



Healthy Fruit, Vol. 26, No. 20, August 28, 2018

Jon Clements, Author (unless otherwise noted) and Editor

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Upcoming pest events

Coming events	Degree days (Base 43 BE)	Meaning?

Current (8/27) accumulation, Belchertown, MA	3267	Warm season...
Apple maggot flight subsides	2772 to 3258	Saw one apple maggot fly on Akane yesterday, 27-Aug, too fast for me to get a pict
Codling moth 2nd flight subsides	2846 to 3462	Codling moth infestation in unsprayed cider orchard...yuk 
Lesser appleworm 2nd flight subsides	2794 to 3488	
Lesser peachtree borer flight subsides	2996 to 3446	
Oblique-banded leafroller 2nd fight subsides	3108 to 3468	

Oriental fruit moth 3rd flight subsides	2928 to 3412	
Redbanded leafroller 3rd flight subsides	3124 to 3436	

Ag-Radar summary

Key insect life cycle and management dates

Note: for 2018, we have ten Massachusetts orchard locations subscribed to Ag-Radar: Amherst, Belchertown (2 locations), Brookfield, Deerfield, Easthampton, Groton, Leominster, Northboro, and Westhampton. The website for looking at AgRadar for these locations is: <http://extension.umaine.edu/ipm/ag-radar-apple-sites/>. What follows is the AgRadar summary for the Belchertown location.

Codling Moth (CM) -- Codling moth development as of August 13: 2nd generation adult emergence at 100% and 2nd generation egg hatch at 98%.

Preliminary McIntosh Harvest Date Forecasts -- Date to apply ReTain to delay first harvest for apples which without treatment would be ready for storage harvest on September 6 is from Thursday August 9 to August 16. Date to apply ReTain to delay maturity for 2nd, 3rd or 4th pick of those apples, without delaying start of harvest maturity, is from Thursday, August 23 to August 30. Begin measuring actual McIntosh starch-iodine index no later than Saturday, August 22. The Michigan formula estimates that non-spur McIntosh will reach starch index 4.0 and start the optimum harvest window for long term storage on Thursday, September 6. Using the Hudson Valley NY formula from Cornell Bulletin 221 '[Predicting Harvest Date Windows for Apples](#),' McIntosh maturity is forecast to reach starch index 6.0 in Belchertown-ColdSpring MA on Wednesday, September 19.

Orchard management: Synopsis of key late season dates

August 23 to August 30 Rough estimate of 14 to 7 days before start of normal harvest period for untreated McIntosh fruit. Applying ReTain 1 to 2 weeks before start of harvest will not delay first pick, but will delay fruit maturity and improve storage potential for 2nd, 3rd, and 4th picks.

August and September Most effective timing for controlling persistent weeds (bindweed, brambles, dandelion, goldenrod, vetch etc.) with carefully targetted glyphosate (Roundup). But there is also increased risk of systemic tree damage from misdirected spray and on trees with root suckers with late-season application. Requires extra caution for application method and wind. Trees with root suckers removed at least one week prior to application and with trunks protected with white paint are less susceptible. Also note preharvest interval.

September 6, Thursday For long-range planning only: Preliminary early season estimate of when non-spur McIntosh will reach starch index 4. This begins the optimum maturity window to harvest for long term CA storage.

September 19, Wednesday Preliminary early season estimate of when non-spur McIntosh will reach starch index 6, and end of optimum maturity window to harvest for long term CA storage.

During or soon after harvest Record pest damage observations at harvest to improve next year's pest management program. About 25 minutes per block for apple scab indexing after September 10 and before leaf discoloration in October can yield more effective and less expensive scab control next spring.

Upcoming meetings

Null...

