



Healthy Fruit, Volume 20, Number 15. July 24, 2012

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Current degree day (DD) accumulations

Through July 23. Location: UMass Cold Spring Orchard, Belchertown, MA

Base 43: 2432

Base 50: 1770

Upcoming pest events

based on current DD accumulations: Base 43 at 2432 on 23-July

Oriental fruit moth 2nd flight subsides	2061-2529
Oriental fruit moth 3rd flight begins	2326-2746
Obliquebanded leafroller 2nd flight begins	2255-2655
Apple maggot flight peak	2102-2602
Codling moth 2nd flight peak	1931-2735
Redbanded leafroller 2nd flight subsides	2182-2742
Spotted tentiform leafminer 2nd flight begins	2253-2659

Orchard Radar key dates

Below are key dates for insects and mites (and McIntosh harvest date) from Glen Koehler's (U. of Maine) Orchard Radar output from Belchertown, MA. You can look at Orchard Radar for Belchertown here: <http://pronewengland.org/AllModels/MAModel/RADARMA-Belchertown.htm>

Codling moth (CM): Codling moth development as of JULY 24: 2nd generation adult emergence at 66% and 2nd generation egg hatch at 27%. 2nd generation 30% CM egg hatch: July 25, Wednesday = target date where one spray needed to control 2nd generation CM.

Apple maggot fly (AMF): Rough guess of peak AM trap captures is: JULY 23, Monday.

Preliminary McIntosh harvest date forecast: Date to apply ReTain to delay first harvest for apples which without treatment would be ready for storage harvest on August 23 is Thursday, JULY 26. Begin measuring actual McIntosh starch-iodine index no later than Saturday, AUGUST 18. The Michigan formula estimates that non-spur McIntosh will reach starch index 4.0 and start the optimum window for long term storage on Thursday, AUGUST 23. Using the Hudson Valley NY formula, McIntosh maturity is forecast to reach starch index 6.0 (end of optimum harvest for long-term storage) in Belchertown, MA on Saturday, SEPTEMBER 15.

The way I see it

We have picked Risingstar peaches and Earlyglo nectarines at the UMass Cold Spring Orchard. PF-14 Jersey will be ready to pick next week, but Redhaven are not sizing up as much as I would like to see because of the lack of rain. Pristine apples are ready and Jerseymacs are barely ready (and dropping and OBLR love them).

Growers minds turn to ReTain application now to reduce the amount of pre-harvest drop. Let's hope we get some rain and cooler weather before we have to apply ReTain as it does not work as well on stressed trees. ReTain application to McIntosh could start as early as next week, however, I suspect most growers will apply the first application during the first full week of August. If I was going to do a split (half or 2/3 rate) application, I would go the first and third (full) weeks of August. If I were doing one full rate application, then the second full week in August sounds right to me. Keep in mind the season is a good 10 days ahead of 'average.' Using 10 ppm Fruitone-L with the Retain application seems to be the new standard, and may be particularly useful this year. Also, pay attention to any gut feeling you have about fruit maturity and the course of the season and the weather. See Duane Greene's write-up below for more information.

Keep an eye on the weather as what appears to be a wetter pattern means summer diseases and fruit rots will be problematic. I think we get in more trouble this time of the year with late sooty blotch and flyspeck and various rots. Maintain fungicide coverage, even though harvest is ramping up and time is hard to find.

Attached to HF is the form to submit leaf samples for nutrient analysis. Leaves really should be collected by the 2nd week in August at the latest. Orchard blocks should be sampled every 3-5 years at a minimum. J. Clements

Early thoughts on the use of ReTain and NAA for pre-harvest drop control

2012 is looking very similar to 2010 when the season was advanced by at least 7 to 12 days. It is not clear how much the season is advanced this year but it appears at this point to be quite similar. In 2010 the combination of Retain and NAA, compared with just ReTain alone, significantly improved drop control and it increased the length of time drop was delayed. My reason for preparing this in advance is to encourage you to start thinking about the strategy you may use this year to delay ripening and to improve pre-harvest drop control. The 2010 season was early, hot and dry and drop was a serious problem. It is for this reason that I suspect that drop will again be a significant issue in 2012. I strongly urge you to include NAA once or twice at 10 ppm. If this or these NAA additions are accompanied by at least ½ rate of ReTain, advanced ripening associated with NAA use just has not occurred.

The ReTain label suggests two scenarios for using ReTain. One scenario is specifically used to aid in retarding ripening. ReTain should be used at the full rate and applied at 4 weeks before the anticipated start of the harvest. This retards ripening 7 to 9 days. A second scenario is to apply ReTain 2 to 3 weeks before the anticipated start of harvest. This will retard ripening less but it will also control or extend drop control later into the season.

Specific Recommendations

Honeycrisp is particularly susceptible to heat and drought and it responds by initiating drop early and often this drop is heavy. If the hot and dry weather pattern continues I am recommending application of a ½ rate of ReTain plus 10 ppm NAA no later than mid August. A second application of ReTain may be appropriate but many may opt not to do this for fear of delaying red color development too much. The use of lower rates of ReTain (e.g. ¼ rate) for the second application 4 weeks after the first may be an option that each grower must gauge against the negative side effects.

