note: The following is a short synopsis of Wayne's comments on Botrytis control.

#### **BOTRYTIS SPRAYS:**

Botrytis bunch rot is most commonly a problem on tight-clustered French hybrid and *Vitis vinifera* cultivars. Proper timing and thorough spray coverage are essential for good control. Removal of leaves around clusters on mid- or low-wire cordon-trained vines before bunch closing has been shown to reduce losses caused by *Botrytis*. Direct the spray toward the fruit zone, and use a minimum of 100 gal/A of water.

There are several new fungicides for Botrytis on the market. This is great news because resistance to Rovral has been showing up. Don't forget, however, that even the best fungicides is only a complement to the various cultural control practices that promote air movement around the clusters and help expose the fruit to sun and air.

#### **Timing:**

There are four application times: 1. early to midbloom; 2. prior to bunch closing; 3. veraison (beginning of fruit ripening); 4. prior to harvest if needed.

Do not make more than 4 applications of these materials per season.

Traditionally New York recommendations for timing Botrytis sprays have emphasized the importance of veraison and preharvest periods. Whereas these recommendations were based on sound field data, they tended to ignore the potential importance of infections occurring during the bloom and or bunch closing periods, which are considered to be important in other parts of the world.

We have found benefit from applying sprays during bloom and bunch closing in 4 of the last 6 years of field trials in the Finger Lakes; when directly compared in 1998 and 1999, these two sprays were as effective as the veraison plus preharvest combination. In a Long Island trial, Alice Wise had only 6% infection of Chardonnay clusters when Vanguard was applied at bloom plus bunch closing, versus 46% infection in unsprayed plots. (This is even though there were only three rain events totaling 1.0 inch from the bloom spray through 2 weeks after bunch closure spray, versus eight rain events totaling 9.7 inches between veraison and harvest). Furthermore, when we inoculated Pinot noir clusters in Geneva at 90% bloom, the pea-sized berry stage, or at bunch closing last year, virtually all berries developed latent dormant infections, and 14-20% of them activated into visible gray mold at harvest.

Collectively these data suggest that we probably have under emphasized the importance of early season Botrytis infections, although there is still a lot of mystery as to when and why such latent infections turn into rotten berries at harvest. Nobody wants to spray four times per year to control Botrytis for obvious reasons. Nevertheless, it appears that the fungicidal protection during the bloom through bunch closure period may be appropriate under "certain conditions" (yet to be determined)

**June 5-7 - Heartland Wine School**, Ohio State University, Columbus, OH. The Heartland Wine School is a joint project of Purdue University, Michigan State University, and the Ohio State University and was created in response to requests for a regional opportunity to train winery personnel in classic wine making principles. Extensive tasting sessions will complement the presentations. Register early to be sure your place is guaranteed - space is limited and will be allocated on a first-come-first-serve basis. To obtain a registration packet contact Roland Riesen, OARDC, Department of Horticulture and Crop Science, 1680 Madison Ave., Wooster, OH 44691. Phone 330/263-3685. E-mail:riesen.1@osu.edu



**Coming Meetings:**

**May 3** – Eastern Indiana Horticultural Society meeting, Muncie. Contact Harold Brown (765-747-7732).

**May 9** – Twilight meeting. LaPorte Co. Ken Williams orchard, 6.30 pm. Contact Walt Sell (219-326-6808 ext. 271).

**May 16** – Twilight meeting, North east fruitgrowers, 6.00 pm. Contact Ricky Kemery (219-481-6826).

**June 5-7** – Heartland Wine School, Ohio State University, Columbus, OH. Contact Roland Riesen, OARDC/OSU Phone 330/263-3685. E-mail:riesen.1@osu.edu

**June 6** – Eastern Indiana Horticultural Society meeting, Muncie. Contact Harold Brown (765-747-7732).

**June 27-28** – Indiana Horticultural Society Summer Meeting. Write these dates on your calendar – more details to follow.

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