

NYS - Hudson Valley Report 2021: Peter Jentsch, Poma Tech Inc.

Factors Contributing to the 2021 Hudson Valley Insect Pest Management

Rainfall accumulations & temperature events: The start of the 2021 season began relatively mild in March with well below average rainfall into April with rainfall accumulations of 2.73" in March (3.6" Ave.), and below average rainfall in April of 2.82" (3.8" Ave.), increasing to above average of 5.40" in May (4.4" Ave.). June experienced well below average rain accumulations totaling 1.68" (4.4" Ave.), with few rain events to produce substantive levels of apple scab or significant fire blight infection in tree fruit and 6 days above 90°F, requiring weekly irrigation and sunburn protection in UV sensitive fruiting varieties, as did July, with significantly higher weekly levels of rain providing above normal rainfall with accumulations of 5.08" (4.2" Ave.) and 4 days above 90°F, also requiring repetitive sunburn protection. August and September also experienced higher than normal rainfall with accumulations of 5.38" (4.72" Ave.) and 7.14" (3.82) respectively. Total rainfall for the March 1st through October 1st growing season totaled 30.23", higher than 2020 (24.80") and significantly higher than the seasonal average of 25.1". Heavy rain in combination with wind events over the region had significant impact in Orange, Ulster and Dutchess County, with losses of fruit and toppling of tree support systems, causing hundreds of end and center posts to crack and sections or entire tree rows to snap at graft unions or uproot and heel over causing significant losses. Freeze events across the region on 22nd of April produced low levels of economic injury to flower clusters, causing moderate frost injury to developing fruitlets in low-lying orchards. Farms employing wind machines had low levels of injury to fruit this season.

Tree phenology: Moderating temperatures in early March supported a near average onset of bud development of green-tip on 27th March (41 year mean: Mean of 29th March) followed by mild temperatures through late March and on-through 21st April of 75% King Bloom, eight days earlier than the Mean (1st May) followed by a 14-day bloom period, 5 days longer than the 9-day average. The season began 2-days earlier than average, however, by petal-fall, the season was 2-days later than the 41-year phenology mid-range, 2 days earlier than the average date.

Degree-day accumulations of 480_{43BE} and 245_{50BE} were lower than the mid-range relative to the 41-year average up to PF. A moderate temperature range of 39.4°F to 77.5°F followed 10-days after PF.

There was ample time, sunlight and temperature (21th April - 5th May) for pollinators to yield strong fruit set in viable flowers of mid-late varieties showing strong set of lateral flowers by late May. Trees required targeted yet prudent thinning for a marketable crop with aggressive thinning made to Gala, Ruby Frost and Honey Crisp. By 10th May, 63% of McIntosh were at fruit set, with 37% of fruitlets at 5mm, with 10% of Ginger Gold reaching 10mm. In Honey Crisp, Crimson Crisp and Golden Delicious we observed high levels of bitter pit at harvest under a low BP management program, exceeding 20%. And yet across commercial orchards under aggressive calcium application programs Bitter Pit was well above 5%.

Losses from wind driven hail were experienced along the southern counties of Westchester and Orange Counties in late June, causing light to near complete loss on a number of commercial tree fruit orchards

within the narrow band of the storm. Ample water was available during the mid-late season, with flooding conditions during July through September requiring many high-density sites with very heavy cropping to add additional support to trees. In trellis systems with trees 4-7 years into production, trellis support systems were insufficient to maintain post integrity, with end trees, anchor and in-line posts giving way to very high crop loads in the upper canopy given the heavily saturated soils.



Tarnished Plant Bug (TPB) *Lygus lineolaris* presence in combination with other members of the plant bug complex including Mullein Plant Bug were observed in relatively low numbers causing low levels of fruit injury. Orchards with historical fruit damage from TPB required timely applications for management in orchards shortly after petal fall. Injury from this pest was observed to be at 2.0% by the 24th of May in the UTC Ginger Gold this season. Observed TPB injury during harvest fruit evaluations in Ginger Gold on 7th September in untreated

plots averaged 4.0%.

Plum Curculio (PC) *Conotrachelus nenuphar* damage levels were moderately high this season. ovipositional injury was delayed due to rains and cool temperature during the two weeks following petal fall (6th May). First observation of PC presence and damaged fruitlets was the 21st May (<1%). Ginger Gold, an early commercial variety, had exceeded 10mm in diameter by 24th May, at which time 30.0% was observed at 21 days post PF. PC ovipositional injury to fruit remained moderate in UTC trees into the season to 18-34% by harvest.



