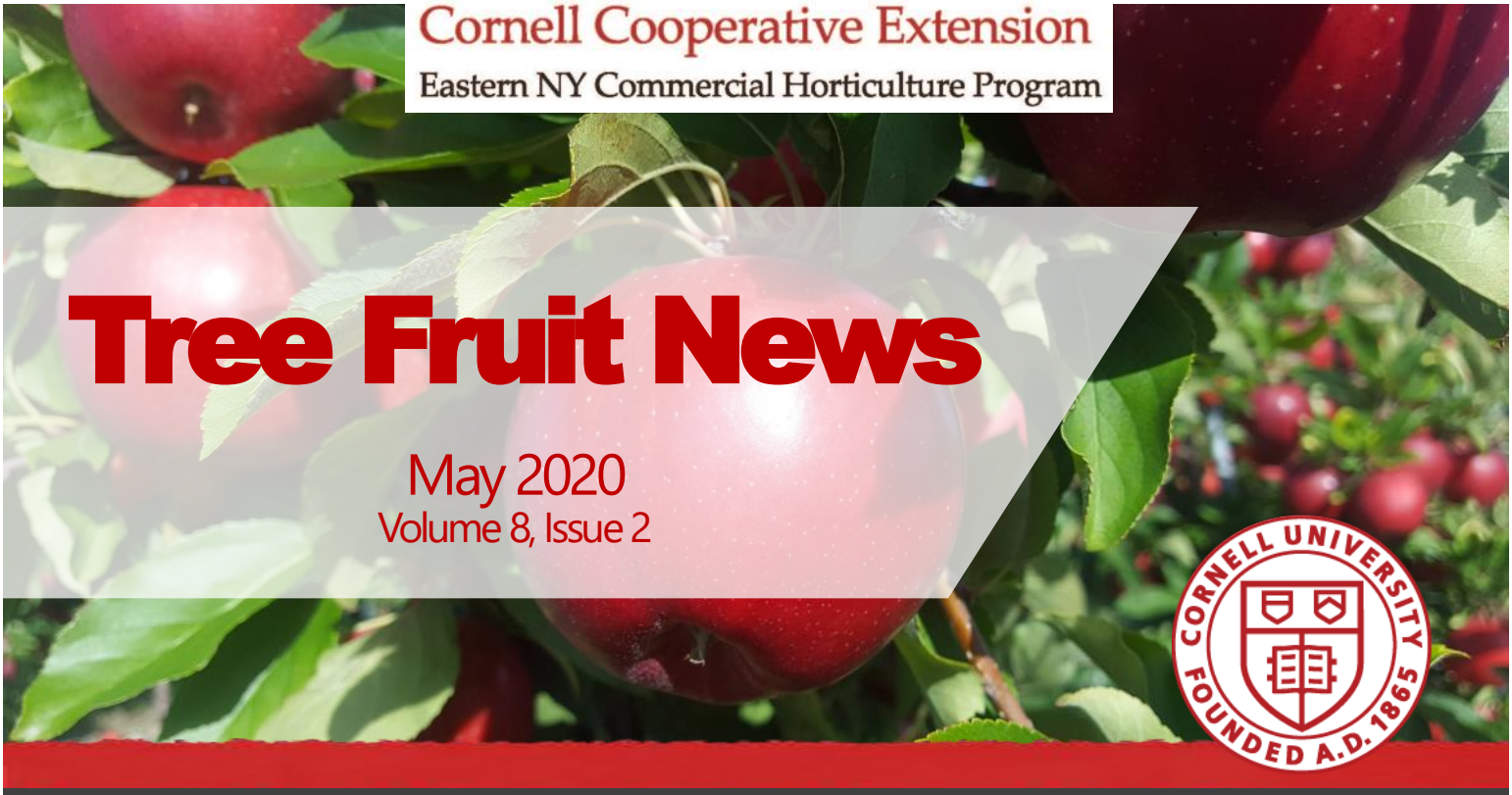
Cornell Cooperative Extension
Eastern NY Commercial Horticulture Program



# Tree Fruit News

May 2020
Volume 8, Issue 2

## The Use of Plant Growth Regulators (PGR) and Foliar Calcium on Apples Pre-Bloom Through Petal Fall

***Daniel J. Donahue, CCE Eastern NY Commercial Horticulture***

**Bitter Pit Suppression in "Honeycrisp":** The preferred timing for Apogee at pink for bitter pit suppression in Honeycrisp (HC) is full pink to late pink, not early pink. HC is slightly slower than average in its rate of flower bud development. If your pink insecticide and fungicide are planned for early pink, then use a separate tank mix at a later "full pink" date for the Apogee application on 'Honeycrisp'. Prohexadione calcium, the active ingredient in Apogee and Kudos, is susceptible to deactivation in the tank if the spray water is "hard". Always use a spray water conditioner, Quest and Choice are two examples, but there are others.

**Foliar Calcium Applications for Bitter Pit Suppression:** Replicated research trials conducted in the Hudson Valley in 2017 and 2018 has shown POMA 6% calcium chelate (click here for the link) to suppress bitter pit in 'Honeycrisp' approximately 45% when applied in five weekly applications starting at early petal fall. Research conducted in ENY over the last several years have shown that certain fruitlets at the end of the cell division period of fruit development have reduced calcium levels in their peel and subsurface cortex tissue. The data suggests that moving foliar calcium applications forward, starting at petal fall, could offer improved suppression of bitter pit symptoms. Overall, there are no miracle materials out there, foliar calcium sprays will not eliminate expression of bitter pit symptoms, only reduce, and in some years or situations are not effective at all. All we can do is keep pushing that rock up the hill…to paraphrase what a wise lion of the industry once said to me.

**Improving fruit shape and size in 'Red Delicious', 'Gala', and 'Golden Delicious':** Apply 'Promalin', 'Perlan', or 'Typy' as soon as the kings open, early is better than late, and don't bother after 50% bloom. Can result in a thinning response, do not apply more than 2 pints/A, use of surfactants improves both the typiness and thinning responses.

**Suppression of physiological russeting:** A particular problem for 'Golden Delicious' in our climate. Apply 'Provide 10 SG (60-100 gm/A)' or 'TypRus 2% (10-13 oz./A)' in 2-4 applications starting at petal fall and on a 7 to 10-day interval. An early PF start is better than late PF. Do not use a surfactant

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with 'Provide'. Good coverage is necessary. Refer to the label for total seasonal usage restrictions. Repeated frost events experienced in the Hudson Valley from April 17 through the 24th this year have the potential to increase the likelihood of fruit russeting this season, but these materials should not be expected to help this situation as the cell damage was incurred prior to the start of fruitlet development. NY-1 'Snapdragon' appears to be susceptible to scarfskin under certain conditions. The issue may become more pronounced in the lower tiers of mature tall spindle trees and may be a more pronounced problem in the Hudson Valley compared to other production regions in NYS. A simple trial conducted in a mature tall spindle orchard in the Hudson Valley in 2019 of *Provide* showed no effect on scarfskin symptoms, while a more sophisticated trial conducted on smaller tall spindle trees suggested some benefit. Further work is necessary before conclusions can be drawn.

