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Crop Conditions: Apples range from early bloom in the north to petal fall in the southern parts of the state. A recent frost event has caused some damage on apples, peaches and strawberries around the state. See article below on frost damage.

Frost Damage: Low temperatures on the evening of Tuesday April 22 have caused damage to fruit crops around the state. Many parts of the state experienced minimum temperatures of 28-30 which is unlikely to have caused significant damage for the fairly short duration that the cold seems to have lasted. Some areas around Indianapolis reached around 25 F which is likely to cause damage to both apples and peaches, but would be unlikely to result in economic losses. What I mean by this is that it will have done some thinning for you but probably not reduced your crop too much. The amount of damage depends on the temperature, the duration it was cold, and the stage of flower/fruit development. If pollination has already occurred then the cold damaging the surface of the stigmas won't matter but obviously if pollination hasn't happened yet this will cause a lot of damage. Wait a few days for damaged tissue to turn brown before cutting flowers/fruit to assess damage. I have two other things for you to consider. First, the temperature at your site may have been different to those reported at weather stations

around the state, and second, it's only April still and we're not out of the danger period yet.

OK so what can you do? Not too much but if you think the bloom has been damaged then a foliar nitrogen application may be useful in helping perk up the leaves and helping remaining bloom to set. An application of about 3 lbs urea/100 gal at about petal fall should help in this regard (Hirst).

2003 Agricultural Assistance Act: Since passage of the bill, the U.S. Department of Agriculture (USDA) has set payment limitations at \$80,000 per producer. The sign-up period begins June 6, 2003. For more detailed information, refer to USDA's Disaster Assistance Web site <http://disaster.fsa.usda.gov/>. We also strongly encourage you to contact your local Farm Service Agency agent. Some key points are:

- Growers to choose disaster coverage for the 2001 OR 2002 crop.

- All growers and all crops, meeting certain requirements, are eligible for disaster payments. The amount of federal money available for payments is not limited to the original \$3.1 billion estimate.

- Loss Coverage: Quantity and quality losses are covered.

- Quantity: A grower must lose 35 percent of his/her crop to be eligible.

- Quality: A minimum of 20 percent quality loss must occur to be eligible.

- Payment Rate: Up to 65 percent of average production times:

- 50 percent of applicable crop price for producers who bought crop insurance or for which crop insurance was not available.

- 45 percent of the applicable crop price for producers who did not buy available crop insurance.

- Growers who receive disaster payments on a specific crop and did not have crop insurance (including CAT), if available, must purchase crop insurance (above CAT), if available, for that crop for the 2004 and 2005 crop years. Violators must reimburse the U.S. Department of Agriculture for the full amount of the disaster assistance provided.

- Payment limitations:

Together, the value of any crop that was not lost, crop insurance payments and disaster payments may not exceed 95% of what the value of the crop would have been without disaster. AMLAP payments are NOT counted toward the 95% payment limitation, since they are for previous crop years.

Payments are limited to \$80,000 per producer. Persons with gross revenue exceeding \$2.5 million are ineligible for program benefits.

- The bill will be paid for through spending reductions in conservation provisions of the farm bill.

Sign-up begins June 6, 2003 for the Crop Disaster Program. See your local FSA office to participate, or for additional details. (Hirst, - from US Apple Association)

Washington Apple Commission Folds: The Washington Apple Commission has decided to

fold, following its legal defeat over the constitutionality of its marketing and promotion program. The commission ceased collecting mandatory assessments on March 31, the day of the judge's ruling. The release did not report what commission assets would go toward repayment of assessments to growers since the lawsuit was filed. The commission will pay for no more marketing activities. (from The Fruitgrowers News).

Commercial Tree Fruit Spray Guide Correction:

An error has been discovered on page 7 of the 2003 Commercial Tree Fruit Spray Guide. Data in the table was shifted out of line. You can download a corrected page in the pdf format for insertion in your spray guide: <http://www.ag.ohio-state.edu/~ipm/fruit/page7.pdf>

Calculating Degree Days - Codling Moths:

One way to improve your control of codling moths is by timing your sprays using pheromone trap catches and degree-days. This is especially important if you are using some of the insect growth regulators such as Intrepid or Esteem.

