2018 Vermont Apple Season Highlights

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Year	Silver Tip	Green Tip	Half Inch Green	Tight Cluster	Pink	First Bloom	Full Bloom	95% Petal Fall
2018	4/23	4/25	5/2	5/7	5/11	5/13	5/14	5/21

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

Conditions for good acclimation to winter cold were suboptimal when transitioning from fall to winter 2017. Trees carried a substantially large crop in 2017, and many were over cropped; fall weather was dry, bordering on late drought conditions; and first frost was late to come on November 7 in South Burlington. Many trees went into winter with unabscised leaves and petioles, which suggested that acclimation was incomplete. Winter was cold, and the cold came early. Near 0°F was seen in Burlington on December 15, in some inland locations saw -10°F on that night, and subzero temperatures continued through the month. The rest of the winter was seasonably cold with some continued stretches of subzero temperatures, and a brief warmup (50°F) and return to seasonable temperatures in February. Early spring was cool and apple buds opened on a relatively 'normal' schedule. No frost was experienced during bloom.

Moisture conditions were deficient in most of the state from the outset of the growing season. By July, much of the southern-most counties (Windham and Windsor) received some substantial, if not excessive, rain in intense storms, yet central and northern Vermont remained dry right into harvest. We accumulated 2449 degree days (base 50°F) by October 1 (fifteen-year average is 2455); by October 18, we were up to 2747, the highest recorded since 2003.

Horticulture Overview - T. Bradshaw

Crop in 2017 was heavy to excessive for almost all cultivars in most orchards in the state. Bloom density was subsequently low in 2018, and many trees showed signs of cold and drought stress early in the season. Pollination weather was generally good, but bloom thinning conditions were set up for excessive thinner action because days, and especially nights, were warm and sunny after petal fall. Dry weather limited fruit size through the summer and into the fall. Drought prompted multiple applications of strop-drop materials to try and hold fruit on trees until reasonable ripening weather could arrive. Warm nights during bloom delayed red color development in 'McIntosh' and similar cultivars, but improved flavor in 'Gala' and other 'Golden Delicious-type ones. Many growers waited late for size and color to pick, and have been rushing to harvest even first-pick 'McIntosh' in early October. Bitter pit has been a moderate to serious problem in 'Honeycrisp' and 'Cortland' due to lack of moisture.

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

Primary Apple Scab Infection Periods:
4/25-5/1; 5/15; 5/19-20; 5/23; 5/26; 5/28-29; 6/2; 6/4-6; 6/15; 6/18.

*McIntosh Green Tip Date: 4/23

Estimated date of 100% Ascospore Maturity (NEWA): 6/18

According to the NEWA apple scab model, primary apple scab season lasted for approximately ten weeks in 2018. This is substantially longer than in most years, but infrequent wetting led to little ascospore discharge ad several periods of ascospore 'dormancy' related to dry conditions. Many of the primary infection periods were 'low infection' events based on the older Mills table. Simply put, this wasn't much of a scab year, except in orchards where guards were put down too much because of the dry conditions.

In low- or no-spray orchards, cedar apple rust was substantial, and this disease is creeping across Vermont out of the Champlain and Connecticut valleys and into the cooler highlands. Other disease of interest this season were secondary pathogens that affect weak, often cold-damaged trees- black rot, nectria canker, and silver leaf. All of those diseases were observed in mulyiple orchards across the state, and are being chalked up as indicators of a challenging crop load/ acclimation / winter damage situation. Pollination weather was generally good, bud bloom was less dense than normal and thinning conditions were set up for excessive thinner action because days, and especially nights, were warm and sunny after petal fall.

