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Tree Fruit News

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Regional Updates*:

North Country—Clinton, Essex, northern Warren and Washington counties

Tree phenology: Apple=post bloom

Current growing degree days	1/1/13 to 8/6/13	<u>Base 43°F*</u>	<u>Base 50°F*</u>
Chazy		2359	1593
Peru		2355	1614
South Hero, VT		2472	1708
Willsboro, NY		2356	1591
Shoreham, VT		2490	1730

Pest focus—Apple: scab, sooty blotch, flyspeck, fruit rots, codling moth, apple maggot.

Capital District—Albany, Fulton, Montgomery, Rensselaer, Saratoga, Schenectady, Schoharie, southern Warren and Washington counties

Tree phenology: Apple, pear, peach, cherry, plum, apricot=post bloom

Current growing degree days	1/1/13 to 8/6/13	<u>Base 43°F*</u>	<u>Base 50°F*</u>
Granville		2368	1624
North Easton		2601	1814
Clifton Park		2516	1754
Guilderland		2544	1774

Pest focus—Apple: scab, sooty blotch, flyspeck, fruit rots, codling moth, apple maggot. Stone fruit: brown rot, oriental fruit moth, aphids. Pear: Fabraea leaf spot, pear psylla.

Mid-Hudson Valley—Columbia, Dutchess, Greene, Orange, Sullivan and Ulster counties

Tree phenology: Apple, pear, peach, plum, cherry, apricot=post bloom.

Current growing degree days	1/1/13 to 8/6/13	<u>Base 43°F*</u>	<u>Base 50°F*</u>
Hudson		2752	1962
Highland		2797	1968
Marlboro		2715	1903
Montgomery		2701	1896

Pest focus—Apple: scab, sooty blotch, flyspeck, fruit rots, codling moth, apple maggot, leafhoppers, mites, aphids, brown Marmorated stink bugs; San Jose scale crawler emergence predicted on 8/19 in Highland. Stone fruit: brown rot, oriental fruit moth, aphids. Pear: Fabraea leaf spot, pear psylla.

Coming Events

Coming Events: Range (normal \pm std deviation)	<u>Base 43°F*</u>	<u>Base 50°F*</u>
Apple maggot flight peak	2103-2657	1408-1838
Codling moth 2nd flight peak	1931-2735	1278-1892
American plum borer 2nd flight peak	2002-2856	1347-1785
Comstock mealybug 2nd gen. crawlers emerge	2234-2624	1505-1781

*All degree day data presented are BE (Baskerville-Emin) calculations.

Orchard Mechanization Points To Major Labor Savings

By Dr. Terence Robinson. Edited by Kevin Iungerman, ENYCH

The tall spindle planting system produces higher yields than traditional production systems. The simple, narrow and very adaptable canopy of the tall spindle system has facilitated the use of motorized platforms for partial mechanization of several orchard tasks. During the last three years we have featured several platforms (self-propelled or pulled by a tractor and single row or 2-row types) at each of the pruning demos conducted in western NY and in the Champlain and Hudson Valley fruit production regions.

Platforms are being used for pruning (with loppers, pneumatic pruners, or a chainsaw on a pole), hand thinning, tree training and trellis construction and repair. The use of platforms has increased worker efficiency and also improved the successful adoption of the horticultural techniques of limb renewal pruning, and tree height control.

Cornell mechanization research and extension in depth schools and field demonstration efforts have begun to increase producer awareness of the economic benefits of orchard mechanization.



Dr. Terence Robinson Speaking of Orchard Mechanization at the Geneva Field Day, August 2013. Photo by K. Iungerman

Current research and extension efforts for orchard mechanization are proceeding along several fronts: Using motorized platforms to position human workers for greater canopy management efficiency, and adopting mechanical pruning with hedging machines and harvest aid machines to improve the efficiency of harvest.

