2017 Vermont Apple Season Highlights

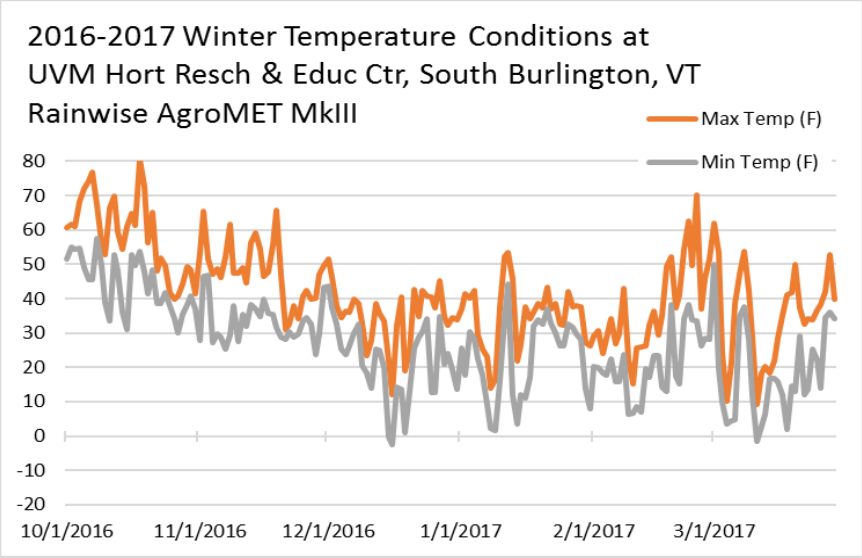
Persons Reporting: Terence Bradshaw, Tree Fruit and Viticulture Specialist; Ann Hazelrigg, Director, UVM Plant Diagnostic Clinic; Sarah Kingsley-Richards, Jessica Foster

Year	Silver Tip	Green Tip	Half Inch Green	Tight Cluster	Pink	First Bloom	Full Bloom	95% Petal Fall
2017	4/10/2017	4/12/2017	4/17/2017	4/28/2017	5/3/2017	5/9/2017	5/11/2017	5/19/2017

General Weather Conditions - T. Bradshaw

Weather data collected from Rainwise IP-100 weather station at UVM Horticulture Research Center (HREC), South Burlington, VT

Temperatures were relatively mild to warm in fall 2016 and cooling was gradual going into winter with no sudden temperature drops during acclimation. Winter was also mild; absolute low only went below 0°F on three days, and lowest temperature recorded in South Burlington was -2.6°F on December 16. Late winter included some warm (~50°F) days in February and early March, but overall was cool, and bud development was just behind 'normal' by a couple of days. Spring was cool and wet, with 3.83", 4.91", and 7.71" of rain in April, May, and June respectively (5.95" above normal during that timeframe). However, as cool and wet as spring was, by mid-July, rains became infrequent and weather warmer, and the season ended with short-term drought conditions. Between the beginning and the end of the season, the weather was, overall, average- but highlighted by opposite extremes at either end. Ripening weather in September continued to be warm and dry. Fall ripening weather was warmer than normal through September, which allowed the heat deficit from the early summer to be made up. We accumulated 2449 degree days (base 50°F) by October 1 (ten-year average is 2428); by October 18, we were up to 2612.



Horticulture Overview - T. Bradshaw

Crop yield in 2016 was about 15% below 'normal', continuing the trend of biennial production and lower yield in even-numbered years experienced in the state. Bloom density in 2017 was high on most cultivars in most orchards, but cool, cloudy, rainy weather was the norm which extended the bloom window to about ten days and many feared that pollination and fertilization weather were going to be poor. A warm, high pressure system at the tail end of bloom presented optimal weather for about two days and few orchards reported problems with fruit set as a result. Posteather during thinning was difficult- cool, cloudy weather set back in and many growers reported under-thinning. However, ample moisture appears to have offset a large number of fruit and resulting fruit size was generally good. Drought stress was observed on younger trees in many orchards including at the UVM HREC; we suspect that stress was present but symptoms not as noticeable on older trees with more established root systems. Warm weather in September delayed red color and flavor development on 'McIntosh' and similar cultivars.