**Use of ReTain (Valent) to improve fruit set:** The club apple variety 'Sweet Tango' is produced in the northern regions of ENY, but not in the Hudson Valley. The variety can have serious issues with fruit set. The ethylene inhibitor ReTain is effective in prolonging flower viability and improving fruit set. Apply one pouch of ReTain per acre, as a single application from pink stage to full bloom. Applications made prior to pink stage or after full bloom will significantly reduce efficacy of the treatment. Do not apply after petal fall.

**Bloom thinning with NAA and NAD:** Parts of Eastern New York have suffered a significant degree of flower loss to frost this season to date. King bloom is usually the most susceptible and this year its not hard to notice side bloom losses as well. Our saving grace is that return bloom for the most part is very strong this season and we only need to set 5-10%, sometimes even less in modern high-density systems, of the flowers to produce a full crop. This year, caution is advised when thinning at bloom unless you have sampled your target blocks and are satisfied that frost losses are at a minimum. **10 ppm NAA** at full bloom offers some help with return bloom on Honeycrisp, and a kick-start for your Gala thinning program. Mildly effectiveness as a thinner, expect only a 5% reduction in crop load at best. However, especially in years of strong return bloom, it does help get the thinning process started. **NAD** is an old "Auxin-type" thinning material that has received a second look in recent years as a component of a carbaryl-free thinning program. Research suggests that it may be a more potent bloom thinner than NAA, so caution is advised. The **Pollen Tube Model** (PTM) is a protocol developed some years ago at Virginia Tech to precisely time the application of lime-sulfur during the bloom period to remove flowers that open after a target number of flowers have been fertilized. Implementation of PTM in NYS is hampered by the lack of NYS labels for caustic bloom thinners, and the unreliability of our weather conditions during the bloom period. The PTM protocol has been widely implemented in the desert climate of Washington State, but has been less reliable in the humid and rainy climate of NYS. The challenge this season is the extent of our king bloom damage, and how to reliably and efficiently determine what percentage of target kings that open in a block are viable.

**Petal fall thinning with NAA and carbaryl:** These materials and this timing constitute the backbone of much of our petal fall chemical thinning programs. Vary the rate of NAA by varietal sensitivity, with some additional adjustment to accommodate environmental conditions, crop load, etc. The efficacy of hormone-type thinners such as NAA increases with temperature, and the thinning effect is short-term. The activity of carbaryl is more rate and temperature stable, with periodic re-wettings boosting efficacy. Our experience in ENY in the cool petal fall conditions of 2016 and 2019 suggest that this combination and timing can be effective even when temperatures hover in the 60's F, usually considered suboptimal for thinning. Fruit set and tolerance to chemical thinning activity tends to be greater in the top-half of the tree canopy so adjust your sprayer nozzles to deliver 2/3's of the spray volume into the top-half of the canopy, or consider turning lower nozzles off completely. However, maintain the per-acre application rate as a constant, only adjust the canopy distribution.

**'Apogee' and 'Kudos' (active ingredient: prohex) for the management of vegetative growth:** Start applications at 1-3" of shoot growth, which is often early petal fall. Multiple applications may be required, re-apply once shoot growth resumes if more control is desired. The general recommendation is not to apply prohex within 10 days of chemical thinners. With the newer, early timing recommendations for prohex application, and thinning programs based on predictive models, this recommendation is outdated. The concern was that Apogee and Kudos usage could improve fruit set under some conditions, which may impact the performance of chemical thinners. Research conducted from 2016-19 in ENY on the Honeycrisp variety suggests that this should not be a significant concern.

**'Apogee' and 'Kudos' for the management of fire blight:** Start your applications at pink stage to maximize FB management. Consider at least two applications total, low rates of 3 oz./100 gallons are effective.

**What's more important, fire blight or bitter pit in 'Honeycrisp'?:** On Honeycrisp, data from studies in 2016-18 show that prohex can aggravate bitter pit if applied in multiple applications made during bloom and later timings. What to do? Fire blight can kill your trees, bitter pit reduces your financial return for the season, I'd recommend prioritizing fire blight management if your Honeycrisp blocks are at risk. On the other hand, 'Honeycrisp' is generally not considered a highly susceptible variety like 'Gala' or NY-2 'Rubyfrost'. If you consider your FB risk to be low, then don't apply prohex after pink in moderate to high BP blocks just because the vegetative growth reduction might save a $100-200 per acre in pruning costs. Losses to BP easily can reach thousands of $$$ per acre.

**Something new on the horizon:** The Fine Americas PGR called "Arrange" has been shown to be effective in the suppression of flower bud initiation in the current year, reducing the number of flower buds available for next year's crop. Why be interested in that? For biennial varieties such as 'Fuji', 'Golden Delicious' and

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'Honeycrisp', careful use in the off-year can help reduce the expected flush of flower buds the next year, moderating the year to year variation in flower intensity, contributing to the restoration of a more annual bearing habit. Fine Americas has a registration application pending with the NYSDEC with some hope that the product will be legal for use in NYS in time for the petal fall through 15 mm application window in 2020. I think processing delays associated with our Covid-19 crisis in NYS will make completing the registration review process difficult this year, but monitor the ENYCHP E-Alert for further updates.

**General comments about chemical thinning and PGR application**

- Thorough coverage is important, and efficacy improves with temperature. Over 70F is great, but no higher than 85F. Slow drying conditions will aid absorption.
- NAA and carbaryl rates are most often expressed in terms of concentration and tree-row-volume, for example "I thin my Macs with 4 ppm acid (NAA) and a pint of Sevin (carbaryl)", and the assumption is that this is an expression of a rate per 100 gallons. Major variables from grower to grower and block to block are the estimate of actual tree canopy volume, travel speed and concentration factor. My point here is that a recommendation of "4 parts and a pint" may translate into something quite different for grower A, and something else for grower B. Bottom line, **keep detailed thinning records** by block and variety, recording the weather conditions before, during and after application. Make note of the efficacy, did it work? Adjust your thinning program based on recorded experience from year to year. If you want to try something new, maybe a new chemistry, timing, coverage strategy or significant rate change, implement on a modest area first to gain experience before potentially risking your entire crop.
- The Cornell Carbohydrate Model (on NEWA) is not intended for bloom or petal fall timings, use it to make rate adjustments at the 8-12 mm timing, but not earlier.
- Most PGR's are expensive and may require a very specific adjuvant (or none at all). Avoid tank mixing with your insecticide/fungicide/nutrient cover sprays, consider mixing up custom tanks for PGR applications.
- Application timing is usually critical, another argument for avoiding the inclusion of most PGR's in regular cover sprays. Early summer NAA applications to encourage flower formation would be one exception.
- Read the label carefully for each material, there are often many caveats to PGR use. For example, prohex use can result in cracking of Empire and Stayman varieties.

