The Produce Pages

Serving the fruit and vegetable growers of Eastern New York

April 2017

Is it Time to Consider a Combined ENY Fruit School?

ANNA WALLIS & DAN DONAHUE, ENYCHP

The 2017 Eastern NY Commercial Tree Fruit Schools held mid-February were received with a great deal of success: the NENY Fruit School was held in Lake George Monday Feb. 13th and the Hudson Valley Tree Fruit School in Kingston Tuesday & Wednesday Feb. 14-15th. Over 500 participants attended both events in total, over the course of four days. Unfortunately, *very* heavy snow had a notable effect on attendance at the NENY Fruit School in Lake George, with attendance down about 20%; on the other hand the Hudson Valley attendance was up 10%.

Programs and speakers at both locations were very highly rated by survey responses as well as unsolicited personal feedback. Highlights included out of state speakers Dr. Duane Greene, UMass Amherst who gave advice on PGRs, and Dr. Win Cowgill, private consultant and professor emeritus at Rutgers University, who provided recommendations on weed management and practical alternatives to

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Cornell University
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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, please visit our website at http://enych.cce.cornell.edu/.

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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

buying finished apple trees from the nursery. Growers were able to meet the new president of the NYAA, Cynthia Haskins, who showed she is extremely well informed about the apple industry, and has acted as a strong spokeswoman for agriculture industries in multiple positions in the past. Dr. Srdjan Acimovic, Plant Pathologist at the Hudson Valley Research Lab, gave a timely presentation about the catastrophic effects of climate change and implications for managing fire blight in our region.

Feedback was extremely positive. Participants felt the value of topics and quality of presentations were overall very high. Topics of particular interest included mechanization, use of PGRs, pest management, pollinators, and sunburn mitigation; participants asked for future topics to include pruning and more information on WPS and other government regulations. Nearly half of participants responded that they would make changes on their farm based on information presented.

Despite the positive responses and smooth logistics (we're quite practiced at this by now…), we can't help feel that some significant changes would vastly improve the fruit school experience in the future. After all, what would extension be without making adjustments once in a while, to adapt to changing circumstances and keep you on your toes!?

If our ENY schools are currently successful, why consider a change?

Program Logistics. The programs between the two schools are historically very similar. This is not accidental, as similar forthcoming research and seasonal challenges tend to be applicable to the entire Eastern NY Region. Current logistical challenges are:

- Developing and administering two educational events and trade shows is time consuming, using up limited ENYCHP resources that could be put to better use elsewhere.
- The NENY program is Lake George is limited to a single day, reducing the educational and interactive opportunities for our northern New York growers, unless they make a four hour drive to Kingston.

Speaker Travel: Many of our speakers are asked to cover both ENY schools. For those speakers, a Monday presentation in Lake George often means Sunday travel, followed by a Monday dash to Kingston, all at the height of an upstate NY winter, no further explanation necessary! Some speakers will also stay for the berry & grape programs on Thursday, or travel to present at the Vermont fruit school at the same time.

- Travel is expensive, both in time and money.
- Winter travel in upstate New York is unreliable, and risky, both to our speakers and our program.
- Our pool of "local" speakers has declined (retirements, lost faculty positions). In response, we have begun to reach out to out of state experts in the northeastern region. Our friends and colleagues form outside of NYS add greatly to our programming, but are understandably more expensive to support.

Our Venues: Keeping costs down requires competition. In Lake George, our venue actually has to re-open for our northern school as the facility closes for the winter. In Kingston, our day 1 attendance (233 in 2017) is straining the capacity of the facility.

- We have not been able to successfully identify alternative venues with sufficient capacity in the Hudson Valley. As a result, there is no competition for our business and our costs have been increasing significantly.
- The quality of the lunch at the Kingston school is excellent, but lunch seating is stretched to the limit.
- No flexibility in Kingston to hold concurrent sessions
- Limited trade show space at both locations

ENYCHP Educational Programming in Total: As the ENYCHP grows, we find that we are able to offer more and more programs across the region, tailored to specific needs of diverse horticultural areas. We have continued to organize historically important events such as Fruit & Vegetable Winter Schools and the Empire State Expo. We have also introduced numerous programs including a NENY & VT Winter Grape School, Garlic School, and Food

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Safety Trainings. We have been able to do this with fewer total specialists and administrative support, in part because we are functioning as a team of specialists and staff who support each other. That said, there is a limit to the number of programs and events a finite number of people can manage while balancing our increasing applied research expectations—to create one event would make winter meetings more manageable and efficient, and provide us with more time to improve or introduce other events (Special permit training, pest management workshops, young grower events…).

Concerns for a combined program

We can think of several major concerns associated with combining our ENY fruit schools:

1. First, we realize moving to one more central location will mean a longer travel distance for some producers in the more distant parts of the region, and may require more people to stay overnight. Regional, local events have been a strength of CCE Tree Fruit programs historically, and have made information more accessible to the large area. We do not wish to alienate producers by moving locations. Will we lose attendees? How many?
2. Also, it stands to wonder whether we are re-creating or competing with the Empire State Producers Expo. This premier statewide multi-commodity event has a smorgasbord of pros and cons unto itself. This is a shame in many ways, because it is really the only time growers have to interact with industry members across the state, there is significant funding to bring in national and internationally recognized speakers, and the venue is one of few places where such a large trade show is possible. However, we have found that fewer and fewer fruit producers are attending this event, precious few of those attending are from ENY. Holding a joint ENY Fruit School would possibly draw participants away from the Expo, but it may also bring a stronger program to the ENY Region.
3. Fruit schools do serve as a fundraiser for the ENYCH program. As we have discussed in the past, your regional extension program is funded from three sources: Member county CCE associations contribute 55% of the team budget, Cornell University contributes 17% as a pass through of federal funds, SUNY covers fringe benefits, and the balance of 28% (termed "Program Generated Funding" or PGF) is raised by the Extension Specialists themselves through successful grant writing and charging registration fees for programming. In the future, we will be expected to raise a higher percentage of PGF. In today's age, providing an effective and viable extension program is more like running a business than you might think! Our bottom line, just like yours, is that we cannot afford to lose either clients or financial support.

Pink Root on Your Onion Transplants: To Plant or Not to Plant?

ETHAN GRUNDBERG, ENYCHP

Word on the Black Dirt in Orange County is that many growers are receiving Arizona-grown onion plants that are heavily infected with pink root. There is not an easy answer to the question of whether or not to plant the infected onions and what, if anything, should be used to treat the plants before planting. However, here are some things to consider when making your decision about whether or not to plant.

1.) Send a sample to the Cornell Plant Disease Diagnostic Clinic: Before you do anything else, send a bundle of 25-50 plants that are showing symptoms to the Diagnostic Clinic in Ithaca. If you need assistance filling out the paperwork (available at http://plantclinic.cornell.edu/pddcforms/2015pddcsubmissionform.pdf and included here), please contact me at eg572@cornell.edu. Samples should be wrapped in dry paper towels, placed in an UNSEALED Ziploc or plastic bag, then mailed in a rigid box container to the clinic along with the completed paperwork, including the check for $30. This step is crucial if you decide to reject plants and seek a refund from your supplier and to help inform how to manage the plants in the field if you decide to plant (another fungal disease, fusarium basal rot, can also cause onion roots to turn a pinkish color).

2.) Understand the risk:

A.) In the long-term: Pink root is caused by the fungus *Phoma terrestris*. This fungus can survive in the soil for many years on other crops, especially some cereal grains. If you decide to plant onions that are infected with pink root, you risk infecting that field and future susceptible crops that you might plant in that field. If a heavy infestation of pink root develops in a single field, you must be extra careful not to transfer soil on tractors, equipment, vehicles, and crew from the infected field to non-infected

fields. It is advisable not to plant any alliums other host crops in heavily infected fields for 3-5 years. All of the Cornell onion pathologists that were consulted strongly recommended not to plant infected onion plants for these reasons. However, if you've ever had pink root on your onions in the past, chances are you already have a healthy population of *Phoma terrestris* in your fields and will not be introducing the pathogen for the first time. You will likely, however, be making an existing problem worse.

B.) In the short-term: Chances are, your crop planted from infected transplants is going to be smaller than normal. It is rare for pink root to kill an onion crop, but the damage to the roots reduces the ability to take up the water and nutrients necessary to promote big bulb development. How much smaller the crop is will depend a lot on the weather: warmer drier weather increases the stress on pink-root infected onions and leads to smaller bulbs.

3.) Dip, drench, spray:
If you get a positive confirmation from the Diagnostic Clinic that you have pink root, but decide to plant anyway, here are some options for how to treat those transplants. Even if you select only the plants that visually appear not to be infected with pink root, chances are that they have some of the fungus present on the plants and precautions should be taken to avoid spreading it in the field.