Pest Management Overview - T. Bradshaw, S. Kingsley-Richards, A. Hazelrigg

Primary Apple Scab Infection Periods:
4/11-12, 4/15-17, 4/19-23, 4/25-26, 4/30-5/2, 5/4-9, 5/13-5/15, 5/21-22.
Secondary apple scab infection periods (through July): 5/25-26, 5/28-31, 6/2-3, 6/5-7, 6/16, 6/18-20, 6/23-24, 6/27-28, 6/29-7/1, 7/7-9, 7/13-14, 7/24-25, 7/27-28.

***McIntosh Green Tip Date:** 4/09

Estimated date of 100% Ascospore Maturity (NEWA): 5/22

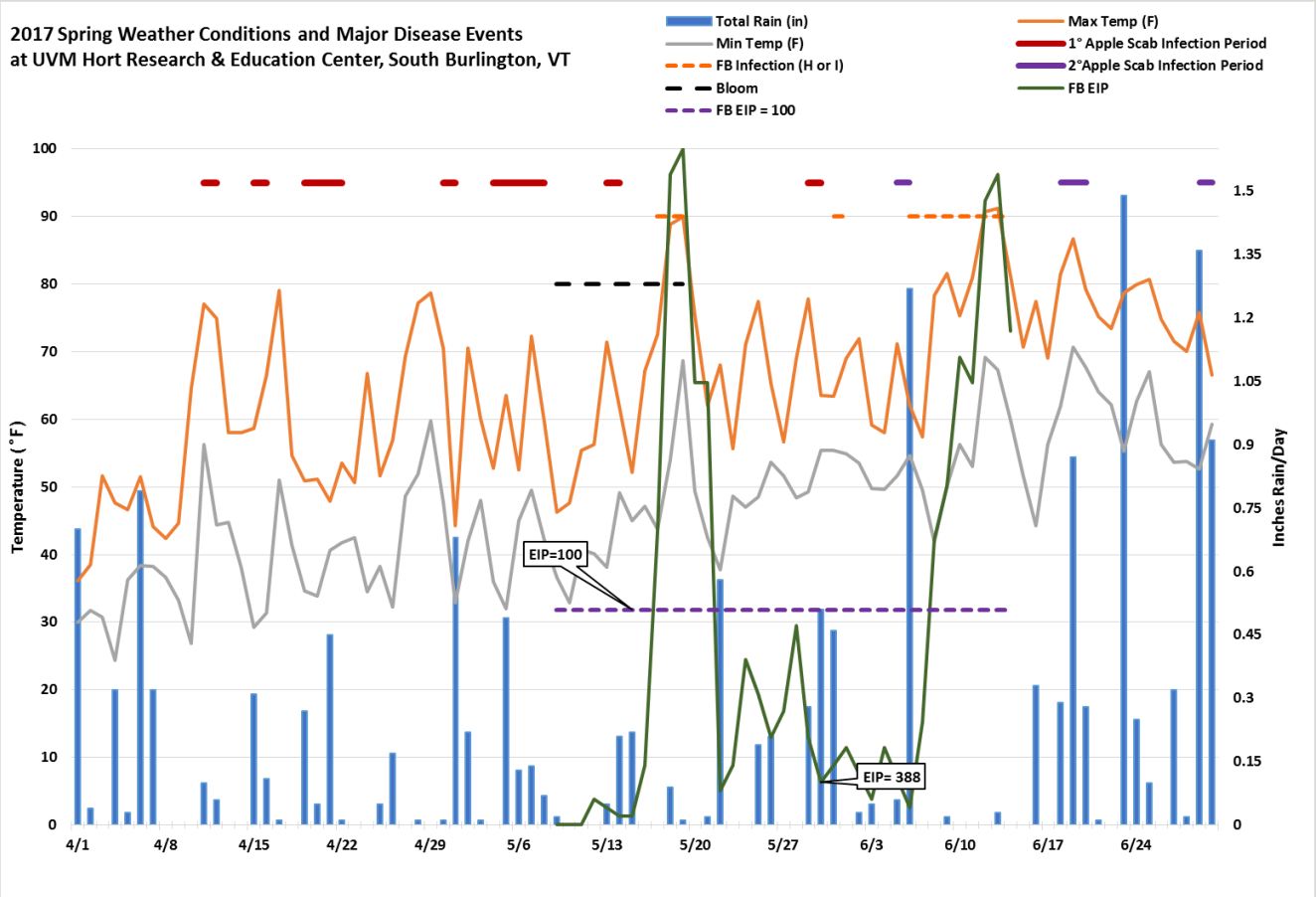
According to the NEWA apple scab model, primary apple scab season lasted for approximately six weeks in 2017. Given frequent wetting during that period it can be expected that mature spores had no problem releasing, but no spore trapping was performed in Vermont to verify the end of primary ascospore season. There were eight primary infection periods during that period, but for all intents and purposes, and allowing for split wetting periods, most of April and May were an active infection period. As a result, apple scab infection was the worst in recent memory. Most commercial orchard stayed ahead of the infections, for the most part, although scabby foliage and fruit were not difficult to find. Unmanaged orchards, however, were so infected that in many cases trees defoliated as early as August. Other foliar fungal diseases, including rusts and frogeye leafspot, were also rampant, and caused defoliation on some scab-resistant cultivars. Dry weather in summer led to surprisingly little sooty blotch / flyspeck, and fruit rots were also less common than expected given the wet weather in spring that was conducive to early development of infections.

