Cornell Cooperative Extension
Eastern NY Commercial Horticulture Program

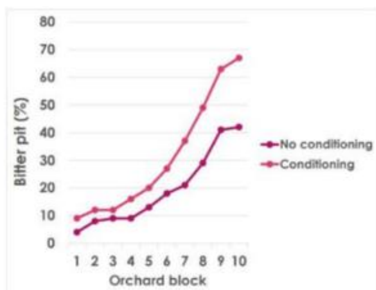
Tree Fruit News

August 2020
Volume 8, Issue 5

Apple Storage Recommendations for 2020

Michael Basedow & Daniel J. Donahue, CCE Eastern NY Commercial Horticulture Program

When it comes to storing fruit long term, there are a number of factors to keep in mind. Below we've reviewed the key storage recommendations for Honeycrisp, Gala, NY-1, NY-2, Mac, Cortland, and Empire, along with a quick comparison of utilizing dynamic controlled atmosphere (DCA) storage and 1-MCP.



Honeycrisp

Fruit in air or CA should be stored at 38°F as any lower temperature is risky. Conditioning for 7 days at 50°F reduces soft scald, but will likely exacerbate bitter pit. The decision to condition or not should be determined by your block history and results of prediction protocols. If a block is very vulnerable to bitter pit, it is likely best to skip conditioning.

Soft scald can be particularly prominent if fruit are stored at lower temperatures, closer to 33°F, but risk is lowered if fruit are conditioned. While not always a problem, some extensive soft scald losses were observed in the Hudson Valley in 2019 when fruit were stored at these lower temperatures without conditioning. If a 38°F room is absolutely not possible, precondition fruit and do not store for more than 2 months. Monitor fruit condition regularly for development of off-flavors as this can be a sign of pending fruit damage.

Air stored fruit can be treated with 1-MCP, as it will help fruit retain acceptable levels of acidity. 1-MCP may decrease the incidence of bitter pit and senescent breakdown.

An increasing number of growers are using Harvista to manage their Honeycrisp harvest. Chris's recent work found that Harvista decreased soft scald, but increased bitter pit incidence of stored fruit. Fruit treated with a combination of Harvista and 1-MCP also had a greater incidence of leather blotch.

For fruit destined for CA storage, CO_2 injury can be problematic, and is generally worse further south in the state. CO_2 injury can be controlled with diphenylamine (DPA), or by delaying CA storage by up to 4 weeks. In Chris's studies, fruit that were delayed CA storage for up to 4 weeks and treated with

(Continued on page 2)

Table of Contents

(Continued from page 1)

1-MCP had very little loss of fruit quality, but greasiness and core browning did increase to a small extent.

Chris's overall recommendation for Honeycrisp currently is air storage with 1-MCP to avoid CA related injuries. Storages should be high quality however, i.e. modern CA-like storages with good control of temperature.

Gala

A major concern for Gala right now is stem end flesh browning (SEFB). So far we know that:

- Harvista or ReTain decrease the incidence of SEFB.
- DCA at 0.5% O2 delays browning development, but will not completely prevent it. DCA may also prevent core browning.
- 1-MCP treatment has inconsistent effects on SEFB incidence.

Washington State and Ontario studies suggest delayed cooling, paired with early CA storage, may help to reduce some browning disorders. This approach needs more study in New York conditions.

Regardless of storage treatment, being on top of harvest date (erring earlier than later) and planting high-coloring strains like Brookfield that can be picked earlier are two of the best strategies for successful long-term storage of Gala .

NY-1

For successful long-term CA storage of NY-1, the current recommendation is to focus on your harvest management. NY-1 should be picked as early as possible to avoid fruit with high internal ethylene, though this may require compromising between ethylene and fruit color. Fruit should be stored at 38°F like Honeycrisp to reduce stem end flesh browning. 1-MCP should not be used for long term storage of NY-1, as it increases flesh browning. Fruit are susceptible to CO_2 injury .

NY-2

Similar to NY-1, Chris suggests early harvest timing is key to maintaining good quality for long term CA storage. NY-2 should also be stored at 38°F. 1-MCP is recommended for NY-2. In Chris's studies, 1-MCP helped retain firmness, and reduced superficial scald and stem end flesh browning. It did, however, lead to some additional general flesh browning .

McIntosh

1-MCP helps keep Macs firm on the shelf after long-term storage, and will also help reduce superficial scald and senescent breakdown. It may, however, slightly increase CO_2 injury, and maintaining low CO_2 in the CA storage for the first 4-6 weeks is critical. CO_2 levels should then be increased as maintaining lower levels will compromise maintenance of firmness. DPA eliminates any concerns of CO2 injury, and there is no need to be concerned about risk of injury .

Control are hard to control against superficial scald regardless of postharvest treatments, but both DCA and 1-MCP help to some extent. DCA plus 1-MCP returned the best fruit in Chris's trials, but the added expense might not make this approach feasible commercially. DCA helps maintain fruit quality regardless of 1-MCP treatment, but a tasting panel found that Cortland stored with 1-MCP maintained a better level of 'snap' after storage. Continued use of DPA is strongly recommended.

1-MCP treated **Empire** tend to retain their firmness better, but may be more susceptible to CO_2 injury and flesh browning. For Empire flesh browning, the best way to keep levels down is to harvest early. Later picks will develop more browning, regardless of 1-MCP practices.

How does DCA stack up to 1-MCP?

Dynamic controlled atmosphere (DCA) is a storage method that actively measures fruit response to storage oxygen levels to determine the optimum oxygen level for that storage room. By keeping the oxygen level just above the "low oxygen limit", respiration rate can be reduced to a minimum. By slowing respiration further, fruit quality out of DCA storage is higher, with less superficial scald. Below are some of the benefits (+) and negatives (-) of using DCA and 1-MCP .

DCA:

\+ Chemical Free

\+ Easily installed in existing high quality storages

\+ Can inhibit superficial scald and some internal flesh browning disorders

\+ Some post-storage residual benefits

\- Need to have that high quality facility

\- Higher upfront investment costs, depending on system, e.g. purchase for HarvestWatch, leasing for Safe Pods

\- Storing fruit closer to oxygen levels at which injury can occur, and therefore higher risk

\- Need to select uniform fruit to serve as your samples: Harvest watch allows different lots in a room to be measured, while Safe Pods are based on a single sample of fruit to represent the entire room

\- Greater potential for quality loss after storage, unless combined with 1-MCP

1-MCP:

\+ Applied as a gas at low concentrations for 24 hours or less

\+ High quality rooms not required

\+ No investment on computerized CA technology

\+ No risk of low O2 injury

\+ Flexible timing of 1-MCP application

\+ Can maintain fruit quality in air storage

\+ Can inhibit superficial scald development

\+ Maintains quality parameters, like firmness and acidity, during the marketing chain

\- Not for organic use

\- Ongoing cost every time you apply

\- Can increase some physiological disorders, such as CO2 injury and some flesh browning disorders, depending on variety

Storing Champlain Valley Honeycrisp Based on the Passive Prediction Model

Michael Basedow and Andy Galimberti, CCE Eastern NY Commercial Horticulture; and Yosef Al Shoffe, Cornell University

'Honeycrisp' is a popular apple variety that is well-suited for growing in cool climate regions such as New York. One major obstacle for growing and marketing 'Honeycrisp' is the variety's susceptibility to bitter pit, a physiological disorder that manifests as sunken pits on or just beneath the fruit surface. Fruit can go into storage showing no signs of the disorder, but symptoms will then develop in storage, causing major reductions in the percentage of marketable fruit.