A. Pre-plant dips: These are going to fall into three categories: 1) fungicides, 2) disinfectants, and 3) biopesticide inoculants. Basically, you want to decide whether to try to just kill as much of the pink root as possible, crowd out the pink root pathogen by introducing beneficial microorganisms, or some combination of both strategies. Here are some specific products to consider:

i. Fungicides: Researchers at the University of Georgia studied the impact of three fungicides used as pre-plant root dips in 2009: Endura (boscalid), Topsin (thiophanate methyl), and Switch (cyprodinil + fludioxinil). While Endura showed the best results, unfortunately none of these chemicals is labeled for pre-plant dips.

ii. Disinfectants: OxiDate 2.0 (peroxyacetic acid + hydrogen peroxide) is labeled for pre-plant dip for control of several fungal pathogens at a dilution of 1:100. OxiDate 2.0 is not labeled for management of pink root, but is for *Fusarium* and *Rhizoctonia*, both potential onion pathogens.

iii. Biopesticides: There are a number of new biopesticide formulations that contain numerous beneficial microgranisms that can effectively crowd out pathogens like pink root, though again, no research has been done on the ability of these products to work to control *Phoma terrestris*. Research in Turkey from 644[1] demonstrated great potential for *Trichoderma* species to provide suppression of Fusarium basal rot of onions. Similar research from Egypt in 2012 showed that *Trichoderma* can help reduce the incidence of white rot on onions in field and even showed some promise for *Bacillus subtilis* strains in improving onion yield in white rot-infested conditions. Products that include *Trichoderma* species and are labeled for pre-plant dip on onions for managing *Fusarium* and *Rhizoctonia* include RootShield Plus WP and Bio-Tam. TerraGrow from BioSafe Systems includes both *Trichoderma* species and *Bacillus subtilis* strains and is labeled for pre-plant dip of onions. Finally, the product Double Nickel 55 (*Bacillus amyloliquefaciens* strain D[1] 8[1]) is also labeled for root dips on onions for the suite of damping off pathogens and could be effective against pink root.

B. Soil furrow drenches: Most fungicides already in an onion grower's arsenal can be used as a soil furrow drench at planting. Unfortunately, again, very little research has been done on how well these chemistries work on pink root. Research out of Michigan State in 2012 showed that the new DuPont penthiopyrad active ingredient was effective at *Phoma terrestris*, but there is no formulation currently available in the U.S. The fungicides listed in the plant dip section ARE labeled for soil drench, so we might assume that the effective control achieved by Endura as a dip may translate into successful management as a furrow drench. There is a disinfectant that is marketed in tandem with TerraGrow called TerraClean (peroxyacetic acid + hydrogen dioxide) that

can be applied in furrow. A study from Colorado State in 2011 showed TerraClean to have similar efficacy on reducing pink root infection as a combined application of Ridomil Gold Copper (copper hydroxide + mefenoxam) + Quadris FL (azoxystrobin). Some *Bacillus subtilis* formulations, like Serenade ASO and Companion, have label recommendations for soil drenches as well.

C. Post-transplant treatments: Depending upon weather conditions in season, supplemental foliar fungicide applications may need to target pink root development. Since the pink root pathogen spread most readily under hot and dry conditions, growers will likely already be applying fungicides for foliar disease control that will likely help curb the spread of pink root. However, it may also be advisable to spray some of the new Induced Systemic Resistance products on 10-14 day intervals beginning after transplant to help trigger the plant's defense systems. The most widely studied product in this class is Regalia (extract of *Reynoutria sachalinensis*) and is compatible with most tank mixes, including other biopesticides mentioned above.

D. Combining strategies: A word of caution on combining disinfectant and/or fungicide applications with biopesticides: remember that the active ingredients of the biocontrol products are living organisms and will likely not survive if application times are too close in time. Make sure to allow plants dipped in disinfectant time to fully dry before dipping in biopesticides. Similarly, a biocontrol inoculated plant transplanted into a fungicide drenched furrow will likely not see the benefit of the inoculation.

4.) Plan for next year: Hopefully, this won't be an annual problem for growers transplanting onions purchased from out-of-state. However, there are some varieties that are more resistant to pink root than others and should be considered for selection to grow transplants for planting into fields where pink root pressure has been heavy. Though Highlander is a popular early variety for transplant crops, it is particularly susceptible to pink root. Meg McGrath, Cornell Vegetable Pathologist, maintains active lists of resistant varieties available for download from the VegMD website: http://vegetablemdonline.ppath.cornell.edu/Tables/TableList.htm. The severity of pink root on onions decreases significantly after rotating out of host crops for 3-5 years as well, so it might be time to trade ground with a neighbor growing mixed vegetables if you choose to plant and have a severe outbreak of *Phoma terrestris* in that field.

If you decide to plant your infected onions and are interested in participating in a research study to try to gather information on the efficacy of some of the biopesticide products mentioned above, please contact me at eg572@cornell.edu for more information.

Works Cited;

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Coşkuntuna, A., Özer, N. Biological control of onion basal rot disease using *Trichoderma harzianum* and induction of antifungal compounds in onion set following seed treatment. Crop Prot., 27 (2008), pp. 330–336.

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Schwartz, Howard F., Otto, K., McMillan, Mark. 2011. Evaluation of TerraClean 5.0 for control of pink root in onions. http://www.biosafesystems.com/PDFs/TerraClean5.0%20Onion%20Pink%20Root%20Tech%20Sheet.pdf

Plant Disease Diagnostic Clinic
Sample Submission Form

Cornell University

Please mail samples and payment to: Plant Disease Diagnostic Clinic, 334 Plant Science Building, Ithaca, NY 14853

In-state (out of state): basic $30 ($50); turf or nematode $50 ($70); or see full list of fees at: plantclinic.cornell.edu

Location Where Sample Was Taken	**Referring Agent** (i.e. CCE Agent, Consultant, Arborist...)
Home Owner ☐ Commercial Grower ☐	
Business name (if any):	Business:
Person to contact:	Agent:
Address:	Address:
Phone:	Phone:
Fax:	Fax:
Email:	Email:
County:	

Describe the nature and extent of the problem:

Collection date:

Scientific Name: **Common Name:**

Disease Symptoms:	**Affected Parts:**	**Distribution on Site:**	**Planting:**	**Additional Information:**
wilting ☐	stems ☐	entire field ☐ sunny ☐	garden ☐	Number of acres or plants affected?
yellowing ☐	leaves/needles ☐	field edge ☐ shaded ☐	nursery ☐	
galls ☐	branches/twigs ☐	random ☐ wet areas ☐	orchard ☐	Approx. date problem appeared?
dieback ☐	flowers ☐	high areas ☐ dry areas ☐	green ☐	
rot ☐	fruit/seeds ☐	low areas ☐ windy ☐	fairway ☐	Did problem occur gradually?
marginal burns ☐	roots/bulb/rhizome ☐	by road/drive/building/pool ☐	yard ☐	
shedding/thinning ☐	crown ☐	feet away:	field ☐	Getting worse or staying the same?
leaf spots ☐	**Distribution on Plant:**	**Media Type:**	forest ☐	
streak ☐	top of plant ☐	sandy ☐ hydroponic ☐	greenhouse ☐	Approx. age of plants?
mosaic ☐	bottom of plant ☐	loamy ☐ artificial mix ☐	interior ☐	
blight ☐	current-season growth ☐	clay ☐	**Drainage:**	Date last transplanted?
other:	previous-season growth ☐	**Aspect:**	good ☐	
	one side of plant ☐	north ☐ east ☐	fair ☐	How often watered?
	scattered ☐	south ☐ west ☐	poor ☐	

Chemicals/Fertilizers: *give rate and date/s of application*	**Cropping History:**

Date Received at the Diagnostic Clinic: By Whom:

Allium Leafminer Expected to Emerge in April

SHELBY FLEISCHER, DANA ROBERTS AND TIMOTHY ELKNER, PENN STATE

Editor's note from Teresa Rusinek and Ethan Grundberg: The following alert was authored by our colleagues at Penn State University. We have reason to believe that allium leafminer has made its way to the lower Hudson Valley and that adults will emerge shortly after those in Pennsylvania (likely by mid-April). We will be scouting for this invasive pest around the region this spring, but please report any suspected damage to your nearest vegetable specialist on the Eastern New York team.

The allium leafminer, Phytomyza gymnostoma, is a fly that originates from Poland, Germany, Austria and Spain, and was confirmed in 18 counties in Pennsylvania last year.