Of particular note is that acceptable disease management was had at UVM Hort Farm IPM orchards with five total fungicide applications. All materials used were protectants- copper at green tip, plus two each captan and mancozeb. No fungicides were applied after June 5, and formal packout as well as anecdotal fruit evaluation found acceptable management of all major disease. In unsprayed organic (Vf-gene scab resistant) cultivars, though, cedar apple rust and frogeye leaf spot were prevalent if not serious problems.
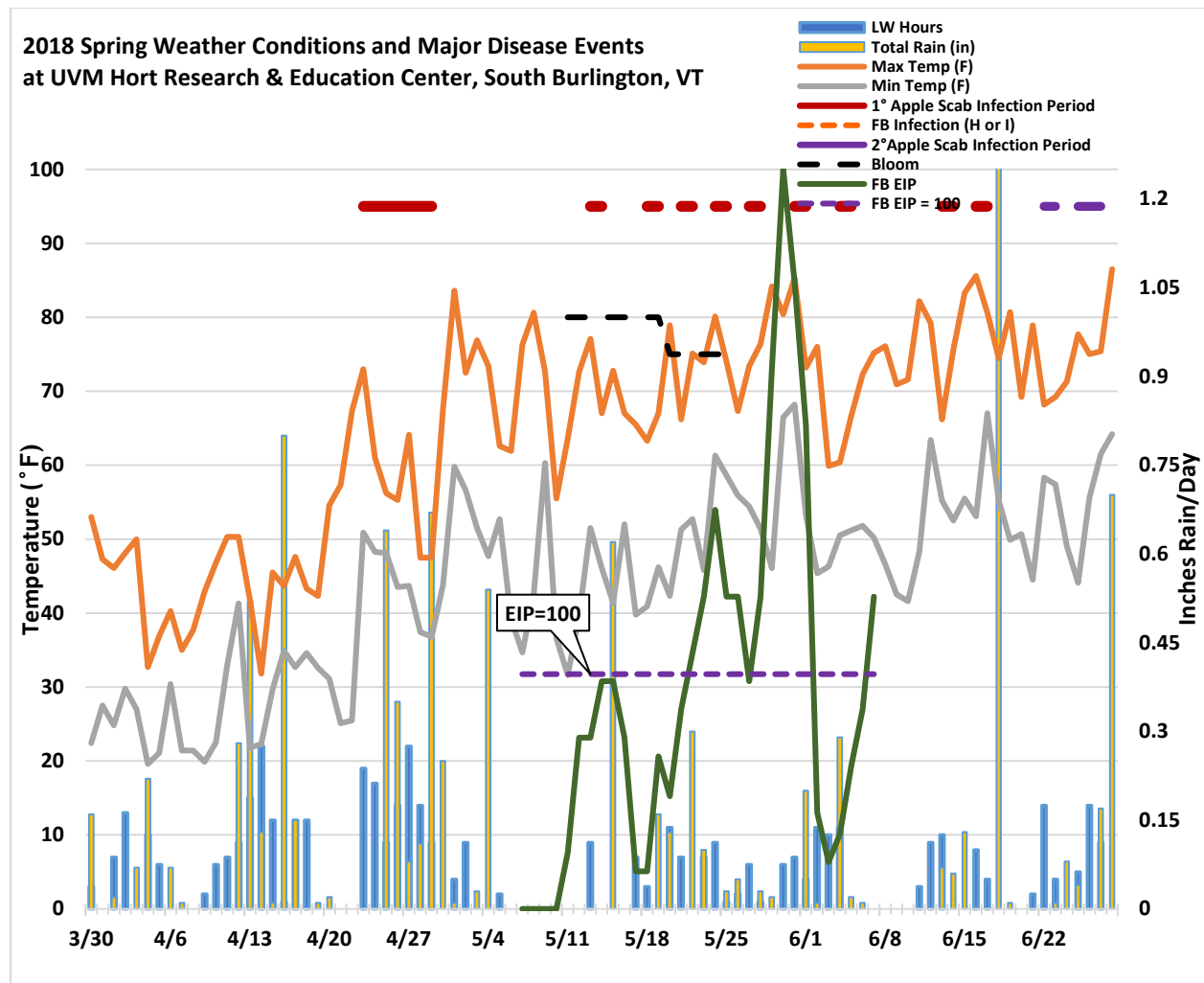
Fire Blight Blossom Blight Infection Periods at UVM HREC:

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**.

(5/23), (5/24), **5/25**, **5/26**, (5/27), **5/28**.
Mac Bloom finished, late blooming cultivar FB infection events: (5/29), (5/30), (5/31), **6/1 5** (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 25-28 pushed the epiphytic infection potential calculated by Maryblyt model into the range to cause infection, but EIP was generally below 200 most days. Most trees were dropping petals rapidly during that spell, and relatively little fire blight infection was observed in Vermont orchards.

Figure: 2018 Spring Weather Conditions and Major Disease Events at UVM Hort Research & Education Center, South Burlington, VT

Arthropod Pests

We continued our partnership with a local Nutrien / CPS consultant to scout orchards across the state. Formal sampling continued statewide in 2018 at the same ten orchard sites that were scouted in 2017: four sites in Addison county, three sites in Chittenden county (including UVM), one site in Grand Isle county, one site in Orange county, and one site in Washington county. Two new sites in Bennington county were added in 2018.

For most arthropod pests, this was a relatively low year for trap captures and fruit damage.

Except for two traditionally low-spray orchards, early-season **European apple sawfly** and **tarnished plant bug** pests were trapped in very low numbers statewide. **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 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 (~40 moths/week) numbers. **Obliquebanded leafroller** typically peaked in late-June to mid-July, 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.

Mites, especially **European red mite**, were a problem in several orchards by late July to early August.

Apple maggot fly was the main insect pest of 2018. All scouted orchard reached spray threshold early and stayed there, with some orchards recording consistent average (over four traps per block) captures of 20-50 AMF weekly. Observed damage in packout assessments has ben low, however, so sprays are working against this pest.