To help reduce the risk of developing bitter pit in storage, prediction models are being developed that will assist growers in identifying at-risk blocks, aiding their decision making in how to best store and market their fruit. Prediction tools currently being assessed are generally based on the fruits' mineral nutrient contents prior to harvest, as there has been good correlation between various ratios of fruit peel minerals ahead of harvest and the development of bitter pit in storage (Baugher *et al.*, 2017).

A Cornell Cooperative Extension team lead by Dan Donahue in Eastern New York is currently developing a bitter pit prediction model named "EMR" for its three major prediction components, (**E**)nvironment, (**M**)ineral profile, and (**R**)ootstock (Donahue *et al.* 2019 in press). Validation of the EMR model's performance in 78 independent Honeycrisp orchards was initiated across New York State in 2019 and will be continued in 80+ orchards this season. In a separate effort, Dr. Lailiang Cheng is leading a team in Western New York working on a prediction model based on early-season peel sap analysis.

An additional prediction tool being evaluated is the passive prediction method. This method has been evaluated over the past few years in New York and Pennsylvania by the Watkins lab (Al Shoffe *et al.*, 2019). In the passive prediction method, 100 fruit that are representative of a block are collected three weeks prior to the first anticipated commercial harvest. These 100 fruit are then stored at 68°F for three weeks to induce bitter pit symptoms, and are then subsequently rated for their bitter pit incidence (percentage of fruit showing bitter pit lesions).

The predicted total bitter pit following conditioning and storage is then generally expected to be 6 percent higher than the incidence in the early harvested fruit. For example, if your early harvested fruit had 2 percent injury, you would expect about 8 percent injury if the fruit were conditioned for a week and subsequently stored at 38°F.

In a 2019 extension project funded by the Northern New York Agricultural Development Program, we utilized the passive method to predict bitter pit incidence in 21 commercial 'Honeycrisp' blocks around the Champlain Valley, and used those predictions to separate blocks into three separate, four month storage treatments designed for blocks at low, moderate, and high risk of bitter pit development following long term storage. Fruit were rated after four months of storage to determine if the passive method, paired with an appropriate storage treatment based on the predicted bitter pit incidence, could be utilized together to reduce losses from long-term storage disorders.

Methods

We collected 100 fruit from 21 commercial orchard sites across the Champlain Valley on September 4, 2019, three weeks before the anticipated commercial harvest. Study blocks represented a range of tree ages, rootstocks, and orchard management practices. 100 apples per orchard block were picked from 10-12 trees. These fruit were stored in a commercial storage room in Peru, NY, at 68̊F for three weeks to induce bitter pit symptom development. After three weeks, fruit were rated for the presence of bitter pit, and were assigned to a low, moderate, and high bitter pit risk group.

Another set of 100 fruit per orchard from the same orchard blocks was collected on September 25, at commercial harvest. These fruit were stored for four months under a specific storage treatment based on their predicted bitter pit risk group. The storage treatment for each risk group was selected based on the following conditions: (Al Shoffe *et al.*, 2016; Al Shoffe and Watkins, 2018) and (Al Shoffe and Watkins, unpublished work):

Low Risk—If bitter pit development on fruit collected 3 weeks before harvest (3WBH) was less than 5%, harvested fruit were conditioned for one week at 50̊F, then moved to 38̊for four months plus 4 days (+4d) at 68°F.

Moderate Risk—If bitter pit development on fruit collected 3WBH was between 5-10%, the fruit were stored directly at 38̊without conditioning for four months+ 4d at 68°F.

High Risk—If bitter pit development on fruit collected 3WBH was greater than 10%, fruit were stored at 33̊for four weeks, and then moved to 38̊for four months+ 4d at 68°F.

Following storage, on January 21, 2020, fruit were rated for the incidence of bitter pit, along with the following additional storage disorders: soft scald, soggy breakdown, wrinkly skin, blotch, internal CO_2 injury, senescent breakdown, flesh browning, core browning, and vascular browning.

Total disorder development following storage was summarized for each block.

Results and Discussion

Bitter pit incidence of the 21 blocks of apples following three weeks at 68°F ranged from 0 to 19% (Figure 1).

14 blocks were rated as low risk, four blocks were rated as moderate risk, and three blocks were rated as high risk. The incidence of actual bitter pit on fruit after four months of storage + 4d at 68°F ranged from 0 to 33% (Figure 2).

Bitter Pit in Low Risk Blocks Stored at 50°F for 1 Week Followed by

(Continued on page 4)

(Continued from page 3)

Four Months at 38°F

The bitter pit incidence of fruit picked 3WBH was less than 5% in 14 of the 21 blocks surveyed. In 11 of these 14 blocks, the actual bitter pit incidence following storage was no more than 5% higher than we predicted using the passive method. These blocks support previous findings, which found the actual incidence out of storage is usually about 6% more than the incidence on the early picked fruit used for the prediction.

Unfortunately, three of the predicted low risk blocks came out of storage with 15%, 11%, and 33% bitter pit, respectively. The site with 15% bitter pit was planted on a vigorous rootstock with extensive shoot growth. The site with 11% incidence was planted on M.26, with a relatively light crop load. The site with 33% incidence was a young block on M.9 which was heavily pruned the previous winter. These horticultural parameters have been associated with increased bitter pit development (Baugher et al., 2017; Cline, 2009). This illustrates the importance in considering block history and management practices when using the passive method.

Bitter Pit in Moderate Risk Blocks Stored Directly at 38°F Without Conditioning

The passive model predicted four of the 21 blocks to have 10%, 7%, 5%, and 8% bitter pit. The actual incidence of bitter pit of fruit from these blocks following storage was 10%, 1%, 16%, and 16%.

For this storage treatment, the actual incidence was the same in one block, was 6% lower in one block, and was 11% and 8% higher in two blocks. These results suggest choosing not to condition fruit based on the passive method predictions may have helped to maintain bitter pit incidence at relatively low levels in the stored fruit that were prone to bitter pit development.

Bitter Pit in High Risk Blocks Stored at 33°F for One Month Followed by Three Months at 38°F

The passive model predicted three blocks to have 17%, 18%, and 12% bitter pit. The actual incidence rates following storage were 20%, 9%, and 2%, respectively.

