

The Produce Pages

Serving the fruit and vegetable growers of Eastern New York



January 2018

TERESA RUSINEK, ENYCHP

This month we feature Hepworth Farms in Milton, New York, operated by Amy Hepworth, Gail Hepworth and Gerry Greco. Being on the Hepworth farm over the past 17 years has truly been a learning experience. There are always new pieces of land Amy is reclaiming, new varieties of vegetables Gail is seeding, and new pests Gerry is taking me out to a field to identify. The Hepworth Farm has been a generous supporter of Cooperative Extension and agriculture, contributing many hours on advisory boards, hosting twilight meetings and research trials.

Can you give me a history of the farm?

Hepworth Farms was established in 1818 along the west bank of the Hudson River. In 1918, the Hepworth family opened a roadside market in Milton. During the 1920-40's cars and trucks would line up on 9w on the way back to the city to buy produce and fresh made fruit drinks at the 24 hour roadside market. The farm also produced and sold Bordeaux mixture to farmers who would come down with their horse and buggies to fill their spray wagons. In the 1940s a commercial cold storage and packing facility was built. The roadside market and storage/packing facility was sold in 2000. The Hepworth family decided to buy back the property in 2014. The buildings and grounds were renovated into a modern facility for packing and storage of the many varieties of vegetables the farm grows today.

Photo: Gerry Greco, Amy Hepworth and Gail Hepworth in the cabbage patch

continued on page 3

Featured Farm

Cornell Cooperative Extension
Eastern NY Commercial Horticulture Program

The Produce Pages

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The Produce Pages is a monthly publication of the Eastern New York Commercial Horticulture Program. **For more information about the program and our events, please visit our website at : <http://enych.cce.cornell.edu/>.**

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Contents

General Updates

Featured Farm: Hepworth Farms	3
Where Did it Hail?	4
Making the Leap to Owner-Operator– are you labor ready?	12
Supervising Seasonal and Temporary Workers	13

Vegetable Production/Marketing

Notes from Winter Storage School	9
Growing Alliums for Storage and Long-term Sales... 15	

Fruit Production/Marketing

How Grapevine Buds Gain and Loose Hardiness	7
Apple Pruning, Tree Cold Hardiness, and Chill Units	5

Calendar of Events.....16



Serving the Educational and Research Needs of the Commercial Small Fruit, Vegetable and Tree Fruit Industries in Albany, Clinton, Columbia, Dutchess, Essex, Fulton, Greene, Montgomery, Orange, Putnam, Rensselaer, Saratoga, Schoharie, Schenectady, Ulster, Warren and Washington Counties

Amy and Gail Hepworth are the seventh generation on the Hepworth farm. Amy graduated from Cornell University in 1982 with a degree in Pomology and took on the lead role in farm operations. Under her management, the farm underwent major changes including downsizing from 900 to 50 acres of fruit trees, using IPM and experimenting in organic production. By 1990 the farm began shifting away from fruit production into organic vegetable production. Currently the farm specializes in the production of fruiting vegetables on 550 acres and is the largest grower of organic tomatoes in the Northeast.



ENYCHP Veg Specialist Teresa Rusinek and Amy Hepworth discuss tomato pruning in high tunnel

What changes have you made to the operation over the last five years?

To keep up with market demands, Hepworth Farms has increased acreage, production, infrastructure and most of all investment in labor. They've grown from 25 to over 200 employees in the past 5 years. These increases required a lot of attention to detail. They have focused on automation and efficiencies in the packing house such as doubling the cherry tomato packing line. Amy, Gail and Gerry have worked closely with farm workers at all levels to build skills needed to

produce quality vegetables and to sustain the operation into the future.

What do you see as the greatest challenge your farm faces in the next couple of years?

Securing enough legal workers for production needs will be a challenge. The paramount challenge is increasing soil health in high production systems.

How have you used CCE?

CCE is an independent, unbiased source for information outside of the farm that is needed. CCE has provided resources, on farm problem solving, a

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What crops do you grow?

Hepworth Farms grows over 400 varieties of vegetables. Tomatoes, eggplants, peppers, summer squash, cucumbers and greens are main crops. They also plant crops based on customer requests and demand such as culinary herbs, okra and husk cherries. They grow winter greens in several high tunnels/greenhouses located on the home farm. There are 89 varieties of tomatoes growing on Hepworth Farms, many are heirlooms. Tomatoes are grown in the field and also under 7 acres of Haygrove high tunnels. Fun fact: If you lined up all the rows of tomato, it would total 128 miles.

Where and how do you market most of your produce?

Hepworth Farms grows crops based on their customer demand. They have a diversified market portfolio, selling directly to wholesale distributors, retail markets, CSAs, restaurants and participate in the local Heart of the Hudson Valley Farmers Market in Milton. Hepworth Farms strongly advocates in the market for locally grown. They are New York State Grown and Certified, GAP Certified, Certified Organic, and achieved the Best rating in Whole Foods Responsibly Grown Program.



Newly renovated packing/ storage facility at Hepworth Farms

broad perspective and independent applied research. Some of the more pressing research needs are: methods to control pests in least toxic ways, particularly soil borne diseases that persist in the soil for many years; and solutions to maintain healthy soils.

What does the future look like for your operation?

For the Hepworth farm, the future lies within the work force. Talents of farmworkers are continually assessed as they develop a model to move the operation to the next generation. The operation will continue to grow and innovate within in a framework of ecological, economic and social justice, retaining what works and identifying what doesn't.

What would you like other growers to know about you and the operation?

Amy is passionate to learn more about the relationship of agriculture and nature. She believes that farmers who work together have a better chance of success. She is committed to building workers' skills, assessing their talents, and giving them a chance to shine. At Hepworth farms,

workers are promoted based on their skill sets and achievements on the farm.