The first thing you should determine is your biofix. Biofix is defined as the first sustained catch of moths, which we have established as when 3-5 moths have been caught in a pheromone trap. Knowing that the moths are flying allows us to predict when the eggs will hatch with more certainty than using calendar date or the stage of growth of the apple trees. The instructions for calculating degree-days follow.

1. Find the high and low temperature (Fahrenheit) for the day. If the high temperature is less than 50, then you will not accumulate any degree-days for that day. If the high temperature is above 50 and the low temperature is less than 50, use 50 as your low temperature. (Notice that this is a change from way I told you to calculate degree days last year.)
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 degree-days. Codling moths don't develop below 50 F, so we are only interested in temperatures above their developmental threshold.
4. Add the day's degree-days to the previous total to get the updated accumulated degree-days. (On the first day you will be adding to zero.)

When you have accumulated 150 degree-days, it is time to spray. (Again, notice that the number of degree-days required for a spray is lower than what I told you last year.) 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. (Foster).

Controlling Codling Moths Without Using OPs:

A number of apple growers are looking for insecticides other than the organophosphates such as Imidan and Guthion to control codling moths. This desire to change is motivated by restrictions on the use of those products, concern about worker safety or pesticide residues, and probably most commonly, because it appears that codling moths in some locations are resistant to Imidan and Guthion.

There are several possibilities available for codling moth control. I will attempt to share with you what I know about some of the alternatives.

- **Danitol** – This pyrethroid insecticide is different than other pyrethroids in that it gives some control of European red mite without much toxicity to predator mites. However, in my trials it has given disappointing control of codling moth. Some of my colleagues have gotten good results with Danitol.

- Insect growth regulators – The three commonly available insect growth regulators are **Confirm**, **Intrepid** and **Esteem**. I would recommend forgetting about Confirm. Intrepid is manufactured by the same company (Dow AgroSciences) and is a better product. When used twice per generation with another insecticide used between generations, I have seen good results with this product. Some growers have had less than satisfactory results, however. I have the most hope for Esteem among the insect growth regulators. In my limited experience with it, Esteem has provided reasonably good control of codling moth, and it also controls several other pests.

- **SpinTor** – Also available as an organic formulation (Entrust), this product has had mixed results. Sometimes the control is quite good and sometimes not so good. Several of my colleagues from neighboring states don't think much of SpinTor at all. If you are trying to grow apples organically,

Entrust is the best option you have. If you are a conventional grower, I would only test SpinTor on limited acreages.

- **Avaunt** – This product from DuPont has not been outstanding in any of my trials or those of my colleagues. It does control codling moths, but never seems to be better than mediocre.

- **Assail** – This insecticide is from the neonicotinoid family, meaning it is similar to Provado, but with a broader range of control. My colleague, Bruce Barrett from the University of Missouri, tested Assail last year and got control as good as Imidan and Guthion. Unfortunately, I will test this product for the first time this year. At this point, Assail appears to be the alternative insecticide that has the greatest potential for providing control that is comparable to the organophosphates. If you must use an alternative this year, I strongly recommend that you give Assail a try. If Imidan and Guthion are still working well for you, I encourage you to conduct your own on-farm trial with Assail this year to see how it compares for you.

This season, my colleagues from Ohio State University, University of Kentucky, University of Illinois, University of Missouri, and I are all conducting identical trials on all of these products, in addition to a few others so that we can make better decisions about how these products work. I will update you as we learn more. (Foster).

Getting the Most out of Glyphosate and other

Sprays: Fruit growers often apply a post-emergent herbicide beneath the tree or vine row in spring to control winter annuals and other weeds. A pre-emergent herbicide may be included in this application. Glyphosate (Roundup) is a post emergent systemic herbicide that is widely used for this first weed spray. In order for glyphosate to be effective, it needs to be absorbed into the plant. In soft water glyphosate has no problems in being absorbed. However in hard water glyphosate will be 'tied up' and not absorbed as readily. Hard water, common in many parts of Indiana, contains high concentrations of soluble salts, calcium and magnesium. When these cations are present they react with the negatively charged glyphosate to form compounds that are not readily absorbed by plants. This results

in poor uptake and poor weed control. The solution to the hard water problem is to add ammonium sulfate to the spray water **before** mixing with glyphosate. Ammonium sulfate ions tie up the calcium and magnesium ions forming conjugate salts. Additionally, some of the glyphosate reacts with ammonium to form a compound that some weeds preferentially absorb. Follow the Roundup label recommendations on the amount of ammonium sulfate to add. Another problem associated with spray water quality is that many fungicides and insecticides break down quickly in high pH water. Captan, Imidan, malathion, and Omite are examples of compounds that are especially vulnerable to alkaline hydrolysis. Both the Commercial Tree Fruit and Small Fruit and Grape Spray Guides have a discussion of spray tank pH. Briefly, addition of about 2 ounces of food grade citric acid per 100 gallons of water will lower the pH from about 8.0 to about 5.5. (Bordelon)

