Cornell Cooperative Extension
Eastern NY Commercial Horticulture Program

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Tree Fruit News

Increasing Your Wild Orchard Pollinators

Mike Basedow, CCE ENYCHP

Back when we were nearing petal fall in the Champlain Valley, a grower and I were discussing when he ought to take his honey bees out of the orchard, which led us to discussing the role wild bees are playing in his orchard. These wild bees help pollinate our crop every year, so I think it is worth reviewing some of the different kinds of bees we can expect to see at bloom, and what we can do to encourage their visits.

Colletes inaequalis female , photo by Margarita López-Uribe , CALS

Over 100 wild bee species visit orchards in the Northeast. Many of these bees are native, and can be very good at pollinating fruit trees when their populations are in sufficient numbers close to the orchard.

Unlike honey bees, many wild bee species are solitary, living in their own nests. Some of these bees build nests underground, and are therefore referred to as ground nesting bees. Bees in this group include cellophane bees, mining bees, and sweat bees. These bees prefer to build their nests where the ground is bare and the soils are well-drained, so a relatively simple way to increase these pollinator populations near your orchard is to leave some areas of ground free of vegetation.

Tunneling bees are another common group of wild pollinators. This group tunnels into dead trees and wooden structures, or takes up residence in other open cavities. This group includes mason bees and carpenter bees. To increase your farm's tunneling bee populations, consider maintaining a woodpile on your property that the bees can use a nesting site. Having hedgerows and wooded areas around your orchard blocks will also provide good nesting areas. If you would like to take an even more hands-on approach, you might consider building nesting boxes to place on the edge of your orchard.

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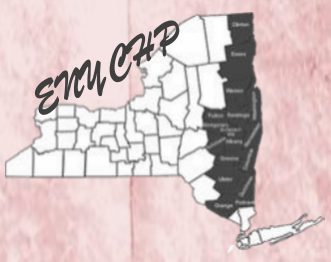

A third common group of pollinators includes honey bees and bumble bees. These bees are social, living together in groups, and build their nests into preexisting cavities. Similar to what you might do to increase populations of tunneling bees, having wooded areas near your orchard blocks will help bring more cavity nesting bees into the orchard at bloom, as will having a woodpile nearby.

In addition to providing areas in your orchards for nesting sites, wild bees need to have enough flowering plants throughout the growing season to forage while the fruit trees are not in bloom. Some bees, like bumble bees, are active throughout the entire growing season, while our apples might only be in bloom for a week. Since many orchards in Eastern NY are located near wooded areas, there are many wild plants in bloom around the orchard throughout the growing season already. You and your neighbors probably have many other flowering plants on your property, and weeds along the roadside also provide a food source for the wild bees. To hedge your bets further, you may consider planting a few strips of flowering plants near your orchard blocks. Just be sure to choose plants that do not bloom at the same time as your fruit trees.

Distance can be an important factor in how well wild bees may help pollinate your blocks. Some bees, like honey bees and bumble bees, can fly over a mile from their nests, while others may fly less than 500 yards from their nesting site. This may limit wild bee pollination in blocks where a large portion of the trees is over 500 yards from the periphery of the orchard, where nesting sites and other food sources are available.

So, while honey bees will continue to be our go-to pollinators, you still might consider some of the small steps you can take to make your site even more attractive to our wild pollinators.

For more detailed information, including color photos of the bees mentioned here, please see the publication *Wild Pollinators of Eastern Apple Orchards and How to Conserve Them* by Mia Park et al., 2012.

Hail Netting, Is it Right for your Farm?

Elizabeth Higgins, CCE ENYCHP

Figure 1: Hail Netting in Clinton County, NY (photo credit: Elizabeth Higgins, ENYCH)

Increasingly tree fruit growers in NYS are looking at hail netting as a tool for reducing the impact of hail in their orchards. Hail netting is already widespread in Australia, Europe and is increasing in popularity in Washington State. Netting is used in those places not only to protect the fruit from hail, but also from sun damage, insect and pest damage, and to increase the quality of the fruit crop. While hail netting seems to have promise, the growing conditions for tree fruit in New York are not the same as Australia, Europe and Washington. The Cornell Cooperative Extension Lake Ontario Fruit Team has recently received a grant to study hail netting in New York and its impact on pests and disease, yields, and quality of the fruit and to better understand the costs and labor needs for managing a hail netting system in a New York orchard.

Growers considering hail netting (or any other investment to protect their crop) need to consider the following questions:

- How likely is the situation I want to avoid and how much harm would the situation cause to my farm business if it occurred? (risk assessment)
- How much would it cost to protect myself (not just in money, but also lost opportunities) and how effective are the protection strategies? (cost benefit)
- Are there other alternative investments that would result in an improved overall situation for the same or lower investment? Make sure that you are prioritizing the "weak link" in your business.