The way I see it

Jon Clements

Somewhat to very concerned about the effect of heat on apple harvest condition. Seeing various rots (black, bitter) on some varieties where fruit is fully exposed to mid-late afternoon sun and on west side row of block. Probably preceded by sunburn/heat damage. Nice information on what causes sunburn here http://www.tfrec.wsu.edu/pages/webdev/Apple_sunburn, but main points are:

- Fruit Surface Temperature (FST) has to reach about 113 degrees before sunburn damage occurs
- FST affected by: air temperature (obviously, my feeling is under our conditions it has to get into the upper 90's for sunburn injury to occur); brightness of sunshine (haze, smoke, light overcast reduces); wind or breeze, calm makes FST higher; humidity, low relative humidity makes FST higher; fruit size, larger fruit such as we approach harvest more likely to suffer sunburn
- Sunburn protectants must be applied before high FST is reached (obviously)
- Using the Fruit Surface Temperature calculator here http://www.tfrec.wsu.edu/pages/webdev/Energy_calculator this is what is predicted for Belchertown tomorrow (29-August). 103 degrees FST. Sunburn should not occur...

Otherwise, Paulared, Sansa, Premier Honeycrisp have been picked at the UMass Orchard. Zestar! has had a first pick. Gingergold need to be picked. McIntosh and Gala need another week before harvest starts, same likely for Honeycrisp. I will update with a maturity report next week, and see this week's maturity report.

calculator for modeling apple fruit skin temperature

Please note, this model is for illustration purposes only to show the relative effects of different factors on the fruit skin temperature of apples. It should not be used to make actual orchard management decisions.

It is based upon the **energy balance model** developed by WSU researchers.

The program code assumes a time of 2 PM.

Skin temperature at 2PM is 103

Air temperature Relative humidity %

Wind

Sun and clouds

Month

Fruit size diameter (in.)

A sunburn protectant ☐ has been applied ☒ has not been applied

Calc

Update: just received an e-mail from Glen Koehler at UMaine this afternoon, he says: "Of all the Ag-Radar sites, Amherst MA on Aug 29 seems to have the highest sunburn risk as of Tuesday morning forecast. Estimated Fruit Surface Temperature is 112.7 F. Threshold for damage is 113 F.



Likely sunburn damage on Akane apples at UMass Orchard followed by bitter/black (?) rot infection

Insects

Jaime Pinero

Spotted Wing Drosophila (SWD) research update:

Grape juice diluted in water is an effective attractant for trapping SWD

The “1-2-3” approach to SWD management provides easy-to-understand steps to manage SWD. The three main IPM components are monitoring, cultural practices, and timely application of insecticide sprays. **The implementation of an “attract-and-kill” system would add another tool to the IPM toolbox against SWD.** For the last couple of months, the UMass Arthropod IPM program has been conducting research aimed at developing a grower-friendly trapping system that could help make insecticide sprays more effective. The successful development of a trapping system that could help reduce SWD populations before crop harvest could potentially result in less insecticide sprayed to crops.

Commercially available lures: To monitor SWD, synthetic lures based on blends of compounds isolated from fermentation materials (mostly wine and vinegar) are commercially available. Examples include Scentry, Pherocon SWD, and Alpha-Scents lures. However, lures that are based on fermentation materials also attract a comparatively high number of other Drosophilid species (and other non-target insects), hindering trap performance and increasing sorting time.

SWD research being conducted by the UMass Arthropod IPM program: This article provides a research update on SWD trapping using commercial fruit juices. Below I present the most relevant results of various field-cage and field experiments that have been conducted since early July, 2018. While additional studies have been conducted, those results are not being presented due to the lack of space. **A detailed article will be published in Fruit Notes.**

Field cage experiments

Multiple bioassays were conducted in cages to compare the attractiveness of five commercial juices (grape, red tart cherry, tart cherry, pomegranate, and blueberry). Known numbers of male and female SWD were released inside 3 ft³ cages, and the response to the olfactory treatments was quantified over a 4-hour period. Results (see Figure 1 below) indicate that tart cherry, grape and pomegranate juice were the most attractive juices to male and female SWD. Blueberry and red tart cherry were statistically less attractive. Additional tests that compared the

response of male and female SWD to various dilutions of selected juices revealed no difference in attractiveness of diluted juices versus undiluted material.