The NEWA predictive model employing the HVRL weather station using 308DD₅₀ calculated the PF biofix (6th May) completion of PC migration requiring residual insecticide until 3rd June, requiring three applications in most HV orchards beginning at 80% PF, followed by reapplication using a 10d intervals for effective management. Rain events occurring after PF to 2C (26th May) at the HVRL NEWA station research orchard totaled 0.83" with sufficient residue for PC management. However, the completion of PC migration continued beyond 2C requiring residue up to the 6th of June.

Very light PC migration likely began well after bloom when temperatures exceeded 70°F on consecutive days from 13th – 27th May. In early harvest assessments prior to 'June Drop', damage was assessed at near 34% in untreated Ginger Gold and Red Delicious.

European apple sawfly (EAS) *Hoplocampa testudinea* (Klug) activity occurred in very low numbers again this season with early varieties showing a range from 0.0% to 0.5% injury in Ginger Gold cluster fruit evaluations with early harvest assessments at < 1.0%. This was the seventh year in which EAS populations were at very low fruit damage levels.

Spotted Tentiform Leafminer (STLM) *Phyllonorycter blancardella* adult populations remain at very high levels in seasonal pheromone trapping with two distinct flights. Since the planting of our semi-dwarf test plots that correlate with the onset and use of the neonicotinoid class of insecticides employed in apple and reduced broad-spectrum OP use, the STLM has not been observed to cause injury to foliage to a degree requiring insecticide management. Seasonal parasitism of early larval stages continues to be observed in trees with 'soft' insecticide programs.



San Jose scale (SJS) crawler emergence calculated using Jan. 1st biofix and growing degree day based model of 973_{DD51} was predicted to occur on 29th June. However, our male SJS pheromone traps placed within our research blocks did not capture adults as expected in late May and no SJS was observed on untreated fruit. Our first capture did occur during the second week of July (9th – 13th July) which typically represents timing for the 2nd generation. Nymphs were not observed in Vaseline petroleum jelly on black electrical tape this season. In general, SJS scale levels were low in infested trees.

Lepidopteran complex: Overwintering larvae of the spotted green fruit worm (SGFW), red banded leafroller (RBLR) pupa, and larvae of obliquebanded leafroller (OBLR) emerge during the pre-bloom period and take flight through fruit set. These lepidopteran remain a concern for most Hudson Valley and Lake Champlain pome fruit growers. The tools used against this lepidopteran complex are diverse in mode of action and efficacy, with older tools challenged by overuse. The newer spinosad and anthranilic diamides groups have shown excellent residual activity and rain fastness.

Relatively low levels of infestation were observed in the pre-bloom, early and late season leafroller complex with harvest ratings for LR injury ranging between 0.0-1.5% injury to fruit in June and 1-2% injury at harvest of Ginger Gold. The Speckled Green Fruit Worm (GFW) *Orthosia hibisci*, was for the first time in 20 years, not captured in pheromone traps this season.

Codling Moth (CM) 1st generation sustained adult flight occurred on 11th May with first hatch / larval emergence predicted for 27th May using 220 DD_{50BE} from CM biofix. Complete hatch of 1st generation was predicted by mid-June with frass from CM observed on 13th July at 16% in Ginger Gold UTC. The internal lepidopteran complex, lesser apple worm (LAW), oriental fruit moth (OFM), and codling moth (CM), showed relatively low levels of damage to apple, with frass produced by the internal lepidopteran complex appearing during mid-late July. The 2nd generation adult emergence followed by sustained catch for the CM biofix occurred on 29th of June with management for larval emergence prediction using

250 DD_{50BE} to occur on July 8th. Damage from 1st and 2nd generation CM evaluated at harvest on untreated Ginger Gold showed 8.3% injured fruit.

Obliquebanded leafroller (OBLR) monitoring and management by tree fruit growers continues to be a high priority, albeit significantly lower levels of fruit injury is attributed to the leafroller complex in fruit pack-out assessments. By targeting up to three seasonal application windows while employing a single mode of action for each period, growers can achieve successful management of OBLR larvae. Recommended application windows include the pre-bloom through petal fall period for the overwintering generation, often using Bt during bloom, IGR's such as Proclaim and Intrepid at petal fall, the summer generation using either Harvanta, Altacor or Delegate, and later in August applying either Delegate or Altacor in rotation for resistance management. Recommendations for applications were made using insect phenology predictions for early emergence, using 340 DD_{50BE} from biofix to manage emergence of larvae, predicted to occur on mid-June. In general, low levels of leafroller feeding were observed on developing foliage and fruitlets in spring 2020. Trap captures began on 8th June and were moderate for 1st generation OBLR averaging 4.9 moths / day during the peak periods (week of 22nd June). The 340 DD_{43BE} emergence date of 1st summer OBLR generation was 21nd June. The 2nd generation flight began on the 27nd of July with larval emergence predicted for the 16th of August. OBLR trap numbers were very low during August at < 0.1 adults per day.

