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### ***Crop Conditions:***

Early apples are being harvested and quality is looking good. Many growers are finding some hail damage. We are about normal regarding the harvest schedule, with Gala harvest 2-3 weeks away for most growers. Bird damage is severe in some areas. Excessive temperatures are negatively affecting berry harvest. Fruit tend to be soft with reduced flavor. Blueberry and blackberry harvest continues. Grape harvest should begin by mid-August in the south.

***Determining Apple Maturity:*** Making the decision on when to harvest can be a very tricky and complicated issue. The longer you intend to store the fruit, the more precise your timing needs to be. For summer apples, most growers only intend to store them until their better quality fall apples come on stream, so storage times beyond a week or two are not that common. Even for fall apples, many growers aim to sell the majority of their crop immediately to the consumer, and try to be done by mid November or so. So since storage times are relatively short, harvest maturity is less important. This being the case, harvest apples when fruit are fully ripe. There are various tests for this, but taking a bite out of a few apples is just as good an indicator as any test. This also applies to apples intended for U-pick.

Bear in mind that even in cold storage, fruit continue to ripen, just at a slower rate. Therefore, fruit intended for longer term storage should be harvested when they are less ripe. There is no single test that will give you the answer but factors such as calendar date, heat unit accumulation, fruit firmness, soluble solids concentration, starch content and ethylene evolution all give answers to a piece of the puzzle. As you can see, this gets complicated real fast. Beyond the taste test, if you are going to perform one test I suggest looking at starch index. This gives an estimate of how much of the starch in the apple has been converted to sugar. This test is quick, easy, and doesn't require expensive equipment. For more details look in the Tree Fruit Pest Management Handbook, ID-93, available at <http://www.hort.purdue.edu/fruitveg> under bulletins. (Hirst)

**Timing Retain Sprays:** ReTain (AVG) is a plant growth regulator that blocks the production of ethylene. When ReTain is applied to apple, several ripening processes are slowed, including preharvest drop, fruit flesh softening, starch disappearance, and red color formation.

In order for ReTain to be effective, it must be applied well in advance of the climacteric rise in ethylene production that signals the onset of fruit maturity. If applied too early the effects may wear off prematurely. If applied too late, a significant portion of the crop may not be responsive to AVG, having already begun to produce autocatalytic ethylene. A second reason for avoiding late applications of ReTain is the 21 day preharvest interval (PHI), which, combined with a late spray date could result in an undesirable delay in harvest.

The label recommends applying ReTain four weeks before anticipated harvest (WBH). This has sometimes caused confusion, as the grower is timing the spray relative to some future, unknown date. A more scientific basis for timing would be to state that ReTain should be applied four weeks before the natural climacteric rise in fruit ethylene, but this is still a future event with an element of uncertainty. The good news is that there is a fairly wide window when ReTain can be applied with optimal results, and a fairly easy way to determine when to apply it.

The best application window for ReTain is about 10 days wide and centered on the 4 WBH date. For early season varieties, such as Gala and McIntosh, start by estimating when you would normally expect to begin harvesting the variety if no ReTain or ethephon (Ethrel, Ethephon II) were used. Now take into consideration the season. Adjust the anticipated harvest date according to how early or late you estimate the season is, and then count back four weeks on the calendar. Now mark the calendar from that date through the next seven days. This is your application window for that early season variety.

Watch for good spray conditions with at least six hours drying time within that week and apply the material at the first opportunity. Congratulations! Your ReTain is on at the right time.

Now mark your calendar for 21 days after the spray was applied. This is the PHI, as required by the label. You can't legally harvest before this date.

Repeat the same thought process for later varieties, but keep in mind that later varieties are usually less affected by seasonal variation in maturity than stone fruits or early apple varieties. It is usually unnecessary to account for seasonal variation in fruit maturity for Empire and later varieties. (Dr. Jim Schupp, The Fruit Times, Penn. State University)

**ReTain use on Apples in Stress Years:** ReTain is a very useful growth regulator on apples that has the following benefits. It will:

1. Delay fruit maturity of any variety.
2. Decrease fruit drop.
3. Improve the condition of treated fruit in storage.

ReTain needs to be applied 30 days before anticipated harvest to achieve the best results and highest effectiveness of the material. Full rate ReTain will delay maturity of most varieties seven to ten days and some very sensitive varieties up to 21 days. Gala and Jonagold are very sensitive to ReTain. Honeycrisp appears to be moderately sensitive and other varieties are less sensitive but still respond to the ReTain treatment. Some growers will use half rate on Gala, Jonagold and Honeycrisp because of the sensitivity, but realize that this also will reduce the response.

