The Apple Press

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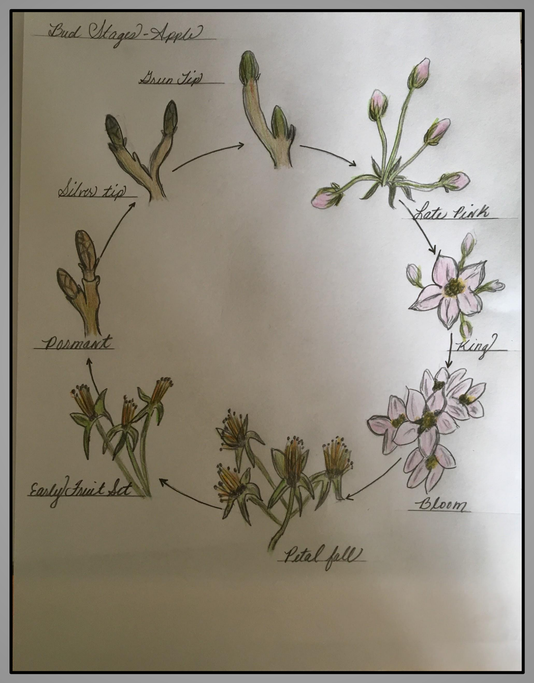
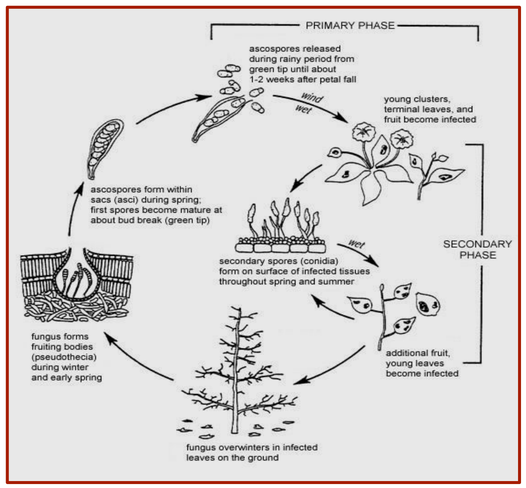
Using Models Effectively

Knowing the cycles prevents running in circles.



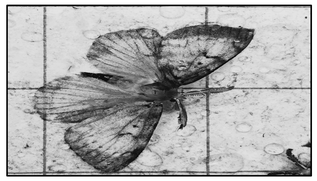
Description of Diagrams: Above 1. Apple tree bud stages 2. Life cycles of codling moth as it applies to the bud stages 3. Communication necessary for most sustainable pest management (Illustration by L.A. Ware, Reference by J. Clements-bud stages) Below: Apple scab disease life cycle provided by American Phytopathological Society



Communication is Key!

L.A. Ware 2018

Knowledge is worthless when it is not communicated effectively. There are numerous books and workshops geared toward teaching people in the agriculture world to do just that.
But as in science, theory is only part of the equation and application is necessary to produce results.
Several New England growers share information readily with one another. They have established a system amongst themselves that fits into their busy lives as farmers. Outside of that circle, Extension workers share research and knowledge with the farmers. This must be done as accurately as possible in a time sensitive manner.
Moving forward, I don't think it is far fetched to emphasis communication skills. It seems that the super science minded often get so caught up in their research or ideas, that they are lacking in their delivery to those who would put those ideas into everyday practice. As a younger generation of farmers arrives on the scene and our social climate changes alongside our physical environment, the way in which we communicate will most certainly have a multi-faceted impact.



Pests, Plants, & People

Notes from the Field

Pests, Plants, People

A report by: Lyndsey Ware, Jon Clements, Liz Garofalo, & Cam Olanyk

December 28, 2018

The University of Massachusetts Extension Fruit Team collaborated with iPiPE from May to September 2018. The Team included Jon Clements, Liz Garofalo, Cam Olanyk, and Lyndsey Ware who monitored traps and pest populations throughout Massachusetts. Primary pests were apple scab, codling moth, obliquebanded leafroller, Oriental fruit moth, apple maggot fly, spotted-wing drosophila, and brown marmorated stink bug (BMSB). Additional pests, environmental conditions, and beneficial insects did not go unnoticed. Likewise, communication between growers and academia increased making pest management more effective.

Methods:

Apple scab: In an effort to determine regional apple scab risk, a landing pad containing leaves known to be infected with apple scab was placed at five orchards in MA, VT and CT. Four potted apple trees were transported to each site and placed around the scab infected leaves, once the bud stage "green tip" had been reached in the orchard. Prior to each forecast rain event, during the primary apple scab infection period, new trees were exchanged for those already exposed to infection potential. Exposed trees were placed under the cover of a hoop house at the UMass Cold Spring Orchard to prevent further infection exposure. Using surveyor's tape, each location was color coded. Trees from each location were flagged and marked with date of departure from the orchard and rain event dates. Exposed trees were monitored for apple scab lesions. Seasonal infection risk was also tracked by monitoring pathogen development in the lab by counting spore induced to eject from leaves contained in the "landing pads". Additionally, the team put their boots on the ground and scouted the orchards for signs of scab lesions. Scouting was especially necessary in the orchards that were not part of the above method.