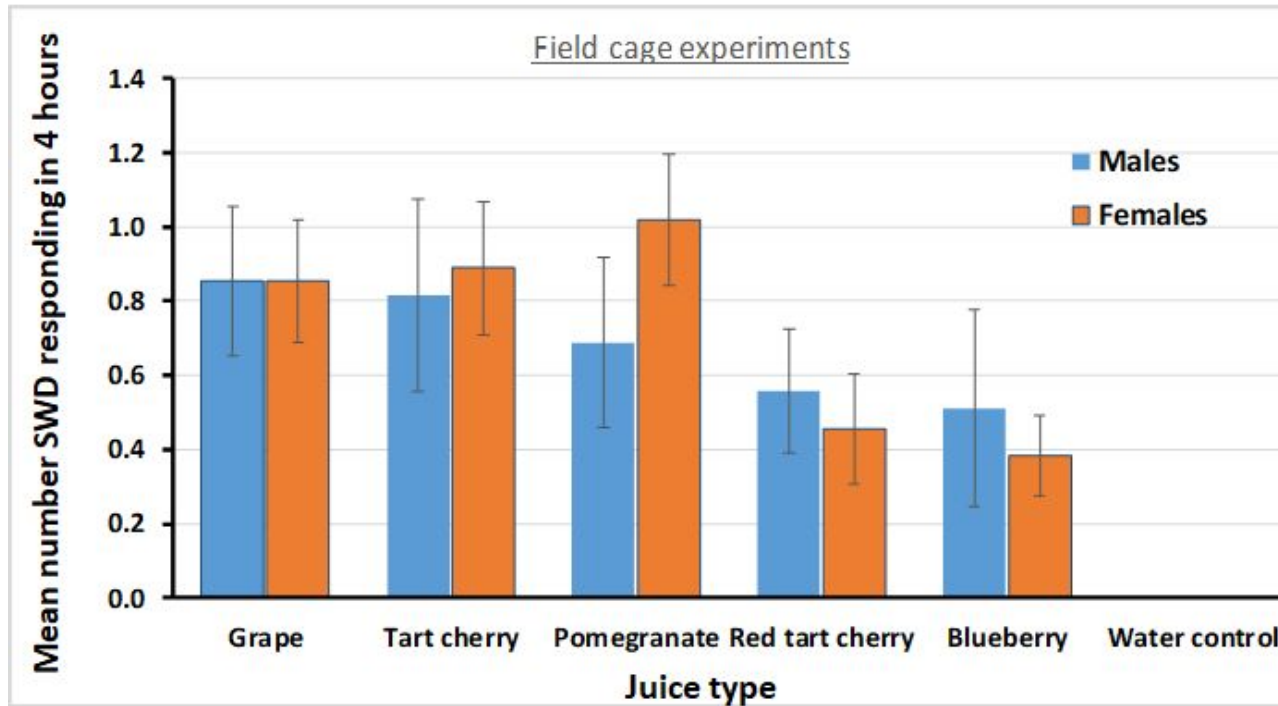


Figure 1. Male and female SWD response to five fruit juices in cages. The above bioassays involved undiluted juices. Water alone served as control.

Take-home message: Grape and tart cherry were the two most attractive fruit juices evaluated in field cages. While pomegranate was also very attractive, it was not considered for further evaluations given its comparatively greater cost and lesser accessibility.

Field experiments

Various field studies have been conducted at Clarkdale and at the UMass Cold Spring Orchard. These studies aimed at (1) evaluating various dilutions of grape and cherry juice, (2) assessing whether the attractiveness of diluted fruit juices can be increased by adding selected synthetic plant volatiles to traps, and (3) comparing the efficacy of grape and cherry juice diluted in water versus that of the Scentry SWD lure.