ReTain will delay harvest, reduce fruit drop, improve storage condition life and sometimes increase fruit size if the fruit hang long enough. The delayed maturity is very useful to pick-your-own operations. The delayed ma-

turity extends when varieties are available for customers to pick in excellent condition.

Large growers can use ReTain to help program harvest. For example, if a grower has large acreages of one variety like Red Delicious, then a portion of the Reds can be treated with full rate Retain to reduce drop and delay maturity. Another portion of the Reds could be treated with half rate to only slightly delay maturity. This will allow the picking to be more orderly, resulting in less drop and all the Reds will be picked in excellent condition.

ReTain is a helpful growth regulator with benefits to small and large growers. Time the applications 30 days ahead of anticipated normal harvest and then plan on picking treated fruit later than normal.

Stressful years: Apple trees under stress do not respond well to ReTain treatments. Hot, dry years seem to reduce the ReTain response. In those situations where trees' stress is a factor, consider not applying ReTain or use the higher rate. One third and half rate will not provide good results on stressed trees. ReTain is also more effective when applied closer to 28 days before harvest rather than 30 to 35 days before anticipated harvest. (Philip Schwallier, Michigan State University)

**Control of Preharvest Drop with NAA:** The traditional material used for stop drop control on apples is NAA (Fruitone N), a synthetic auxin. Other synthetic auxins you may have heard of include 2,4-D and 2,4,5-T. Of course you also know Fruitone N as a chemical thinner. Early in the season NAA knocks them off and later towards harvest it sticks them on. This highlights the importance of timing when using plant growth regulators.

Another newer stop drop material is ReTain (see articles by Schupp and Schwallier in this issue). Although both NAA and ReTain can reduce preharvest drop, they do this in dif-

ferent ways. ReTain delays apple maturity whereas NAA does not delay maturity (and may even hasten it) but just reduces the fruit dropping. ReTain must be applied well ahead of the anticipated harvest date so a considerable amount of planning is required. NAA on the other hand needs to be applied just before apples start dropping, so in this regard can be viewed as a rescue treatment.

Once NAA is applied it takes about 3 days for the activity to kick in. After that you can expect about 7 days of drop control. Rates of 10-20 ppm are usually effective, but knowing exactly when to apply it can be tricky. If the application is made too soon, the effect may wear off before harvest is complete. If the NAA is applied too late, then too many apples will have dropped on the ground before the NAA starts having an effect. Wait until you start to see a few apples drop, and perhaps assist this by bumping a few branches and seeing if any apples drop. Then it's time to apply the NAA. Longer stop-drop control can be obtained with a split application, 10 ppm applied 7-14 days apart. NAA works best when the temperature is over 70F but the way the weather has been lately, this won't be much of a constraint. Be aware that high rates of NAA (20 ppm) can advance fruit maturity.

NAA can be tank mixed and is compatible with a wide range of products. Always conduct a small test before mixing NAA with materials you haven't tried previously. Apply in enough water to ensure good coverage. (Hirst)

**Black Rot and White Rot:** Got flags? You know, those branches that have bright yellow leaves that eventually turn brown, curl up, and die. These may be infected with *Botryosphaeria obtusa*, which causes black rot, or *Botryosphaeria dothidea*, the white rot cankers.

Black Rot is a fungal disease that can cause a fruit rot, frog-eye leaf spot, and a limb canker. Infected fruit becomes unmarketable, leaf

spotting can cause serious defoliation that weakens the tree, and as the pathogen travels from leaves into limb, cankers can develop and girdle and eventually kill entire branches. Around the canker, the bark is slightly sunken and reddish. These cankers can enlarge and girdle the limb, causing that flagging that caught your eye in the first place!

White rot, or Bot Rot, on the other hand, infects numerous woody plants including birch, chestnut, peach, and blueberry. Infections on twigs and limbs are developing as you read this, and originate around lenticels (little breathy holes in the bark), appearing as small, circular spots or blisters. Expanding lesions become depressed and ooze may appear around the blisters. Now is the time to figure out if you have black rot or white rot: Cankers stop enlarging by late fall and are indistinguishable from black rot cankers (caused by *B. obtuse*). Trees are predisposed to this disease by cold winters and drought stress.

**Management:** Sanitation! Removing mummies, and pruning out dead wood and cankers may reduce both the incidence and severity of the disease. As this is a pretty good saprophyte, sanitation entails that everything removed from the orchard be taken out and burned, or really removed—not put in a pile to burn or remove later. Fungicides are also key—Refer to the Commercial Tree Fruit Spray Guide for recommendations. Apple cultivars do not vary greatly in their susceptibility to black rot, but Golden Delicious, Empire, and Jersey Mac seem more susceptible to white rot.