Amy stresses the importance of independent applied research, which she sees as a critical component to the sustainability of agriculture. She believes that all farmers should participate and financially support the Eastern NY Commercial Horticulture program as well as the Hudson Valley Research Lab, aka F.A.R.M. (Farmers Alliance Research Management).

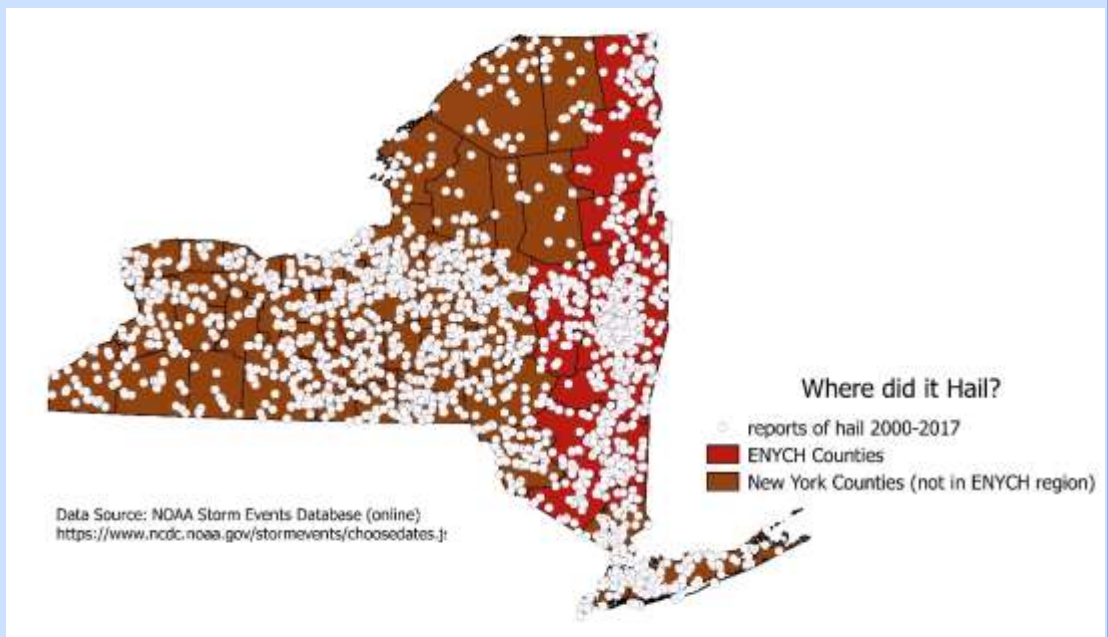
What advice would you give new growers?

"Work on a successful commercial farm for 2-5 years before going into farming and keep an open mind. I have found that key factors contributing to our success are: you have to have grit; delayed gratification is more valuable than instant gratification; prioritize and commit - be ok with the sacrifices that farming takes because as we say here 'tomatoes don't know it's Sunday'. Apply the principles of your life to your farm, seek the truth and think of your actions and the impact of your decisions for future generations."

FYI:

If you wondered if you were in a "hail-prone" area? Below is a map of New York with the locations of hail reports from 2000-2017. The hail data comes from the NOAA Storm Events Database. It should be noted that the data is not collected by weather stations,

most of the sightings were reported by the public, trained weather spotters or emergency personnel (fire or police) which will skew the results to areas with more population.



Elizabeth Higgins, ENYCHP

Apple Pruning, Tree Cold Hardiness, and Chill Units

MICHAEL BASEDOW &
DAN DONAHUE, ENYCHP

After a relatively warm fall, cold temperatures have settled into Eastern New York. In the Champlain Valley, we've already had a stretch of single digits and a few nights into the negative teens. The Hudson Valley has also experienced some temperatures in the negative single digits. With the possibility for extreme cold and fluctuating temperatures, it is worth reviewing some concepts of cold hardiness, how pruning can affect it, and how to avoid winter injury.

So, how do trees acquire their cold hardiness? Trees acclimate to the cold following shorter day lengths and exposure to cool temperatures in the fall and winter. Cold hardiness develops in stages as the temperatures get progressively colder. Trees reach their maximum cold hardiness when they have been exposed to temperatures below freezing, close to 0° F (Marini and Schupp 2017). To ensure trees have reached their maximum hardiness, we often recommend waiting until at least January to begin pruning. If possible, wait until after mid-winter when the risk of very cold temperatures is past.

Cold hardiness is dynamic. When the freezing temperatures bringing on cold hardiness are maintained, the trees will remain very hardy. However, if there is a stretch of mild weather, trees will likely lose some of their hardiness. Once the temperature drops again, trees should re-acclimate to the cold over the next few days. This topic leads us into a discussion of chill units, the North Carolina Model (Shaltout and Unrath 1983) and how it relates to endodormancy and ecodormancy. Apples are most resistant to deep, mid-winter cold while they are still in the resting or quiescent stage (endodormancy). In order to break endodormancy, a certain number of "chill units" must accumulate, and this number varies between varieties in a range of around 10% on either side of 1,100. For example, research has found that Empire, Fuji, Gala and McIntosh require 1080 chill units to accumulate

before endodormancy is broken (Hauagge and Cummins 1991). A NC model chill unit is defined as one hour at 45F. As the ambient temperature moves above or below 45F within a 15F band, the chilling unit accumulation drops to a decreasing proportion of one unit. If temperatures rise above 65F, the accumulation of chilling units can actually reverse.

The endodormancy process starts in late July, and in most years sufficient chilling units have accumulated by late December and early January to break endodormancy. After that point, the apple tree will respond directly to ambient temperature conditions. In a sense, the endodormancy brakes on bud development are off, and we enter the ecodormancy phase. Once in ecodormancy, the tree responds to ambient temperatures. We saw this phenomenon at work in the Hudson Valley in early 2016. The unusually warm February and March pushed trees into early bud development, with disastrous bud freeze damage from cold early March weather that was not out of the ordinary at all.