The fly infests plants in the *Allium genus*, including leeks (*A. porrum*) onion (*A. cepa*), garlic (*A. sativum*), chive (*A. schoenoprasum*), shallot (*A. cepa var. aggregatum*), and green onion (*A. fistulosum*). We've also found feeding signs on wild garlic (*A. vinealae*), garlic chives (*A. tuberosum*), and an ornamental– Allium 'Globemaster' (*A. christophii x A. macleanii*). The Pennsylvania Department of Agriculture and Penn State posted reports and a pest alert to these websites:

Allium Leafminer, PA Department of Agriculture
Allium Leafminer, Penn State Extension

Adult females puncture leaves in a linear pattern with their ovipositor for feeding and egg laying (Figure 1). Leaves from infested plants can be wavy, curled and distorted (Figure 2). Larvae mine leaves moving towards and into bulbs and leaf sheathes (Figure 3) where they pupate (Figure 4). It is often necessary to peel back the leaves to find the insect. Both the leaf punctures and mines serve as entry routes for bacterial and fungal pathogens.

Allium leafminer overwinters as a pupa. Reports suggest that the fly has a distinct spring flight, a summer aestivation (dormancy) period, and a fall flight. One useful report from Fuchsenbigl, Austria

Figure 1. Female puncturing leaf with ovipositor. Note linear puncture marks, which is a sign of adult activity. Photo: T. Elkner

Figure 2. Twisted leaves of infested crop. Photo: L. Donoval

Figure 3. Larvae feeding in onion. Photo: S. Spichiger

Figure 4. Pupae in base of allium plants. Photo: L. Donoval

([1]Kahrer, 1999) recorded the adult flight based on emergence of adults within cages that held infested plants. Kahrer noted that adults were active during the spring from mid-April to mid-May, and in the fall from early September to early October. Last year we used sticky traps to estimate timing of fall flight from 5 farms in Lancaster County and 3 farms in Berks County. Adults were active during the last week of September until we stopped trapping in the second week of November. We also recorded data about how the fly responds to different visual stimuli, as part of ongoing studies to optimize traps.

Figure 5. Adult. Top view. Note yellow patch on head, and yellow 'knees'. Photo: A. Megroz

Figure 6. Adult, preserved specimen. Note yellow head patch and yellow knees. Photo: N. Sloff

The adult fly (Figures 1, 5, 6, 7) has a charismatic orange face, yellow "knees" (end of femurs), and matte black body. At 3mm-4mm, the adult is small (larger than a fruit fly but much smaller than a house fly). Eggs are laid in or on plant tissue, and larvae are well embedded into the plant tissue.

The timing of planting and harvest affect risks of damage. We seem to be getting most damage to allium crops that are showing strong vegetative

Figure 7. Adult. Side view. Photo: A. Megroz

growth at the time of adult flight activity. For example, last year, bulb onions planted after the spring flight, and harvested before the fall flight, mostly escaped damage. But settings with alliums present during the flight periods were most at risk. Last year, spring onions were damaged during the spring flight, and leeks and other alliums were damaged during the fall flight. Row covers during the flight period should prevent damage.

We anticipate emergence of the adults in the beginning of April.

Works Cited:
[1]Kahrer, A. (1999). Biology and control of the leek mining fly, *Napomyza gymnostoma*. *Integrated Control in Field Vegetable Crops IOBC Bulletin*, 66 (9), pp. 205-211.

Germination Chamber Project Yields Two Unique Designs

CRYSTAL STEWART, ENYCHP

A two year, NYSERDA funded project to examine the efficacy of different types of germination chambers has yielded two unique and effective designs for useful, cost-effective structures. The project also helped us understand what considerations each grower should take into account when deciding what type of chamber is right for him or her.

Project background

Seven growers from across Eastern NY were identified as having the need for germination chambers and a variety of different locations in which to trial them. These growers convened at a meeting with agriculture engineers and greenhouse experts to share the key components they needed in a germination chamber. Some of these components included:

- Cost-effective to build and maintain
- Easy to build and maintain
- Moveable
- Possible to light, for items like lettuce
- Possible to cool, for use in greenhouses and in the summer
- Modular, with ability to have different parts at different temperatures

Other needs, such as size, building material, and monitoring equipment type were extremely variable. However, understanding the underlying needs of most chambers was very helpful in informing the design process.

Based on this process, agricultural engineers started to create designs for the growers but ultimately growers created their own designs, with the support of Teresa and Crystal. Of the designs which were created, two seemed to offer wide appeal due to their cost-effectiveness, versatility, and the quality of the transplants grown.

Chamber design overview

A common design feature of both chambers was the digital thermostat mounted to the outside to control a water pan with a heat element inside. It is essential to purchase a thermostat designed for greenhouse use even though the control is mounted on the outside, as moisture can damage the sensor on thermostats not designed for this purpose.

Both chambers also relied on solid foam core insulation for the walls. This choice allowed the chambers to stay at the desired temperature with limited use of electricity. The insulation also kept temperatures extremely even, which resulted in very good germination stands and quality-much better than with the out-of the box unit we compared farm-designed models to (and, notably, for half the cost).

The design of the chambers themselves varied greatly. The Poughkeepsie Farm Project built a wooden frame for their chamber and placed greenhouse shelving inside, while Cold Spring Farm had a metal frame fabricated from extra steel endwall tubing with a network of shelf supports made of piping welded to the frame. Cold Spring farm opted to spend additional money on water-resistant LED lighting for the ceiling of the chamber, allowing for germination of light-sensitive plants. Poughkeepsie Farm Project spent additional “tech money” on a wireless temperature and relative humidity sensor for each chamber so that they would receive updates on their phone to alert them to system deviation.

Benefits and challenges

The chambers created optimum environments for germination and increased the speed of germination and improved the quality of the stand. We trialed the chamber on peppers and onions, both with consistently better results than with bench germination.

Challenges with the chambers centered on issues with heat. In one case the thermostat failed and the chamber reached 120 degrees. In another case the chamber was in a greenhouse and became very dry because the heating unit never came on during the day and water never evaporated from the pan.

Conclusions

Germination chambers make growing quality transplants easier, and have the potential to save in fuel costs by delaying greenhouse heating slightly. These two designs offer a spectrum of options that hopefully will provide growers with the guidance needed to build a chamber that meets their farm’s needs.

If you have questions about chamber design, please feel free to contact Crystal at cls263@cornell.edu or Teresa at tr28@cornell.edu

"The chambers are essential to our greenhouse system. We're noticing quicker and higher germination rates."
-Leon Vehaba, Poughkeepsie Farm Project

Germination Chamber Case Study

Name: Leon Vehaba
Farm Name: Poughkeepsie Farm Project
Email: leon@farmproject.org
Case study prepared by Crystal Stewart of Cornell Cooperative Extension's Eastern NY Commercial Horticulture Program: enych.cce.cornell.edu or cls263@cornell.edu

Key considerations for chamber design: Leon wanted to have two different chamber areas that could be set at different temperatures (one for tomatoes, for example, and one for lettuce). In order to accomplish this goal, he created two chambers which face each other in the head house to the greenhouse. The design provided is for one of the two chambers, which accommodates 96 flats. Other key considerations were that the chamber be cleanable, durable, simple, fixable, have temperature alarms, and be rodent-proof.

Materials	#	Unit Cost	Total
Box Materials			
2 x 4's Doug Fir (12, 10' and 20, 8')	1	$74.3	$74.3
1/2" plywood (walls)	6	$19.16	$114.96
3/4" pressure treated plywood	1	$44.5	$44.5
2" Blue foam insulation	8	$41.1	$328.8
Swivel casters	8	$14.25	$114
Chamber shelving			
Metal shelving base	1	$210	$210
Metal shelves	9	$43	$387
Freight	1	$192	$192
Temp/RH Control Materials			
Monnit temp. and humidity monitor	1	$224	$224
Monnit cellular gateway	.5	$249	$124.5
Digital thermostat	1	$83	$83
Water pan gasket and auto-fill valve	1	$35.7	$35.7
Aluminum pan	1	$27.94	$27.94
Wiring hardware and materials	1	$154.61	$154.61
Grand total			$2115.31