Labor Inputs	Traditional Central Leader Trees (1000 bu./A with ladders)	Tall Spindle Trees (1500 bu./ac with platforms)
Dormant Pruning	60 hrs/acre	20 hrs/acre
Tree Training	20 hrs/acre	10 hrs/acre
Hand Thinning	80 hrs/acre	30 hrs/acre
Summer Pruning	40 hrs/acre	1 hrs/acre
Total Pre-harvest	200 hrs/acre	71 hrs/acre
Harvest	80 hrs/acre (5 bins/person/day)	80 hrs/acre (7.5 bins/person/day)
Total annual labor input =	300 hrs/acre	151 hrs/acre

At the Geneva Field Day, Robinson reviewed 1) the current concepts of new motorized platforms for dormant pruning, hand thinning, tree training and trellis construction; 2) the Cornell concept for a fruiting wall via mechanical pruning and other fruit wall concepts from around the world; and (3) the current advances for mechanized apple harvest in the NY and the US.

Motorized labor positioning platforms to reduce pruning, hand thinning and summer pruning costs research (see accompanying table) indicates that NY apple growers could reduce labor inputs from approximately 300 man hours per acre to as low as 150 man hours per acre. Future pruning costs may be reduced even further with mechanized summer sidewall shearing.

Prior High Heat Stress Opened Pathways for Bitter Pit Entry

By Kevin Iungerman, ENYCH

Just a month ago, a prolonged string of 90+ degree days sat upon the region, and some days carried heat indexes of 105! Many of us were concerned about heat impacts upon fruit, especially if heat persisted into August.

Fortunately, the high heat abated, and the long term forecast suggesting that August would be warmer than normal (see last issue) appears to be quite the reverse, at least for the present, as temperatures more reminiscent of mid-September now hold sway and look to do so through the first full week of the month. (Meanwhile, brief- and bikini-clad bathers tested arctic coastal waters in northern Siberia as weather peculiarities continue to mount.)



Apples with Bitter Pit from Saratoga Orchard.

Photo by K. Iungerman

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Though the earlier heat is now memory, calling cards were left behind, and are now coming to notice in the form of fruit rot and sunburned fruit reports (even in the Champlain region).

These circumstances of heat damage appear especially severe if trees were under water stress at the time of the heat event(s). While many growers feel that trees can't be water stressed if they have been provided minimal irrigation and/or if the grass in row middles has not browned out; such that is not the case.

Dr. Dave Rosenberger is of the opinion¹ that soils must be close to being fully saturated for a tree to draw it's needed water complement for adequate leaf cooling via stomates when stressed by 95 F temps in full sunlight. If the draw potential exceeds supply, stomates can close, and the whole natural cooling system of the tree starts to shut down; in such circumstances photosynthesis ceases (as CO₂ can not enter stomates), fruit can overheat, cells can die, and rot organisms can move into damaged fruit tissue.

The accompanying photos show one instance of apple rot in an orchard in Saratoga County on Friday, August 2, where the owner and I estimated perhaps a 14% crop loss at present. Conferring with Rosenberger it was our



Apples cross-sectioned to show Bitter Pit internally.

Photo K. Iungerman.



Bitter Rot Saratoga County. Photo by K. Iungerman

determination we were almost certainly dealing with bitter rot; Dave allowed that the hot and humid weather during July had really permitted this disease to explode in many orchards.

Bitter rot of fruit is thought to exploit situations of severe tree stress brought on by pronounced water stress. Large particulate, gravelly and sandier soils, present greater risk in this regard; even in this year of earlier over-supply in June, with such soils there is a

lesser buffering field capacity as occurs in loamier or soils with higher organic matter.

So, what nature copiously supplies with one hand can be rapidly removed from coarse soils on the other hand via very volatile evapotranspiration differentials. Unfortunately, in this or other like instances, where fruit damage (presently visible or not) or rot may have set in, little can be done to arrest what was set in motion fully three weeks ago.

Though the earlier high heat may have inactivated natural defense mechanisms in the fruit, which can compromise fungicide efficacy, the best option for protecting remaining sound fruit is to apply the maximum label rate of captan every 10-14 days, or to use captan at 2/3rd rate plus Pristine.