## Resources for Going to Online Sales

***Elizabeth Higgins, CCE Eastern NY Commercial Horticulture***

We know that many farms in the region have increased their capacity for on-line sales. For some of you this may be a new activity. There have been a ton of webinars and resources recently made available to help you improve so this article is to summarize some of the best of them.

Cornell Small Farms Program has an on-line resource guide ***Using Online Marketing to Build Resilience*** which https://smallfarms.cornell.edu/2020/04/using-online-marketing-to-build-resilience/ which offers a bunch of resources and links to help you get going as well as information about local, NYS programs and resources.

Penn State offered a webinar ***Ramp Up Your Online Ordering for Expanded Delivery Or Curbside Pickup*** https://extension.psu.edu/ramp-up-your-online-ordering-for-expanded-delivery-or-curb-side-pickup-1?iwd_preview12345=1.

If you want to know what impact online sales might have before you leap in here is a more research-oriented webinar from C-FARE. ***E-Commerce During COVID-19: Opportunities for Food Producers to Make Direct Market Sales On-Line*** (https://www.cfare.org/new-blog/c-fare-webinar-april-24-2020-e-commerce-during-covid-19-opportunities-for-food-producers-to-make-direct-market-sales-online) which featured:

- Jeffrey O'Hara of the USDA Agricultural Marketing Service (AMS) outlined the resources USDA makes available for producers to develop e-commerce sales, the latest data and research, and examples of ways farmers have migrated online.
- Chyi Lyi "Kathleen" Liang, the W. K. Kellogg Distinguished Professor of Sustainable Agriculture and the director of the Center for Environmental Farming Systems at North Carolina Agricultural and Technical State University, discussed various online platforms, the merits of using digital sales strategies, and sample innovative aggregated venues online.
- Gary Matteson, vice president for Young, Beginning, Small Farmer Programs and Outreach at the Farm Credit Council, emphasized the need for business planning with clear goals for inputs such as time and money, and clear expectations for sales and profitability when approaching new markets.

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The National Young Farmer's Coalition has a new publication ***The Farmers Guide to Direct Sales Software Platforms*** (https://www.youngfarmers.org/wp-content/uploads/2020/04/Farmers-Guide-to-Direct-Sales-Software-Platforms.pdf). The publication provides information about 19 on-line sales platforms and gives advice about on-line and direct sales channels as well as providing links to other resources.

The Eastern NY Commercial Hort Team offered a podcast at the end of March ***Consumer Messaging and Online Sales in Response to COVID-19*** (https://podcasts.apple.com/us/podcast/consumer-messaging-and-online-sales-in-response-to-covid-19/id1455139420?i=1000470090432) Ethan Grundberg, of CCE ENYCH interviewed Erin Enouen, owner and operator of Long Season Farm in Kerhonkson, NY (https://www.longseasonfarm.com/), shares her strategies for using social media to connect with consumers, implementing an online sales system, and coordinating drop-offs and on-farm pick-ups in response to COVID-19.

Farm Commons offered a podcast ***Farm Sales through Online Platforms and CSA During COVID-19.*** In this episode, they discussed the legal mechanics of online sales platforms and CSA agreements as part of special coverage on COVID-19's effects on farm businesses with Sarah Vaile, Farm Commons' Staff Attorney. You can hear it at: https://farmcommons.org/episode-15-farm-sales-through-online-platforms-and-csa-during-covid-19

Finally, if you just want to know more about credit cards, and how to start taking them, I developed a fact-sheet: ***Selling Online and Taking Credit Cards*** (https://bit.ly/2VRy1XF) which provides more information about how credit cards work, explains some of the fees you may encounter as a vendor, and discusses some alternative electronic payment options.

## Paycheck Protection Program (PPP) and Economic Injury Disaster Loan (EIDL) Fact Sheet #4

***Elizabeth Higgins, CCE Eastern NY Commercial Horticulture; Nicole Tommell, Central NY Dairy, Livestock and Field Crops Program; and Myron Thurston, CCE Madison County***

**PPP Update**

The Paycheck Protection Program and Health Care Enhancement Act was signed on April 24th. So as of April 27th, the Paycheck Protection Program was back in business with $310 billion more in appropriated funding. A new interim final rule was issued by SBA/Dept of Treasury on April 24th https://home.treasury.gov/system/files/136/Interim-Final-Rule-on-Requirements-for-Promissory-Notes-Authorizations-Affiliation-and-Eligibility.pdf and the Treasury Department also issued an updated FAQ as of April 26th https://home.treasury.gov/system/files/136/Paycheck-Protection-Program-Frequently-Asked-Questions.pdf.

In order to make this factsheet more efficient a summary of the PPP program can be found at https://www.sba.gov/funding-programs/loans/coronavirus-relief-options/paycheck-protection-program, and we have included links to earlier fact-sheets which provide more in-depth analysis of the PPP program. In summary, the Paycheck Protection Program PPP is a low interest (1%) loan authorized in the CARES Act designed to provide a direct incentive for small businesses to keep their workers on the payroll. SBA will forgive up to 100% of PPP loans if all employees are kept on the payroll for eight weeks and the money is used for payroll, rent, mortgage interest, or utilities. You can apply through any existing SBA 7(a) lender or through any federally insured depository institution, federally insured credit union, and Farm Credit System institution that is participating. The last day for SBA to approve a PPP loan is June 30, 2020.

The Paycheck Protection Program and Health Care Enhancement Act did not significantly change the PPP. The biggest change in the Act was a set aside of $60 billion of the $310 billion authorized PPP funds to be distributed through minority serving and smaller banks – with the intent of helping small businesses that had "banked locally" to have a better shot at receiving a PPP loan. One criticism of earlier rounds of PPP funding was that an applicant's ability to get funded depended more on *who* they banked with than their need for the program.

Because of the speed with which the first round of PPP funding disappeared, it is also clear that Congress will be looking at *who* gets PPP funding. Prior to the authorization of additional funds, there was widespread outrage about small businesses being squeezed out of the funding program, while large companies, with relationships with banks and the ability to raise money by issuing shares, received tens of millions of dollars. Shake Shack notably returned their loan and several hundred million more will likely to be made available to the PPP fund from large companies returning loans made in earlier rounds.