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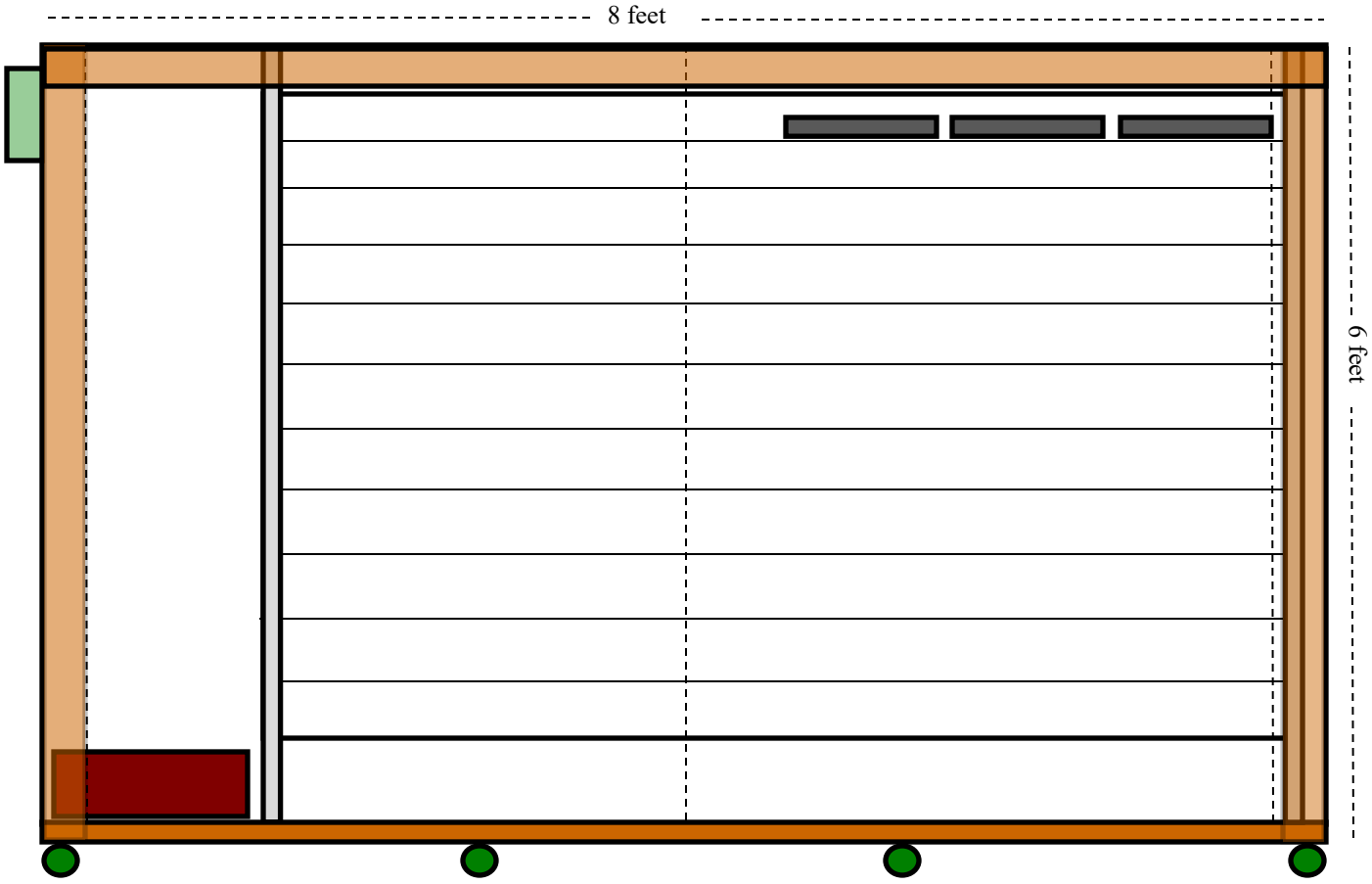
Construction overview: the germination chamber is made of an untreated lumber frame with a plywood exterior and blue foam inside. All exposed wood on the inside was painted with leftover water resistant paint to slow rotting. The plants are placed in a pre-made shelving unit and the temperature/humidity control is located on the floor next to the shelving unit. The door is made of two pieces of blue foam held with wood. The unit is deep enough to accommodate flats length-wise with room for air exchange around the shelving unit—almost 48 inches.



This unit could be easily made to accommodate a variety of spaces, with the box consisting entirely of common lumber. The key technology features of this chamber are the temperature and humidity monitors, which allow the farmer to constantly monitor the chamber despite not living at the farm. Each chamber needs its own monitor, but the cellular relay which conveys information is shared by the two units.
This chamber was placed in the headhouse, but had to have new electrical lines brought to it from the box. This increased the cost of the unit, but placement in a temperature-moderated area brings down the long-term costs of operation and increases the convenience of the unit.

Key Suppliers for this Project:

- Monnit Greenhouse Monitors: info@monnit.com, 1-801-561-5555
- Johnson Controls Digital Thermostat: Available through Amazon
- Metal shelving units: Wellmaster: http://www.wellmaster.ca/

Germination Chamber Case Study

Name: Lenny Prezorski
Farm Name: Cold Spring Farm
4953 State Route 145. Cobleskill , NY 12043
Email: lmp1358@hotmail.com
Case study prepared by Crystal Stewart of Cornell Cooperative Extension's Eastern NY Commercial Horticulture Program: enych.cce.cornell.edu or cls263@cornell.edu

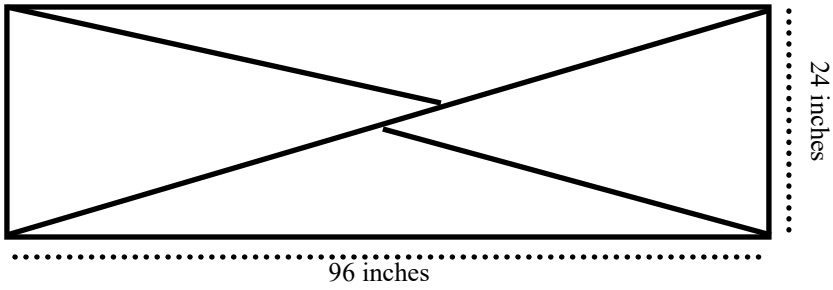
"We begin germination on March 1st and continue until June. A wide variety of flower and vegetable seeds are germinated throughout this period. We go from impatiens to seedless watermelon and would especially like to be able to germinate light sensitive seeds."

This chamber consists of an custom-fabricated metal frame with poly-coated racks. The insulation is solid foam board. Humidity and heat are provided by a water pan with a heat element placed in the bottom. The thermostat controls are mounted on the outside of the unit. Supplemental lighting is mounted on the top of the unit, providing illumination to the first row of trays.

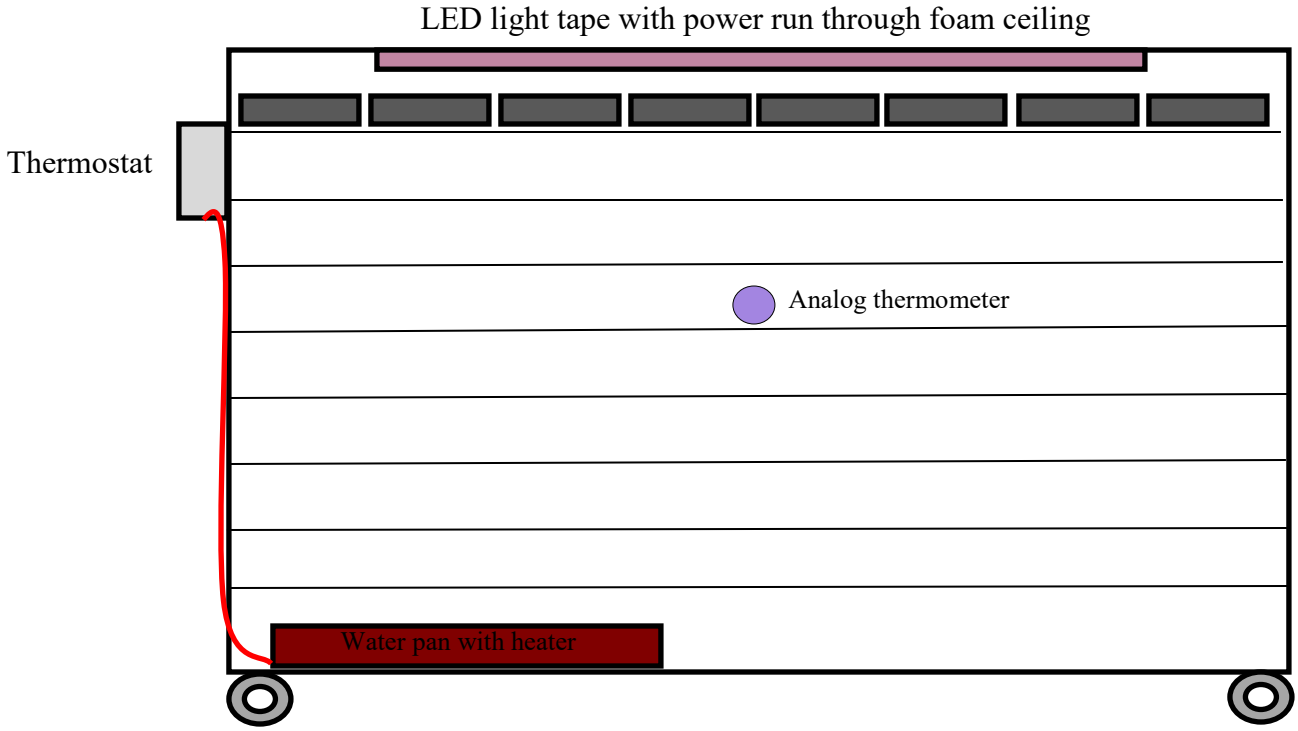
Metal Frame Costs			
	# of Units	Unit Cost	Total
1.75" Square steel greenhouse endwall tubing	66	$2.35	$155.10
1/2" galvanized conduit for shelf supports	18	$5.50	$99.00
Fabrication cost	1	$650	$650.00
Casters, 4 inch rigid	2	$22.99	$45.98
Casters, 4 inch swivel	2	$22.99	$45.98
Insulation and Shelving Costs			
Close mesh pantry shelving	9	$21.97	$198
2-inch foam board (4'x8' sheets)	4	$33.92	$135.68
Tuff-R r12 insulation board 7/8"	2	$31.95	$63.90
Foamboard adhesive	2	$3.58	$7.16
Tek Screws, box of 30	1	$5.49	$5.49
Electronic Equipment			
Thermostat	1	$116.72	$116.72
LED lighting strip	1	$201.15	$201.15
Aluminum pan and heating elen	1	$61.53	$61.53
Assembly of chamber			
Labor	10	$20	$200.00
Grand Total			$1,985.42

Construction Sketches

Top view of shelf support: the dimensions of the unit are 24x96, with cross braces made of welded conduit on each shelf to support the wire mesh. Nine shelves are welded to the frame, which is described below. An LED light strip is mounted on the ceiling of the chamber.