Degree day accumulation during the ecodormancy phase is an important driver for bud development, though in and of itself it is not enough information to accurately predict apple bud break. As far as chill unit accumulation goes, there certainly is annual variation in the breaking date for endodormancy, whether that date is December 20 or January 20 is not really relevant, because in (almost?) all years, ecodormancy is maintained because of cold mid-winter temperatures into February. As long as degree days above 40 to 43 degrees aren't accumulating, effective winter cold hardiness should remain stable. Once your trees

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less likely to fully re-acclimate to the cold if there are fluctuating stretches of warm and cold temperatures late in the winter. Late winter is still usually a safer time to prune though, since the likelihood of very cold temperatures is much less than in January.

In addition to weather changes, pruning also decreases a tree's cold hardiness, as the pruning cut is believed to invigorate the tissue surrounding it. The tree should regain its hardiness about ten days after being pruned. The extent of pruning can also increase the amount of potential winter injury. The more you prune, the more cold hardiness you will lose at the region of the cut, and the longer it will take your tree to regain its hardiness (Long).

So, a good time to begin pruning would be when the forecast calls for at least five days of sustained, moderately cold temperatures after the trees have been exposed to stretches of freezing, near zero temperatures. This is when trees will be at their maximum cold hardiness. If it can be avoided, do not prune when there is going to be a large drop in temperature in the ten days following pruning, or if the temperature is going to be below 0°F in the five to ten days following pruning (Long). Again, waiting until mid to late winter when the risk of severe cold has passed is ideal.

If you have many blocks that need to be pruned, but are concerned about the weather, you can start on your most mature blocks. Mature trees with adequate vigor are the least likely to be injured by the cold following pruning (Long). The most susceptible blocks are poor growing blocks, those with too much vigor, or young plantings. These should be pruned when the forecast shows very little chance of a severe temperature drop in the days following pruning.

Sources:

Hauagge, R. and Cummins, J. 1991. *Relationships among Indices for the End of Bud Dormancy in Apple Cultivars and Related Malus Species under Cold Winter Conditions* J. Amer. Soc. Hort. Sci. 116(1):95-99.

Long, L. E. *Winter Pruning Temperatures*. Oregon State University. http://extension.oregonstate.edu/wasco/sites/default/files/horticulture/winter_pruning_temperatures.pdf

Marini, R. and Schupp, J. 2017. *Tree Fruit Cold Hardiness – Pruning Effects*. Penn State University. <https://extension.psu.edu/cold-hardiness-of-fruit-trees>

Shaltout A. D., Unrath C. R. 1983. *Rest Completion Prediction Model for Starkrimson Delicious apples*. J. Am. Soc. Hortic. Sci. 108(6):957–961

How Grapevine Buds Gain & Lose Cold Hardiness

TIM MARTINSON, CORNELL

Each fall and winter, grapevine tissues produced during the growing season transition from a cold-tender to cold-hardy state. This process, known as cold acclimation, allows vines to survive low winter temperatures. It is a gradual process, which starts around veraison in response to low temperatures and decreasing day length and continues after leaf fall when temperatures are below freezing. As temperatures rise after mid-winter, grapevine tissues deacclimate in a gradual process, culminating in bud burst and active growth at the start of the growing season. How fast this process happens, and to what extent vine tissues survive extreme winter low temperatures, depends upon the cultivar (its genetic makeup), seasonal temperatures and how they vary, and the vine's condition as it enters the dormant season.



Grapevine buds gradually gain and lose cold-hardiness as temperatures fall and rise during the dormant season (Figure from Zabadal et al., 2007)

Dehydration and supercooling.

During the growing season, green, actively growing vine tissue is composed mostly of water—which will form ice at freezing temperatures, expanding the cells and disrupting their integrity. In preparation for the dormant season, cells become resistant to lower temperature through two mechanisms: dehydration through movement of water to intercellular spaces and

accumulation of sugars and protein complexes that bind water and serve as cryoprotectants. These cryoprotectants lower the freezing point of water and allow cell contents to supercool without forming damaging ice crystals. The acclimation process starts well before freezing temperatures occur, but buds continue to gain hardiness from the onset of freezing temperatures through the coldest part of midwinter.

Veraison to leaf fall.

In autumn, green shoots turn brown from the base outwards toward shoot tips as the cork cambium forms (a ring of cells

outside the phloem), producing a layer of water-resistant cork cells called the periderm. As these cells are produced and die, they become impervious to water. Buds are only weakly connected to the vine's vascular system, which isolates bud tissue and limits the

potential for them to take up water. At leaf fall, buds are moderately cold-hardy and can survive temperatures ranging from 5 to 20° F.

Leaf fall to midwinter.

After the onset of below-freezing temperatures, buds continue to gain cold-hardiness through further desiccation and redistribution of water to the intercellular spaces. As ice forms outside of cells, differential vapor pressure draws water out of the cells and on to the surface of the ice crystals. This response is highly correlated with the vine's exposure to low winter temperatures. For example, buds exposed to lower winter temperatures in New York have median lethal temperatures (LT50) two to three degrees lower than buds exposed to more moderate winter temperatures in Virginia.

Midwinter to bud burst.

After attaining their maximum cold hardiness in midwinter, buds deacclimate in response to milder temperatures—and deacclimation is often more rapid than the acclimation process. Warmer temperatures increase ambient humidity, and vine tissues gradually

gain water. As soils warm up, capillary action draws water up the trunk, and "sap flow" occurs. By the time of bud swell, rehydrated bud tissue is vulnerable to freeze injury at only a few degrees below freezing.

Compound buds.