Although the recent Act did not place additional explicit constraints on large businesses, the updated April 24th interim final rule and April 26th FAQ do make it clear that need for the loan matters. The rule included Section 5, Limited Safe Harbor with Respect to Certification Concerning Need for PPP Loan Request which states … *"Consistent with section 1102 of the CARES Act, the Borrower Application Form*

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*requires PPP applicants to certify that "current economic uncertainty makes this loan request necessary to support the ongoing operations of the Applicant."* And in the April 26th FAQ, the Treasury Department further stated: *"In addition to reviewing applicable affiliation rules to determine eligibility, all borrowers must assess their economic need for a PPP loan under the standard established by the CARES Act and the PPP regulations at the time of the loan application. Although the CARES Act suspends the ordinary requirement that borrowers must be unable to obtain credit elsewhere (as defined in section 3(h) of the Small Business Act), borrowers still must certify in good faith that their PPP loan request is necessary. Specifically, before submitting a PPP application, all borrowers should review carefully the required certification that "current economic uncertainty makes this loan request necessary to support the ongoing operations of the Applicant." Borrowers must make this certification in good faith, taking into account their current business activity and their ability to access other sources of liquidity sufficient to support their ongoing operations in a manner that is not significantly detrimental to the business…."*

What does this mean for you? First the good news is that Congress is now making more effort to better target the PPP funding to small businesses. Some of the kinks of the first round are being addressed and an attempt is being made to better reach small businesses. Small farm businesses in New York State are unlikely to be the primary focus of programmatic scrutiny and Congressional belt tightening so if you have real concerns about your markets and labor this season, you can apply for a PPP loan in good faith, even if you haven't experienced a significant loss in income yet. COVID-19 economic impacts are likely to be long lasting and should times get hard, accessing affordable credit could be a challenge for many small businesses. That is what these programs can help with.

The bad news is that it is not clear what additional requirements or restrictions there will be for PPP loan forgiveness. The PPP is a new program put together quickly. It is kind of like building an airplane while flying. As the program unfolds, the program rules seem to be establishing the groundwork the SBA to hold businesses to a standard of suffering economic harm in order to receive loan forgiveness, especially as obvious issues with funding allocation are identified. There could be more documentation of economic harm required or more restrictions placed on forgivable uses of the funding. Right now, loan forgiveness in the PPP is based on hiring at the same level you had in 2019 and being able to pay out most of the grant in the first 8 weeks after you receive funding. Some businesses are having trouble meeting this standard because of worker shortages or changes in how they are operating right now. This is something you as a business owner should be prepared for. Our recommendation is if you are applying to the PPP because, like many farms you are <u>unsure</u> of how your season will unfold, be prepared to pay the loan back if your season goes well and consider your PPP funds as a low interest, safety net. If you operate this way you protect yourself from short term cash-flow problems. If you are ultimately eligible for loan forgiveness then you will be ahead and if you are not, you will not be worse off. Even if you must pay the PPP loan back, at 1% interest and no fees it is a very affordable loan and might be worth having for peace of mind.

Neither the April 24th Interim Rule nor the April 26th FAQ included any new guidance to lenders about using the Schedule F or alternative sources of documentation for assessing owner income for the PPP. We are hearing that farms with negative net income reported on their Schedule F, line 34 are being denied owner income for the PPP, which is consistent with the guidance that was given to lenders for using the Schedule C in the April 14th Interim Rule. In the interim rule SBA did state that for businesses with no paid employees, if the 2019 Schedule C showed $0 or a negative net income, you are not eligible for a PPP loan. So, if you do not have paid employees and you reported net negative income on your 2019 Schedule F, you probably will not qualify for PPP funding. You should contact your lender to verify your eligibility prior to applying.

We had said that H2A employee eligibility for PPP was a grey area. It still is. The April 26th FAQ Question 33 did add some clarifying language about how a lender should determine whether an employee's principle place of residence is in the United States, but it is not really that helpful for H2A employers. The answer is "*PPP applicants and lenders may consider IRS regulations (26 CFR § 1.121-1(b)(2)) when determining whether an individual employee's principal place of residence is in the United States.*" So, this is the applicable CFR language *(26 CFR § 1.121-1(b)(2)):*

*2) Principal residence. In the case of a taxpayer using more than one property as a residence, whether property is used by the taxpayer as the taxpayer's principal residence depends upon all the facts and circumstances. If a taxpayer alternates between 2 properties, using each as a residence for successive periods of time, the property that the taxpayer uses a majority of the time during the year ordinarily will be considered the taxpayer's principal residence. In addition to the taxpayer's use of the property, relevant factors in determining a taxpayer's principal residence, include, but are not limited to—*

*(i) The taxpayer's place of employment;*

*(ii) The principal place of abode of the taxpayer's family members;*

*(iii) The address listed on the taxpayer's federal and state tax returns, driver's license, automobile registration, and voter registration card;*

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*(iv) The taxpayer's mailing address for bills and correspondence;*

*(v) The location of the taxpayer's banks; and*

*(vi) The location of religious organizations and recreational clubs with which the taxpayer is affiliated.*

The Treasury Department/SBA are punting on this one and it will be up to a farmer and their lender to determine if any of their H2A employees meet this test and this could vary quite a bit depending on how the farm uses H2A workers and how much time the H2A worker had spent in the US in the past few years.

**EIDL and Advance Update**

The Paycheck Protection Program and Health Care Enhancement Act made the SBA Economic Injury Disaster Loan available to farms for the first time. EIDL is the SBA's primary disaster assistance program to businesses. It provides low interest loans (3.75%) for working capital that are intended to help a business keep going during a period of business interruption due to a disaster. Businesses can apply for up to $2 million. The terms for repayment of the loan can be quite long (up to 30 years) with the intention that the repayment costs are low enough to help the business stay economically viable after the disaster.

The CARES Act also added the ability for businesses applying for EIDL Loans to receive up to $10,000 as an advance to "provide economic relief to business experiencing a temporary loss of revenue." The Advance does not have to be repaid and businesses that receive the advance, but ultimately are turned down for the loan, do not have to return or repay the advance if they were otherwise eligible to apply for EIDL and the purpose of the loan was eligible. Because of demand for EIDL, SBA had been limiting the Advance to the number of employees that the business had – so businesses with fewer than 10 employees were receiving less than $10,000. There has been some pushback from Congress about this reduction in the Advance, so it is unclear as to whether that reduction will continue with the new round of funding. Right now, $50 billion of the new appropriation is to fund loans under EIDL and $10 billion is for the Advance.

Unlike PPP, which you apply to through a commercial lender, you apply directly to SBA for the EIDL. SBA had closed their application portal for EIDL when funding was fully obligated on April 15th. They have not yet reopened the application portal because they had a backlog of applicants. According to the SBA website https://www.sba.gov/disaster-assistance/coronavirus-covid-19 (as of April 28th): *"SBA is unable to accept new applications at this time for the Economic Injury Disaster Loan (EIDL)-COVID-19 related assistance program (including EIDL Advances) based on available appropriations funding. Applicants who have already submitted their applications will continue to be processed on a first-come, first-served basis."*

It appears that because of the backlog in applications that no new applicants will be able to apply, effectively closing the EIDL to farms. However, because the EIDL is a long-standing program, with fewer glitches than PPP, further rounds of funding if there is enough demand and demonstrated need could be forthcoming. We advise you to keep trying to apply. Small Business Development Center (SBDC) staff are a great resource to help guide you through this process as they are very experienced with EIDL loans. You can find your local SBDC center at https://americassbdc.org/

**Next Steps**

If more funding becomes available for EIDL you can apply for both the PPP and the EIDL programs. However, you cannot use the funds for the same purpose. So, if you do receive a PPP loan, it would be to your benefit to first use the PPP loan funds for salary because that use of the PPP is forgivable and uses of the PPP are more restricted. EIDL loans, for example, can be used to pay vendors and pay other operating costs. Many local areas are also developing emergency loan and grant programs for businesses, so it may be worth looking closer to home – especially if the amount of funding you need is more in the under $10,000 range.

