

FACTS FOR

Fancy Fruit



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Crop Conditions

Quality of early apples is looking good, but the season is still running about a week late. Grapes are nearing harvest in southern areas, which is a bit later than normal. Blackberry harvest is underway and fruit quality is excellent. Fall raspberries are just getting started. Blueberry harvest is progressing well with excellent quality and berry size.

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 apples, 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, 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 maturity 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, result 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 closer to the 28 days before harvest timing rather than the 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

Facts for Fancy Fruit is a newsletter for commercial and advanced amateur fruit growers. It provides timely information on pest control, production practices, and other topics likely to be of interest to fruit growers. All growers and interested persons are welcome to subscribe.

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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 Schwaller in this issue). Although both NAA and ReTain can reduce preharvest drop, they do this in different ways. ReTain delays apple maturity whereas NAA does not delay maturity (and may even hasten it) but just reduces the fruit dropping. As Dr Schupp highlights in his article, 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)

NRCS and Specialty Crop Growers

Many of you are probably familiar with the Natural Resource Conservation Service and its Environmental Quality Incentive Program (EQIP). The goal of NRCS is "A landscape in which a productive agricultural sector and a high-quality environment are both achieved." EQIP offers financial and technical help to assist eligible participants install or implement structural and management practices on eligible agricultural land. Historically, EQIP in Indiana has focused most of its resources on livestock and/or row crop producers. In addition, one of the practices eligible for incentive payments through EQIP is pest management. Currently, there are two levels of pest management, basic and high, that are included in the guidelines for Indiana but, again, the programs and price structures (\$4 and \$10 per acre, respectively) are directed more toward row crop producers.

Current information about EQIP in Indiana can be found at: <http://www.in.nrcs.usda.gov/programs/2008eqip/eqip2008.html>.

For the past 1 ½ years, I have been serving on a regional working group with the goal of increasing the amount of IPM funded by the EQIP program. I have also been meeting with NRCS employees Tony Bailey and Jill Reinhart, to find ways to increase the involvement of specialty crop growers in EQIP, especially as it relates to IPM. For an idea of how this program could benefit fruit and vegetable growers in Indiana, please look at the guidelines for Michigan: <http://www.ipm.msu.edu/work-group/Michigan.htm>.

EQIP in Michigan pays row crop growers \$5/acre for IPM scouting, which would likely be of little interest to you who grow fruits and vegetables. However, they will pay \$30/acre for IPM in vegetables and \$60/acre for IPM in fruit crops. We would like to see similar opportunities for you here in Indiana. Some examples of practices we have discussed include the use of the MELCAST disease

forecasting system on melons, the use of pheromone traps for major pests such as codling moth on apples or corn earworm on sweet corn, and general pest scouting.

As a next step toward accomplishing that goal, I have received a small grant to support hosting a meeting (probably in November) with Indiana fruit and vegetable growers to gather input on the feasibility of refining the incentives so that you would be more likely to adopt IPM practices on your farm. I will be looking for leaders in the industry who are willing to commit most of a day to helping us develop a practical incentive program. We will then have a follow-up meeting with NRCS to work through the details of implementing the program. We will let you know as soon as the logistics are worked out. In the meantime, feel free to contact me if you have any questions or suggestions. (Foster)

Grape Harvest

Grape harvest will begin soon in the southern part of the state. As harvest nears, it is very important to monitor grape chemistry. Sampling should occur weekly leading up to harvest. Fruit quality is comprised of several factors, the most important of which are sugars, acids, and pH. Other factors such as phenolics and anthocyanins, terpenes, and other flavor and aroma compounds can be very important to wine quality as well. And of course, freedom from rots is an important consideration. Unlike some other fruits, grapes do not continue to ripen after harvest. Consequently, it is important to harvest grapes at the peak of quality and with the desired parameters for the intended use.