For example, an asteroid hitting your farm could be devastating but it is also highly unlikely, and your options to protect yourself are few and costly. Asteroid protection is probably a low priority investment in most farming operations. Money is better spent on pest control,

irrigation, and improved horticultural practices. So, what do we know about hail netting now?

In research conducted in Australia*, apple price was found to be the most influential factor determining the profitability of hail nets. According to researchers "to offset high establishment costs, orchard productivity under hail netting must be maximized through the production of high yields of premium quality fruit and efficiency in tree management". However, studies did indicate that if the price of hail netting was low enough, it would be cost effective in a wider range of orchards. They also did consider benefits to hail netting such as improved apple quality (even when there is no hail), improved spray efficiency, and reduced pressure of pests and diseases.

Unfortunately, data on frequency and probability of hail affecting a specific location is not accurate and good models are not available. It turns out that hail is really hard to model because the conditions that would create hail in the atmosphere, do not necessarily result in hail on the ground. Recent research on hail in the context of global warming indicate that in the future (in the Eastern United States), hail events are likely to decrease but the hail that does fall will be more damaging**.

Hail is certainly damaging to tree fruit growers. From 2015 -2017, 993 acres of apples in the LOFT region received insurance payments for hail damage. The reimbursed loss was $4,139,880. This loss does not include: loss of market share, uninsured acres, multi-year impacts on production, the financial burden in the lag in receiving insurance payment.

If you are considering hail netting, and can't wait for the LOFT research to be completed, I have developed a quick spreadsheet that you can use to calculate the net present value of installing hail netting on your farm. You can include 1-3 hail events in the 10 year period and change the percent of fruit that goes to processing. The spreadsheet is located at this link: https://tinyurl.com/yc7jogot. The spreadsheet does not include multi-year effects, other benefits of hail netting, and labor costs only include manufacturer's estimates for application and removal at the beginning and end of the season. Once the LOFT project is completed, this tool will be refined with more accurate data and a sensitivity analysis. If you have any questions about this spreadsheet please contact me at emh56@cornell.edu.

**Whittaker and Middleton. "Profitability of Hail Netting in Apple Orchards". Contributed paper for the 43rd annual conference of the Australian Agricultural and Resource Economic Society at Christchurch, 20-22 January 1999 and Middleton and McWalters. "Hail Netting of Apple Orchards – Australian Experience". Presentation at 45th Annual IDFTA Conference February 16-20, 2002, Lekowna, British Columbia, Canada*

***Brimelow et al. "The changing hail threat over North America in response to anthropogenic climate change". Nature Climate Change 7, 516-522 (2017).*

Were you affected by the storms on the 16th of May?

Just a reminder to report to FSA if you had damage from the storm on the 16th (or any other time, for that matter). If you have suffered damage, call your USDA Farm Service Agency (FSA) office and notify them of the extent of damage. This information influences the availability of federal disaster assistance. If you have orchard and vineyard damage you can sign up for Tree Assistance Program (TAP). For more information on the Tree Assistance Program see: https://www.fsa.usda.gov/Assets/USDA-FSA-Public/usdafiles/FactSheets/2018/tap_fact_sheet_may_2018.pdf

Have you considered Whole Farm Revenue Protection?

Are you thinking about crop insurance for next year? The Cornell Crop Insurance Education Program suggests that fresh market apple producers consider Whole Farm Revenue Insurance as a possibility, either alone or in conjunction with your existing APH yield-based program. Whole Farm Revenue Insurance insures you for loss of revenue due to a disaster rather than loss of yield. Currently the federal subsidies are high and premiums may be lower than the APH program. They developed a video that covers Whole Farm Revenue Protection at https://www.youtube.com/watch?v=wpEtW-YIrbg The scenarios presented at the ENYCH Fruit and Veg Conference are available as an on-line presentation at: https://youtu.be/jl-GZOouc2c.

Ag-Analytics

USDA
U.S. Department of Agriculture
Risk Management Agency

The CCE Apple Decline Survey has been Extended through Summer 2018

Dan Donahue, CCE ENYCHP

The Issue

Cornell Extension Specialists are being asked with increasing frequency to investigate both chronic decline and rapid collapse of apple trees in young, high-density plantings in all regions of New York State. Symptoms of chronic decline can include poor growth, off color foliage, and a generally unthrifty appearance that worsens over several years. The death of an (apparently) previously healthy tree over the course of just a few weeks has been termed Rapid Apple Decline (RAD). While the symptoms of chronic decline are subtler in some cases, RAD is eye-catching. Afflicted trees appear to "burn up" mid-summer after having set and sized a normal crop load. RAD may be a subset of the chronic decline condition or a completely different problem; causation is unknown at this time.