**Following is a chart summarizing the differences between the two assistance programs:**

| | EIDL + Advance | PPP |
|---|---|---|
| Max Loan Amount | $2 million | 2.5 x average monthly payroll, up to $10 million |
| Interest Rate | 3.75% (2.75% for non profits) | 1% |
| Maximum Forgivable Amount (aka Grant) | up to $10,000 – even if EIDL loan is not approved | The first 8 weeks of payroll immediately after you receive PPP funds + (rent, utilities, mortgage interest) BUT the total amount forgiven for non-payroll expenses is capped at 25% of the total amount forgiven. |
| Repayment Period | up to 30 years | 2 years |
| Allowable Uses | working capital | payroll, mortgage interest, rent, utilities |
| Who is the Lender? | SBA | commercial banks |

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**Prior Fact Sheets:**

Fact Sheet #1: ***CARES Act's Emergency Resources for Farm Businesses: Paycheck Protection Loan Program***, April 2, 2020
https://bit.ly/358Q3Ye

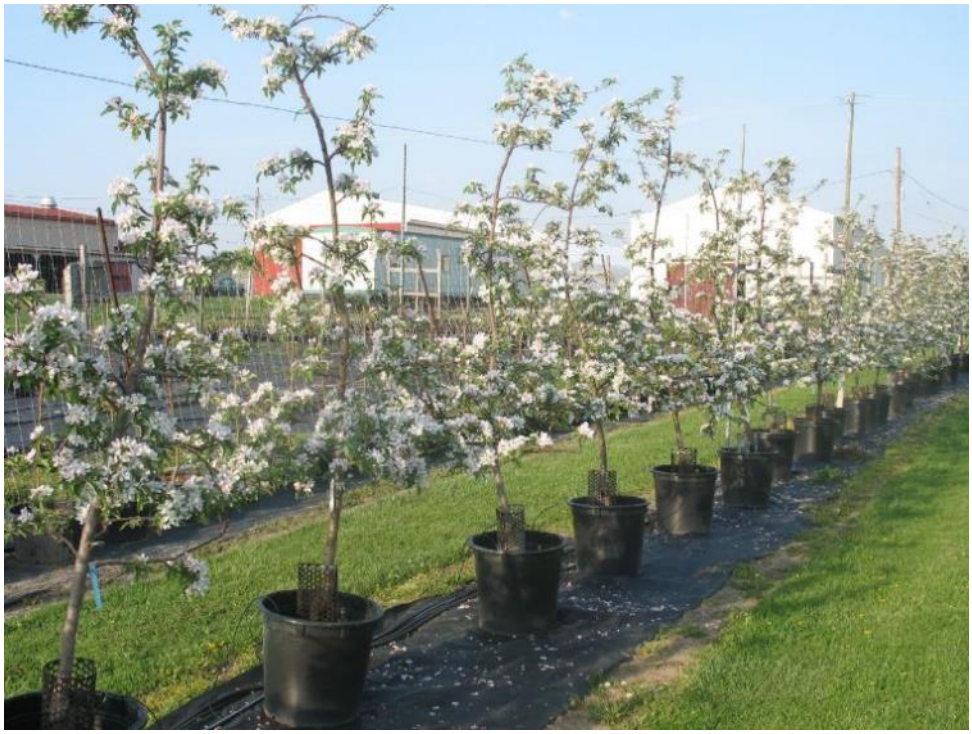
Fact Sheet #2: ***April 8th Update to the Paycheck Protection Program (PPP) – Where the Only Constant is Change!***, April 8, 2020
https://bit.ly/2Yamx2Y

Fact Sheet #3: ***A New Interim Rule, The First Round of Funding is Depleted. What Does the Future Hold?*** April 14, 2020
https://bit.ly/2ScV7pr

## Nutrient Management in Apple Orchards for the 2020 Growing Season

***Michael Basedow, CCE Eastern NY Commercial Horticulture, and Dr. Lailiang Cheng, Cornell University***

Nutrient management plays a vital role in determining your orchard's tree growth, yield, and fruit quality. Here are a few things to keep in mind when developing your orchard nutrition program.



*Sixth leaf Gala on M.26 rootstock grown in sand culture at 3.5x11 ft spacing at the Cornell Orchards were used to determine Gala nutrient demands in high density systems. Photo: Lailiang Cheng*

**Nitrogen:**

The highest demand for nitrogen in the orchard occurs from petal fall to the end of shoot growth. During this period, rapid shoot growth and fruit cell division require substantial amounts of nitrogen. Nutrition studies have shown maintaining leaf N levels between 2.0 to 2.2% balances adequate tree growth with high fruit quality.

Fertigation is the preferred application method for N, as these applications can be made from bloom to the end of shoot growth to match peak N demand. If ground applications are made, the best timing is between budbreak and petal fall for most soils. The exception would be orchards on sandy soils with low organic matter. At these sites, multiple split applications from spring through early summer would be more desirable to limit nutrient loss.

The rate of N applied depends on the orchard soil organic matter content and tree N status. Because each orchard soil is unique, the best way to fine-tune your N rates would be to have your own N rate trial on your farm. Apply varying levels of N to a small subset of similar trees, and compare tree growth and fruit quality over multiple growing seasons. **However, you might consider 30-60 lbs of actual ground applied N per acre where leaf analysis indicates a deficiency as a starting point.**

Foliar N application at petal fall through the early cover sprays is a good way to supply nitrogen to young fruitlets and spur leaves. **We recommend foliar urea applications at petal fall, first cover, and second cover at a rate of 5 lb. urea per 100 gallons on blocks that had marginal N status last year.** Urea can be easily tank-mixed with most fungicides and insecticides, but cannot be mixed with oil. It should be applied as dilute sprays, but if you have to make concentrated sprays, do not concentrate urea over 3X.

**Potassium:**

Of the macronutrients required by apple trees, K has the highest concentration in fruit. More than two thirds of the total tree K requirement is found in the fruit. As a result, harvest removes a significant amount of K from the orchard. Work on Gala/M.26 has shown trees have constant demands for K from bloom to harvest. 80 to 85 lbs of K are removed at a fruit yield of 1500 bushels/acre in Gala, which equates to about 100 lbs of potash (K2O) per acre.