¹Personal email and phone consultations with Dave Rosenberger, August 2, 2013

Harvest Nutrient Removal and Replacement for Long Term Tree Health

By Dr. Lailiang Cheng. Edited by Kevin Iungerman, ENYCH

When apples are harvested each year, all of the mineral nutrients that the fruits contain are permanently removed from the orchard. One approach to orchard nutrient management is to replace at least the amount of nutrients removed by the fruit harvest to sustain tree productivity and fruit quality. The amounts of macro- and micronutrients removed by fruit harvest are determined by fruit yield and the concentrations of nutrients in fruit. To determine the rates of nutrient removal in field-grown trees, we selected 30 orchard blocks per cultivar of Gala, Mac, and Empire in NY having a wide range of fruit yield, and analyzed the leaf nutrient concentrations at regular leaf nutrient concentrations at regular leaf analysis times and fruit nutrient concentration at harvest. Our data indicated that:

- 1) The removal of N, P, K, and B by fruit harvest is highly related to fruit yield,
- 2) Nutrient predictions based on data obtained on Gala trees grown in sand culture are applicable to trees of other apple varieties generally under field conditions, and
- 3) Fruit K and B concentrations at harvest can be predicted from leaf K and B concentrations measured at regular leaf analysis times.

Key Apple Nutrient Amounts Removed During Harvest at Different Cropping Levels				
Yield (bu/acre)	N (lbs/a)	P (lbs/a)	K (lbs/a)	B (grams/a)
500	10.3	2.6	30.6	49.9
1000	20.3	5.0	57.9	79.2
1500	30.3	7.4	85.1	108.5
2000	40.3	9.7	112.4	137.8

We believe that taking nutrient removal into consideration will allow growers to manage nutrient inputs into apple orchards more effectively to sustain high yield and quality in high density plantings. This is especially useful for management of K and B as both are present in high concentrations in fruit, but low in most orchard soils in NY.

Hello SnapDragon™ and Ruby Frost™!

Source: Adapted from “SnapDragon and RubyFrost are New Apple Varieties” by Amanda Garris, *Cornell Chronicle*, August 5, 2013. Edited by Kevin Iungerman, *ENYCH*

New York’s newest Cornell hybrid apples, SnapDragon™ and Ruby Frost™, had their public introduction at the Geneva Fruit Field Day, August 1, by Jeff Crist, vice chairman of the New York Apple Growers board of directors, and Dr. Susan Brown, leader of Cornell’s Apple Breeding Program and Associated Director of the Experiment Station.

SnapDragon™ is an offspring of Honeycrisp and a second unnamed apple in Cornell’s breeding program that was described as being similar to Jonagold. The apple captured early attention because of its taste, crispness, and the juiciness.



SnapDragon Apple. Photo: Susan Brown



Ruby Frost Apple. Photo: Kevin Maloney



Unveiled SnapDragon Marketing Poster. Cornell Fruit Field Day, August 1, 2013.

Though SnapDragon’s harvest window starts relatively early – in late September – its long storage and shelf life means retailers may be able to offer it with consistent quality for a longer time than Honeycrisp.

RubyFrost™, ripens later in the fall, stores well, and will provide a boost of vitamin C well into winter. The parents of RubyFrost™ are Braeburn and Autumn Crisp, and Dr. Brown expects it will be popular with fans of Empire and Granny Smith. It has a beautiful skin and a crisp juiciness.

The New York Apple Growers Association entered into an exclusive licensing agreement in North America for the two apple varieties with Cornell. Growers pay royalties on trees purchased, acreage planted and fruit produced, and the income is used to market the new varieties and support Cornell’s apple-breeding program. The first SnapDragon™ and Ruby Frost™ trees were planted in 2011 and they will begin to be available to consumers this fall in limited quantities, with greater availability to come by 2015. Currently about 400 acres are planted in member New York orchards.