One of the field studies that were conducted at Clarkdale (data not shown) revealed that grape juice diluted by 50% in water was as attractive as undiluted grape juice. A separate study evaluated a 50% dilution of grape juice either, alone or in combination with selected plant volatiles against the Scentry SWD lure. Over a 3-week period, traps captured 462 males and 1,002 females. Remarkably, across all sampling dates, the 50% dilution of grape juice was significantly more attractive to male and female SWD than the Scentry SWD lure (Figure 2).

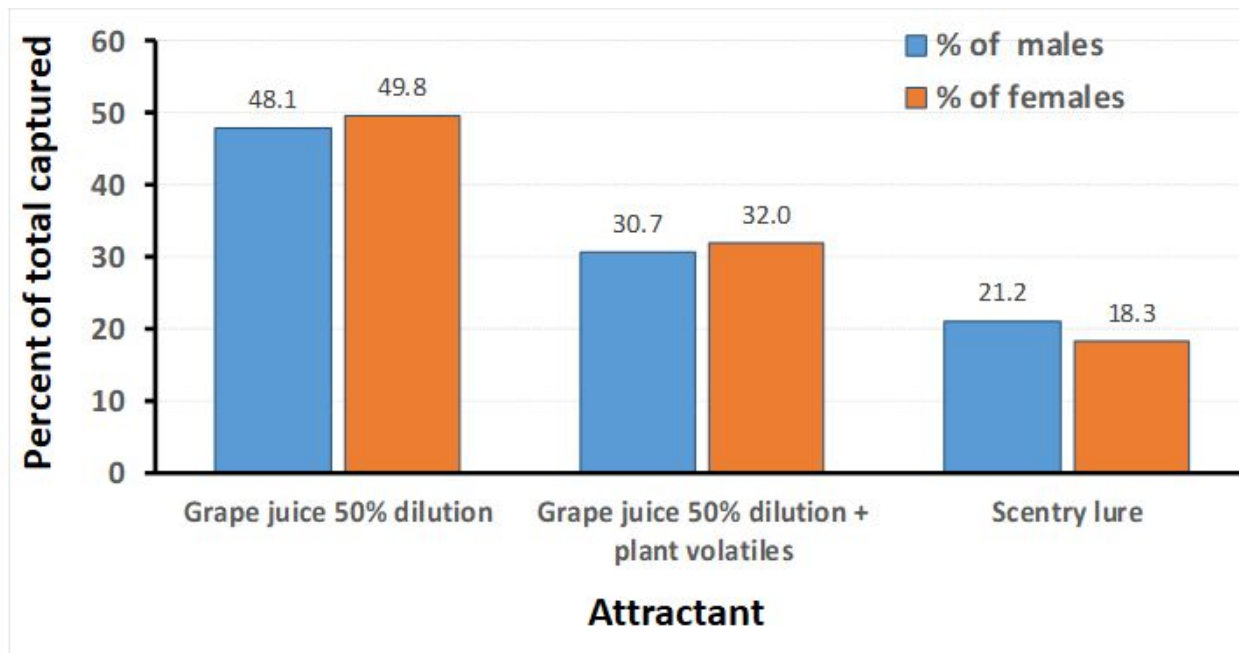


Figure 2. Male and female SWD captured by traps baited with diluted grape juice either, alone or in combination with plant volatiles versus the Scentry SWD lure.

Take-home message: A 50% dilution of grape juice was more than twice as attractive as the Scentry lure. The addition of plant volatiles to the juice affected negatively SWD captures.

Results from a separate experiment conducted at the UMass Cold Spring Orchard indicate that, thus far, grape juice diluted at the ratio of 1 part of juice in 3 parts of water (= 25% concentration) is as effective at trapping male and female SWD as the 50% dilution (Figure 3). Results are consistent across sampling dates. Experiments are underway to determine if the 25% concentration is as attractive as the Scentry SWD lure. Cherry juice dilutions and the effect of plant volatiles continue to be evaluated.