Side view: the frame is made from square 1.75 inch steel greenhouse endwall framing material. Foam board is attached on the outside of the framing using Tek Screws. The door is a piece of foam board the size of the front mounted on a channel that allows it to slide. It is held in place by a 2x2 piece of lumber across the front (see picture next to profile)



This chamber is located inside the greenhouse, and is powered by an extension cord. Because the unit is in the greenhouse, high temperature controls have been a more significant factor than low temperature controls, which are automatically corrected by the heating element located in the chamber. During year one of use, high temperatures were regulated by opening the door of the chamber to release warm air. This strategy relies on human monitoring and intervention, which is not ideal. In the future Lenny would like to install a thermostat-driven exhaust fan in the chamber.
The fact that the chamber needs venting for temperature control may contribute to sub-optimal relative humidity as moisture is lost during the venting process. This is a concern which growers wanting to site chambers in the greenhouse instead of a cooler head house should be aware of.

Key Suppliers for this Project:

- Waterproof LED strip light: Allied Electronic: http://www.alliedelec.com/
- Steel endwall framing: Nolts Greenhouse Supply: http://noltsgreenhousesupplies.com/

How Did Winter Treat Your Berries?

JIM O'CONNELL, ENYCHP

This past winter was generally very mild. Winter low temperatures in the Hudson Valley remained above zero and for part of the winter, there was adequate snow coverage, to help insulate the soil and prevent early warming. The lowest recorded temperature at the Hudson Valley Research Lab was 1°F, recorded on December 17, 2016.

Spring is here despite the recent cold, wintery, weather and the berries are responding. Haskaps (*Lonicera caerulea*) broke bud at the HVRL a little over two weeks ago, just in time for the March blizzard. They are some of the earliest maturing fruits and break bud earlier than many other small fruits. Currently, Haskap buds are at early green tip (see picture) and it won't be long before they flower. Blueberries are a little further behind than Haskaps and are currently at bud swell.

Overall, in the Hudson Valley, it appears the blueberries made it through this past winter with minimal damage. Buds sampled from several farms in Ulster County ranged from <1% to 15% for bud mortality (complete bud death) and from 11% to 29% for injury (one or more damaged bud ovaries). Though there is a wide range of mortality and injury levels, they fall within acceptable levels and growers shouldn't be too concerned about pruning "lightly" this year.

photos by Jim O'Connell

Blueberry bud swell

Haskap early greentip

Managing Pathogens Inside Seed with Hot Water

MEG MCGRATH, CORNELL, ANDY WYENANDT, RUTGERS UNIVERSITY & KRIS HOLMSTROM, RUTGERS COOPERATIVE EXTENSION

Ensuring seed is not a source of pathogens causing diseases is an important first step in management. Some pathogens can be on or in seed. Fortunately, not all are capable of becoming associated with seed, but some important pathogens can. Seed-borne fungi include pathogens causing Septoria leaf spot of tomato and Alternaria leaf spot of crucifers. Diseases caused by seed-borne bacterial pathogens include black rot of crucifers, bacterial leaf spot of pepper, and bacterial canker of tomato. Contaminated seed can be an important first source of a pathogen on a farm or even a larger area (most notable example is the new downy mildew of basil in the US). Additionally, a severe disease outbreak can result when a pathogen is present at the start of plant growth. Pathogens able to get inside seed are especially difficult to manage because a surface disinfectant or fungicide treatment won't affect them. Only heat treatment can get in to these pathogens. Diagrams showing how pathogens can get inside seed plus additional useful information about seed-borne pathogens are in a pdf file prepared by Lindsey du Toit.

What seed should be treated? Likelihood that a particular batch of seed could benefit from hot water treatment depends on the crop, the pathogens affecting it, and the seed's history. Most large-seeded crops (beans, cucurbits, and peas) cannot be effectively treated with hot water. Some pathogens that can be in seed occur more commonly than other seed-borne pathogens. For example, the pathogen causing black rot in crucifers is common in the northeast while the pathogen causing black leg has not been detected for years. Tomato, pepper, and crucifers are crops affected by some of the more common pathogens that can be seed-borne. Vegetable seed that can be treated are listed in Table 1 and diseases caused by pathogens that can be seed-borne are listed in Table 2. The seed's history is another important consideration when deciding whether treatment is warranted. If you save your own seed or buy from a small producer, hot-water treatment may well be worthwhile. Some seed companies have the resources to minimize the chance of their seed becoming contaminated and also to test their seed. Producing seed where key pathogens do not occur and/or where environmental conditions are not favorable, such as in a greenhouse, are used to obtain clean seed. Determine the likelihood that pathogens could be present by asking your seed supplier if the seed was produced in a way to minimize potential for exposure to seed-borne pathogens and ask if the seed was tested for their presence. It is also important to find out if the seed has already been treated with hot water as treating again could adversely affect the seed. Pelleted seed cannot be treated, and primed or old seed should not be treated.

How should seed be treated? While hot-water seed treatment can be done effectively on a stovetop, it is much better to use a precision water bath. The temperature of water for treating seed varies from 118 to 125 F, depending on the crop, and the treatment period likewise varies from 15 to 30 minutes. Pre-heating seed at 100 F is recommended. Equipment for treating seed, including precision water baths, were purchased for several locations in the mid-Atlantic and northeast regions through a project funded by the Northeastern IPM Center (Fig 1, Table 3). Additionally, extension specialists were trained so that they could assist growers who want to hot-water treat their seed (Fig 2). Contact Meg McGrath to find the nearest location. It is important to use the appropriate treatment protocol for a crop to achieve control of pathogens without damaging the seed. Protocols are listed in Table 1. Additional information about how to hot-water treat seed plus other management steps to also implement in an IPM program for seed-borne diseases are in a ppt file prepared by Kris. Guidelines for treating seed on a stovetop are at http://vegetablemdonline.ppath.cornell.edu/NewsArticles/All_BactSeed.htm.

Table 1. Hot-Water Seed Treatment Protocols

PREPARED BY MARGARET TUTTLE MCGRATH, CORNELL

Crop	Temperature and time	Reference
Brussels sprouts	122°F 25 minutes	1, 3, 4
Broccoli	122°F 20 minutes	1, 2, 3
Cabbage	122°F 25 minutes	1, 3, 4
Carrot	122°F 20 minutes	1, 2, 3
Cauliflower	122°F 20 minutes	1, 3, 4
Celeriac	118°F 30 minutes	3
Celery	118°F 30 minutes	1, 3
Chinese cabbage	122°F 20 minutes	1, 4
Collards	122°F 20 minutes	1, 3, 4
Coriander	127°F 30 minutes	4
Cress	122°F 15 minutes	1, 3, 4
Cucumber	122°F 20 minutes	1, 4
Eggplant	122°F 25 minutes	1, 3, 4
Kale	122°F 20 minutes	1, 3
Kohlrabi	122°F 20 minutes	1, 3, 4
Lettuce	118°F 30 minutes	1, 3, 4
Mint	112°F 10 minutes	4
Mustard	122°F 15 minutes	1, 3, 4
New Zealand Spinach	120°F 60-120 mins	4
Onion (sets)	115°F 60 minutes	4
Parsley	122°F 30 minutes	5
Pepper	125°F 30 minutes	1, 3, 4

Hot Water Seed Treatment Protocol References

1 Seed Treatments for Commercial Vegetables in Kentucky. by Bill Nesmith 7-94

2 http://agspsrv34.agric.wa.gov.au/agency/pubns/farmnote/1990/F09090.htm

3 Hot Water and Chlorine Treatment of Vegetable Seeds to Eradicate Bacterial Plant Pathogens. Ohio State University Extension Fact Sheet. By Sally Miller and Melanie Ivey.