Fire Blight Blossom Blight Infection Periods at UVM HREC:

Based on MaryBlyt and using the weather data from the RainWise weather station on site at UVM HREC. “High” risk dates in parentheses (). Extreme risk dates in **bold**.

(5/17), **5/18**, **5/19**, (5/21), (5/31), (6/1) (stopped on 6/1).

Cool weather during bloom did not allow for development of infective populations of *E. amylovera* bacteria, but a warm spell right at the end of bloom on May 18-19 pushed the epiphytic infection potential calculated by Maryblyt model into the range to cause infection. However, most trees were dropping petals rapidly during that spell, and relatively little fire blight infection was observed in Vermont orchards. In 2016, hot weather during bloom led to high potential for infection and unprotected orchards indeed saw more of the disease than we have typically seen in the state, growers were prepared. Virtually all apple acres in Vermont received at least one early-season copper application, and many growers applied streptomycin during the warm spell.



Arthropod Pests

Beginning this season, program staff collaborated with a local CPS consultant to scout commercial orchards in central and northwest Vermont. Although pest damage at harvest is limited to anecdotal reports and some (presently unanalyzed) data from a few projects, trap data were informative of the incidence of many pests around the state. This scouting program is intended to continue and be refined over the next several years.

Early-season **European apple sawfly** and **tarnished plant bug** pests were trapped in very low numbers statewide. However, even with low trap counts, the extended bloom made fruitlets susceptible to damage, and some orchards reported extensive damage from the 'deep feeding' stage of EAS larvae. **Redbanded leafroller** are all over traps, like hundreds per week- do we worry particularly about them, or manage them along with the other lepidopteran pests? **Oriental fruit moth** has been largely off the radar for most growers (*and myself- T.B.*) over the years, but was trapped in most orchards with a bell-shaped population curve that peaked around mid-late June.

Codling moth were trapped in every orchard, some at high (60-80 moths/week) numbers. Two orchards (one organic, one non-organic) were known to deploy CM mating disruption in 2017. In the organic orchard (seven years' using MD), no other controls were used specifically targeting CM and extensive damage was observed. Better protocols for integrating limited sprays with MD programs are needed. **Obliquebanded leafroller** typically peaked in mid-June, and are commonly targeted as a primary pest using degree-day models. **Lesser appleworm** and **tufted apple budmoth** were trapped in all orchards, sometimes as high as 40 moths/week. Traps for **dogwood borer** indicated that this pest is present in all monitored orchards. **Apple maggot fly** was above management threshold in most orchards by mid-July, and damage was reported at harvest in at least one orchard where a second flush August over threshold was not treated. Mites, especially **European red mite**, were a problem in several orchards by late July to early August.

In 2018 and beyond, project personnel will work with growers to train them to conduct their own accurate scouting programs, and centralized data reporting and summary will be made available to assist the industry in managing key insect pests. The presence of many, usually lepidopteran, pests that were not previously considered major pests in Vermont indicates that more work is needed to translate trap counts and orchard observations into actionable recommendations. Follow-up monitoring of fruit damage at harvest is also necessary to best evaluate IPM programs used by growers.