Wine grape growers should have the ability of monitor sugars (with a refractometer), titratable acidity and pH (with a pH meter and burette). Equipment and supplies to measure these parameters can be purchased for about \$500. Each of these factors are important in determining proper harvest time, but none alone can accurately estimate overall fruit

quality. It is the balance of sugars, acids and juice pH that is important to the wine maker. And of course, there are the subjective qualities of seed ripeness, skin tannins, aromas, etc. The Berry Sensory Analysis workshop coming up in September (See coming meetings below) will address evaluation of these more subject factors. If you have not yet signed up for the workshop, do so soon as space is filling up quickly.

With wine grapes, all fruit of a given cultivar is usually harvested from the vineyard or block at a single time to coordinate winery activity and to reduce costs. It is important to carefully plan the harvest date to coincide with the optimum fruit quality from the entire vineyard. Most vineyards have some degree of variability in soil type and drainage, sunlight exposure, wind, insect and disease pest, nutritional status, etc. These variations can result in large differences in fruit ripeness. Fruit from adjacent vines as well as from different parts of the same vine can vary. Differences are caused by variation in crop load (pounds of fruit/vine size), cluster position, degree of sun exposure, vine vigor, and so on. Much of the variability can be reduced with proper vineyard management. A pre-harvest walk through the vineyard block should identify any clusters lagging in ripeness. In most cases, those clusters will never catch up to the rest and will only reduce the overall quality of the crop at harvest. Now is a good time to drop that undesirable fruit. Don't expect your workers to sort as they pick. Go through beforehand and eliminate the guesswork. (Bordelon)

Multicolored Asian Lady Beetle, Grapes, and Wine

The Multicolored Asian Lady Beetles or "Lady Bugs" as most of us know them, have become an indirect pest of grapes. Armed with a smelly defense chemical (methoxy-pyrazine), these beetles have the capability of ruining vast amounts of wine. In the past few years, we have found them congregating on certain

grapes at or near harvest. They tend to stay in the clusters through the crush and pressing operation, depositing their defense chemical (rancid aroma) into the juice, leading to a distinctive "Lady Bug" odor and flavor to the wine. Not surprisingly, most people consider this rancid odor a serious wine flaw. The problem exists across the wine regions of the eastern US and seems to be mostly a problem where grape harvest occurs late. The problem seems to be worse in central and northern Indiana, the Great Lakes region, etc. It has not been a serious problem along the Ohio River Valley. We have not seen significant numbers of Asian Lady Beetles showing up in vineyards yet this year, but it is important for growers to scout frequently as harvest nears. In a recent study we found that a single application of products containing imidacloprid (Provado or Prey) was very effective in reducing MALB in clusters. Another product registered for control of MALB is Venom (dinotefuran). See the Midwest Commercial Small Fruit and Grape Spray Guide (www.hort.purdue.edu/hort/ext/sfg/) for complete information. (Bordelon)

Late Season Grape Disease Management

With the exception of the northern part of the state, we have had above average rainfall this year. That has led to a few disease problems in grapes, most notably, downy mildew. Downy spreads rapidly under warm, moist conditions. We noticed a small amount showing up in southern Indiana a couple of weeks ago. It is important for growers to prevent downy mildew from developing into a full-blown epidemic. There are a number of management strategies growers may consider at this time as harvest nears. Preventative fungicides like Captan or the phosphorous acid (PA) products (ProPhyTe, Agri-Fos, Phostrol) provides good protection against spread, and the PA products also reduce sporulation. Both have short (zero days) pre-harvest intervals (PHI). The PHI of other products should be considered as we near harvest. It's obviously too late to apply

mancozeb or Ridomil containing products as they have long PHI (42-66 days). The strobilurins are fairly effective against downy, but all have a 14 day PHI. Since Pristine is also good on miscellaneous fruit rots, it might be a good choice this late in the year if you have at least 14 days before harvest. Note the potential for phytotoxicity on certain varieties. Once harvest is complete, PHI is no longer an issue and there are several options for management of downy through the rest of the year. See the Midwest Commercial Small Fruit and Grape Spray Guide (www.hort.purdue.edu/hort/ext/sfg/) for complete information. (Bordelon)

Edema on Apples Looks A Lot Like Blister Spot

Edema (or oedema) is a physiological disorder that results when the plant takes up more water through the roots than the leaves can give off through the stomates or lenticels (transpiration). The excess water usually accumulates in the leaf cells, causing them to enlarge and sometimes burst. As cells become engorged with water, small blisters may appear on the upper or lower surface of the leaf, or on the fruit (Fig. 1).