In some of these cases, tree death, initially thought to be either chronic or RAD, upon further testing can be ascribed to Fire Blight (Erwinia amylovora) or Crown/Root Rot (Phytophthora sp.). In other cases, the causation is much less clear. The decline and demise of apple trees in orchards up to the 8th leaf is currently a hotly debated topic among producers, researchers, extension specialists, industry consultants and nursery businesses in several states across the country, as well as parts of Canada. A long list of potential causes of decline has been compiled by fruit workers throughout the eastern U.S., including winter injury, herbicide injury, ambrosia beetles, and dogwood borer.

From recent studies, Cornell virologist Dr. Marc Fuchs and a team of Cornell Cooperative Extension Regional Specialist have discovered a resurgence in the incidence of latent viruses in recently planted apple orchards across New York State. A latent virus is defined as a virus that doesn't normally produce visible symptoms in an infected tree. Studies have indicated the potential for reduced tree growth and yield in some instances. As reported at the 2018 CCE-ENYCHP Fruit & Vegetable Conference in February, latent viruses has been identified in over 50% of tested trees surveyed across the state in 2016 and 2017, with 12% of samples found to contain two or more species. Virus species identified include Apple Chlorotic Leaf Spot Virus (ACLSV), Apple Stem Pitting Virus (ASPV), and Apple Stem Grooving Virus (ASGV). ASPV has been the most commonly found latent virus to date. While not a latent virus because it produces visible symptoms in the graft union and is directly implicated in tree death, Tomato Ringspot Virus (ToRSV) has also been observed, but at a comparatively low incidence.

An example of chronic apple decline in a 7th leaf Zestar! orchard.

The high incidence of latent viruses in young New York State apple orchards is troubling. The interaction of virus infected budwood with newer rootstocks which are relatively unproven in commercial plantings is a cause of concern and the subject of ongoing research efforts. The consequences of two or more viruses infecting a tree in a commercial orchard are not well defined. Many acres of high-density orchards are being top-worked from less profitable varieties over to more popular choices. First identified in Japan (Yanase, H. et. al. 1975) *Top-Working Disease* is a condition where the grafted scion suffers from gradual decline associated with the presence of latent virus in the grafting material. Virus testing bud sticks or the host tree is not commonly practiced in Eastern New York orchards prior to top-working. Roughly speaking, considering the high incidence of latent virus found in orchards of 10th leaf and younger, both host trees and bud sticks that fall in this age range should be considered suspect and be tested.

We cannot discount the possibility that the observed declines are due to interactions between multiple

stressors, or that we are facing the possibility of a previously unrecognized problem. Apple Luteovirus 1 (ALV1) has been found in three of four tested ENY orchards to date, with additional orchard survey testing currently underway. A group of virologists including Dr. Ruhui Li of the USDA, Dr. Kari Peter of Penn State, and Dr. Ekaterina Nikolaeva of the Penn Dept. of Ag. discovered and described the new Luteovirus species in late 2016 (Lui et al. 2018). Some species in the Luteovirus family are known plant pathogens. The pathogenicity status of ALV1 as of the writing of this article has not been determined, research on this topic is currently underway in both Pennsylvania and New York.

An example of Rapid Apple Decline (RAD) in a 7th leaf Zestar! orchard.

The Apple Orchard Decline Survey

After numerous orchard visits by specialists in different states, a working group of regional apple professionals coordinated by Dr. Kari Peter of Penn State University has developed a comprehensive list of symptoms to identify declining orchards. From this list, extension professionals in Pennsylvania and New York developed an online survey of apple tree decline to facilitate consistency in the collection of orchard data, and the identification of commonalities. Thirty-seven orchard surveys were completed in 2017, with more in progress. The NYSDAM Apple Research and Development Program granted an extension to Dr. Tess Grasswitz (CCE-Lake Ontario Fruit Program) and I to continue survey data collection through the summer of 2018. To date, the results are inconclusive and do not point to any specific causes. Chlorotic foliage in declining trees has been identified as a common symptom. More surveys (i.e. data points) are needed to reliably identify causal factors.

If you have apple blocks showing decline symptoms, your comprehensive and accurate completion of this online survey will be an essential first step in helping us identify possible causes and to search for solutions to the problem. Please include data for all your declining blocks: the more data points we have, the more we will learn. Please be assured that your specific farm information will be kept strictly confidential. This statewide apple decline survey project has been funded by NYS apple producers under the auspices of the NYSDAM New York Apple Research & Development Program. To complete the survey, please click here. The survey may take a few moments to load. If you would prefer to complete the survey through an in-person interview during a farm visit, please contact Dan Donahue at djd13@cornell.edu and arrange an appointment before the end of August.

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