Lepidoptera: Wing traps with sticky bottoms and pheromone enticements were used to draw codling moth, obliquebanded leafroller and Oriental fruit moth. Three camera traps were employed between two of the orchards to aid in catching codling moth and oblique banded leafroller. (Spensa Technologies: West Lafayette, Indiana based company founded by Johnny Park in 2009; The company specializes in precision agriculture and is known for its ag-related technologies.)

Brown marmorated stink bug: multiple trap styles were used to monitor this pest: the rocket trap is placed in the tree canopy, tedders traps were placed on the ground near trunks and sticky panels were deployed attached to wooden stakes in the ground, also near trunks. Pheromone packets invited the stink bugs into each trap. In tedders traps, pheromone packets flanked a "kill strip" that ultimately did them in (Nuvan pesticide strips with the active ingredient, vapona). The idea was to catch incoming BMSB as they moved from the surrounding woods/structures into the orchards.

Apple maggot fly: These small flies were identified by the "F"- like marking on their wings. Simple non-pheromone yellow sticky traps were hung from trees on the borders of the orchards. Many pests and, sadly, the occasional beneficial were found stuck to the traps. Wet conditions made for a soupy mess at times requiring an investigative eye to see the often dislocated body parts of the apple maggot fly.

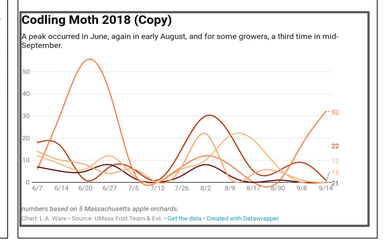
Spotted wing drosophila: required a different design. A deli cup style container with holes toward the top allowed entrance to the small flies seeking out Suzukii on the inside. Once in, they fell to the liquid filled bottom and drowned. Those particular traps were treacherous to count. The tiny organisms were collected by filtration on a paper towel, brought back to the lab and sorted tediously beneath microscopes.

Traps were checked weekly. Trap captures were recorded in field notebooks, entered into the iPiPE app, iPiPE and internal spreadsheets. Information found on the six orchards was relayed to the appropriate growers and consultations regarding IPM decisions were conducted accordingly. Communication remained essential. This was reflected throughout interviews conducted with the region's growers.

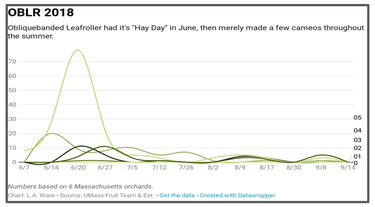
Results:

Apple scab: Leaf lesion development confirmed when a rain event was also an infection event at each location. Based on visual scouting, Eastern parts of the region were hit hard with apple scab while others managed to keep the scab isolated to more susceptible varieties such as Mcintosh and some orchards showed very little to no signs of scab. Approximately one fourth of the 220 test trees proved to be infected. During their time in the hoop house they developed aphids and other problems that may have impacted the accuracy of data collected. They now reside in a root cellar and await a new life as cider trees.

Codling moth fell short of surprise by following their predictable peak times with the first generation peaking in June and a milder second generation peaking in early August. One of the five locations however, surprised us with another peak in mid-September despite the grower's efforts to completely eradicate them.

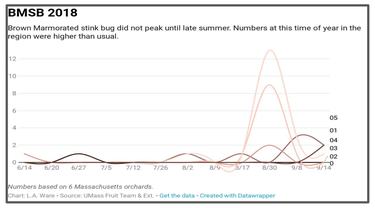


Obliquebanded Leafroller peaked during the second half of June. It is worth noting that the few orchards that demonstrated high numbers at the peak varied significantly from the majority of the orchards during that same peak. One orchard peaked at numbers as high as 77 OBLR while most of the other locations peaked at an average of 16 OBLR.



A low economic threshold of 1-2 apple maggot per trap per week was reached but not exceeded. As mentioned above, the traps seemed to catch more of everything else under the sun.

Brown Marmorated stink bug were few and far between until late August. The first nymphs were found at the end of June. More were caught in the first week of August and trap captures reached greater numbers than previously seen in MA toward the tail end of August. The team has continued to see BMSB overwintering in various shelters. Spotted Wing drosophila mostly only exceeded high numbers in orchards that also maintained small fruit crops.



Exit interviews with growers validated both the team's observations as well as the grower's throughout the season. Being able to compare notes and share information enabled sound preparations to be made. More importantly by listening to the growers share their experiences and perspectives, the team was able to make better sense of the picture as a whole. Timely communication was necessary to effectively resolve pest issues while also tending to countless other moving parts that are a farmer's day-to-day reality.

Conclusion:

The methods used were sufficient in collecting the intended data needed to aid growers in making important pest management decisions. The traps varied in convenience. Although the more advanced camera traps provided immediate information via its accompanying software, people were still required to check on those traps when technical difficulties occurred. The iPiPE app intended to track the data was useful to a degree for the team. But when it came to communicating that information to growers, it repeatedly proved more reliable to talk with them directly.

Feet on the ground and eyes on the surroundings of all traps made for more comprehensive assessments of pest incidence. With numerous pests and environmental factors to consider, all collected data was helpful. The growers who collaborated with the team were able to synthesize the team's data with their years of expertise and keep crop damage to a minimal.

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