Massachusetts Fruit IPM Report for 2024

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Weather

Note: all observations from the UMass Orchard in Belchertown, MA.

Minimum **Winter** temperature was 6 degrees F. on January 21. The winter was mild overall. No bud damage was expected nor observed a result of the winter weather. We had it easy.

Spring: green tip was the first week in April. Bloom was during the second week in May. It's becoming increasingly difficult to peg down green tip and bloom dates with the increasing diversity in apple varieties planted that have varying phenologies, up to a week to ten days apart. Exacerbated by a cool April. During the last week in April, the temperature dropped into the upper 20's and there was some bud damage when apple flowers were in the pink to early bud stage. But it did not put much of a dent into the apple or peach crop.

Summer was not particularly noteworthy, although overall on the warm, humid, and wet side. A high summer temperature of 92 was observed on June 21 but there were plenty of days in the upper 80's. Mid-August started a cool down which lasted into Fall.

Fall: September was a bit above average temperature, and record dry. No one was complaining about warm days and cool nights though. And largely rain-free weekends.

NEWA update: During 2024 there are 42 NEWA (https://newa.cornell.edu) on-farm weather stations in Massachusetts. If you don't have a weather station and would like to be on NEWA – where you can take advantage of many Crop, IPM, and Weather tools – feel free to contact Jon Clements, Massachusetts NEWA state coordinator.

Diseases

Massachusetts saw a little bit - or a lot- of just about everything in terms of orchard disease this year. Sanitation is the name of the game.

Apple Scab There were several orchards reporting scab at significantly higher than usual levels. Precipitation forecasts were all over the map this spring, confounding scab forecast model output making management difficult enough without compounding that trouble with extreme precipitation events- which we received in many locations in abundance- which had the potential to cause reduced/lost fungicide coverage. Sanitation should be a priority *this fall* as waiting until Spring can mean muddy orchards and trouble getting in to apply urea or implement leaf chopping.

Powdery Mildew was not as widespread as scab seems to have been this year; however, it continues to pop up at the UMass orchard every year and seems to be spreading to new locations. Honeycrisp, among other CVs, is being impacted. Even though there were a number of rain events, they were spread out enough to allow dry, high humidity conditions conducive to PM development. Again, sanitation is key to the reduction of overwintering inoculum.

Peach Leaf Curl was also a surprise development this year. Despite growers reporting implementation of their standard curl management strategies (after a year with

no crop) there was still widespread curl and subsequent defoliation. This year growers were advised to make fungicide applications of chlorothalonil after harvest, rather than waiting until the spring and to focus on tree health this year to compensate for early defoliation.

Bitter Rot continues to increase in incidence in MA orchards and in severity as well in some locations (which tend to vary by year). This year we began sending samples in for genetic analysis to determine which species within the *Colletotrichum* genus are present as not all species are sensitive to the same fungicides.

Fire Blight seems to have been, by and large, relatively brought back to heel this year after last year's outbreak, except in places that still had left over active cankers. After last year's outbreak growers were highly vigilant in controlling this disease.

Marssonina continues to kick around and is causing/ has caused early defoliation although no fruit appear to be affected.

Insects

Plum Curculio (PC): Figure 1A shows the average infestation levels recorded at harvest in 10 Massachusetts orchards. Overall, PC injury levels in 2024 were slightly lower compared to those in 2023 (Figure 1B).

Tarnished plant bug (TPB), European sawfly (EAS), San Jose scale (SJS). The injury levels caused by TPB and EAS in 2023 (Figure 1A) were low and nearly identical to those recorded in 2024 (Figure 1B). SJS was only found in one of the 10 orchards.

Japanese beetles. In 2023, we validated a mass trapping system for Japanese beetles at the UMass Cold Spring Orchard. In 2024, three fruit growers evaluated this system. At a farm in NH, three traps were deployed in raspberries and one in blueberries. At a Massachusetts farm, two systems were deployed in raspberries and one in blueberries. A single system was deployed in blueberries at the UMass Cold Spring Orchard. All traps effectively controlled Japanese beetles, capturing thousands while maintaining low beetle counts on the crops. Additionally, a mass trapping system was tested near a basil research plot at the UMass Crop and Animal Research Farm in South Deerfield and at an apple block in response to high beetle populations in a grower's Honeycrisp orchard in Bolton, MA. In the basil plot, results were acceptable but a good number of beetles were already present on the crop when the trapping system was set up. At the apple orhard, the performance of the trapping system was satisfactory but beetles were also present on trees. The trapping system is meant to intercept the pest before they reach the crop.