**Fire Blight:** As I drive through Indiana, I can't help but notice all the fire blight in the landscape on ornamentals. However, I have heard very little about fire blight in the orchards. This must mean: a) Everyone has adopted a program of effectively pruning out strikes, using Apogee to reduce shoot growth, and excellent streptomycin management, coupled with fire blight resistant rootstocks; or b) You are really, really lucky; or c) The scab is so bad you

just don't care anymore; or d). Everyone has Garwood's Hail Canon; or e) Next year is going to be a humdinger. Only time will tell....

***Necrotic Leaf Blotch (NLB) On Goldens:***

As the weather gets hot, Golden Delicious' everywhere feel the need to shed their leaves. NLB symptoms include leaf yellowing and drop, with blotchy brown or green "lesions" on the veins. Symptoms develop suddenly, and the cause of NLB is not known; however, it is most severe when a cool, rainy period of 4 - 5 days precedes several hot, sunny days.

Even though no disease-causing agent is associated with the problem, when the dithiocarbamate fungicides ziram or thiram are used in the summer spray program, its severity is reduced. Foliar applications of zinc oxide also have been effective in reducing the severity of the disorder. (Beckerman)

***Brown Rot of Stone Fruits:*** For those of you lucky enough to have plums or peaches, and better yet, peaches without scab, or bacterial spot, you're not out of the woods yet! Warm, wet, humid weather is particularly favorable for brown rot, and under ideal conditions fruit infections can occur with only three hours of wetness when spore levels are high. Longer wet periods during infection result in shorter incubation periods so symptoms develop more rapidly. For those of you, where it isn't too late, pre-harvest sprays for brown rot should be started no later than 3 weeks before harvest or when fruit begins to color. For information on fungicides and timing of spray applications see ID-168, 2006 Indiana Commercial Tree Fruit Spray Guide (as the fungicides for plums and peaches are different). In addition to maintaining sprays for brown rot, also maintain sprays for insect pests that may injure fruit and allow brown rot to gain a foothold. Use care in the picking and handling of fruit to avoid punctures and skin abrasions. Any break in the skin of the fruit enables brown rot to more easily cause infection. This holds true for plums, too! (Beckerman)

***New Midwest Grape Production Guide Wins Award:*** The recently released Midwest Grape Production Guide (Ohio State University Bulletin 919) was selected by the American Society for Horticultural Science as the outstanding Extension publication for 2006. Released in 2005, this publication was a joint effort between specialists at Purdue University and Ohio State University. (Bordelon)

***Heat-caused Disorders:*** We have been receiving lots of reports of white druplet disorder in blackberries. In this disorder, some of the individual druplets on a berry remain white, and do not ripen normally. The affected druplets may be grouped or scattered randomly across the berry. This problem is caused by excessive heat and high sunlight intensity. It can occur in red raspberries and blackberries. It has been most prevalent in blackberries this season. Affected fruit can be sold for processing, but has reduced marketability as fresh fruit.

A very similar disorder occurs frequently in Concord grapes. Called “uneven ripening”, this disorder causes some berries in a cluster to remain hard and green while the rest of the berries ripen normally. In years with above normal temperatures, we have seen up to 25% of the berries affected. This problem occurs only on the Concord variety and is fairly common in southern Indiana. It is one of the main reasons that Concord grapes are not widely grown in the southern U.S. (Bordelon)

***2006 Produce Availability and Merchandising Guide Now Available:*** The Packer has distributed the 2006 Produce guide. This guide is a great resource for new fruit and vegetable growers as well as others who are transitioning into the industry. Information provided includes merchandising information by commodity, commodity availability by competing states, commodity promotion tips, food service recommendations, shipping requirements, USDA grades, common PLUs, handling (varies by commodity), nutritional facts, and ship-

pers by state. Select specialty crop information is also available. Other resources include food safety tips, food inspections, load compatibility, and a Red Book Buyers guide. The 2006 Guide is available online at <http://www.thepacker.com/TheGuide/TheGuide-home.asp> (Dennis)

***Understanding the Perishable Agricultural Commodities Act:*** Growers or other intermediaries that sell or ship produce should be aware of the Perishable Agricultural Commodities Act or PACA, a set of regulatory trade practices that was created in 1930. PACA is a law that enforces fair trading practices throughout the supply chain (i.e. growers, shippers, and buyers). The United States Department of Agriculture (USDA) is the enforcing agent examining shipper-related issues such as enforcing market contracts, fair business practices, and timely payment.