We are seeing a trend of increasingly high levels of **red banded leafroller** (RBLR) with mixed populations of **tufted apple bud moth** (TABM) and *sparganothis fruitworm* (SFW) during the season, likely contributing to overall leafroller leaf and fruit damage.

Apple maggot (AM) emergence was very early this season (22th June) compared with first emergence on 2nd July in 2018. The threshold of 5 flies per trap per block was observed on the 29th of June. Yet AM density continued to increase throughout the season and across the region with very high emergence and subsequent trap captures peaking on 27th July at 6.0 AM flies / trap / week on through the end of August. High populations also occurred late in the season on 17th August under ideal emergence conditions with high soil moisture for the adult fly.

Black Stem Borer (BSB) *Xylosandrus germanus* (Blandford) caused significant tree loss in commercial orchards during the 2019 and 2020 growing season. Fuji and Honey Crisp on dwarfing M9 rootstock in locations with well drained ripped shale outcroppings in Hudson Valley sites in Marlboro and Walden under drought conditions were found to contain BSB entry sites and rapid apple decline (RAD). These sites were under irrigation both seasons, yet proved insufficient during drought to maintain low levels of stress induced ETOH. Few sites with BSB induced RAD were observed in low lying situations with seasonal standing water. Invariably, young trees coming from nurseries appear to have insufficient root systems on M9 & often B9, to withstand extreme wet or dry soil conditions during the first few years after planting.

European Red Mite (ERM) and **Two Spotted Spider Mite** (TSSM) caused considerable early season bronzing in commercial orchards during the 2020 growing season. Varieties most impacted included Red

Delicious, Fuji and Honey Crisp. Repeated applications of conventional miticides made during the summer were insufficient to maintain levels of population below threshold to reduce foliar damage as severe bronzing was observed in early June. High temperatures exceeding 90°F beginning in late June exacerbated egg production while providing ideal conditions for rapid generational times.

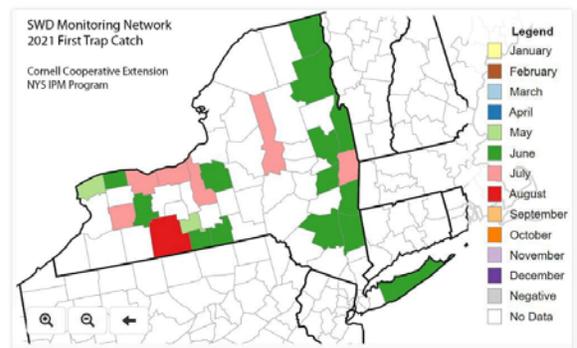
Brown marmorated stink bug (BMSB), *Halyomorpha halys*, has been observed throughout the southern Hudson Valley for the past 13 years with the first BMSB confirmation in NYS on December 2008. Since that time increasing populations have been documented in urban environments and present on many farms throughout the season throughout the lower to mid-Hudson Valley region. We have observed a **second generation** over the past several years, developing in mid-late August in HVRL with confirmation through NYS voltinism studies. In 2021 we again found oviposition and newly emerging nymphs from mid-August through September confirming a second generation.

There appears to be very low levels of stink bug feeding in apple this season from both BMSB and the **green stink bug**, *Acrosternum hilare*. Both species, being arboreal insects, can be observed from mid-season through harvest on pome fruit in lower to mid-Hudson Valley with increasing northern observations and fruit injury of BMSB observed in traps and higher incidence of fruit injury in WNY along the Lake Ontario fruit growing region.

BMSB has been found reproducing along the woodland edge of agricultural production in deciduous trees such as Sugar Maple, *Acer saccharum*; White Ash, *Fraxinus Americana*; Tree of Heaven, *Ailanthus altissima*; and eastern black walnut *Juglans nigra* in high numbers with lower numbers observed in Staghorn Sumac, *Rhus typhina*, and wild grape, *V. vinifera*.