Each grapevine bud contains a primary, secondary and tertiary bud. The primary bud is most well-developed and is typically less cold-hardy than secondary or tertiary buds. Freeze injury in response to low temperatures typically affects the primary bud first.

Lethal temperatures for bud injury.

We measure bud freezing temperatures by collecting canes from vineyards, cutting off buds, and placing them on thermocouples in a controlled temperature freezer. As the temperature in the freezer gradually decreases, each bud will release a small amount of heat, called a low temperature exotherm, as it freezes, allowing a precise estimate of the lethal temperature for that bud. A collection of buds from a single vineyard will exhibit a range of bud freezing temperatures that varies over two to six degrees. The median freezing temperature from a collection of 30 buds, called the LT50, is a common measure of cold hardiness.

Measurements of LT50 bud freezing temperatures from leaf fall to bud burst reveal that bud hardiness undergoes constant change in response to weather conditions.



Cut buds are placed on thermocouples in a controlled-temperature freezer to determine lethal temperatures. As buds freeze they release heat, which is detected by the thermocouples.

Variation among cultivars.

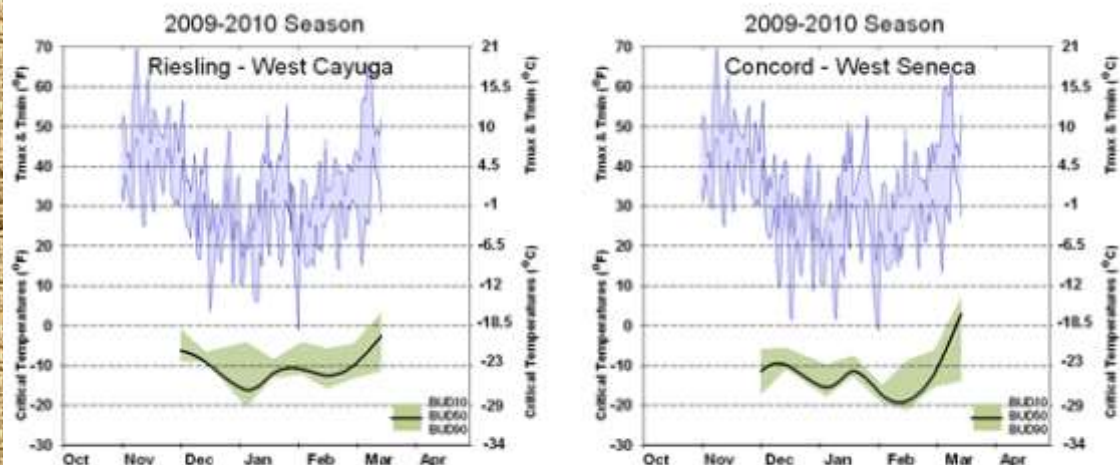
The winter low temperatures that injure buds limit where a cultivar can be grown. Cold-sensitive *V. vinifera* cultivars may have significant bud injury at <-3° F, but buds of cold-hardy varieties with *V. riparia* parentage can survive winter lows of -30° F. In general, cold-hardy Minnesota hybrids > Labrusca types > conventional French-American hybrids > *V. vinifera* cultivars. Cultivars also vary in the rate at which they acclimate and de-acclimate. Cold-hardy cultivars (e.g., Concord) may acclimate and de-acclimate faster than less cold-hardy cultivars (e.g., Cabernet Sauvignon), which occasionally can result in freeze injury in the springtime even in hardier cultivars.

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Dead primary bud resulting from low winter minimum temperatures

Bud freezing temperatures (solid line) compared with minimum and maximum daily temperatures during the 2010-2011 winter season for Cabernet Franc (left) and Concord (right). Note that LT50 temperatures are lower and change faster for Concord than for Cabernet Franc. For current information, see [Bud Hardiness Data](#) page.



Bud freezing temperatures (solid line) compared with minimum and maximum daily temperatures during the 2010-2011 winter season for Cabernet Franc (left) and Concord (right). Note that LT50 temperatures are lower and change faster for Concord than for Cabernet Franc. For current information, see [Bud Hardiness Data](#) page.

Vine stress associated with delayed harvest, drought stress, disease pressure or overcropping can reduce the vine's ability to attain its maximum potential cold hardiness. Years in which frost is early or fruit maturity is delayed may also delay cold acclimation and reduce bud hardiness.

Consequences for management.

Genetics determines a vine's maximum cold-hardiness, but environmental conditions will influence how much of the genetic potential is realized in a given year. Growers can't influence weather conditions, but they can understand the risks, evaluate potential bud injury, and manage vines to limit or respond to bud injury in the following ways:

Cultivar selection: Match grape variety with your climate. With new cold-hardy varieties, cultivars are available that will survive even extreme winter low temperatures. If you choose more cold-sensitive varieties, be aware of the higher risk of winter injury in your climate—and be prepared to compensate for it.

Site Selection: Site your vineyard in a location that will have good air and soil drainage. Cold air moves downhill, so avoid low areas or "frost pockets" where cold air will collect. Mid-slope areas are less risky than low areas,

both in midwinter and in the spring or fall. All else being equal, vineyards with heavier, more poorly drained soils will be more prone to winter injury than those on well-drained, lighter soils.

Bud injury evaluation: The extent of bud injury following a cold temperature event can be evaluated by collecting dormant canes and buds and examining them to determine whether primary buds are alive or dead. [Guidelines for determining bud injury](#) and a [video](#) for evaluating bud injury before pruning are available online.