Mass trapping system consisting of a 3 ft-long mesh sock attached to a yellow vane funnel and baited with a dual lure(for agricultural use) containing the *P. japonica* sex pheromone and floral-based volatiles.

Brown Marmorated Stink Bug. Monitoring BMSB populations over five years revealed significant fluctuations despite consistent trapping methods. The highest numbers were recorded in 2020, with 1,324 adults from pheromone-baited sticky traps across seven orchards. In the summer of 2021, only 166 BMSB were found across five farms, increasing to 667 in 2022 across 11 farms, then dropping to just 17 in 2023 despite consistent monitoring. This population decline may be related to regional weather variability.

Sunflowers are highly attractive to BMSB and can be effective in reducing the number of stink bugs that move into cash crops

In 2024, BMSB numbers increased again, although feeding damage to apples remained relatively low, con-

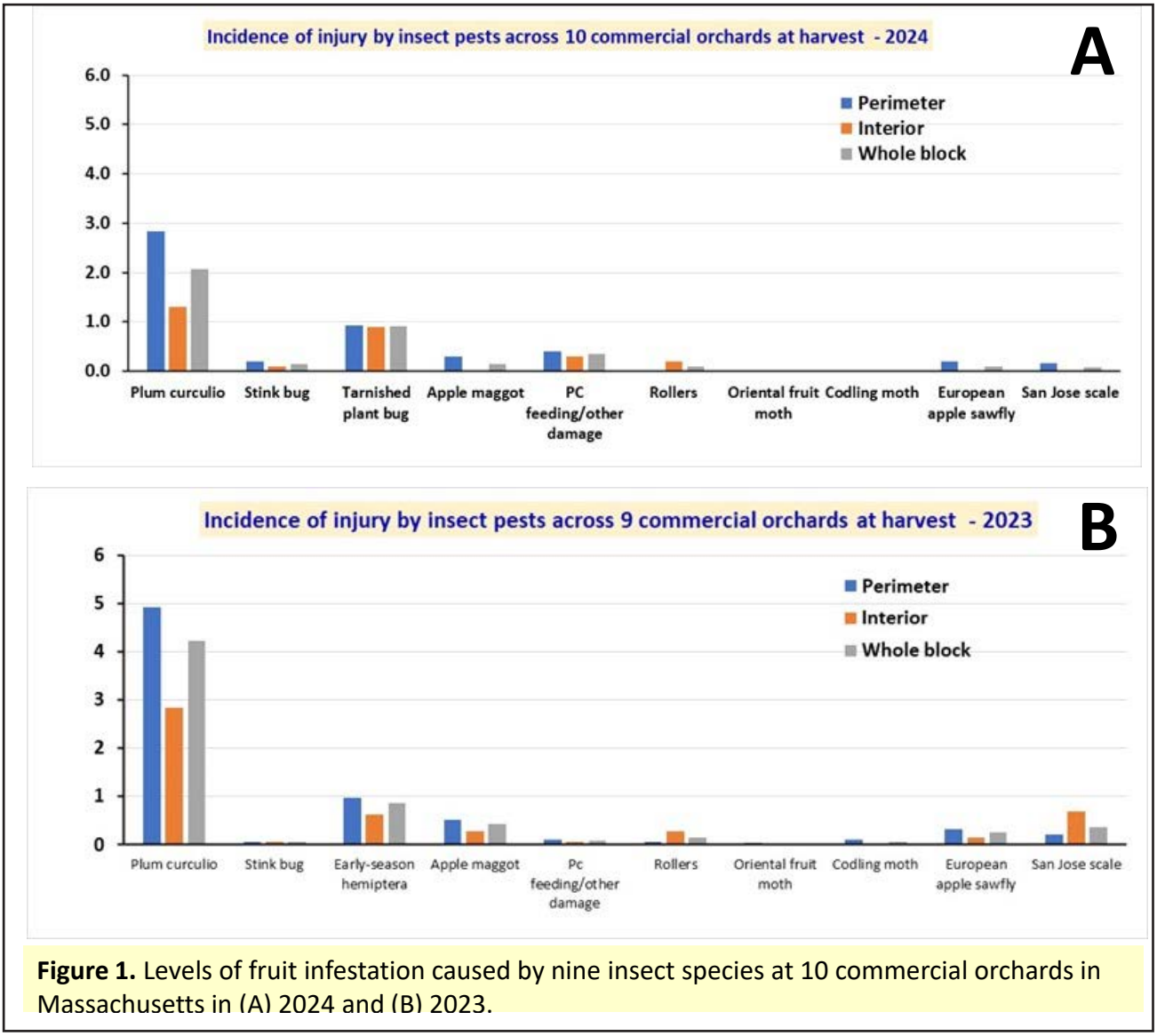

Figure 1. Levels of fruit infestation caused by nine insect species at 10 commercial orchards in Massachusetts in (A) 2024 and (B) 2023.