Figure 1

The affected cells often have a dark green water-soaked appearance surrounding these swollen cells and may suggest bacterial disease, like blister spot. Over time, these blisters may develop a corky appearance. Blisters may eventually harden to form white, tan, brown or rusty pustule on the fruit (Fig. 2) or leaves.



Figure 2

In severely affected plants, edema can develop on petals, petioles, and stems, and apparently, fruit. The appearance on fruit is fairly unusual. In the case of many herbaceous plants, and houseplants, continued conditions may result in leaves that droop, turn yellow, and fall off (abscise). On apples, this problem could be easily mistaken for blister spot. Unlike blister spot, no bacteria could be observed in the pustules. However, at least in this case, Mutsu was one of the few unaffected varieties of apples!

Most apple growers who grow Mutsu (or Crispin) are concerned with the blister spot, caused by a bacterium *Pseudomonas syringae*. Symptoms of blister spot appear months after petal fall. Like edema, symptoms begin as small, green, water-soaked, lesions that develop into raised blisters (Fig. 3).



Figure 3 Photo by T. van der Zwet

Symptom development occurs at the lenticels on the fruit. As the fruit grows and develops, the blisters expand as well, growing to be about 3/16 inch and become darkened and purplish. Although Mutsu is most susceptible to this pathogen, many cultivars including

Golden Delicious, Cortland, Red Delicious, and Jonagold, are susceptible to this disease as well. Problems on the other cultivars usually develop when these susceptible cultivars are planted beside a block of the infected Mutsu cultivar.

The bacteria that causes blister spot spread when the rain spreads the bacteria onto the fruit. The bacteria infect through the lenticels and require only a misting rain or brief shower to spread the bacteria to new infection sites. The bacteria overwinter in buds, leaf scars, and diseased fruit that are left from the previous season. The bacteria multiply on developing leaves without causing obvious symptoms during the spring and are rain-splashed to leaves and other plant surfaces throughout the orchard.

The standard recommendation for management of blister spot is to apply streptomycin at 1/2 pound per 100 gallon dilute rate at first and second cover. If the weather pattern of rain continues, two additional sprays should be applied at weekly intervals. Streptomycin-resistance has been documented in commercial orchards in the northeastern United States.

In the case of edema, severe rainfall is probably the culprit in this problem so management options are limited, particularly after the fact. In apples, certain varieties are apparently more susceptible than others, and the role of rootstock remains uncertain. (Beckerman)

Obesity in America

We all know how important eating fresh fruit and vegetables, along with getting some exercise, is when it comes to staying healthy. Indiana ranks 11th among all states for obesity, with 26% of adults being obese and 63% of all adults being obese or overweight. For a stark demonstration of how obesity rates in the USA have been rising over the last 20 years, look at:

<http://www.cnn.com/SPECIALS/2007/fit.nation/obesity.map/>

So why do I bring this up? Because the products we produce are healthy and play a pivotal role in a healthy diet. Not only are our products healthy, so are the activities many of us promote. Corn mazes, u-pick, pumpkin patches, etc. all require a certain amount of exercise. Our industry is part of the solution. We all know the apple is a symbol of health, so why not really promote the healthy lifestyle aspect of what we do? Perhaps this means partnering with local health departments and healthcare professions to promote healthy lifestyles (maybe give them some dollar-off vouchers to hand out, or other promotions). We have a great story to tell, so let's be creative about the telling. (Hirst)

Upcoming Meetings

August 21-22

U.S. Apple Association Outlook Conference, Chicago. For more details:

<http://www.usapple.org/industry/outlook-conference/index.cfm>

September 9

Berry Sensory Analysis Workshop. Marion County Extension office. 6640 Intech Blvd. Contact Bruce Bordelon 765-494-8212 or bordelon@purdue.edu

October 5-8

Michigan State University "Berries and Cherries in British Tunnels" tour.