**Who needs a PACA license:** PACA affects almost all those who buy and sell produce within the fruit and vegetable industry. Intermediaries, resellers, as well as contractual buyers and sellers within the fruit and vegetable industry are required by law to have a PACA license. This license is an agreement indicating that all parties involved in fresh fruit and vegetable industry trade will follow the rules set forth from PACA.

There are only a few people that are exempt from carrying the PACA license including:

- Producers that sell only products they grow themselves.
- Retailers that purchase less than \$230,000 of fresh produce for retail sales in a calendar year.
- Truckers who only transport produce from one location to another, regardless of the product being traded intrastate or interstate.
- Food processors or others who transform products before it reaches the end consumer.

All other businesses marketing commercial quantities of fresh produce must have a PACA license. A fining policy is set up for those who are required to have a PACA license, but disregard the law.

How to obtain a license: PACA has a National Licensing Center in Virginia. For more information on how to obtain a PACA license, call 1-800-495-PACA (7222) or visit the website for a PACA application at <http://www.ams.usda.gov/fv/paca.htm>.

Costs: PACA licenses are \$500 per year as of July 2005. Businesses with more than one location (multiple branches) are required to pay an additional \$200 fee per branch. However, the fees are capped and the maximum amount charged is \$4,000 per year per license. Retailers and grocery wholesalers obtaining a license for the first time also incur a \$100 one-time fee for administrative costs.

For example, John Q. is a wholesaler that wants to buy produce. He has three locations all will resell produce. The costs John Q. will incur to obtain a PACA license include:

- \$100 for administrative costs
- \$500 for the first branch
- \$400 for the two additional branches (\$200 \* 2 branches)

The total cost of the license would be \$100 + \$500 + \$200 + \$200 = \$1,000 for the first year. The next year, the cost would be (\$500 + \$200 + \$200 =) \$900. Since the license is a renewal in year two, the administrative fee is dropped.

If grower Allen W. ships produce and has a contractual agreement with Marsh Supermarket, he would need a PACA license. The costs incurred would include:

- \$100 for the administrative costs
- \$500 for the single location

The total cost of the license would be \$600 (\$100 + \$500) for the first year. The next year, the cost would be \$500 (\$600 – the \$100 one time administrative fee).

Benefits of PACA licensing: There are many benefits that come from owning a PACA license. They include:

- Enforcement of Contracts:
  - When produce is bought or sold under contractual agreement, the buyer is required to take the produce subject to the terms of the contract.
  - PACA laws make it illegal to reject produce without a reasonable cause and outlaws dumping, discarding, and destroying of produce by the buyer.
- Timely Payments:
  - The laws enforce timely payment for all produce, as set up by the contract.
  - If a business goes bankrupt, PACA enforces the bankrupt company's obligation to pay for the product it received.
  - The laws also regulate the timeliness of producers to make their shipments in accordance to the terms of the contract.

- Settling Disputes:
  - If there are disputes over quality between any two PACA licensees with a contractual agreement, PACA will send a USDA agent to grade and inspect the product in question to determine if the product meets the terms of the contract.
  - If a buyer rejects a shipment and does not have a USDA agent's report stating the produce does not meet contractual agreements, they are violating their PACA license agreement.
  - If a dispute between a buyer and seller arises, PACA has neutral facilities where all parties can meet and a PACA representative will serve as a mediator to resolve the discrepancy.

PACA licensing is required for most produce intermediaries and is similar to buying insurance. This license helps to protect the product in question and ensures growers get paid for their products and fair business practices are enforced from all parts of the supply chain. (Hofmann and Dennis)

***Farwell to Danielle Sheese:*** This is the last issue of the FFF newsletter for which Danielle will be taking care of the formatting and distribution. Many of you know Danielle from the registration desk at the Indiana Horticultural Congress. Over the last 3 years we have benefited from Danielle's excellent secretarial and organizational skills and we are sad to see her leave us for another position at Purdue. We extend our thanks to Danielle for her help and dedication over the last 3 years and wish her well in her new position.

***Upcoming Meetings:***

Aug. 30-Sept.1. North American Fruit Explorers (NAFEX) annual meeting. Holiday Inn North, Lexington, KY. For more details contact John Strang, Univ. KY, jstrang@uky.edu

September. Fall Grape and Wine Workshop. Purdue West Lafayette campus. Watch for more details in the future. Contact Jill Blume, 765-494-1749 or blume@purdue.edu. Date to be announced.

Dec. 5-7. Great Lakes Fruit and Vegetable expo, Grand Rapids, MI.

Jan. 29. Beginning Commercial Apple Production workshop. Indianapolis. For more info contact Peter Hirst, 765-494-1323 or hirst@purdue.edu

Jan. 29-31. Indiana Horticultural Congress and Trade Show, Indianapolis.

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