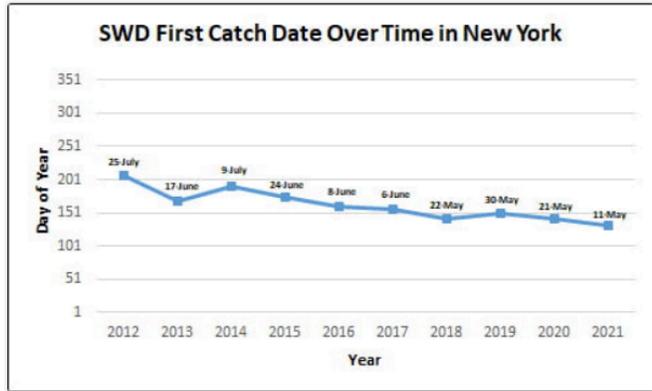
Nymph and adult trap captures of BMSB using Tedders traps employing dual lures based on stereoisomers of BMSB aggregation pheromone the *Plaudi stali* aggregation pheromone lure, *methyl (E,E,Z)-2,4,6-decatrienoate*, were observed along orchard edges in Wayne, Niagara, Monroe, Ontario, Orange, Ulster, Dutchess, and Columbia Counties throughout the season. In 2021 we monitored the population throughout NYS in tree fruit orchard sites, employing a trap threshold of 10 total BMSB adults per trap to recommend management timing for tree fruit production. We are presently recommending that grower's place traps along the orchard edge and upon achieving threshold, monitor the crop for BSMB in the tree canopy and employing a 1 per 100' of orchard perimeter threshold prior to management.

Spotted wing drosophila (SWD), *Drosophila suzukii*, (Matsumura) (Diptera: Drosophilae) were first observed in NY late August of 2011. As in years past, EDDMaps was used to record trapping data. Niagara County caught the first SWD on 11th May, which is the earliest recorded capture date in NYS. In 2022



Map showing first catch months for counties having traps. Counties colored white have no traps.

SWD were monitored in four counties throughout the lower to mid-Hudson Valley using baited Trece Pherocon traps across small fruit, grape, and tree fruit. SWD trap captures were found in Columbia County on the 21st June, 10th June in Ulster County, on the 10th June in Suffolk County. Populations were generally slow to build in commercial berry crops. Growers who harvested frequently and kept to a 3 to 7-day program in brambles and 10 day program in blueberry and cherry are able to maintain low infestations levels. We are presently recommending that growers access <http://www.eddmaps.org/project/project.cfm?proj=9> for weekly updates on SWD monitoring of adults and fruit injury for early season management.



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Pear psylla populations, *Cacopsylla pyricola* (Foerster) were unusually high this season in European pear varieties. Adults were present through winter within the orchard with the onset of female oviposition in late March. First observation of egg-laying on Bartlett of 8 eggs/50 buds made on 1st April at the HVRL research orchard. Cool spring temperatures delayed nymph emergence until late April, observed on 24th April with 15 nymphs/ 25 lvs. observed on Bartlett foliage with threshold exceeded on 14th June with 6.8 nymphs/lf. observed. The onset of severe sooty mold on untreated trees began in early July followed by defoliation of Bosc then Bartlett in August.

Major Problems/Successes this Year: Samurai wasp, *Trissolcus japonicus*, continues to be redistributed throughout the state. During succeeding sampling efforts using alpha scent yellow cards, 30% of the 155 redistribution sites have shown recapture of individuals during efforts to confirm establishment. Urban citizen scientists have stated generally that home infestation of BMSB have been on the decline over the past 5-years, yet in 2021, although very low trap numbers were observed during the season, late season presence was moderate to high with home infestations on the rise. No fruit injury was observed from BMSB this season given very high levels of rain and water table that support preferred woodland host plants.



Codling moth fruit infestation continues to be a severe problem in orchards. Contributing factors include rain events reducing insecticide efficacy, lax re-application spray schedules, delayed timing during the early emergence, reduced rates, or use of less effective insecticides. , yet in 2021, relatively low levels (UT Macoun @ 3%) were found.

Increasingly, woolly apple aphid, *Eriosoma lanigerum*, requires management in many more commercial orchards beginning in late June through harvest. Contributing factors include loss of efficacious insecticides over the past ten years. That said, late season predators including Coccinellids, primarily ladybird beetles, and lacewing larvae have been found to reduce WAA beginning in late July through harvest of early pome fruit where pest management is conducive for biological control.

Unusual entomological events: The lack of insect presence and injury to fruit was most unusual this season. Apple maggot, although present in red spheres was not causing significant economic infestations of apple this season. Fall Webworm, (Lepidoptera: Erebidae) *Hyphantria cunea* Drury, was also not observed this season in either home orchards, research or commercial orchards typically beginning early August.