centrated in two orchards that were hot spots in 2020. For the past four years, we have been studying the use of trap crops (sunflower + buckwheat) combined with lure-baited traps to concentrate BMSB (both nymphs and adults) in specific areas. This research also explores whether trap crops attract natural enemies of BMSB, such as predators and parasitoids. Results from 2024 will be published in *Fruit Notes*.

Mites. Reports of severe mite infestations emerged from one orchard in late June 2024. On-farm research from early July to mid-August at CN Smith Farm East in Bridgewater, MA, involved applying Magister® SC (Gowan, Co.), a quinazoline-based miticide, at 32 oz/acre to two apple blocks. This single mid-July application effectively reduced populations of European red mites and two-spotted spider mites. Although predatory mite numbers initially decreased, they rebounded by mid-August, achieving a favorable pest-to-predator ratio, indicating effective control while preserving biological control agents. Full details are available in the Fruit Notes article.

Oriental fruit moth, codling moth, and oblique-banded leafroller. As shown in Figure 1A, Harvest assessments in 10 Massachusetts orchards revealed zero fruit injury from OFM and CM and very low injury from OBLR. Figure 2 illustrates the seasonal activity patterns of adult CM, OFM, and OBLR in three orchards.

Lures for tortricid moth monitoring. Numerous commercially available lures effectively monitor CM,