Early Grape Sprays: Grapes are at budbreak to 2 inch shoots in Lafayette and further ahead in southern areas. Growers should make their first fungicide application soon. This early spray (1- to 3 inch shoot) is primarily for Phomopsis cane and leaf spot, so mancozeb or captan are effective materials. Because these materials are protectants, they must be applied prior to infection periods, so growers should spray before any forecast rains occur. Over the next two weeks shoots should double in length and addition of one of the sterol inhibitors (e.g. Nova, Rubigan, etc.) should be considered for control of black rot and powdery mildew. The most important sprays of the year for fruit rot control are the sprays surrounding bloom. Plan now to have one of the strobies on hand for those sprays. Refer to the Commercial Small Fruit and Grape Spray Guide (www.hort.purdue.edu/hort/ext/sfg) and the Midwest Small Fruit Pest Management Handbook (www.ag.ohio-state.edu/~sfgnet/) for complete discussions of grape IPM. (Bordelon)

Strawberries and Botrytis Fruit Rot: The most important sprays for control of Botrytis fruit rot (gray mold) 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 and

Rovral can no longer be used on strawberries. Elevate received registration in 2000, and Switch received registration in 2002. Both should provide excellent control of gray mold. So, the options for Botrytis control are Elevate, Switch, Benlate, and Topsin M. None of them 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, 2003 Indiana Commercial Small Fruit & Grape Spray Guide, (www.hort.purdue.edu/hort/ext/sfg) and the Midwest Small Fruit Pest Management Handbook (www.ag.ohio-state.edu/~sfgnet/) for complete discussions of strawberry IPM. (Pecknold and 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. These winds may blow eastern flower thrips to Indiana from southern areas. It would be prudent for strawberry growers to watch for thrips as we approach bloom. We recommend looking at the early flowers, especially on early varieties. Although an exact threshold has not been established for Midwest conditions, data from elsewhere suggest that control is warranted if counts exceed 2 to 10 thrips per blossom. This is a wide range, but more precise information is not available. Lorsban or Thiodan are probably the best choices among conventional insecticides, and Brigade and Danitol or SpinTor also are likely to work well. Growers may also want to consider using an insecticide containing neem extracts (Align or Neemix) that is less toxic to bees. (Foster and Bordelon)

Fire 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. Streptomycin is most effective when applied the day before or the day of an infection event. The "MARYBLYT" computer software program will help you in determining when and if an infection event oc-

curred as well as predict the risk for future infection periods. We strongly recommend its use for those growers at high risk. Speaking of high risk, be especially diligent in your fire blight program if you have blight susceptible varieties (Ida Red, Jonathan, Gala, Rome, Lodi, etc.) in combination with M.26, M.9 and/or Mark rootstocks and/or interstems. These DYNAMITE combinations have the potential to explode into rootstock blight, which usually means a dead tree! (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 Strobilurins. (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 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 previous field trials indicate that Sovran, applied at the full rate, will provide 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 lets use them when they will do the most good and hopefully avoid future resistance problems. (Pecknold).

Specialty Crops Marketing Position at Purdue:

As many of you know, we are currently seeking to fill a new faculty position in specialty crops marketing at Purdue. We have completed the interview process for the three candidates we brought in and the search committee will meet next week to discuss the merits of the candidates. A number of industry representatives were involved in the interview process and met the candidates. For those people, we really want your input, so if you have not done so already, please communicate your thoughts and impressions either to Peter Hirst or to Ed Ashworth (phone 765-494-1306 or email: ashworth@hort.purdue.edu).

Upcoming meetings:

May 22. LaPorte County twilight meeting. Garwood Orchard. Contact Walt Sell, LaPorte County Extension Educator. Email walt.sell@ces.purdue.edu, Phone 219-326-6808

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