Adjusting pruning severity: When the risk of winter bud injury has passed, it may be necessary to adjust the number of buds retained after pruning to compensate for buds lost to winter injury. Zabadal et al (2007) recommends the following:

- < 15% injury, no adjustment
- 15-35% bud mortality, retain 35% more buds
- 35-50% mortality, retain 100% more buds
- > 50% mortality, minimal or no pruning

Other protection methods: Aerial "wind machines"—powerful fans mounted on posts—can be installed in a vineyard and used during temperature inversions to mix warmer above-ground air with cold air, thus raising temperatures above bud-injuring levels at the trellis. Hilling-up soil over graft unions can protect scion buds for re-establishing trunks following a cold event that damages buds.

For further reading:

Zabadal, T., I Dami, M Goffinet, T. Martinson, and M. Chien. 2007. Winter Injury to Grapevines and Methods of Protection. Michigan State University, Extension Bulletin E2930.

Pool, R. M. 2000. [Assessing and Responding to Winter Cold Injury to Grapevine Buds](#), web page, Cornell University.

Walter-Peterson, H. 2010. [Bud Injury Testing](#), two-part video. Finger Lakes Grape Program's YouTube channel.

Martinson, T., S. Hoying, H. Walter-Peterson and J. Creasap Gee. Bud Hardiness Page, Viticulture and Enology Outreach page, Cornell University.

Notes from Winter Storage School

AMY IVY, ENYCHP

On November 30 we held an in-depth, discussion-based workshop on winter storage of vegetables in Saratoga Springs. Fifty-five growers attended and actively participated. Our speakers were Jean-Paul Courtens from the Hudson Valley Farm Hub and Roxbury Farm, Chris Callahan – ag engineer from UVM specializing in produce storage and Crystal Stewart who was also the lead facilitator. Crystal, Chris and Jean-Paul assembled an extensive and very useful 70 page handbook for the program. It is available for free to anyone as a pdf on our website under “current projects” or at this link: https://rvpadmin.cce.cornell.edu/uploads/doc_619.pdf

I had laryngitis that day so I spent my time taking copious notes, the highlights of which I’ll share with you here in note form. Be sure to download and save or print off the program handbook which has comprehensive details on these topics with excellent charts and photos, etc.

In planning this program we decided to focus on just three key crop types so we could really go in depth on each one: carrots and beets, sweet potatoes and winter squash.

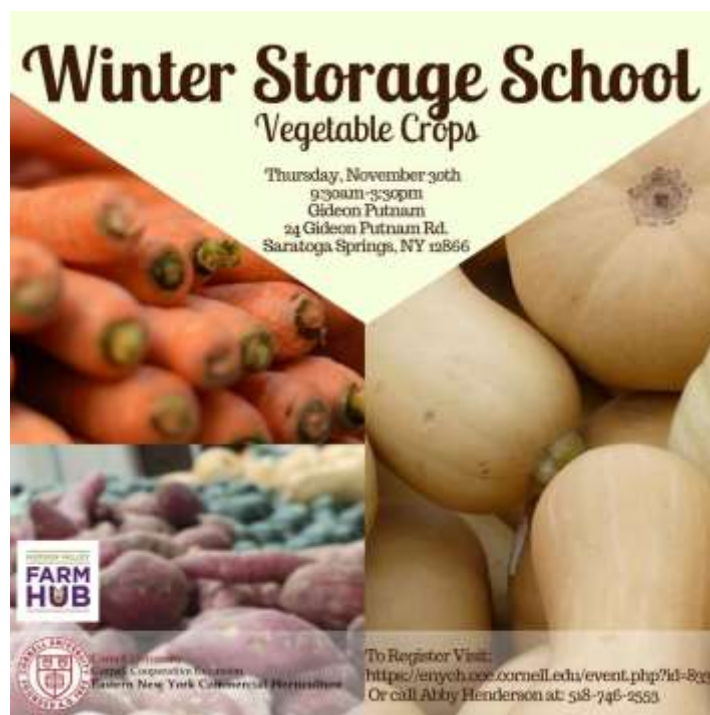
Carrots and Beets – tips from growers and speakers

- Beets can be harvested any time, you don’t need them to reach maturity for optimal storage.
- Carrots do need to reach maturity in order to store well. Look at the tip of the root, it should be blunt rather than tapered. At maturity carrots develop a cuticle that helps them last longer in storage.
- Bolero was the most popular storage variety among the growers. Other varieties mentioned were Cupar, Dolchiva, Napoli, Romance and Envy. Yaya is very sweet but is best for summer sales rather than winter storage.
- About half the group said they washed their carrots before storing, half did not. Reasons given to wash before included convenience, warmer working conditions, and less staining.

One grower said if he leaves clods of soil on his carrots they tend to rot there, but a light layer is fine. The rest of the group washes their carrots as needed throughout the winter.

- Sandy soil usually doesn’t cause much staining but heavy or soil high in organic matter can result in more staining.
- One grower leaves carrots and parsnips in the field, covered with a foot of straw and harvests them in blocks throughout the winter. Dealing with the straw in the spring is a challenge but the roots store great in the ground.
- Carrots produce ethylene in storage and are sensitive to it; it makes them bitter. Open storage room door once a day to vent out the ethylene, and do not store carrots with other ethylene producing crops.
- Pages 24-31 of the program handbook has details on storage conditions for many vegetable crops from UC Davis and USDA Bulletin 66. Pages 53-55 of the handbook include a case study comparison of a few crops and lists of useful resources
- Check storage bins regularly through the winter for rot. To simplify checking stacked bins put some samples in a mesh bag and just check that

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bag every couple of weeks to gauge their condition.

Sweet Potatoes - tips from growers and speakers

With any storage crop, you must start with healthy produce. Chris Callahan advised us to, *“think of storage as a hotel, not a hospital”*. Produce is not going to get better in storage, and will likely get worse.

Spacing – some said they plant at 12” apart in the row for the largest tubers and 9” apart for medium sizes. Restaurants like the biggest tubers while direct market customers usually prefer medium sizes. 30” between rows is too tight. 36” minimum was recommended.