The basic program that I favor for pre-harvest drop control for McIntosh involves multiple applications. I suggest the use of ½ rates of ReTain plus 10 ppm NAA tank mixed starting 2 to 3 weeks before the anticipated start of normal harvest. I would then suggest a second ½ rate plus 10 ppm NAA as a tank mix two weeks later. A third ½ rate of ReTain (with no NAA) would be applied 2 weeks after the second. If the tree row volume is above 150 gal/acre then 2/3 rates of ReTain should be considered. This amount of ReTain may be larger than you are used to applying, however, if the drop pattern and intensity that we observed in 2010 holds true for 2012, it will be worth the added expense.

Individuals will undoubtedly deviate from what is presented above, but these are just guidelines and details will depend on when you plan to harvest and how long in the season you wish to have effective drop control. Some of you may wish to start out with the full rate of ReTain and then follow with half rates. This will delay ripening and also extend the period of drop control.

If appropriate I follow this up in a couple of weeks (early August) especially if weather conditions change. D. Greene

Guest article: pre-harvest fruit drop treatments for apples

Mosbah Kushad (kushad@illinois.edu), University of Illinois Extension and the College of Agricultural, Consumer, and Environmental Sciences. Reprinted from *Illinois Fruit and Vegetable News*, Vol. 18, No. 9, July 19, 2012, <http://ipm.illinois.edu/ifvn/contents.php>

Apple growers who have a decent crop this year will probably be wise to consider applying a stop-drop treatment to keep fruits from dropping before they are harvested. As apple fruits reach maturity, many will drop before harvest, with some varieties dropping more than others, and in some years fruit drop is more severe than in others. For example Cortland, Empire, Mutsu and Idared hang very well, while McIntosh and Spartan, in a certain year, may drop all their fruit before harvest unless treated with a stop-drop. Many physiologists agree that the main reason for fruit drop is fruit and tree stress. Trees that have been exposed to water stress, like we are seeing this year or in years when there is too much water, are likely to drop their fruits rather quickly. Other factors that contribute to tree stress include magnesium, boron, and/or calcium deficiencies, too much leaf nitrate nitrogen, heavy crop, sick trees from diseases or insects, very high daytime and nighttime temperatures, and mechanical injury.

The mechanism of fruit drop is not very well defined, although the abscission layer at the base of the fruit petiole is a ring of only a few cells wide. It is distinguishable by a small bulge at the bottom of the petiole. Some researchers suggest that fruit drop is caused by a decline in the plant hormone auxin and a rise in two other hormones, ethylene and abscisic acid in the abscission zone. Ethylene and abscisic acid stimulate two enzymes (polygalacturonase and cellulase) in the cells of the abscission zone. Polygalacturonase breaks down the pectin in the walls of the cells. While the other enzyme is called cellulase, which as the name suggests breaks down the cellulose microfibrils. Pectin is the glue that keeps the cells cemented together. Once the pectin and cellulase disintegrate, the cells fall apart and the fruits drop. Fruit drop can be slowed down considerably by keeping the level of auxin in the cells high and the level of ethylene low.

NAA, or naphthaleneacetic acid, is a synthetic auxin that has been in use as stop-drop for more than 60 years. NAA does not reverse the abscission process but slows down the activities of the two enzymes and hence fruit drop. NAA, like many other auxins, is not readily soluble in water but it is readily soluble in alcohol. You do not need to waste your good alcohol on getting NAA into the fruit ... if you use soluble formulations, they have added inert chemicals that dissolve NAA.

The general rule for NAA is to apply it at the first sign of fruit drop or one to two weeks before harvest, but not less than four or five days so it has sufficient time to get into the cells of the abscission zone. NAA should be added at about 15 to 20 ppm (3.6 to 4.8 ounces per 100 gallons for NAA-200 or 6 to 8 ounces for WP) concentration and should be applied as dilute spray. NAA will not get into the fruit very readily unless it is mixed in sufficient water to get it there. A minimum of 160 gallons per acre should be used. The effect of NAA should be noticeable within 3 to 4 days and should last for up to two weeks. Repeat applications have given some help. Nonionic spreaders-stickers will

improve uptake of NAA. Ironically, fruits treated with NAA do not keep well in storage, so market fruits that have been treated with NAA soon after harvest.

ReTain: This relatively new stop-drop treatment for apples is rather expensive, but in years like this it is likely to pay for itself, especially when used on fresh-market fruits. The active ingredient in this material is aminoethoxyvinyl glycine (AVG). In the late 1970's I did my Master's thesis research at Washington State University on the effectiveness of this chemical as an inhibitor of ethylene synthesis and leaf abscission. The chemical was first extracted from soybean root nodules infected with *Rhizobium japonicum*. I found that ReTain is one of the most powerful inhibitors of ethylene synthesis. By inhibiting ethylene, ReTain is in effect blocking the enzymes that break down the cell wall, and so fruits treated with ReTain are likely to stay attached to the tree longer. Because ReTain inhibits ethylene, there are several precautions that need to be understood in order to get its maximum benefits.

