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FACTS FOR Fancy Fruit
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In This Issue

Crop Conditions

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Black raspberry- harvest underway

Peach- fruit developing. Harvest a few weeks off

Grape – bunch closure (berry touch)

Thornless blackberry – harvest beginning

Apple- Fruit developing

Indiana Hort Society summer field day

(Peter M Hirst, hirst@purdue.edu, (765) 494-1323)

Approximately 40 growers attended the Society's summer field day a couple of weeks ago. Thanks go to David, Valerie and Theresa Doud for being wonderful hosts. We saw apples, peaches and strawberries, and also some of the new MAIA apple selections being developed. After lunch we visited Cordes Berry Farm which consists of over 9 acres of blackberries. Jared and Erica Cordes are doing a fantastic job and everyone I spoke with was highly impressed. Myron and Marvin Metzger's farm was our next stop where we saw a range of crops being grown well, from plasticulture strawberries to netted blueberries. Nate Fingerle showed us what can be achieved on a small plot of land with the most

intensively and intelligently managed 1 ½ acres most of us had ever seen. Our last stop was with Jeff and Zach Hawkins, who showed us their integrated approach to farming that is well supported by the local community.

All who attended were treated to some very interesting and well-run operations. Thanks again to the five families who opened their farms up to us and were so hospitable.

The next meeting of the Indiana Hort. Society will be at the Hort. Congress, Jan. 10-12 at the Indianapolis Marriott East Hotel. As details come to hand, they will be posted at the IHC website: https://inhortcongress.org

Determining apple maturity

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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 fruit until their better quality fall apples come on stream, so storage times beyond a week or two are not that common. For example, very early season apples such as Lodi and Pristine should only be stored for a few weeks until Gala harvest begins. Even for fall apples, many Indiana 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 than for longer term storage. This being the case, apples should be harvested when they are fully ripe. This will maximize their flavor, and although it reduces their storage potential, this is not too important for many direct market growers. There are various tests for measuring fruit maturity and degree of ripeness, but taking a bite out of a few apples will give a good enough indication for fruit being stored for short periods where flavor is important but long storage life is not. Obviously 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. In fact, states with large apple industries have labs dedicated to performing these tests and measurements are fed into complex mathematical models to determine the optimum harvest time for fruit for long-term storage.

Beyond the taste test, if you are going to perform one test I suggest looking at starch index. As fruit ripen, enzymes convert starch in the fruit to soluble sugars, which explains why fruit become sweeter as they ripen. This test provides 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 Chapter 7 of the Tree Fruit Pest Management Handbook, ID-93, available at http://www2.ca.uky.edu/agc/pubs/id/id93/id93.htm

Control Of Preharvest Drop with NAA

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Preharvest drop refers to the process where fruit fall from the tree prior to harvest. Not all apple varieties are affected, but with some, such as McIntosh and Pristine, pre-harvest drop can be extreme. Several growth regulator materials are available to growers to help reduce pre-harvest drop. These materials are often referred to as "stop-drop" or "sticker" sprays. The traditional material used to help prevent pre-harvest drop 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 fruit off the tree 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 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 applied in slow drying conditions and when temperatures are warm (70-75F). Bearing this in mind, many growers apply their stop drop sprays early in the morning when there may be some dew on the trees and when temperatures are rising. 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

Timing Retain Sprays

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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, 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)

PristineTM apple

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Pristine Apple

Although Pristine™ was selected in 1982, its history goes back to the early days of the PRI breeding program. From an original cross of Rome Beauty with Malus floribunda 821, selections and hybridizations were made incorporating Golden Delicious, McIntosh, Starking Delicious and Cazumat along the way. The cross that resulted in Pristine™ was Coop 10 x Cazumat made in 1974 at Rutgers University in New Jersey, and Pristine™ was selected at the Purdue Hort. Farm in 1982.Pristine™ is a very early maturing apple usually ripening in late July in Lafayette. It is very attractive with a clean finish (see Fig. 2). For such an early apple, it has very good eating quality, certainly much better than other very early apples such as Lodi or Transparent. The texture is crisp and flavor has a good acid/sugar balance. If fruit are allowed to become over-mature, pre-harvest drop can be severe, but with timely pickings this should be a minimal problem. Fruit stores well for up to a month or so, but usually growers will probably only store the fruit until better quality, main season fruit comes along, such as Gala. Pristine™ has good field resistance to apple scab, and seems to have quite low susceptibility to fireblight and powdery mildew. Russet and skin disorders are rare, but bruising can be severe so careful handling is required.For direct marketers, Pristine™ may be a very good way to kick off the apple season, or to transition from peaches into apples. But only grow them in such quantities that you can have them sold by the time main-season apples are ready.

Summer Diseases

(Janna L Beckerman, jbeckerm@purdue.edu, (765) 494-4628)

Warm, wet, summer weather, coupled with any lapses in orchard sanitation, can result in summer disease outbreaks. At Meigs, we are seeing the foliar stage of Botryosphaeria, aka frog eye leaf spot (Fig. 1).

Fig. 1
apple frog eye leaf spot

On the plus side, we won't be surprised when we see black rot on the apples at harvest (Fig. 2).

Fig. 2
appleblackrotbeckerman

Fortunately, this only seems to be a problem in our Red Delicious block. Thankfully, the Honeycrisp haven't shown any symptoms…yet. In general, frog eye leaf spot serves as an indicator that we should probably prepare for problems in the form of black rot on fruit. Red Delicious isn't normally described as a susceptible host. Reportedly susceptible cultivars include Cortland, Empire, Northern Spy, and Honeycrisp. A few rows away is the Honeycrisp, and I'm hoping for a lot of rot for our fungicide trial. This frog eye leaf spot gives me hope. If I was a real grower, it would give me heartburn, as it is a warning of things to come.

At this point, summer disease management should focus on using protective fungicides for 'cover'. Should disease pressures increase with wetter weather, or if you too are seeing frog eye leaf spot, supplement your protectant based cover schedule with either strobilurins (Flint, Sovran—remember your PHI) or an SDHI fungicide (Fontelis) or a strobilurin+SDHI premix—(Pristine, Merivon, Luna Sensation).

In the fall, make sure that you keep an eye out for any developing cankers (Fig. 3) being sure to remove in the spring, and burn.

Fig. 3
apple black rot cankers

Rigorous sanitation and removal of windfalls and mummies is also important. The Red Delicious block with frog eye leaf spot had both mummies in the tree, and uncollected windfalls in an attempt to 'Bring on the Rot'!

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