4 Vegetable Seed Treatment. University of Illinois Extension. RPD No. 915. March 1992. By Mohammed Babadoost.

5 Hot water treatment of vegetable seed – an alternative seed treatment method to control seed borne pathogens in organic farming. *Journal of Plant Diseases and Protection* 110(3):pp. 220-234. 2003. By Eva Nega et. al.

Note: Hot water treatment can be damaging or not practical for seeds of peas, beans, cucumbers, sweet corn, beets and some other crops. Some hybrid varieties of cauliflower may be damaged by the recommended treatment. From:http://agspsrv34.agric.wa.gov.au/agency/pubns/farmnote/1990/F09090.htm

continued on next page

Table 1. Hot-Water Seed Treatment Protocols

CONTINUED

Crop	Temperature	and time	Reference
Radish	122°F	15 minutes	1, 3
Rutabaga	122°F	20 minutes	3, 4
Shallot	115°F	60 minutes	4
Spinach	122°F	25 minutes	1, 3, 4
Sweetpotato (roots)	115°F	65 minutes	4
(cuttings, sprouts)	120°F	10 minutes	4
Tomato	122°F	25 minutes	1, 3, 4
Turnip	122°F	20 minutes	1, 3, 4
Yam (tubers)	112°F	30 minutes	4

What to do after treating seed? Treating seed with hot water is one component of an integrated disease management program. Sometimes this procedure is not completely effective. But even when it is, achieving effective control of a disease typically necessitates implementing other practices targeting additional potential sources of the pathogen. Other practices to use include sanitation (greenhouse, planting materials, tomato stakes, etc.) and crop rotation. Resistant varieties, fungicides, and water management will slow disease development. Specific practices to use vary with the pathogen.

Table 2. Diseases of Vegetable Crops Caused by Seed-Borne Pathogens

Crucifers (Cabbage, broccoli, cauliflower, Brussels sprouts, kale)
Alternaria leaf spot
Bacterial leaf spot (peppery leaf spot)
Black leg
Black rot

Carrot
Alternaria leaf blight
Bacterial leaf blight
Cercospora leaf spot
Crater rot and foliar blight

Celery
Bacterial leaf spot
Early blight (aka Cercospora leaf spot)
Late blight (aka Septoria leaf spot)
Phoma crown and root rot

Eggplant
Anthracnose
Alternaria early blight
Phomopsis
Verticillium wilt

Lettuce
Anthracnose
Bacterial leaf spot
Lettuce mosaic virus
Septoria leaf spot
Verticillium wilt

Onion
Botrytis neck rot
Downy mildew
Purple blotch
Smut
Stemphylium leaf blight

Parsnip
Phoma canker

Pepper
Anthracnose fruit rot
Bacterial leaf spot
Cucumber mosaic virus
Pepper mild mottle virus
Tobacco mosaic virus
Tomato mosaic virus

Spinach
Anthracnose
Cladosporium leaf spot
Cucumber mosaic virus
Downy mildew (aka Blue mold)
Fusarium wilt
Stemphylium leaf spot
Verticillium wilt

Tomato
Alfalfa mosaic virus
Anthracnose
Bacterial canker
Bacterial speck
Bacterial leaf spot
Cucumber mosaic virus
Early blight
Fusarium wilt
Late blight (requires both mating types)
Leaf mold
Septoria leaf spot
Tomato mosaic virus
Verticillium wilt
Double virus streak

Turnip, Rutabaga and Radish
Alternaria leaf spot, brown spot
Black rot
Black leg

continued on next page

Table 3. Equipment for Hot-Water Treating Seed

Carolina Biological Analog 10L bath: $716
http://www.carolina.com/laboratry-water-baths/polyscience-water-bath-analog-10-l/707123.pr?catId=&mCat=&sCat=

Fisher Thermo Scientific Precision General Purpose bath: $1036
https://www.fishersci.com/shop/products/precision-5l-gp-bath/tsgp05

Thermometer from Carolina Biological Supply: $12.20
Enviro-Safe Partial Immersion 12" Thermometer (-20 to 150 C) Item #745443
You will need 2 if multiple seed lots are being treated in succession.

Supplies: distilled water, aquarium bubbler, roll of fiberglass window screen, coffee filters, weights (such as metal nuts or coins), plastic labeling stakes, and permanent markers.

Article & photos selected from:
http://vegetablemdonline.ppath.cornell.edu/NewsArticles/HotWaterSeedTreatment.html

Please Note

while this is a well-documented procedure, any treatment done to seed after purchase voids any guarantees of the seed company.

Wholesale Market Survey Shows Opportunities and Barriers

CRYSTAL STEWART, ENYCHP AND ROBERT HADAD, CORNELL VEGETABLE PROGRAM

There is increasing interest in local produce wholesaling, both from buyers and growers. Yet there are also questions about how to do this profitably, and how to fit these efforts into a diversified vegetable operation. This winter the regional vegetable teams created and distributed a survey to examine these questions. The results are helpful in beginning the conversation about successful wholesaling of local produce, and they also open a series of additional questions.

Our survey sought to examine the needs of growers who are already selling into wholesale markets, those interested in selling into wholesale markets, and those who have sold to wholesale markets in the past and who have opted to abandon this market channel. Unfortunately, a glitch in the survey caused the questions about abandoning the wholesale market channel to be skipped, so this data is missing from the survey. The remaining information is detailed below.

The survey attracted 199 responses from growers across the state, ranging from very small (under ten thousand annual sales) to sales of $1 Million per year. Below is the size breakdown of survey respondents.

Sixty-nine percent of respondents said that they are either currently (53%) or have previously sold into a wholesale market, which we defined sales to a distributor, food hub, or supermarket/grocery store at a reduced price and often using standard grades. This definition excluded restaurant sales which are in smaller quantities and bring retail prices.

We next asked growers why they are wholesaling, and provided 9 clickable answers and one write-in space called “other”. Growers were able to rank their reasons from 1-10, with one being most important. The following graph shows the frequency of each response being listed as the most important reason that they wholesale. See Chart 2.

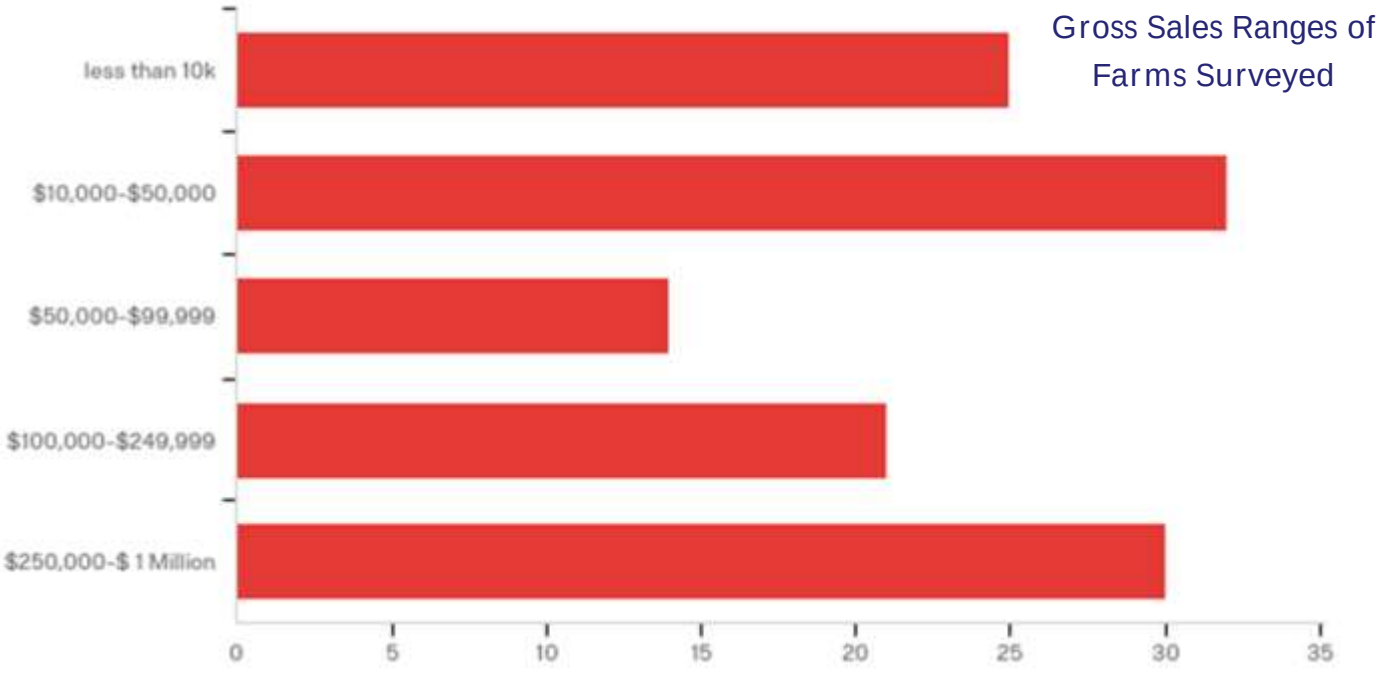
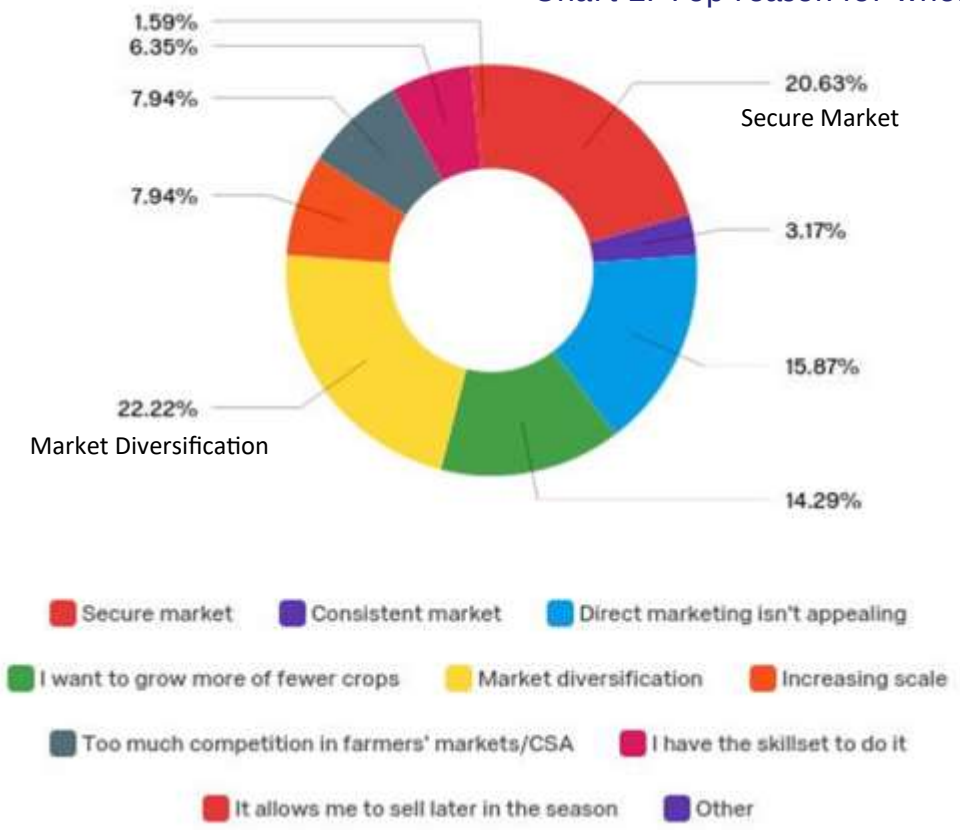