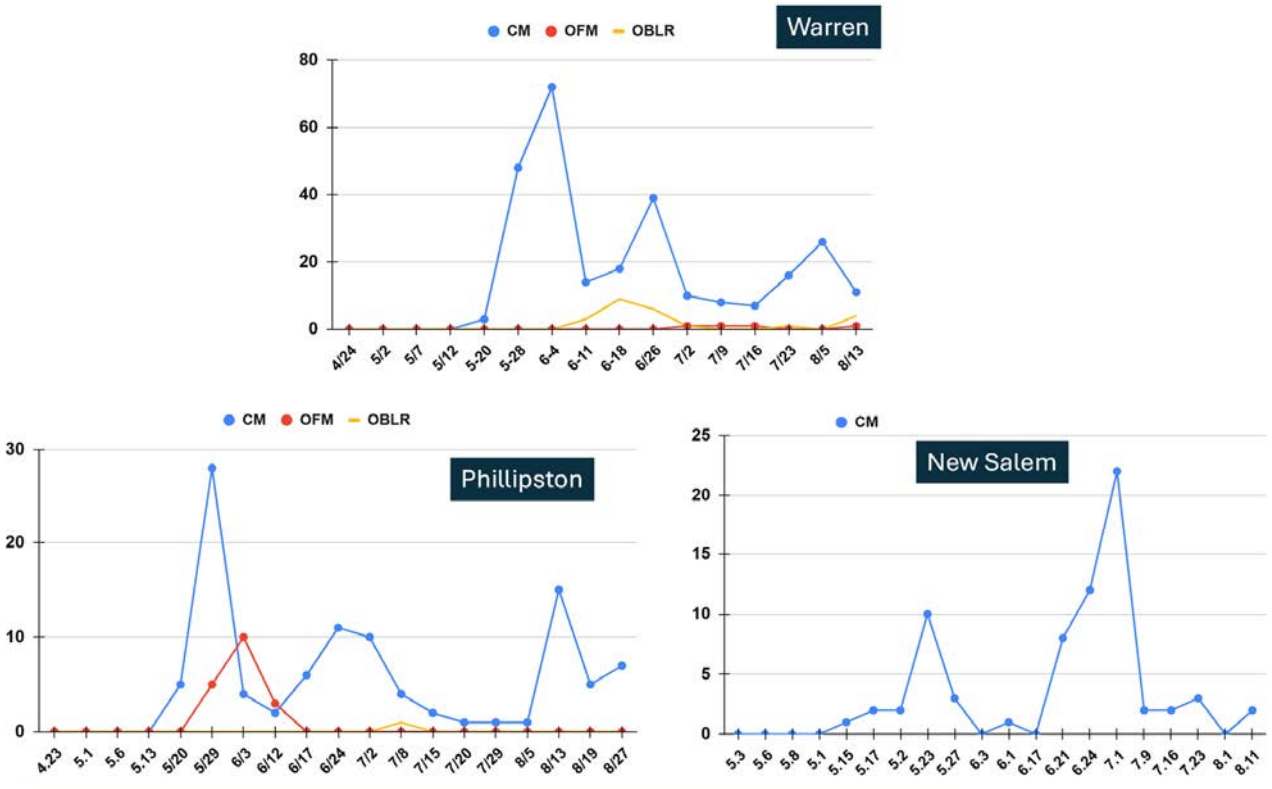

Figure 2. Codling moth seasonal activity as determined by pheromone-baited traps in 2024

OFM, OBLR, and other moth species, primarily using sex pheromones to attract males. Combining plant volatiles or kairomones with sex pheromones can increase captures of female moths. For example, adding pear ester (ethyl (E,Z)-2,4-decadienoate) and acetic acid to CM pheromone traps increases female captures (Knight et al., 2019). Additionally, the "Megalure CM 4K dual" blend of plant volatiles has been developed to attract both CM and OFM females without the use of sex pheromones (Giri et al., 2023). Ajay Giri published a Fruit Notes article describing commercially available lures for CM, OFM, and OBLR, including their deployment methods, which typically involve rubber septa for dispensing pheromones with field longevity of 4 to 6 weeks. Newer options include the PVC matrix system by Trécé, which extends release longevity to up to 12 weeks.

A red 1-quart deli container with a lid and 3/16" holes, baited with diluted Concord grape juice and table salt, serves as an effective and selective trap for SWD.

Spotted-wing drosophila (SWD). UMass has used an effective and inexpensive monitoring system for SWD for nearly five years. The trap consists of a red-painted, 1-quart plastic container filled with 6 ounces of diluted Concord grape juice fermented for seven days with 2% table salt. In 2024, the first SWD (2 females) were captured on May 28. The grape juice bait has proven highly selective, capturing high numbers of SWD while minimizing non-target insect catches. For instance, on July 29, traps averaged 442 SWD males and 332 females, with only 28 non-target insects. By August 5, SWD counts averaged 99 males and 118 females, alongside 102 non-target insects per trap.

Horticulture

Not much to report here, especially compared to 2023. It seems the apple tree decline situation reached a peak last year. Trees that were/are declining still are declining (or dead/dying), but not much new tree decline was observed.

Regarding the chemical thinning period, the late-April frost/freeze made things a little touchy. Initially some good thinning seemed to have occurred, maybe even over-thinning, however, in the end the apple crop set

was above average and even on the heavy side. There was certainly some block-by-block variability though. This was the first year Accede (Valent USA) was used widely on peaches, and results were good to non-existent. But, at the UMass Orchard where Accede was applied during the week of sub-freezing temperatures, significant over-thinning (virtually no crop set) was observed on some varieties. Consider that a lesson learned.

Berries

March was one of the wettest in Massachusetts history with a total precipitation of 8.79" in Belchertown. While this stressed some fields, specifically strawberries as they put out growth, the spring was not one to drown in. April saw an average amount of rainfall and May dried out with less than an inch. Aside from some cold snaps that zapped early flowers, flower set was relatively good. Notably, blueberries had a heavy flower bud set this year due to a mild fall in 2023, the flower set was accompanied with wonderful pollination conditions leading to a (dare I say) abundance of fruit set this season.

The mild and wet winter caused SWD to rear their feared faces at the end of May. In strawberry PYO fields, early varieties arrived earlier than usual, combined with schools not letting out yet and rather hot weather on weekends, operations saw lower attendance and higher amounts of fruit drop. In blueberry PYO fields, heat overnight in July led to fruit quickly ripening and fruit drop as well. Berry pest management programs worked well this season due to a lack of continuous storms, with almost no signs of *Botrytis, Anthracnose,* or SWD. This season demonstrated the importance of sanitation as fields with higher fruit drop saw higher SWD trap catch.

Strawberry Nursery Supply Chain Issues

Some Massachusetts growers reported receiving unfulfilled orders or sub-par materials for fall planting. Apparently, there were major concerns about the spread of Neopestalotiopsis fruit rot and leaf spot this year at nurseries using strawberry tips sourced from Prince Edward Island. No cases or reports of the disease were noted in Massachusetts this year.