Under this storage treatment, the actual bitter pit incidence was 3% higher in one block, and 9% and 10% lower in the other two. These data suggest storing fruit for one month at 33°F based on the passive method predictions can be effective for maintaining or reducing the incidence of bitter pit

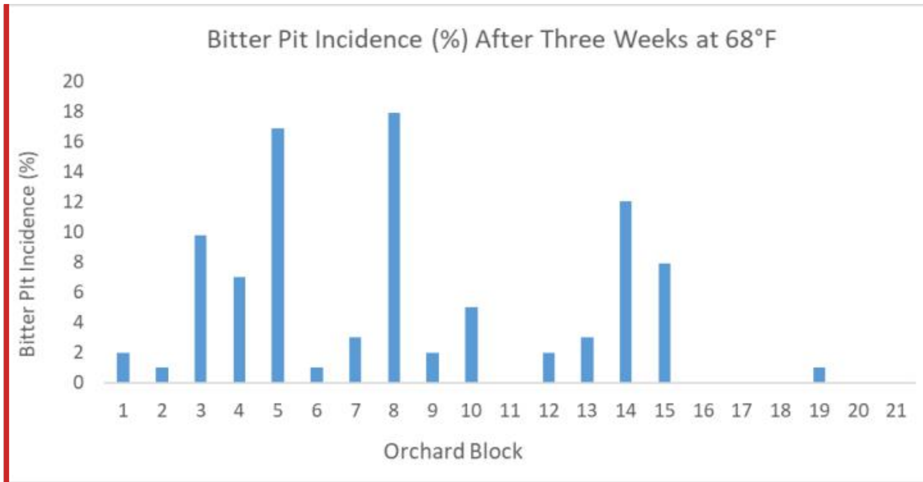


Figure 1. Bitter pit incidence (%) of 100 fruit from each of the 21 Champlain Valley orchard blocks. Predicted bitter pit incidence if fruit were conditioned for one week and subsequently stored at 38° would be 6% higher across all sites.

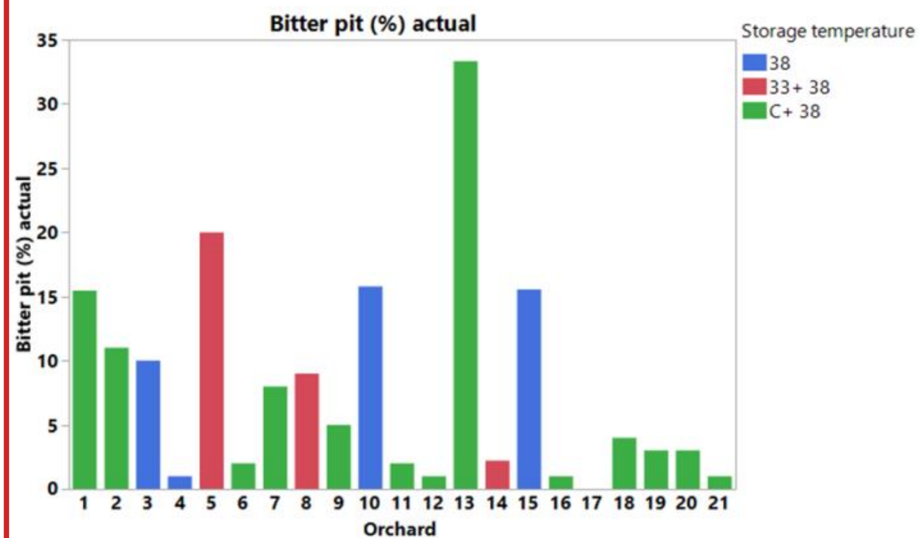


Figure 2. The actual incidence of bitter pit (%) of 100 fruit from each block coming out of one of three storage treatments.

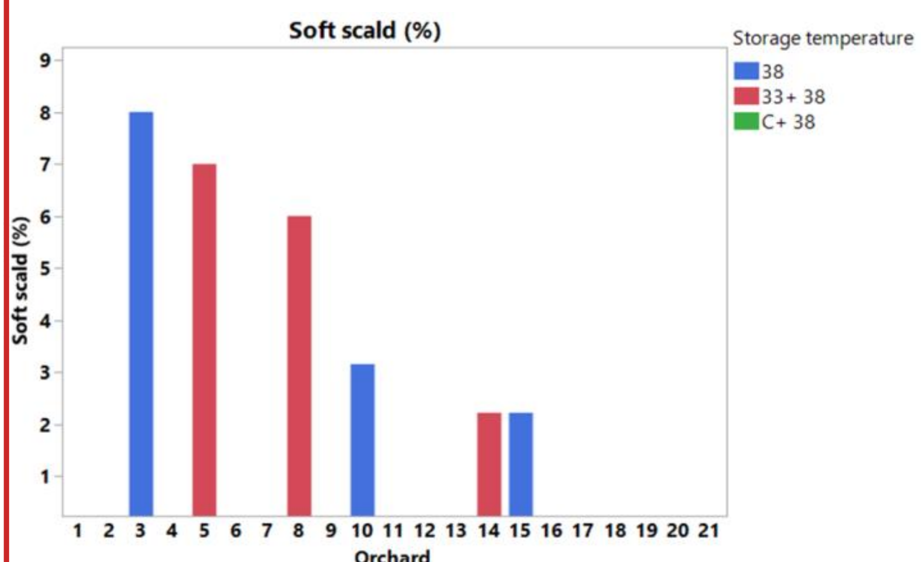


Figure 3. The actual incidence of soft scald (%) of 100 fruit from each block coming out of one of three storage treatments.

(Continued on page 5)

(Continued from page 4)

over a four-month storage period when fruit are at high risk.

Development of Other Disorders in Stored Fruit

In addition to bitter pit, fruit were rated for the development of soft scald, blotch, shrivel, wrinkly skin, rot, soggy breakdown, senescent breakdown, CO_2 injury, and flesh, core, and vascular browning.

Soft scald and soggy breakdown are common postharvest disorders of 'Honeycrisp' that can be exacerbated when fruit are stored at low temperatures. In our study, soft scald incidence ranged from 0 to 8% following four months of storage (Figure 3). The highest incidences of soft scald were observed in three blocks that were initially stored at 38°F and 33+ 38°F, respectively. Soft scald was not observed in conditioned blocks.

Soggy breakdown incidence ranged from 0 to 18% (Figure 4). The highest incidence was observed in a block that was stored at 33° F before being moved to 38°F.

The inverse relationship of bitter pit to soft scald and soggy breakdown development has been previously documented (Al Shoffe *et al.*, 2020; Watkins *et al.*, 2004), and should be heavily weighed when determining if 'Honeycrisp' should not be conditioned, or stored at lower temperatures, to minimize bitter pit. These findings reinforce that additional research is needed to optimize storage temperatures to reduce bitter pit, while also reducing the risk of soft scald and soggy breakdown development. Research is being performed to see if shorter storage durations at 33° prior to 38° can further reduce bitter pit incidence, while also reducing the risk of scald and soggy breakdown.

Decay incidence ranged from 0 to 15%, and was commonly observed on fruit with soft scald, or in fruit that had been damaged by stem punctures. Blotch incidence ranged from 0 to 6%, and was also highest in a block of fruit stored at 33°F. Senescent breakdown was observed at low levels (0 to 8%) across storage treatments. Flesh, core, and vascular browning were observed at low levels (under 5%) in four, three, and five blocks, respectively. We did not detect any wrinkly skin or internal CO_2 injury in any of the fruit we rated.