Chart 2: Top reason for wholesaling

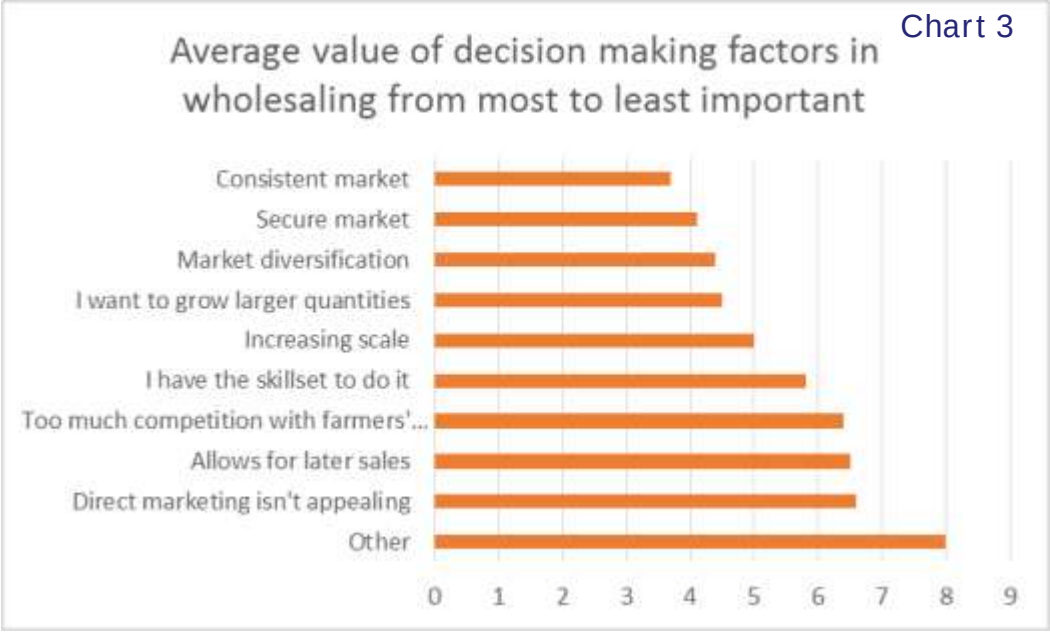


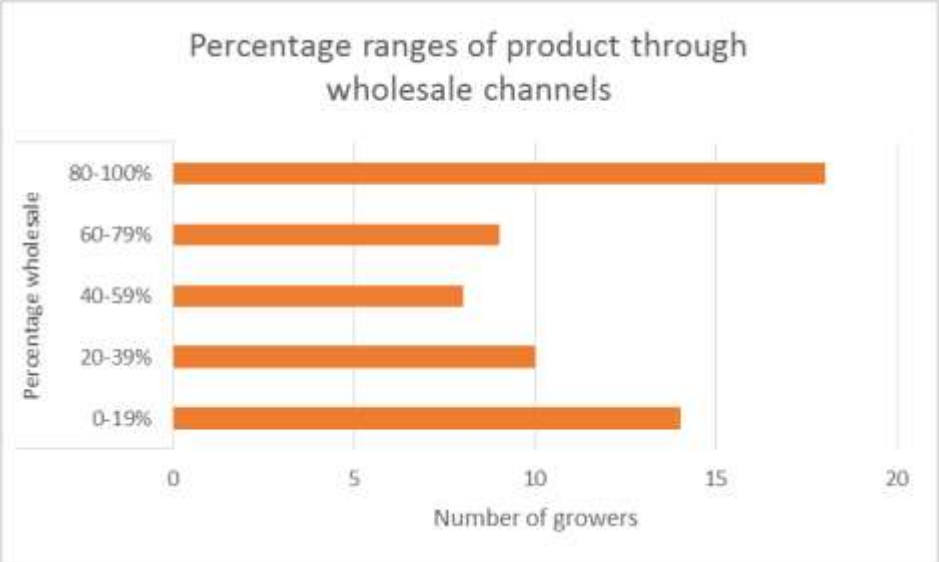
The top two responses were that wholesaling allows for market diversification (22%), and that it provides a secure market (21%). To look at this data another way, we took the average numerical value of each of the responses. This allowed us to see the overall comparative importance of each factor, not just the most important factor. This arrangement of the data show that having a consistent market is also a very important factor in decision making, even though most growers did not list it as a number one priority. Interestingly, competition in other market channels was not a priority concern for the majority of growers, though it was more important than some other factors.

Next we looked at what percentages of total farm sales are wholesale, which markets farmers are selling wholesale to, and which crops they are selling in those markets. We felt that it was helpful to look at this information while cross-referencing farm income levels when possible. This allows us to get a sense of whether certain wholesale markets or crops are being utilized by certain sized farms .

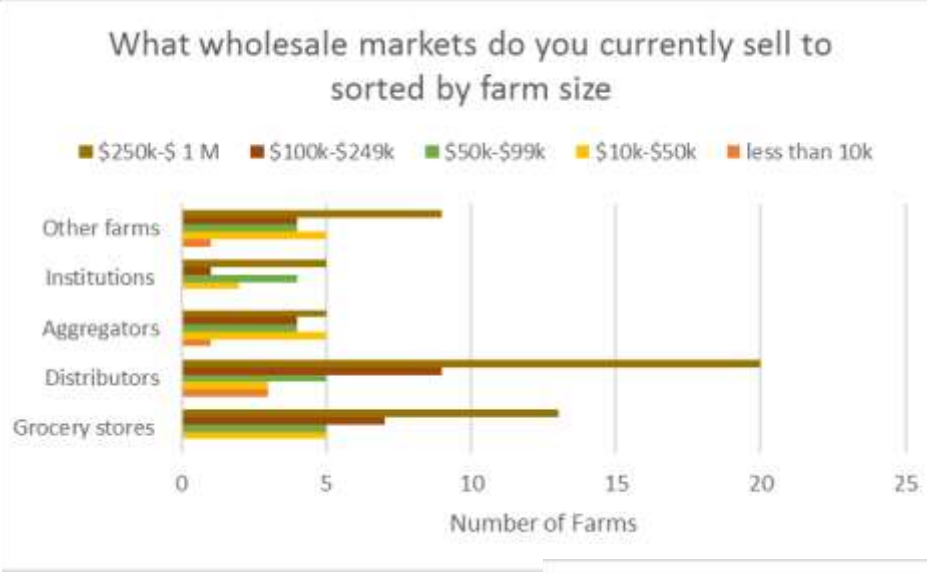
The survey software would not allow us to cross-reference income with the percentage of sales that are wholesale, so numbers shown for this response are only broken down by percentage. However, it is interesting to note that farms tend to either specialize in wholesale production (greater than 80% gross sales) or use it as a minor market (20% of gross sales).