Insect Pests

Tarnished plant bug. Tarnished plant bug populations reached economic action thresholds in mid-May at only one surveyed strawberry field this season. Very few TPB adults were captured on white sticky cards. Minor instances of 'button' berry injury were observed, primarily in mid-season strawberry varieties. Ultimately, TPB overwintering adult populations were notably low this year in the region; the exact mechanism is not fully understood.

Blueberry aphids. Concerns over Blueberry Scorch have piqued in recent years and more readily available virus testing may be needed by the UMass Diagnostic lab. Blueberry aphids were observed at multiple farms, with relatively high populations in the mid to late summer. While aphid mummies were not abundant, low level of parasitism occurred and growers chose not to control as there were no incidences of Showstring or Scorch virus scouted.

Black vine weevil and white grubs. Strawberry growers reported historic issues with root feeding pests, a problem intensified by this season's wet start which created a favorable environment. Scouting revealed the larvae of Black vine weevil, Japanese beetle, and Asiatic beetle to be the principal culprits at two sites. The entomopathogenic nematode, *Steinernema feltiae*, was utilized on one commercial farm and effectiveness is to be documented next season.

Potato leafhopper. Potato leafhopper appeared early in June and had great environmental conditions. Populations seemed average on farms, requiring multiple insecticide applications to protect newly planted strawberry fields.

Two spotted spider mites. Two spotted spider mite populations built rapidly in June due to prolonged heat waves and little precipitation. However, treatments were not applied prior or post-renovation with populations being controlled effectively by native predatory mites.

Blueberry maggot fly/Cherry Fruit worm/ Cranberry fruit worm. Scouted farms had either no emergence or very low trap catch, signaling very little activity from this trio of pests this season.

Weed Management

In the first year of this new position, the focus was on identifying the most important weed management needs of growers. Grasses and rhizotomous perennial weeds including oriental bittersweet (*Celastrus or-*

biculatus), yellow nutsedge (*Cyperus esculentus*), and hedge bindweed (*Calystegia sepium*) were the most troublesome weeds. Most growers used herbicides or hand weeding as their primary weed control tools and requested more support selecting appropriate herbicides to use. They also expressed difficulty in determining the best application timing. Timing is tricky because growers need to balance tree safety, herbicide efficacy, preharvest intervals, and other crop management activities.

Based on research out of Oregon, we conducted a trial testing the efficacy of quiclorac (Quinstar) on controlling hedge bindweed in highbush blueberries. There was little response of bindweed to quinclorac measured in year 1 of this research, but we plan to continue collecting data in future years.

Two herbicides often used in fruit crops have been or will be removed from production:

- The EPA issued an emergency order to stop the use of DCPA (Dacthal) because exposure by a pregnant individual can cause the fetus to experience changes to their thyroid hormone levels that are linked to low birth weight, impaired brain development, decreased IQ, and impaired motor skills. See the full Emergency Order here or here.
- BASF has decided to stop producing Rely 280, their glufosinate product for use in orchards. Existing inventory of Rely 280 can be used until it is gone. BASF will continue to maintain labels for this legacy brand for several years beyond the last date of production to allow for stocks to be used.

Special Projects/Research/Publications

Extension publications

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Hannigan, M., Rull-Garza, M., and Piñero, J.C. 2024, Harvesting Hope: Addressing Food Insecurity and Agricultural Waste Through Gleaning in Massachusetts. Fruit Notes 89(3): 13-15.

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Clements, J. 2024. 2024 Apple Maturity Report. https://ag.umass.edu/fruit/2024-apple-maturity-report

Research:

Clements, J. et. al. 2024. Precision Cropload Management of Apples. USDA-NIFA-SCRI SREP 2020-51181-32197. 09/30/2020 – 08/31/2024. https://ag.umass.

edu/fruit/nifa-planned-integrated-research-outreach-initiative/precision-crop-load-management-for-apples

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Peer-reviewed research articles

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Grants

2024 $324,262 Piñero J.C. (PD), Delisle, J. (co-PI). Impacting Change: Fostering the adoption of grower-friendly apple Integrated Pest Management strategies in New England. NIFA Crop Protection and Pest Management Program (9/1/24 – 8/31/27).

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Clements, J. 2024. OrchardWatch. Massachusetts Fruit Growers' Association. ($700)

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