Conclusions

The passive method of bitter pit prediction has previously been confirmed as an efficient, cost-effective method for predicting bitter pit prior to commercial 'Honeycrisp' harvest across New York. Our findings from 21 Champlain Valley orchard blocks support these findings, as the predicted incidence rates were within 6 percent of the actual rates in 11 of the 14 blocks that were conditioned for one week at 50°F, prior to being stored at 38°F. However, three of these 14 blocks under-predicted bitter pit development by 10% or more. Since these blocks had a history of bitter pit, or had management features making them more prone to bitter pit development, our findings highlight the importance of growers strongly taking into account their management practices and block history when interpreting the results of the passive method.

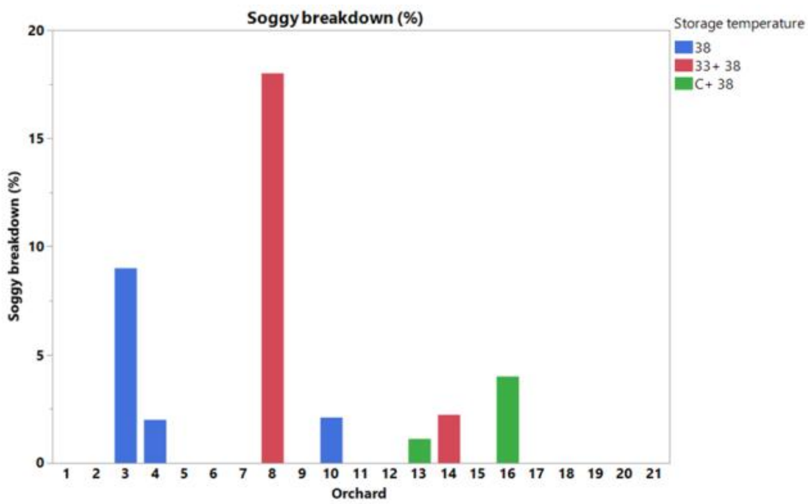


Figure 4. The actual incidence of soggy breakdown (%) of 100 fruit from each block coming out of one of three storage treatments.

While low storage temperatures can help mitigate bitter pit development in some cases, the lack of conditioning and/or prolonged storage at 33°F can exacerbate soft scald and soggy breakdown, which can contribute to having less marketable fruit following storage. With this in mind, we still recommend to avoid storage at 33°F. Therefore, our recommendation would be to condition fruit that have low predicted bitter pit values and a history of low rates of bitter pit prior to storage. Fruit with high bitter pit predictions should not be conditioned and should instead be stored directly at 38°F. These fruit should not be marketed until most of the bitter pit has been expressed to avoid significant retail losses, as described by (Al Shoffe et al., 2016).

If you'd like to trial the passive method on your blocks this season, get in touch with Mike Basedow or Dan Donahue for additional information.

References

Al Shoffe, Y., Nock, J.F., Baugher, T.A., Marini, R.P., Watkins, C.B., 2020. Bitter pit and soft scald development during storage of unconditioned and conditioned 'Honeycrisp' apples in relation to mineral contents and harvest indices. Postharvest Biology and Technology 160, 111044. 10.1016/j.postharvbio.2019.111044.

Al Shoffe, Y., Nock, J.F., Baugher, T.A., Watkins, C.B., 2016. Honeycrisp–to condition or not condition. New York Fruit Q. 24, 19-23. http://nyshs.org/wp-content/uploads/2016/10/Watkins-Pages-19-24-NYFQ-Book-Summer-2016.pdf.

Al Shoffe, Y., Nock, J.F., Zhang, Y., Zhu, L., Watkins, C.B., 2019. Comparisons of mineral and non-mineral prediction methods for bitter pit in 'Honeycrisp' apples. Sci. Hortic. 254, 116-123. 10.1016/ j.scienta.2019.04.073.

Al Shoffe, Y., Watkins, C.B., 2018. Initial short-term storage at 33 degrees F reduces physiological disorder development in 'Honeycrisp' apples. HortTechnology 28, 481-484. 10.21273/

(Continued on page 6)

(Continued from page 5)

horttech04102-18.

Baugher, T.A., Marini, R., Schupp, J.R., Watkins, C.B., 2017. Prediction of bitter pit in 'Honeycrisp' apples and best management implications. HortScience 52, 1368-1374. 10.21273/hortsci12266-17.

Cline, J. 2009. Bitter pit control in apples. Ontario Ministry of Agriculture, Food and Rural Affairs. Factsheet 00-009. Canada. http://www.omafra.gov.on.ca/english/crops/facts/00-009.htm

Donahue, D.J., Reig, G., Rutzke, M., Wallis, A., Basedow, M., Elone, S.E. 2019. A predictive model for *Malus* × *pumila* Borkh 'Honeycrisp' to reduce storage risk in Eastern New York State, U.S.A. International Symposium on Precision Management of Orchards and Vineyards, Palermo, Sicily, Italy. Acta Horticulturae. In Press.

Watkins, C.B., Nock, J.F., Weis, S.A., Jayanty, S., Beaudry, R.M., 2004. Storage temperature, diphenylamine, and pre-storage delay effects on soft scald, soggy breakdown and bitter pit of 'Honeycrisp' apples. Postharvest Biol. and Technol. 32, 213-221. 10.1016/j.postharvbio.2003.11.003.

CFAP for NYS Fruit and Vegetable Farms (as of July 2020)

Elizabeth Higgins, CCE Eastern NY Commercial Horticulture

CFAP, or the Corona Virus Assistance Program, helps agricultural producers impacted by the effects of the COVID-19 outbreak by providing direct payments to producers of eligible commodities. There are currently CFAP payments available for dairy livestock (beef pork lamb) non-specialty crops (corn malting barley soybeans wheat oats) wool AND specialty crops (fruits vegetables and herbs). This fact-sheet focuses on the latter.

Generally to be eligible for a CFAP payment a farmer must have sold (or tried to sell) a specialty crop between January 15 and April 15 2020 that USDA has determined suffered a 5- percent-or-greater price loss over a specified time resulting from the COVID-19 outbreak <u>or</u> faces additional significant marketing costs for unsold inventories. In NYS these would generally be crops harvested in FY2019 and in storage or crops that matured and were ready to sell in January-April.

USDA greatly expanded the number of specialty crops in July that are eligible and the amount of funding for some crops that were eligible in a notice of funding availability (NOFA) so more specialty crop farmers should look at this program. If you sold apples potatoes onions garlic greens greenhouse herbs and micro-greens, you should be looking at this program! For these crops there is now an automatic payment based on crop sold rather than based on losses. The full list of eligible specialty crops (as of July 10) is at the end of this fact sheet.

Other specialty crops will be announced in a future NOFA (Notice of Funding Availability) as losses due to COVID-19 market disruptions are better understood. Nursery crops and cut flowers are still under consideration but have not yet been included.