If interested visit the following web site:

<http://www.hrt.msu.edu/tunneltour/>

Nov. 6-8

Southeast Strawberry Expo, Hilton Charlotte University Place, Charlotte, NC. Includes Strawberry Plasticulture Workshop for New Growers, farm tour, educational sessions, and trade show. For more information, email info@ncstrawberry.com

Dec 8-10

North American Raspberry & Blackberry Conference. DeVos Place Convention Center, Grand Rapids, MI, as part of the Great Lakes Expo. For more information, email info@raspberryblackberry.com

Dec. 9-11

Great Lakes Fruit, Vegetable and Farm Market Expo, DeVos Place Convention Center, Grand Rapids, <http://www.glexpo.com/>

2009

Jan. 5-6

Kentucky Fruit & Vegetable Conference & Trade Show, Embassy Suites Hotel, Lexington, KY. For more information contact John Strang at phone 859-257-5685 or email: jstrang@uky.edu

January 12-14

OPGMA Congress, The Nia Center at the Kalahari Resort Sandusky, Ohio

Jan. 19, 2009

Beginning apple growing workshop. Adam's Mark Hotel, Indianapolis.

Jan. 19-21, 2009

Indiana Horticultural Congress, Adam's Mark Hotel, Indianapolis. As details become available, they will be posted at: www.inhortcongress.org

Obituary – Lorne Doud

Lorne Doud passed away August 1, 2008 at age 92. He was born November 1, 1915 in Richland Township, Indiana to Lorenzo V. and Elba (Reed) Doud. He married the late Betty M. Shortz on June 30, 1945 in Medaryville, IN. She died February 8, 2002.

He and his wife owned and operated Doud

Orchards in Miami County near Roann and north of Chili on State Road 19. Lorne served on the Indiana Horticultural Society executive committee from 1939-1953. He served as president of the society 1948-1949. He was one of the first nurseryman in America, beginning in 1940, to produce apple trees on the East Malling dwarfing rootstocks. Lorne was one of the founding fathers of the Dwarf Fruit Tree Association (now called the International Fruit Tree Association). He served as president in 1964-65 and was a board member for 18 years. He was one of the early adopters of dwarfing rootstocks in the United States. It is hard to overstate the benefits these rootstocks have brought to the fruit industry across the country. In 1977 he received the Indiana Horticultural Society Distinguished Service Award. He and his wife received 2 Hoosier Homestead Awards for having 2 farms in the same family for 100 years or more.

His love and enthusiasm for fruit growing were obvious for all to see, even in his later years. It seems that his passion rubbed off on those who knew him best - his sons Steven and David are fruit growers in Indiana and his daughter Diane is pomology research and extension specialist at The Ohio State University.

He is survived by 2 Sons, Steven (Connie) Doud and, David (Valerie) Doud both of Wabash, Indiana; Daughter, Diane (Greg) Miller of Carrollton, Ohio; 3 Granddaughters, Emma Doud of Cambridge, Massachusetts, Theresa Doud of Greencastle, Indiana; and Amy Miller of Carrollton, Ohio; 3 Grandsons, Michael Doud of West Lafayette, Indiana, Quinn Miller and Colin Miller both of Carrollton, Ohio; Lorne is preceded in death by his sister, Kathleen J. Poole.

Another of Lorne's passions was Purdue. He was active in the marching band and the glee club, and graduated from the horticulture department in 1937. He was a proud and active Purdue alumnus, and was always very supportive of our efforts here at Purdue.

Lorne had a profound influence on the industry he loved, and will be missed. Our thoughts and prayers are with the Doud family.

Preferred memorial is the Roann United Methodist Church Scholarship Fund or Midwest Apple Improvement Association. The memorial guest book for Lorne may be signed at: www.grandstaff-hentgen.com.

In Memory of Lorne Doud



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