- The recommended rate is about 50 grams a.i. per acre. Some varieties like Gala, Golden Delicious and Honeycrisp, may need less than the recommended rate. Experiment with different rates.
- It works best when the temperature is in the mid 70's F rather than in the 90's F.
- Apply ReTain as dilute spray (160 gallons/acre) and make sure the leaves and fruits receive full coverage but not to the point of run-off.
- Apply at least 28 days before harvest but not earlier than 35 days.
- Retain will reduce fruit color, so it's best to use it on fruit that develop early color
- Check for fruit maturity using a combination of starch, total soluble solids, and firmness.
- Adding silicone-based surfactants like Sylgard 309 will increase the effectiveness of ReTain. Check the label for permitted surfactants.
- Because of cost, use ReTain on varieties that will give you the maximum return on investment or on trees that are subject to severe drop.

Useful links

- UMass Fruit Advisor: <http://umassfruit.com>
- Scaffolds Fruit Journal: <http://www.nysaes.cornell.edu/ent/scaffolds/>
- Network for Environment and Weather Applications (NEWA): <http://newa.cornell.edu>
- Follow me on Twitter (<http://twitter.com/jmcextman>) and Facebook (<http://www.facebook.com/jmcextman>)
- UMass Vegetable & Fruit IPM Network (on Facebook, <https://www.facebook.com/umassipmteam>)

The next Healthy Fruit will be published Tuesday, August 7, or thereabout, 2012. As always feel free to get in touch with any member of the UMass Fruit Team (<http://extension.umass.edu/fruitadvisor/about/members>) if you have questions or comments.



PLANT TISSUE SAMPLE SUBMISSION FORM: TREE FRUIT

See the reverse side of this form for sampling instructions, test descriptions and fees.

Name:	Telephone No:
Business Name:	E-mail address:
Street Address:	Method of receiving results <input type="checkbox"/> US Mail (Choose one or include \$2 fee for both) <input type="checkbox"/> E-mail
City, State, and Zip	

Send copy of results to:	Name:	E-mail address:
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LAB # (Leave blank)	Sample ID (You create this)	Test requested		Fee, \$
		Standard (\$25)	Standard w/o N (\$18)	
		<input type="checkbox"/>	<input type="checkbox"/>	

Sample Information	
Crop, management, and soil information Date sampled: _____ Crop: _____ Variety: _____ Rootstock: _____ Age: _____ (years) Tree spacing or population: _____ Tree vigor is: <input type="checkbox"/> poor <input type="checkbox"/> moderate <input type="checkbox"/> vigorous Lime: _____ (tons/ac) applied on _____ (date) Fertilizer rate (lbs/tree or lbs/A) and application date(s): _____ _____ _____ Were foliar nutrients applied this season? (Yes / No) If yes, list the rate(s) and date(s) _____ _____ _____ Soil series (if known): _____	Complete this section for problem diagnosis If leaves are discolored, does the color variation occur: <input type="checkbox"/> along leaf margin <input type="checkbox"/> interveinal <input type="checkbox"/> in spots <input type="checkbox"/> over entire leaf Leaves first affected at shoot: <input type="checkbox"/> tip <input type="checkbox"/> base <input type="checkbox"/> over entire shoot Symptoms first seen: _____ (month and growth stage) Describe additional symptoms below:

Office Use Only	
Received	Due
Check#	PO#
Cash	

Sampling Instructions

Leaf samples should be collected around 60 to 70 days after petal fall (between late July and early August for apples). Mid-shoot leaves should be collected from current season terminal shoots on the periphery of the tree.

Sampled trees should represent the general conditions of the orchard in terms of vigor, crop load, etc. For problem diagnosis, it is often helpful to collect and analyze separate samples from both affected and non-affected trees/areas. This allows a direct comparison of nutrient levels and may aid in diagnosing specific nutrient deficiencies.

Each sample should consist of about 50 leaves collected from several trees in the area being sampled. Do not mix leaves from different varieties, soil conditions, tree vigor, or fruit load.

Thoroughly rinse leaves to remove pesticides, foliar applied nutrients, and soil particles then place on clean paper to air-dry. Place air-dried tissue in a small paper bag labeled with your sample ID and complete the submission form. Hand deliver or mail sample, submission form, and a check or money order payable to UMass to the address listed above.

Plant Tissue Test Descriptions & Fees

Standard Tissue Test: \$25.00

A determination of the Total Tissue P, K, Ca, Mg, Na, Zn, Cu, Mn, Fe, and B. Analysis by ICP Spectroscopy of dry-ashed sample in 10% HCl . Also included Total Nitrogen by catalytic combustion.

Standard Tissue Test Without Total Nitrogen: \$18.00

Same as standard tissue test but without N