Chuck Bornt summarized several tips for growing the best quality sweet potatoes:

- Start with healthy slips, don’t let them languish before planting. Open up the box, remove the rubber band and heel them into a bin of potting mix if you can’t plant them immediately. Do not put them in a cooler, they will sustain cold injury!
- Water wheels don’t set slips deep enough. Chuck suggested 3/8” rered or a spiked wheel, which sets the slips at least 6 inches deep. Start with moist soil before planting.
- Be careful if the weather gets hot the week after transplanting. Some overhead irrigation can help cool them down.
- Cracking has nothing to do with water but with nitrogen and variety (Georgia Jet is very prone to cracking)
- Go light on nitrogen (N), just 50-60 lbs/acre preplant, and they need the N early. They need a lot of potassium (K) for flavor and stability. 150-200 lbs/acre.
- In fall, harvest before the soil temperatures reach 50 degrees or a bitter taste can result.
- Wireworms are worse in years after sod, so don’t use grasses as summer cover crops. Wire worms' life cycle is 3-4 years so wait that long before planting after sod, if possible. Can use

grains or grasses as winter cover as long as you turn them under in spring. To monitor for wire worm bury pieces of white (Irish) potato in a mesh bag in early spring, leave for 4 weeks, then check for larvae.

- Orange Varieties: Covington is the best, then Beauregard. New variety, Bellview is good but has no flavor until it is cured, then excellent.

Lots of information on curing and storing sweet potatoes is in the program handbook.

Winter Squash - tips from growers and speakers

- Summer diseases: powdery mildew, black rot and gummy stem blight, can lead to rotten spots in storage.
- Use summer squash as an indicator of powdery mildew (PM) severity to come that year. Remove summer squash plants as soon as harvest is over so they don’t serve as breeding ground for PM.
- Bacterial wilt is worse on younger plants, and the Maxima types (Hubbard, Kabocha). Delicata is sensitive too. Butternut is more resistant to cucumber beetle feeding damage that transmits the bacteria.
- 2 year rotation for black rot and gummy stem blight (see handbook for details).
- Handle like eggs while harvesting! Drive the loaded truck slowly in the field!
- Leave stems on, squash stores better with stems, but they are apt to poke and bruise. Load and pack storage bins carefully, orient stems away from each other. One grower uses padding but you need to ensure good air circulation
- Lots of discussion on curing. The UC Davis info on storage winter squash is better than Bulletin 66 which has some errors in this crop. Ex. Acorn squash does not need to be cured. See program handbook.
- Don’t ever let squash experience temperatures below 50 degrees, in field or in storage, as chilling injury will occur.
- If a cold spell hits in August the plants can take 50 degrees since they are still

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growing and respiring. But once the vines die down or the squash is cut off the vine, they cannot take it that cold. Chilling injury leads to rot in storage.

- Dark skins absorb sunlight and can suffer sunscald while curing in the field. Dark or shaded locations are better for curing.
- For storage, lower the temperature gradually to avoid condensation. 55-66 degrees and low humidity is ideal for storage.
- Planting date – no rush, you don't need the crop until September. See pages 39-45 for more on harvest maturity and storage.
- Questions about washing or sterilizing squash before storage. Those who said they do wash have not seen improvement. The less you handle squash, the better and sanitizers are neutralized around soil and organic matter so dirty water is no help, so don't bother.

Cooler Construction and Operation – tips from Chris Callahan

- Shipping containers are popular but are meant to be filled completely, hard to get anything out from the back.
- ***Pre-cool produce before putting in cooler, cooler maintains the temperature.***
- Vapor barrier – because you need it for winter and summer, putting it on both sides is best. Not up to building code but this is storage, not living space
- Staggered stud construction is better insulated and doesn't cost more
- Insulation – Chris recommends blueboard or Hi-R board. Spray foam is convenient but very hard to make a smooth surface to cover with washable surface.
- Lighting – LED's are good, occupancy switch is handy.
- Sliding doors use the least space. Some add a person-sized door for efficiency in access.
- Check the seals around doors regularly, latches

too. To find leaks go inside, turn off the lights and see where light comes in around the doors.

- Rodent control, lots of info in handbook. Tip: install hardware cloth as rodent barrier in all corners during construction.
- CoolBots use window A/C units. Info at www.storeitcold.com Slow to lower temperature and recover from rise in temp, 8x10' space is maximum reasonable size. We often ask too much of them. One grower uses it to pre-cool to 50 degrees in his washing area, his staff love it in summer.
- Heating – winter squash, pumpkins and sweet potatoes all need it to stay above 50 degrees. Good air flow essential, especially in the middle of large bins
- Humidifiers need to put out tiny droplets of water. Chris has some new designs at <http://farmhack.org/tools>
- See pgs 56-58 of the handbook for thermostats
- He suggests putting data loggers into some packed boxes and large storage bins to see what the temperatures really are. Humidity sensors are not as accurate
- Vermont Energy Control Systems www.vecs.org is developing customized controls and sensors for produce.

Lastly, we heard loud and clear during this program that an in-depth program on onions and garlic is needed, so mark your calendars for Thursday February 8, 2018 for Growing Alliums for Storage and Sales, which will be held at the Saratoga CCE office. We hope to see you there!



Making the Leap to Owner— Operator: Are You Labor Ready?

ETHAN GRUNDBERG, ENYCHP

Deciding to start a farm can present a multitude of challenges. Do you have access to suitable farmland? Have you identified your markets? What equipment are you going to need to put your plan into practice? Will you need to borrow money to start your business? While the question “who is going to do all of the work on the farm?” is also usually on that short list of things that keep aspiring farmers up at night, it is much less common for new growers to ask themselves “do I have the tools and experience necessary to be an effective manager of farm employees?”