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However, not all varieties are equal in their K needs. Honeycrisp requires lower K inputs compared to Gala and McIntosh; about 25-30% less K is needed when at similar levels of yield. With these findings in mind, we recommend the optimal leaf K levels in Honeycrisp as 1.0 to 1.3%, while the optimal for other varieties would be between 1.3-1.8%.

If your K level was marginal in last year's leaf analysis, you should apply a higher than average amount of potassium this year in varieties such as Gala, McIntosh, and Empire.

If you use fertigation, target the period from petal fall to a couple weeks before harvest. Regular ground applications can be made at petal fall, after shoot growth has stopped, and following harvest. **Typical ground application rates range from 60 to 150 lbs of K per acre at each application timing where leaf analysis indicates a deficiency. The lower end of this range should likely be used in Honeycrisp plantings, particularly if the block is prone to bitter pit.** If your soil analyses show your Honeycrisp blocks contain 350 lbs or more of K in the top six inches of soil per acre, you should skip your K fertilizer for one to two years to bring the soil K levels back down.

**Boron and Zinc:**

Boron and zinc are both important for fruit growth and development. A foliar spray program of Solubor is a very effective management practice to supply B to fruit, while foliar applications of zinc are the only economical way of providing this element. **We recommend applying Zinc chelate at the labeled rate, and Solubor at 1 lb per 100 gallons at petal fall and at first or second cover to promote early fruit growth**. Zinc chelate and Solubor can be tank-mixed with urea. However, Solubor should not be tank-mixed with any pesticides contained in water-soluble plastic packages because it inhibits the dissolution of the plastic. Solubor should also not be tank -mixed with oil. Solubor increases spray water pH. Keeping this in mind, the pH of the tank mix should be tested and adjusted with a suitable acidifying agent if Solubor is to be applied with pH sensitive pesticides.

**Calcium:**

Ca accumulation occurs during the entire fruit growth period from petal fall to fruit harvest. In addition to having proper soil pH and maintaining calm trees, **a foliar Ca spray program is essential for bitter pit susceptible cultivars**. We have been recommending the following Ca spray program: **3 to 4 cover sprays of 1 to 2 lbs of calcium chloride (78% $CaCl_2$) or its equivalent per 100 gallons (dilute basis) at 14-day intervals, beginning 7 to 10 days after petal fall, followed by 2 additional sprays of 3 to 4 lbs of calcium chloride (78% $CaCl_2$) per 100 gallons at four and two weeks prior to harvest.** It's important to keep in mind that complete coverage of fruit is essential. More frequent sprays are more important than the exact timing of the sprays. Calcium chloride cannot be mixed with oil.

**Maintaining proper soil pH**

Soil pH should be maintained in the range of 6.0 to 6.5 throughout the soil profile to optimize tree growth and nutrient availability. New York orchard soils tend to acidify over time. The high annual precipitation gradually leaches calcium, magnesium, and potassium out of the soil. This loss of these elements leads to an increase in active hydrogen and aluminum, causing a decrease in soil pH. Ammonium-forming fertilizers (such as ammonium nitrate, ammonium sulfate and urea) also acidify the soil by releasing hydrogen ions as they convert to nitrate. To mitigate these acidifying effects, a soil analysis should be conducted every 2 to 3 years in mature plantings. **If pH tests low, a maintenance lime application of 1 to 2 tons per acre should be applied.**

**Water/irrigation:**

Dry fertilizers applied to soil cannot be taken up by the roots unless there is good soil moisture. Soil water status also affects the mineralization of organic matter, which consequently affects the amount of nitrogen available for the trees. Soil water availability also affects fruit cell division and cell enlargement, thereby affecting final fruit size. **Providing irrigation to ensure water supply and nutrient uptake is essential for sizing the fruit to achieve high yield and good quality, especially if it turns out to be a dry year.**

*Additional Reading:*

*Cheng, L. 2016. Challenges and opportunities for Honeycrisp nutrient management. Proceedings of the 2016 Empire State Producers Expo. http://www.hort.cornell.edu/expo/proceedings/2016/TreeFruit.%20Challenged%20and%20opportunities%20to%20optimize%20mineral%20nutrition%20of%20Honeycrisp.Cheng.pdf*

*Cheng, L. and Miranda Sazo, M. 2018. Why is 'Honeycrisp' so susceptible to bitter pit? NY Fruit Q. 26(1): 19–23.*

*Miranda Sazo, M. and Cheng, L. 2017. Stress-Induced Watercore in 'NY2' Fruit: Causes and Mitigation. NY Fruit Q. 25(1): 29–34.*

# Spray Mixing Instructions Considering Tree Row Volume (TRV)

***Dr. Terence Robinson, Dr. Poliana Francescatto, and Dr. Jaume Lordan, Cornell University***

Plant Growth Regulator response is a function of the amount of chemical deposited on the leaves of the tree. The amount of chemical that is sprayed per acre should consider tree size to not over-apply chemical to small trees and under-apply chemical to large trees.

Tree size can be used to adjust the amount of chemical added to the spray tank by calculating the size of the tree canopy (tree row volume). The tree row volume (TRV) of an orchard is defined as the volume of water needed to spray the trees to drip point, which is termed a full dilute spray.

The amount of chemical can then be adjusted to the size of the trees with fully-grown trees receiving a full amount (100% dose) and smaller trees receiving an appropriate fraction of a full dose.

The volume of water used to carry the chemical to the leaves can be less than the full dilute volume, but if less than the full dilute volume is used then the amount of chemical in the tank must be concentrated to allow the proper amount of chemical to be applied to each tree.

The concentration factor is determined by dividing the full dilute volume of water (TRV) by the actual amount of water to be sprayed.

***First Step is to Mix the Tank Properly***

This process can be broken down into 3 easy steps:

1. Calculate Tree Row Volume (Tree height X Tree width X 43,560 X 0.7) / (Between row spacing X 1000)
   - Example of a Tall Spindle Orchard - for many mature Tall Spindle Orchards this is ~200 gallons/acre. Example (11' X 7' X 43560 X 0.7) / (12' X1000) = 196 gallons/acre (rounded to 200GPA).
   - For the example of the Tall Spindle trees lets assume you set up the sprayer to spray ½ of Tree Row Volume which would be100 gallons/acre. Thus this is a 2X application on TRV trees of 200GPA (200/100=2).
   - Multiply the recommended rate for 100 gallons dilute TRV basis X 2 for each chemical (except oil or surfactants).
2. Then set up the sprayer for less than the full TRV amount
3. Concentrate the chemicals in the tank

We suggest that for each orchard block, you calculate tree row volume with the formula above and set up your sprayer for some fraction of TRV and then calculate YOUR own concentration factor. **Note**- Old semi dwarf trees may be 300GPA+ however, these older bigger trees with more vigorous rootstocks, thin easier, so set your maximum TRV at 200 GPA max, never 300. However younger trees in tall spindle blocks may be only be 150, 125 or 100 GPA TRV on younger trees. We strongly recommend that you calculate the actual TRV with the formula in #1 above and then adjust the chemical rate based on how many gallons you spray per acre.