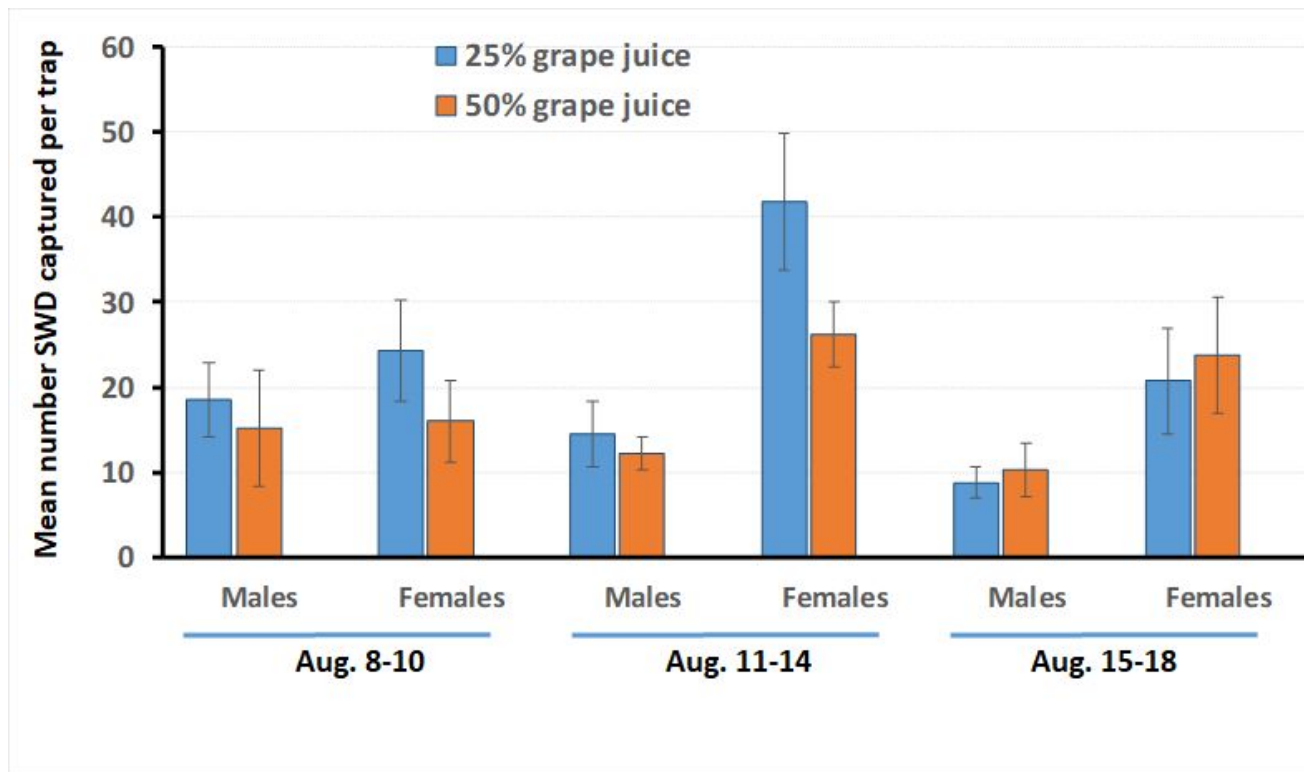


Figure 3. For each sampling date, comparison of male and female SWD captures by traps baited with grape juice diluted 50% in water or further diluted to 25% juice (= 1 part of juice : 3 parts of water).

Take-home message: A 75% dilution of grape juice (1 part of juice : 3 parts of water) is showing to be as attractive as the 50% dilution. This preliminary result points to the possibility of using diluted juice as an effective bait for SWD trapping.