Thanks in part to funding from the USDA Beginning Farmer and Rancher Development Program (grant number 2017-70017-26837), from the USDA National Institute of Food and Agriculture, Cornell University and Grow NYC are partnering to work with fruit and vegetable growers across New York to help support advanced beginning farmers hone their personnel management skills and become “labor-ready farmers.” Additionally, we will be working on developing resources to support Latino farm employees develop the skills that they need to advance to management level positions on produce farms in the state. We already have some programming in the works focusing on topics from labor regulatory compliance to how to write a great job description, but we are going to want your help identifying labor management issues that you want to improve. To that end, keep an eye out for the survey announcement coming in early 2018 to help shape our curriculum!

Farmers of all ages and experience levels can struggle with attracting and retaining employees, but newer farms operating on a shoestring budget and struggling to develop production and marketing systems with small crews often feel the impact especially acutely. Max Morningstar, owner and operator of MX Morningstar Farm in Copake, NY, described his first few years in this chaotic

environment by saying, “the farm was so insane at that point that we didn’t so much care what method people were using, so long as it was getting done.” The lack of clear expectations and structures for employees to follow can worsen the state of frenzy of a growing season, but can also lead to more work for managers who can fall into the trap of micromanaging under those circumstances. Again, Morningstar felt like he struggled “knowing how to delegate while leading without micromanaging” during the first few years supervising farm employees and has since invested more time in training new employees and setting clear expectations at the outset.

Training and expectation setting are commonly identified by farmers as areas that “need improvement” on the farm, but that are also deemed invaluable for the business to run smoothly. Leon Vehaba, Farm Director at the Poughkeepsie Farm Project, has used some of his experiences gleaned from an earlier career in private industry to emphasize training on the farm. Vehaba notes that, “I find that whenever we really invest the time to train people that first week, it really pays off.” Jeff Bialas of J&A Farm in Goshen, NY agrees and emphasizes the need to have clear systems in place before hiring to be able to effectively train new employees. Successful training depends on “creating an efficient system and teaching people to work within that system.” Jeff also adds that another value of having clear production and marketing systems in place is that it can depersonalize critical feedback. The conversation becomes less about “this is how *I* want it done” to “this is how it’s done here.” This initial training and expectation setting is so important to Jeff that he makes sure that he’s the one in the field working with new employees for the bulk of the first two weeks on the job. This helps to ensure that the new crew clearly understands the processes that he has in place, allows sufficient time to observe how those employees are acclimating, and provides an opportunity for timely constructive feedback.

It is easy to write off labor sourcing and retention challenges as being a natural outcome of the inherent misery of farm work.

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Who wants to work long hours in inclement weather doing repetitive and uncomfortable tasks for what is often a less-than-living wage, right? How can I expect to keep my crew year after year when I can't offer them year-round work? Though there is certainly some truth in those statements, it is also the case that some farms have found ways to improve labor management and create incentives for workers to stick around for many years that don't have to cost the business a lot of time or money. For example, research out of Central California found that respectful treatment of employees by managers and owners was one of the biggest factors influencing labor retention and happiness at work (see <http://www.cirsinc.org/publications/farm-labor?download=47:positive-practices-in-farm-labor-management-keeping-your-employees-happy-and-your-production-profitable> for more information). Or, as Jeff Bialas put it, "a lot of it [labor retention] comes down to having a safe and comfortable place to work."

There are plenty of other examples of how to improve personnel management on the farm and we're excited to share them with you over the next couple of years. In addition to continuing with this labor management article series, we'll be announcing a series of webinars, roundtables for Latino farm employees, and more over the winter. For now, please reach out to Kat McCarthy at the Cornell Small Farms Program (kmm485@cornell.edu), Gabriela Pereyra at Grow NYC (gpereyra@grownyc.org), or Ethan Grundberg at Cornell Cooperative Extension (eg572@cornell.edu) for more information. This work is supported by the Beginning Farmer and Rancher Development Program grant no. 2017-70017-26837, from the USDA National Institute of Food and Agriculture. Any opinions, findings, conclusions, or recommendations expressed in this publication are those of the author(s) and do not necessarily reflect the view of the U.S. Department of Agriculture.

Supervising Seasonal and Temporary Workers: Special Considerations

ELIZABETH HIGGINS, ENYCHP

Most fruit and vegetable farms need to hire people on a temporary seasonal basis. The short length of time which seasonal employees will be on your farm does require some special considerations. Although these workers are only on your farm for a little while, they contribute to the success of your farm business. Below are some tips for getting the best contribution out of your seasonal farm staff.

Good Employee-Employer Relations

Although it is challenging to make time for training and orientation during the height of the season, you will increase your worker's commitment to your farm if you can get to know your seasonal employees as quickly as you can and communicate to them their value to the business and the importance of their job. The group is made up of

unique individuals who do not want to be viewed as a faceless mass. At a minimum, try to learn each person's name immediately. Find out each person's interests and develop a relationship with him or her as quickly as possible. You want to establish a trusting relationship between the two of you and to develop a commitment to *your* farm on the part of the worker. When training is short changed, this will help to increase their confidence in coming to you with issues or concerns before they become serious problems.

Language Barriers

If you cannot speak the language of your employees, the best advice is to start learning it immediately. To get the best effort out of your employees they must be able to understand you and be able to communicate problems to you. The inability to communicate with everyone makes establishing good employee-employer relationships with your employees more challenging.

The use of interpreters on farms is a common solution, but it must be done with caution. Often interpreters make inaccurate translations, do not stress the same points that you

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would, or change what you say to elevate their own position. This responsibility gives them a powerful position in your business. They can withhold, or share information based on their own needs. Rarely do interpreters just translate; often they also supervise groups of workers. With their control of the flow of information they have tremendous power over the people beneath them. Employee grievances may not come to your attention until they have reached unsolvable proportions.