***Next Step is Adjusting the Spray Pattern***

Often the bottoms of trees show over-thinning while the tops of trees show under-thinning. Our standard recommendation is to nozzle the sprayer so that 2/3 of the spray volume is directed to the top half of the tree and only 1/3 is directed to the bottom half of the tree. Recent studies have shown that this still gives 65% of the fruit in the top half of a tall spindle trees and only 35% of the fruit in the bottom half of the tree. To overcome this imbalance of crop load and ensure fruit on the entire tree uniformly, our new recommendations are in two parts:

1. Bloom and petal fall sprays
   - Adjust nozzles so that spray pattern directs 2/3 of the spray to the top of the tree and 1/3 to the bottom of the tree.
2. Sprays from 10-18mm
   - Completely shut off the bottom half of the nozzles, so that all of the spray is directed to the top half of the tree and no spray be directed to the bottom half of the tree.
   - Mature Tall Spindle Orchard (11' X 7' X 43560 X 0.7) / (12' X1000) = 196 gallons/acre (rounded to 200GPA)
   - Sprayer calibrated at 100GPA (1/2 TRV)
   - Concentration factor = 2X (200/100=2)
   - The dilute rate for Sevin is 1pt/100 but the orchard needs 200 gallons for full coverage so each acre should receive 2pts.
   - The dilute rate for Maxcel is 48oz/100 but the orchard needs 200 gallons for full coverage so each acre should receive 96 oz.

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- Calculation: 1pint Sevin x 2X= 2pt Sevin per 100 gallons of spray
- + 48 ounces Maxcel x 2X=96 oz. Maxcel per 100 gallons of spray
- If your tank is 500 gallons you would times chemical by 5
- 5 x 2 Pints of Sevin XLR= 10 pints per 500 gallon tank+
- 5 x 96 ounces Maxcel=480 ounces per 500 gallon tank and sprayer will cover 5 acres

These recommendations are based on three years of research with Terence Robinson and Andrew Landers and 3 years with Poliana Francescatto and Jaume Lordan. Turning off the bottom half of the nozzles and adjusting the chemical rate up produced the most uniform fruit set overall. The reason this works is that the upper part of the tree gets so much sun light and therefore produces more carbohydrate. Fruit on top receive a greater carbohydrate supply making fruits harder to thin, as compared to the fruit located on the bottom of the tree where you have more shade. The harder to thin fruit on tree tops need the extra chemical (PGR) to assist in thinning fruit.

Please note that when you shut off the bottom half of the nozzles you need to adjust up your rate of chemical per acre you add to the tank since the volume of water applied per acre is less. We still want to keep the same amount of chemical per acre, even though you are spraying only the top of the trees. The bottom part of the trees will get some drift and do not need to be directly sprayed in 8-14 and 18mm sprays. Therefore, if we turn off 50% of the nozzles and reduce the GPA by 50% you need to recalculate the concentration factor and increase the amount of chemical you add to the tank. More chemical has to go in the tank to account for the factor that you shut off nozzles and less water is applied to the acre.

For example, if you reduce the water by 50%, instead of covering five acres with one tank it now covers ten acres. The way to think about this is how many acres will your tank be covering? This determines how much chemical per acre you need to add. (If you just want to try shutting of 30% of the bottom nozzles that's ok to start, and adjust the chemical you add per tank accordingly.)

Note: one important item, you will have to know the output of the nozzles you turn off, to calculate the water reduction in gallons per acre. Often growers already have smaller nozzle sizes on the bottom. Calculate the total output for each nozzle turned off on each side x 2 sides, and subtract from your GPA to get your actual GPA output.

**Example 1. Calculations for bloom or petal fall spray of Maxcel+Sevin with all nozzles on.** Standard rate of Sevin XLR at 1 pint per 100gal TRV basis+ Maxcel at 48 ounces per 100 gallons TRV basis:

**Example 2. Calculations for 12mm or 18mm sprays of Maxcel+Sevin with bottom nozzles turned off.** Standard rate of Sevin XLR at 1 pint per 100gal TRV basis+ Maxcel at 48 ounces per 100 gallons TRV basis:

- Mature Tall Spindle Orchard (11' X 7' X 43560 X 0.7) / (12' X1000) = 196 gallons/acre (rounded to 200GPA)
- Sprayer calibrated at 50GPA (1/4 TRV since bottom half of nozzles turned off)
- Concentration factor = 4X (200/50=4)
- The dilute rate for Sevin is 1pt/100 but the orchard needs 200 gallons for full coverage so each acre should receive 2pts.
- The dilute rate for Maxcel is 48oz/100 but the orchard needs 200 gallons for full coverage so each acre should receive 96 oz.
- Calculation: 1pint Sevin x 4X= 4pt Sevin per 100 gallons of spray
- + 48 ounces Maxcel x 4X=192 oz. Maxcel per 100 gallons of spray
- If your tank is 500 gallons you would times chemical by 5
- 5 x 4 Pints of Sevin XLR= 20 pints per 500 gallon tank+
- 5 x 192 ounces Maxcel=960 ounces per 500 gallon tank and sprayer will cover 10 acres

**Example 3. Calculations for bloom or petal fall spray of NAA+Sevin with all nozzles on.** Standard rate of Sevin XLR at 1 pint per 100gal TRV basis+ NAA (Fruitone) at 10ppm or 4 ounces per 100 gallons TRV basis:

- Mature Tall Spindle Orchard (11' X 7' X 43560 X 0.7) / (12' X1000) = 196 gallons/acre (rounded to 200GPA)
- Sprayer calibrated at 100GPA (1/2 TRV)

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- Concentration factor = 2X (200/100=2)
- The dilute rate for Sevin is 1pt/100 but the orchard needs 200 gallons for full coverage so each acre should receive 2pts.
- The dilute rate for Fruitone is 4oz/100 but the orchard needs 200 gallons for full coverage so each acre should receive 8 oz.
- Calculation: 1pint Sevin x 2X= 2pt Sevin per 100 gallons of spray
- + 4 ounces Fruitone x 2X=8 oz. Fruitone per 100 gallons of spray
- If your tank is 500 gallons you would times chemical by 5
- 5 x 2 Pints of Sevin XLR= 10 pints per 500 gallon tank+
- 5 x 8 ounces Fruitone=40 ounces per 500 gallon tank and sprayer will cover 5 acres

**Example 4. Calculations for 12mm or 18mm sprays of NAA+Sevin with bottom nozzles turned off.** Standard rate of Sevin XLR at 1 pint per 100gal TRV basis+ NAA (Fruitone) at 3 ounces per 100 gallons TRV basis:

- Mature Tall Spindle Orchard (11' X 7' X 43560 X 0.7) / (12' X1000) = 196 gallons/acre (rounded to 200GPA)
- Sprayer calibrated at 50GPA (1/4 TRV since bottom half of nozzles turned off)
- Concentration factor = 4X (200/50=4)
- The dilute rate for Sevin is 1pt/100 but the orchard needs 200 gallons for full coverage so each acre should receive 2pts.
- The dilute rate for Fruitone is 3oz/100 but the orchard needs 200 gallons for full coverage so each acre should receive 6 oz.
- Calculation: 1pint Sevin x 4X= 4pt Sevin per 100 gallons of spray
- + 3 ounces Fruitone x 4X=12 oz. Fruitone per 100 gallons of spray
- If your tank is 500 gallons you would times chemical by 5
- 5 x 4 Pints of Sevin XLR= 20 pints per 500 gallon tank+
- 5 x 12 ounces Fruitone=60 ounces per 500 gallon tank and sprayer will cover 10 acres

## Cider Apple Production Survey and Bud Phenology Data Collection

***Terence Bradshaw, University of Vermont***

Partners from the Universities of Maine, Massachusetts, and Vermont are collaborating on the New England Cider Apple Project (NECAP), a three-year effort funded by Northeast SARE. Our first outreach meeting was held at the New England Vegetable and Fruit Conference in December, where we distributed a survey to collect data on who's growing what cider apples and what your major production issues with them are. We are looking for more input, so please take the survey here: https://www.surveymonkey.com/r/ZX53MK6

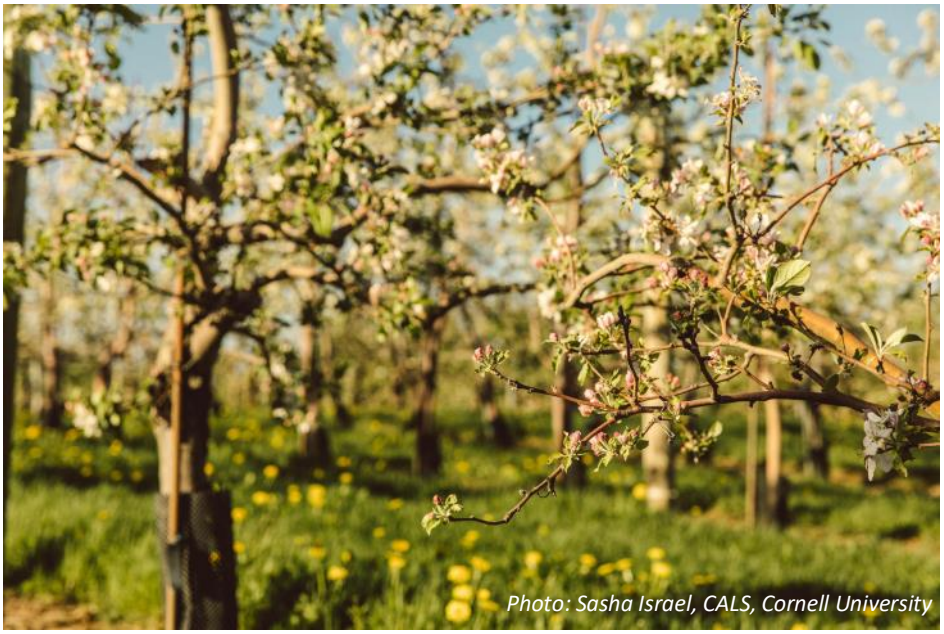

*Photo: Sasha Israel, CALS, Cornell University*

In addition, we are seeking to collect phenology data from growers if specialty cider apple cultivars in New England and eastern New York. Data from this year *or any year if you have it* may be entered in the shared spreadsheet here: http://go.uvm.edu/ciderbuddate

I will happily take any phenology data that you have, and will provide further instructions as we collect it. This is a live-edit document, so please only enter the data you have, but do not delete. I will periodically save a copy offline for archiving.

# Upcoming Events & Important Information

**Cornell Hard Cider PWT Virtual Office Hours: Cider Apple Production**
May 7, 4-5pm

Please join Cornell's Hard Cider Program Work Team for a question and answer session on any topic related to hard cider production that you want to discuss.

There will be no formal presentations, but we will focus our attention on horticultural issues related to cider apple production. We will share updates and upcoming events related to Cornell's hard cider programs and activities. Participants can also ask questions related to any of our areas of expertise (horticulture, fermentation, and marketing and small business management) through a moderated chat session. Join Zoom Meeting: https://cornell.zoom.us/j/91387384347

**Virtual Petal Fall Meetings**

Dates and Times TBA

**Best Management Practices for U-Pick Farms During the COVID-19 Pandemic**

U-Pick is a critical direct marketing approach for many of our farms and provides customers with a unique connection to fresh produce grown close to home. In light of what we understand about the spread of COVID-19, new management practices will be needed to protect your farm team and your customers. This document provides recommended practices and communication strategies for U-Pick operations for the 2020 season. View it here: https://smallfarms.cornell.edu/resources/farm-resilience/best-management-practices-for-u-pick-farms-during-the-covid-19-pandemic/

**Organizations across New York are offering support and resources for farmers:**

- NYS Department of Agriculture and Markets COVID-19 guidance for the agricultural industry: agriculture.ny.gov/coronavirus
- Cornell CALS and CCE have developed and regularly update several resource pages
  - General Questions and Links: eden.cce.cornell.edu
  - Food Production, Processing & Safety Question: instituteforfoodsafety.cornell.edu/coronavirus-covid-19/food-industry-resources/
  - Employment & Agricultural Workforce Questions: agworkforce.cals.cornell.edu
  - Cornell Small Farms Resiliency Resources: smallfarms.cornell.edu/resources/farm-resilience/
- NY FarmNet is open and available to calls at 1-800-547-3276. These calls are toll-free, confidential, and available 24/7.

**NYS Department of Ag & Markets Requesting Information to Connect Impacted Producers to Purchasing Opportunities**

The New York State Department of Agriculture and Markets, in coordination with its partners, is reaching out to New York producers that have surplus agricultural products as a result of COVID-19-related supply chain disruptions. The Department is working to connect affected farmers to potential new purchasing opportunities through various institutions, such as food banks, retailers and more.

If you are a producer with surplus product, the Department asks that you send your name, contact information, and the type of product(s) you have in surplus to Lindsey McMahon at lindsey.mcmahon@agriculture.ny.gov. Please provide this information by Monday, May 4th.

*The Eastern New York Commercial Horticulture Program is a Cornell Cooperative Extension partnership between Cornell University and the CCE Associations in these seventeen counties: Albany, Clinton, Columbia, Dutchess, Essex, Fulton, Greene, Orange, Montgomery, Putnam, Rensselaer, Saratoga, Schenectady, Schoharie, Ulster, Warren & Washington.*

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