How are payments determined?

There are three possible payments for eligible crops:

1. CARES Act Payments for crops that USDA has determined had a five percent-or-greater price decline in sales price that were sold between January 15, 2020 and April 15, 2020. <u>This does not mean that YOUR prices needed to decline by more than 5%</u> if a crop you sold is on this list you are eligible for the payment.
2. CARES Act Payments for eligible crop shipments that left the farm by April 15, 2020 and spoiled due to no market or the buyer did not (could not) pay.
3. CCC Payments for eligible crops that did not leave the farm by April 15 2020 (for example were harvested but sitting in crates on the farm) or mature crops that were unharvested by that date (for example were plowed under) due to lack of buyers and which have not been and will not be sold. This could also include crops you donated because the market dried up.

Payments for eligible specialty crops will be 80% of the sum of:

(1) For eligible specialty crops that were sold between January 15, 2020 and April 15, 2020 the quantity sold multiplied by the payment rate in Column 2; Producers must maintain records such as a bill of sale documenting that they sold the crop and the amount sold.

(2) For eligible specialty crops listed that were harvested and shipped off the farm between January 15, 2020 and April 15, 2020 producers must obtain documentation such as a letter from the buyer explaining non-payment or other record validating non-payment. This applies to producers who have met contractual obligations in delivering the crop to the buyer but have not been paid the harvested and shipped quantity that spoiled (or was unpaid) multiplied by the payment rate in Column 3.

(3) For eligible unpriced specialty crops listed that did not leave the farm or mature crops that remained unharvested between January 15, 2020 and April 15, 2020 due to loss of marketing channel the sum of the quantity of crops that did not leave the farm (in acres in this case) or the quantity of mature crops that remained unharvested multiplied by the payment rate in Column 4.

Should you apply?

(Continued on page 7)

(Continued from page 6)

USDA-FSA has a payment calculator on the CFAP page (https://www.farmers.gov/cfap) that you can use to estimate what your CFAP payment is likely to be. This will help you determine if it is worth applying. If your crop is eligible for a payment in column 1 it is almost certainly worth applying as the application process is easy. USDA FSA has made this program very accessible (by USDA standards). Unfortunately for NYS specialty crop growers without crops in storage or early season crops currently summer and fall crop losses for 2020 aren't covered as the crops needed to be mature and harvested by April 15th.

Example Eligible Crop	**Column 2 crops you sold between January and April** (per lb)	**Column 3 crops that left the farm to be sold between January and April, but pmt. not received** (per lb)	**Column 4 mature crops that never left the farm (could have been donated or destroyed)** (per acre)
Apples	$0.05	$0.22	$1500.00
Cabbage	$0.04	$0.07	$367.00
Collard Greens	$0.04	$0.21	$560.00
Garlic	$0.17	$1.10	$3410.00
Greens	$0.08	$0.16	$420.00
Kale	$0.00	$0.22	$748 .00
Green Leaf Lettuce	$0.44	$0.60	$2611.20
Dry Onions	$0.01	$0.05	$540.10
Potatoes, fresh (not russets)	$0.01	$0.04	$449.00
Potatoes, fresh (russets)	$0.07	$0.09	$898.00
Strawberries	$0.84	$0.72	$7042.00
Tomatoes	$0.64	$0.38	$6122.90

Table 1: Example Eligible Crops and Payment Rates – full list of crops and payments is available on the USDA CFAP website.

USDA is aware that there are likely to be some specialty crops that suffered losses that weren't included. If you suffered significant losses from a specialty crop that isn't covered USDA is collecting data to consider including other crops. Examples of these could include maple syrup and nursery plants. Contact FSA if you produce a specialty crop that suffered losses that aren't reflected here.

What do you Need to Apply?

Sign ups for CFAP began on May 26 and will run through August 28. The application for CFAP is available at https://www.farmers.gov/cfap. Forms are on-line. The program is first come first served at the national level. Links to local FSA offices are also on that website.

All applicants need to be signed up with USDA FSA to be able to apply for these funds. If you have NAP have had a USDA-FSA loan or have USDA NRCS cost-share funding you are probably already in their system. Because USDA disaster payments almost always require you to be signed up with FSA even if CFAP payments are not much signing up with USDA-FSA would get you into the USDA system to be eligible for future programs. Also, by being in the system USDA is more likely to see how disasters impact your farm.

List of Specialty Crops eligible for CFAP as of July 10, 2020

Alfalfa Sprouts [1], Almonds , Apples [2,3] , Anise [1] , Artichokes [3] , Arugula [1], Asparagus [3], Avocados, Basil [1] , Beans , Bean Sprouts [1], Beets [1], Blackberries [1] , Blueberries [2,3] , Broccoli , Brussels Sprouts [1] , Cabbage , Cantaloupe [3], Carrots , Cauliflower , Celeriac (Celery Root) [1], Celery, Chives [1], Cilantro [1] , Coconut [1], Collard Greens [1] , Corn sweet , Cucumbers [3] , Dandelion Greens [1] , Eggplant , Garlic [2,3] , Grapefruit, Greens (others not listed) [1] , Guava [1] , Kale Greens [1], Kiwifruit [3], Lemons , Lettuce Boston [1] , Lettuce green leaf [1] , Lettuce iceberg , Lettuce Lolla Rossa [1], Lettuce oak leaf - green [1], Lettuce oak leaf - red [1], Lettuce red leaf [1] , Lettuce romaine , Marjoram [1] , Mint [1], Mushrooms [3], Mustard Greens [1], Okra [1] , Onions dry , Onions green, Oranges, Oregano [1], Papaya [3], Parsnips [1] , Passion Fruit [1] , Peaches [3,5], Pears , Peas Green (English/Garden Snap and Sugar) [1] , Pecans , Peppers bell type , Peppers other , Pineapples [1], Pistachios [1], Potatoes fresh - other [2,3,4] , Potatoes fresh - Russets [2,3,4] , Potatoes processing [2,3,4] , Potatoes seeds [2,3,4] , Radicchio [1], Raspberries [2,3] , Rhubarb [3,5], Rosemary [1], Sage [1] , Savory [1], Spinach , Squash , Sorrel [1], Strawberries, Sugarcane table [1], Sweet potatoes, Swiss Chard [1], Tangerines [2,3] , Taro [2,3] , Thyme [1], Tomatoes , Turnip Tops Greens [1], Walnuts, Watermelons

1: Commodity added in response to Notice of Funding availability, effective July 10, 2020
2: Expanded eligibility to include CARES Act funding for sales losses because USDA found these commodities had a 5 percent or greater price decline between mid-January and mid-April as a result of the COVID-19 pandemic.
3: Payment rate corrected per notice published in Federal Register July 10, 2020.
4: Divided potatoes into fresh russets, other fresh, processing and seed, with payment rates attributed accordingly.
5: USDA determined that peaches and rhubarb no longer qualify for payment under the CARES Act sales loss category.