Work Crews

Large groups or labor crews who work closely together can present another challenge. They may live and travel together developing very close bonds. They often depend on each other for food, loans, and other assistance. A supervisor's disagreement with one worker may quickly become a confrontation with the entire crew as it did on one New York farm. One member of a labor crew was told the cost of his damaged picking-sack would be deducted from his pay. The rest of the crew agreed with the worker's story that the sack had a broken strap when it was given to him. The disagreement escalated, and the employee was ordered to return to the labor camp. To show their support of their fellow employee, the rest of the crew sat right down in the orchard and refused to work until the man could return to work.

On the other hand, a crew also knows when one employee is disrupting work or is taking advantage of you. You will gain respect of the group by dealing with this employee's behavior fairly. Other employees will support you when they see fair treatment for everyone. If they perceive favoritism or arbitrary treatment, the whole group will react. Establishing a relationship with each individual will be the determining factor. If they know and trust you, they will come to you with problems or complaints before things get out of hand.

Housing

Although good housing conditions can be used to attract workers, when you are providing housing to an employee, you need to be particularly careful about whom you hire. The process of evicting a former employee from housing which you provide can be a lengthy process. The effect of a disruptive

employee on your other employees in nearby housing must be considered. Migrant farm workers reported leaving a well-liked employer because other workers at the labor camp were causing problems for them or their families.

Cultural Differences and Values Conflicts

People from various cultural and ethnic groups have different ways of viewing the world and have their own, unique value system. When people from different cultures work together, you need to take the time to talk about differences. Consider these differences as you establish work rules and methods for achieving your goals. A farm worker repeatedly arrived late for work in the morning. The manager told him that the next incident meant termination of his employment. This farm worker gave rides each morning to two neighbors whose jobs started later than his. The choice of leaving his friends behind or being late for work was not even a choice to him. Of course, he would wait for his friends. Respecting the values of your employees and trying to be flexible in your operation will allow you to draw on the strengths of each person involved. Explaining your production practices and the logic behind your rules will go a long way toward preventing problems.

Resources to help:

The Eastern New York Team will be offering a session with tips and resources (in Spanish) for working with Latino farmworkers at the Winter Fruit School in Albany on Tuesday, February 20.

We are also offering the Human Resource training program "Good To Great in Ag Labor Management" on January 4 and 11 from 9-4 in Ballston Spa and on four consecutive Thursdays in March from 5:00-8:00 pm (March 1-22). Registration is available on the ENYCH website <https://enych.cce.cornell.edu/events.php>

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United States
Department of
Agriculture

National Institute
of Food and
Agriculture

Growing Alliums for Storage & Long Term Sales

Thursday, February 8th, 2018

9:30 am - 3:30 pm

Saratoga County Cornell Cooperative Extension
50 West High St.
Ballston Spa, NY 12020

*\$30 registration fee (enrolled ENYCHP members) /
\$35 non-enrolled. Includes lunch and
Informational materials. To register online [CLICK
HERE](#), or call Abby at 518- 746-2553*

This will be an interactive meeting facilitated by
Cornell Cooperative Extension's ENYCHP
vegetable specialists:

Amy Ivy, Ethan Grundberg
Teresa Rusinek, Crystal Stewart

**Featuring a grower panel
including:** Paul & Sandy Arnold,
Jeff Bialis, Jean-Paul Courtens, Brian
Denison, David Stern, and Leon Vehaba

Key topics will include:

Growing practices that lead to good storage, tips and tricks
for harvest, drying and storage, and ample time for audience
questions about garlic, leeks, onions, and shallots.

Cornell Cooperative Extension

Eastern NY Commercial Horticulture Program



Growing Alliums ...Agenda

9:00-9:30	Registration
9:30-10:00	Introductions and Brainstorming Participants will develop list of details to include in discussions
10:00-11:00	Pre-Planting and Planning Field Layout Field layout, spacing, mulch options, weed mgt, rotations
11:00-11:30	Fertility Management Timing and rates for best crop growth for long term storage
11:30-12:00	Break
12:00-1:00	Pests, Diseases, Problems Pest issues and strategies for minimizing their impact
1:00-1:45	Lunch
1:45-2:45	Harvesting, Curing, Postharvest Handling, Storage Strategies to minimize storage issues and lengthen storage life.
2:45-3:15	Growing Onions Over Winter for Spring Sales Timing, variety selection, weed mgt tips for success.
3:15-3:30	Wrap up and evaluations



This meeting is sponsored by SARE



NYS DEC recertification credits will be available

Upcoming Events

January 16-18, 2018 - The 2018 Empire State Producers Expo. SRC Arena in Syracuse, NY. The Becker Forum will be January 15th. Information and registration at: <http://nysvga.org/expo/information/>

January 19-21, 2018- NOFA NY Winter Conference. Saratoga Hilton and City Center. For more information visit: <https://nofany-winterconference.squarespace.com/>

January 30-February, 2018 – Mid-Atlantic Fruit and Vegetable Conference. Hershey Lodge and Convention Center, Hershey, PA. For more information visit: <http://www.mafvc.org/>

February 6th & 7th 2018– Pesticide Recertification Days Essex and Clinton Counties, NY. More Info Here: https://enych.cce.cornell.edu/events.php?date=02_2018

February 8th, 2018– Growing Alliums for Storage and Long-term Sales Ballston Spa, NY. Register Here: <https://enych.cce.cornell.edu/event.php?id=880>

February 20-21, 2018- Eastern New York Fruit and Vegetable Conference. The Desmond Conference Center, Albany, NY. More information and Registration: <https://enych.cce.cornell.edu/event.php?id=881>

February 21-22, 2018- Ontario Fruit & Vegetable Conference in Niagara Falls, Ontario For more information visit www.ofvc.ca.

February 28, 2018– Orange County Onion School More Information to come.