Successful Geneva Field Day August 1, 2013

By Kevin Iungerman, *ENYCH*

Approximately 350 persons attended the August 1st Fruit Field Day at the Cornell NYS Agricultural Experiment Station in Geneva last week. It was a magnificent weather day – though several fast moving and very brief microbursts had everyone casting wary eyes to the skies at times to see if fleeting raindrops were just that or a prelude to a real soaking. We were repeatedly teased, but rains never came, and the sky bloomed light fluffy clouds with silver and black linings against azure skies; though it was a strong August sun, temperatures remained in the upper 70’s.

All in all, just about ideal conditions for a field day, a barbecue lunch under the big tent, and a great backdrop for the centerpiece news of the day - Cornell’s NY 1 and NY 2 apple were formally re-introduced as SnapDragon™ and Ruby Frost™ by Jeff Crist, vice chairman of the New York Apple Growers board of directors and Dr. Susan Brown of Cornell.

The field day’s research presentations covered tree fruit, small fruit, and grapes projects, and we also had an introduction to the newly established hop yard. Tree fruit stops were many, and included sessions on apple breeding, orchard mechanization, precision thinning and spraying, tall

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spindle management during years 1-6, russet control in Dragonfly, impacts of glyphosate on tree health, harvest nutrient removal and replacement, evaluation of bactericides for fire blight management, nematodes for plum curculio management, rain protection for cherries, high density production systems for cherries, peach rootstocks and systems, high density pear training systems and rootstocks, and scab management in fungicide resistant orchards.

I ran into people from Colorado, VT, Michigan, Ohio, Pennsylvania, and Ontario. We had New Yorkers there too of course and a wee contingent (i.e. as in few) from the Upper Hudson – Champlain Region. Yes there was a lot to take in for the folk who came for the day.

Perhaps the attested value of the highlighted research was best indicated in the journeys of the more-distant visitors; thinking about this, a song refrain of Joanie Mitchell's came to mind: "and don't it always seem to go, that you don't know what you've got till it's gone." In the meantime, for those unable to make the field day, we include the summation of several of these presentations in this newsletter (and more will follow in the next).



Growers having lunch under the big tent, Cornell Fruit Field Day, August 2013.

Apple Breeding at Cornell

By Dr. Susan Brown, Cornell University Department of Horticulture

Cornell University apple breeding effort started in the late 1890's. SnapDragon™ and Ruby Frost™ are just the latest of in a lineage of 65 cultivars that have included Macoun, Cortland, Empire and Jonagold. The breeding program has a truly integrated approach: parental selection emphasizes cultivars with good field tolerance to many pathogens, most notably scab resistance. Disease tolerance evaluation is conducted in cooperation with the department of plant pathology. Selection also has a focus on fruit quality, especially crispness and juiciness, and superior shelf and storage life as well as freedom from storage disorder. Finally, substantially subsumed throughout are considerations of consistency as to quality and productivity and achieving fruit distinctness from the standpoint of consumer reaction and marketing.

The Cornell breeding program is part of the national "Enabling Marker Assisted Breeding in the Rosaceae" collaborative project known in shorthand as "RosBREED,"

which emphasizes the rose family of plants, which has many members including apple, pear, peach, and cherry. As a multi-institutional effort RosBREED coordinates the resources of many national institutions.

Genetic studies are part of the apple breeding program and they enhance prospects for cultivar development. Studies include characterizing components of quality and their inheritance, enhancing Vitamin C content, developing reduced flesh browning types, and understanding sources of scion dwarfing and architectural genes. Brown's PhD students Ben Orcheski and Ben Gutierrez (in cooperation with the USDA) are using new technologies to study apple hybridization and germplasm (unique genetic plant materials).

Advanced selections have performed well in taste tests, storage trials, and grower trials and at Cornell. Many advanced selection are in the pipeline for both "open" releases and club varieties. After current season harvests, growers will have the opportunity to taste some of the new selections later this year.

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