Post-Emergent (Burndown) Herbicide Damage—Signs and Symptoms

Mike Basedow, CCE Eastern NY Commercial Horticulture; Janet van Zoeren, CCE Lake Ontario Fruit Program; and Lynn Sosnoskie, Cornell University

Herbicides can damage any part of the tree – shoots, roots, leaves, flowers and fruits – which can lead to stunted or distorted growth, reduced yield, and decreased winter hardiness. Of course, you already know that herbicides are specifically intended to kill plants. However, unintended herbicide contact with orchard trees can and does happen in a variety of ways. For example, soil-applied herbicides can move into the root zone via leaching. Residual herbicides may be deposited on leaves, flowers or fruit if disturbances, like mowing, cause treated soil particles to become airborne. Spray tank contamination is a route for directing herbicide residues directly onto sensitive tissue. Herbicides may also come into contact with trees via spray drift or volatilization.

Spray drift vs. volatilization.

Herbicide drift occurs during the application process and is the physical movement of spray droplets onto non-target tissues. This unintentional contact may lead to significant plant injury as well as reduced weed control (because target weed species do not receive the optimal herbicide dose. Drift is most likely to occur when applications are made under high wind speeds and conditions that increase turbulence, when travel speeds are faster, and when droplet/particle size is small (which may be affected by spray pressure, small nozzle orifices, and conditions that result in droplet evaporation such as high temperatures and low humidity), among other factors. Inversions, which may be accompanied by calm conditions, may also facilitate spray drift.

Volatilization occurs when the pesticide itself changes from a solid or liquid form into an air vapor. Even if the original application landed on the intended target, volatilized herbicides can spread off-target. Herbicides are most likely to volatilize when the products are applied to non-absorbent surfaces (like rocks or concrete) and air temperatures and humidity are high. Note that not all products are volatile. The volatility of a product may be listed on the label, or can be found through an online search. Note that the specific formulation is key in determining risk of volatilization – for example, some 2,4-D products have a high risk, whereas others have a low risk, depending on their formulation. If in doubt, you can always contact any of us for help determining the volatility of a product.

Symptoms/identification.

Any herbicide, if applied incorrectly, can damage your trees. Knowing the symptoms that herbicide active ingredients cause can help you determine which active ingredient may be responsible for observed injury. For example:

Glyphosate injury appears as yellowing between leaf veins (usually beginning at the base of leaves), stunting of new growth (due to shortened internodes, which is referred to as a 'witches broom'), and leaf cupping, curling and distortion. Because glyphosate is a systemic product that is translocated to meristems, symptoms may not be observed immediately after application. Glyphosate is not volatile, so tree injury from this product will occur during application or due to accidental particle drift.

Glufosinate injury is similar to glyphosate (leaf yellowing, leaf crinkling and distortion, and stunted growth), but may also include necrotic spots on the leaves. Some symptoms (like leaf burning) may occur within a few hours of application while others may develop over the course of several days. Glufosinate injury can be enhanced when the weather following application is sunny and humid.

2,4-D is also a systemic herbicide, which is translocated to sensitive growing meristems. Injury often first appears as leaf cupping and curling, along with stem disfigurement or excessive lengthening of shoots. Within a few weeks you may see yellowing of growing tips, wilting, and eventual necrosis of growing shoots.

Paraquat most consistently appears as necrotic spotting of leaves, which can develop quickly following herbicide application. Other symptoms may include leaf yellowing, crinkling, and wilting, which, within a few days, can lead to complete leaf necrosis.

There are a couple of websites with excellent pictures of herbicide damage. Visit and bookmark: the **University of California Herbicide Symptoms** page and the **OMAFRA Apple IPM Herbicide Gallery**. The newly hired Weed Scientist at Cornell University, Dr. Lynn Sosnoskie, has been tentatively approved for a grant to develop an online gallery of herbicide injury images across New York's specialty crops starting in fall of 2020, so look for updates about its progress.

Of course, not all mysterious damage is caused by off-target herbicide applications. Herbicide symptoms can be confused with damage caused by diseases, nutrition imbalance, drought, or winter injury. Some clues that herbicides may be a culprit include:

- Specific patterns of injury within the orchard block, such as damage predominantly in border rows, on one side of the tree, or only the outer leaves of the tree (drift shadows).
- Weeds showing similar symptoms near the orchard block, or between the orchard and suspected source of drift or volatilization.
- Symptoms that are consistent with recent herbicide applications made within or near the orchard.

To help identify herbicide damage (and if applicable, to help with insurance claims if drift is from an outside source), it is best to have a consistent way to keep records, both of all herbicide applications you make on your farm, as well as of any damage symptoms or other unusual things you notice while driving or moving through the orchard. Keep a pad and paper with you when scouting the orchard. If you see any unknown injury, jot down some notes if you notice any specific patterning, such as those described above. Be sure to document weather conditions at the time of and following application as well as details about travel speeds, nozzles used and

(Continued on page 9)

(Continued from page 8)

heights, spray pressure, and weed density and canopy height.

Avoiding herbicide damage.

You can't always predict when herbicide drift or volatilization will occur, but you can decrease the likelihood.

- Do not apply under high temperatures (see labels regarding specifics for each herbicide). If an application is necessary during a prolonged hot spell, use herbicides that have a lower risk of volatilizing, if applicable.
- Keep the boom as low to the ground as possible to reduce the chance of herbicide hitting the trees, but high enough above target weeds to ensure good spray coverage.
- Plant windbreaks to prevent drift from neighbor's fields.
- Use shields or air induction nozzles when applicable, to reduce drift.
- Counterintuitively, drift can be worst both when there are strong gusty winds, but also when there is no wind. The best condition for an herbicide (or any) spray is a mild, consistent, predictable breeze.
- When allowed by the label, the use of an adjuvant may reduce the chance of drift for certain products.

As a side note, remember to read and follow the label for cleaning spray equipment, especially if you use the same sprayer for herbicides as you use for other pesticides. Water is not always sufficient to clean all herbicide residue out of the tank, which can have disastrous consequences! Even when re-using equipment for another herbicide application, the residue may lead to a mix of products or adjuvants that are more toxic to the crop or more prone to drift or volatilization. Conversely, incompatible herbicides may congeal and clog sprayer components.

What to do if you do see herbicide injury?

The good news for orchard managers is that perennial plants, and especially trees, can often recover from significant single-time herbicide damage. The larger biomass and longer life allows trees to dilute and translocate the product away from the most sensitive tissues.

Although less well-studied, chronic low-dose exposure may be detrimental to the overall health of the tree, making it more susceptible to insects, diseases, or other stressors.

In general, if you are concerned about herbicide damage to your orchard block, you can contact Mike Basedow mrb254@cornell.edu) or Lynn Sosnoskie (lms438@cornell.edu).

NYCAMH/NEC Farmworker Needs Assessment Survey

Please support NYCAMH's farmworker needs assessment by encouraging your farm employees to complete the survey below. NYCAMH provides farm safety training and equipment, respirator fit testing and other resources to help keep you and your workers safe and healthy!