Cost considerations

In terms of costs, 42 traps can be prepared with only \$ 3.50, which is the cost of one bottle (64 oz.) of grape juice (assuming traps are already available). By mixing the content (64 oz.) of the bottle of grape juice with 192 oz. of water you can produce **256 oz. of attractive bait**. This amount of bait is enough to prepare 42 traps, each having 6 oz. of the diluted juice. With the above calculations, the cost of diluted juice per trap is \$ 0.08 whereas the cost of one Scentry lure is about \$ 7.

The above research findings are for informational purposes only and do not yet represent new recommendations for SWD population reduction. The above results and the economic considerations require additional research.

Acknowledgements. The arthropod IPM program thanks Nicole Foley, Natalie DiDomenico, and Cam Olanyk for assistance. The UMass Center for Agriculture, Food and the Environment (CAFE), through the 2018 Undergraduate Summer Scholars Program, and the UMass Stockbridge School of Agriculture provided funding for this research.

Do you have any suggestions for articles on arthropod IPM? Please let me know!

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Diseases






Necrotic leaf blotch of Golden Delicious??? At UMass Orchard, resulting in significant defoliation... :-(





Horticulture (apple maturity report)

Jon Clements

Date	Variety	Drop	Diameter	Color	Firmness	Soluble Solids	Starch Index	DA Reading	Comments	Picture
8/27/18	Akane	nil	2.9	65	17	12	6 (5-7)	0.71	Some rot, sunburn, heavy crop, 1 with watercore	
8/27/18	Buckeye Gala	none	3	90	20	12.4	4 (3-6)	0.53	Pick in 5-7 days	
8/27/18	Ginger Gold	none	3.3	NA	17	11.6	2-3	0.61	Some water core, needs to be picked ASAP	
8/27/18	Rubymac McIntosh	none	3.2	85	17	11.6	2.5	1.93	Despite color not ready to pick, very tart, seeds white and not seeded well	

8/27/18	Zestar!	some	3.4	35	14	13.1	4-5	0.65	What's left after 1st pick, color lacking, very large fruit with still heavy crop	
8/22/18	Sansa	none	3	65	15.1	11.3	4	0.45	Picked as of 8/27, pretty nice this year	
8/22/18	Ginger Gold	none	3.2	NA	17.3	11.2	3	0.75	Could start harvest, nice crop on young trees	
8/22/18	Premier Honeycrisp	some	3.4	60	16.1	13	6	0.52	Pick ASAP	
8/22/18	Paulared	nil	3.2	65	19.5	12.8	3-4	1.15	Light crop, with Apogee, not pretty...	

8/22/18	Zestar!	some	3.2	45	13.7	11.8	4	0.76	Some push-off, attractive, ready for 1st pick (almost)	
8/16/18	Premier Honeycrisp	some	3.1	35	15.9	12	5-7	0.52	Could be skim-picked, then rest come off within a week?	

Hawkeye's corner (notes from the field)

Liz Garofalo

Liz is working fervently on trying to finish her M.S. Thesis, so no notes from the field this go-around. Oh, wait a minute, see Facebook Me...

Guest article

No Guest article this week...

Facebook Me



Elizabeth W. Garofalo

7 hrs · 🌐



We are lucky to have so many orchards in Massachusetts! What better way to spend the last day of summer vacation than heading to an orchard for some fresh fruit?? Check out Bashista Orchards in Southampton! <http://www.gotcider.net/index.html>



👍 Peter Mitchell and 1 other



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Scaffolds Fruit Journal: <http://www.nysaes.cornell.edu/ent/scaffolds/>

Network for Environment and Weather Applications (NEWA): <http://newa.cornell.edu>

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The next Healthy Fruit -- mostly an apple maturity report -- will be published on or about September 4, 2018. In the meantime, feel free to contact any of the UMass Fruit Team if you have any fruit-related production questions.

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