The purpose of the survey is to understand the unique challenges your workers are facing in relation to the COVID-19 pandemic. This information will help NYCAMH create materials and programs that are more appropriate and helpful to you and your workers. To gather this data, we are asking if you would share the following survey link with your workers:

Please click here to take the survey in English – https://redcap.bassett.org/redcap/surveys/?s=NH8CHXX499

Please click here to take the survey in Spanish: https://redcap.bassett.org/redcap/surveys/?s=LND3MR9TPD

You can also email the link directly to your workers or contact NYCAMH to request paper copies that you can distribute to them. You can contact NYCAMH if you would prefer to have your workers complete the survey over the phone or if they need assistance completing the survey (assistance is available in English or Spanish). [contact: Nicole Blanchard at 607.422.7527 or farmworkercovidsurvey@bassett.org]. Lastly, please assure your workers that the survey is voluntary, and responses are confidential (no contact information will be requested in the survey).

If you would like to learn more about our organization, please visit www.nycamh.com or www.necenter.org. Thank you very much for considering this request and for your essential work in providing agricultural products to the nation throughout the pandemic.

Julie Sorensen, NYCAMH/NEC Director

Identifying Bindweeds: A Quick ID Guide for Three Common Species

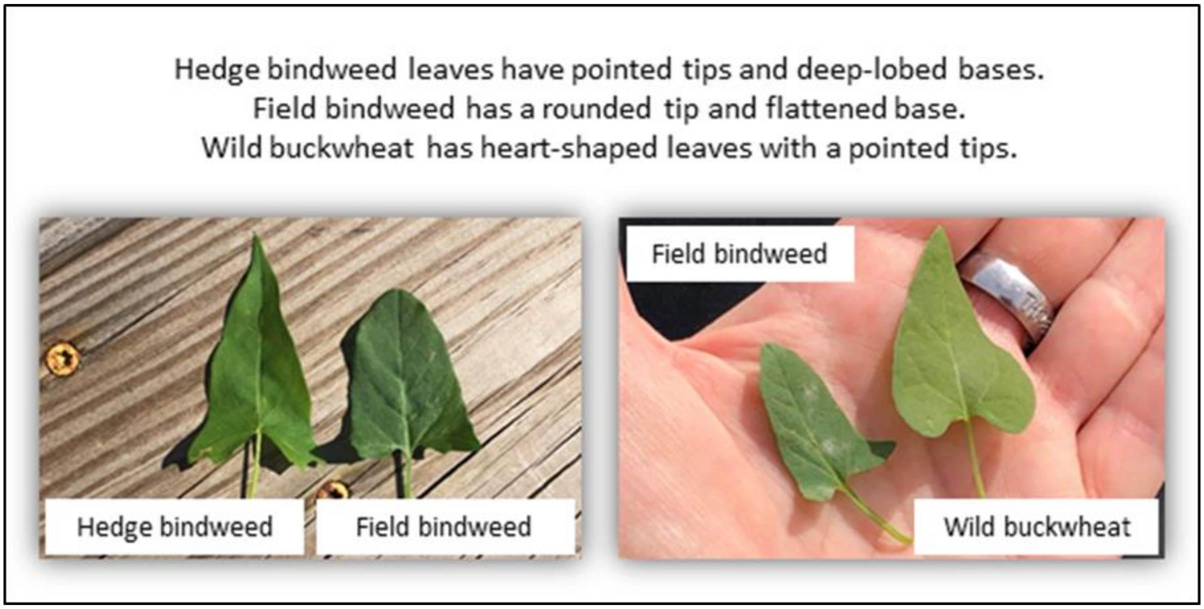
Dr. Lynn Sosnoskie, Cornell University

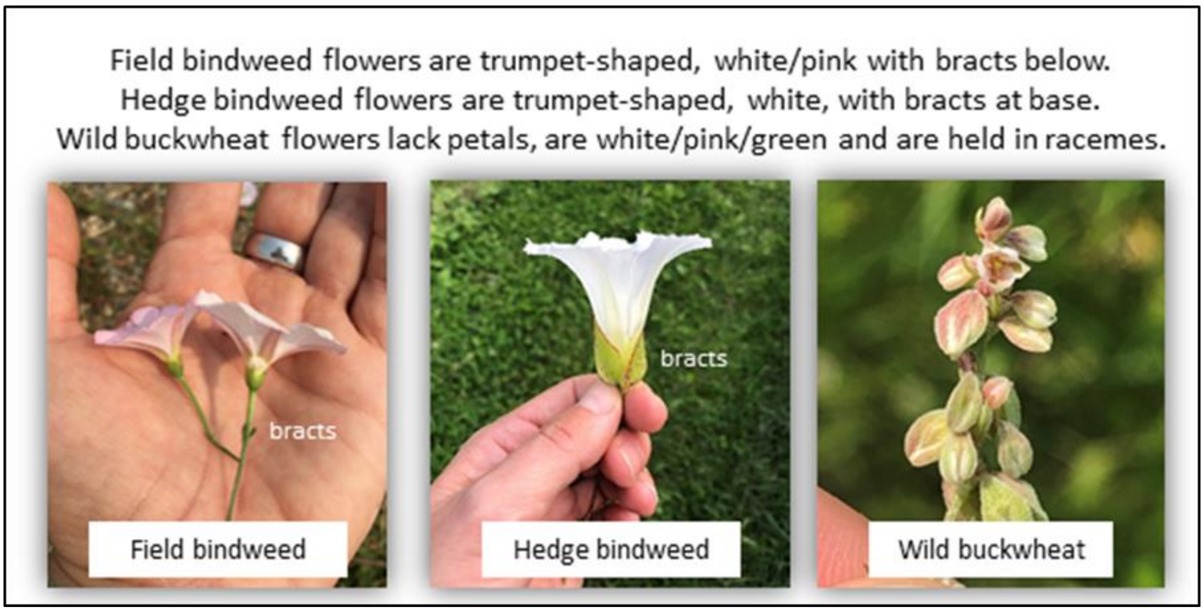
The name “bindweed” is often used as a catch-all term that encompasses several different weedy plant species. This can include the annual morningglories (Ipomoea spp.) and the perennial field (Convolvulus arvensis) and hedge (Calystegia sepium) bindweeds. It also may include a species that is not even a bindweed at all. i.e. wild buckwheat (Fallopia convolvulus), which is occasionally referred to as black bindweed. The specific bindweed species present at your site may impact the type and timing of weed management strategies you will want to employ because of differential sensitivity to herbicides or regrowth potential following physical control measures. Below is a guide to help you distinguish between three commonly encountered “bindweeds” present in New York.

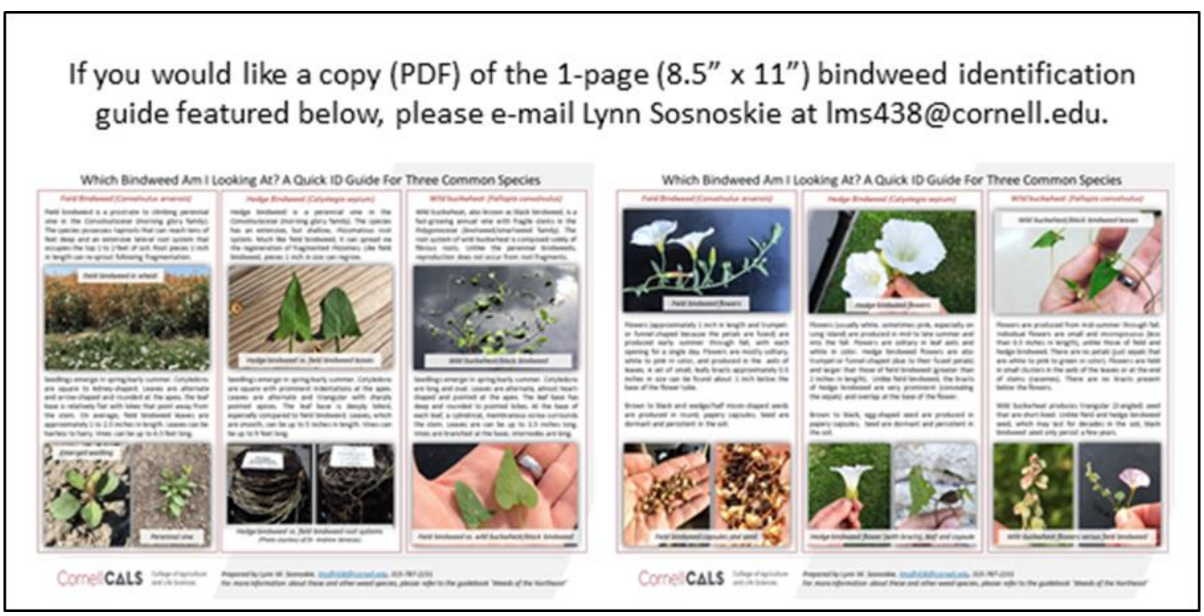
Common name:	**Field bindweed**	**Hedge bindweed**	**Wild buckwheat (Black bindweed)**
Latin name:	*Convolvulus arvensis*	*Calystegia sepium*	*Fallopia convolvulus*
Plant family:	*Convolvulaceae* Morningglory family	*Convolvulaceae* Morningglory family	*Polygonaceae* Knotweed family
Life cycle:	Perennial	Perennial	Annual
Reproduction:	Root fragments and seed	Root fragments and seed	Seed
Leaves:	Leaves are alternate and arrow-shaped and rounded at the apex. The leaf base is relatively flat with lobes that point away from the stem. Field bindweed leaves are approximately 1 to 2.5 inches in length. Leaves can be hairless to hairy.	Leaves are alternate and triangular with sharply pointed apices. The leaf base is deeply lobed, especially compared to field bindweed. Leaves, which are smooth, can be up to 5 inches in length.	Leaves are alternate, almost heart-shaped and pointed at the apex. The leaf base has deep and rounded to pointed lobes. At the base of each leaf, a cylindrical, membranous sheath (ocrea) surrounds the stem. Leaves are can be up to 3.5 inches long.
Roots:	Deep (reaching tens of feet into the soil profile) vertical roots; extensive lateral roots in the top 1 to 2 feet of soil. Root pieces as small as 1inch in size can regenerate.	Extensive, but shallow, rhizomatous root system. Root fragments as small as 1 inch in size are capable of regrowth.	Fibrous root system. Regeneration does not occur from roots.
Flowers and seed:	White to pink, solitary trumpet-shaped flowers that emerge from leaf axils. Usually 1 to 2 inches in size. Small leafy, bracts are located approximately 1 inch below the base of each flower. Seed are brown to black, wedge-shaped, and persistent in the soil (decades).	White, trumpet shaped flowers that are mostly greater than 2 inches in length. Bracts are large, leafy and cover the base of the flower. Seed are brown to black, egg-shaped and persistent in the soil (decades).	Individual flowers are small and inconspicuous (less than 0.5 inches in length). There are no petals, only sepals that are white to pink to green in color. Flowers are held in small clusters in leaf axils or at the end of stems. Seed are 3-angled and short-lived.

(Continued on page 11)

(Continued from page 10)







LOF Honeycrisp Bitter Pit Prediction Models
August 11, 1:15pm
CCE LOF

In this webinar, Dr. Terence Robinson, Dr. Lailiang Cheng, CCE-LOF's Mario Miranda Sazo, and Lake Ontario Fruit Inc.'s Scott Henning will present a summary of the peel sap analysis for bitter pit prediction. Dr. Chris Watkins will follow with instructions on how to use the passive prediction model. CCE-LOF's Craig Kahlke will talk about arrangements for fruit storage for the passive model in commercial storages, along with help in evaluating the fruit. The panel will discuss recommendations/comparison between the 2 models to help guide storage regime and marketing plans.

Register here: https://cornell.zoom.us/webinar/register/WN_HDoRGEYiSy2qdoktY5UGAQ

This event is free, but pre-registration is required. Once you register, if you are calling in with your phone, you will receive an email with a password, which will be required to login. Any questions or concerns with registration please direct to Craig Kahlke at cjk37@cornell.edu.

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

U-Pick is a critical direct marketing approach for many of our Eastern New York orchards 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. https://smallfarms.cornell.edu/wp-content/uploads/2020/05/Cornell-U-Pick-Best-Practices-COVID-19.pdf

SECTION 18 APPROVAL OF BIFENTHRIN FOR BMSB
(Mike Helms, PMAP, Ithaca; mjh14@cornell.edu)

The US Environmental Protection Agency has granted New York State a FIFRA Section 18 Specific Emergency Exemption for the use of Bifenture 10DF Insecticide/Miticide (EPA Reg. No. 70506-227), Bifenture EC Agricultural Insecticide (EPA Reg. No. 70506-57), and Brigade WSB (EPA Reg. No. 279-3108) to control brown marmorated stink bug on apples, peaches, and nectarines in Columbia, Dutchess, Monroe, Niagara, Orange, Orleans, Ulster, and Wayne Counties in New York State.

Please note the following:

- The Section 18 labels restrict use to Columbia, Dutchess, Monroe, Niagara, Orange, Orleans, Ulster, and Wayne Counties. Use in any other counties is prohibited.
- The exemption is valid through October 15, 2020.
- Bifenture 10DF, Bifenture EC, and Brigade WSB are all restricted-use pesticides.
- Aerial application is prohibited.

Users must have a copy of the appropriate Section 18 exemption in their possession at the time of use. Users must also follow all applicable directions, restrictions, and precautions on the primary product label. Copies of the approved Section 18 labels are available at the DEC's NYSPAD product registration website.

Tree Fruit Specialists

Daniel J. Donahue
Phone: 518-691-7117
Email: djd13@cornell.edu

Mike Basedow
Phone: 518-410-6823
Email: mrb524@cornell.edu

Business Specialist

Liz Higgins
Phone: 518-949-3722
Email: emh56@cornell.edu

ENYCHP Office

Chelsea Truehart
Phone: 518-746-2553
Email: ct478@cornell.edu

www.enych.cce.cornell.edu

Find us on Facebook & Instagram

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.