Chart 3





To get a sense of which market channels are being utilized, we separated them into five categories, which are abbreviated in the graph below. The categories are direct to other farms, to institutions such as schools and hospitals, to aggregators such as food hubs and CSA aggregators, to distributors, and to grocery stores. Interestingly, a primary channel for larger farms is sales to other farms.

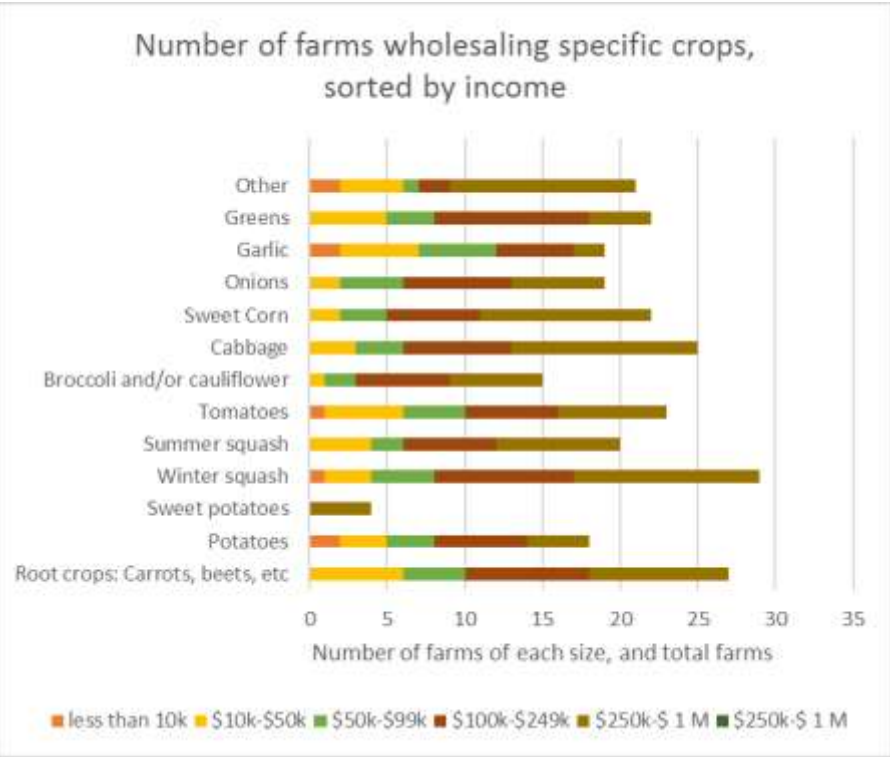


Next, we looked at which crops are most often wholesaled, and sorted this by farm size as well. In this graph the farm types are stacked in the crop line, in the order listed in the legend. If a color is not present, no farmers from that group responded that they wholesale that crop. Crops that fell into the other category included pumpkins and bell peppers.

Two final planning questions looked at what comes next, and asked growers about their interest in wholesaling crops in the future

A note on reading the above graph: the farm size, listed in the legend at the top, corresponds in order to the lines on the bar graphs. The top left (250k-1M), always corresponds to the top line of each of the five channels.

A note on reading the graph to the right: the farm size, listed in the legend at the bottom, corresponds in order to the lines on the bar graphs. Far left bar is always less thank 10k, for example. Each count is stacked on the next in the same line.



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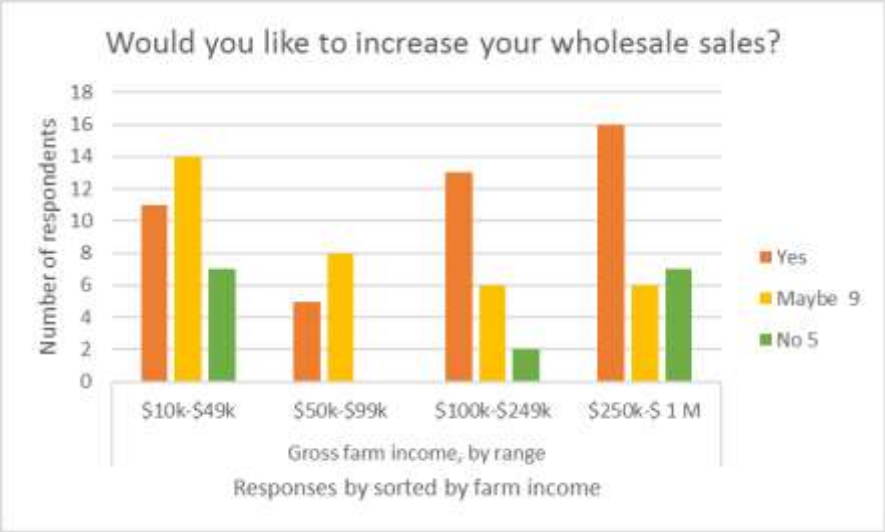


and about potential barriers to expanding. Looking at them one at a time, we see significant willingness to expand this market, paired with clear ideas about potential barriers.

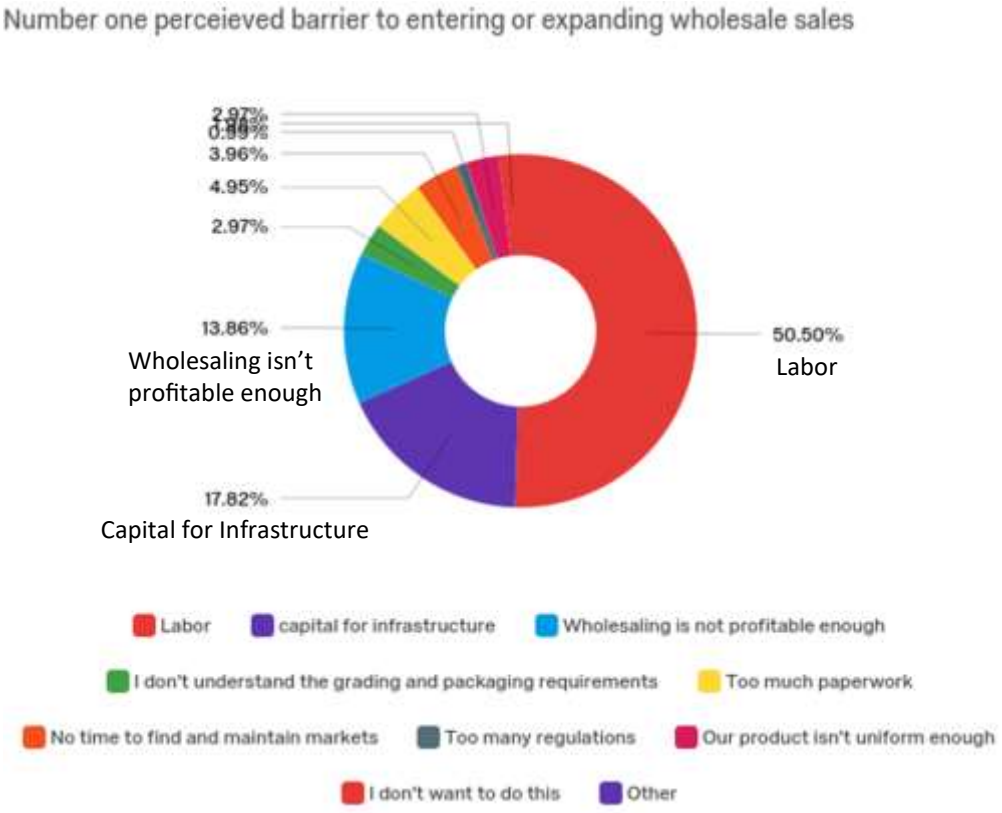
If respondents answered "maybe" about increasing wholesaling, there was space to add qualifying statements to explain. The answers here tended to fall into a few categories, typified by these quotes: "It depends on if other markets are more profitable," and "Not sure the next level is worth the investment to secure," and "If it is a positive experience for us and those we are selling to." There is no easy answer to this question, but in general growers prioritize profitability when looking at this market channel.

When provided with a list of potential barriers, the question of profitability becomes more refined to issues surrounding labor, and infrastructure investment is echoed again, followed by questions of profitability, as indicated in the open-ended answers in the previous question. Interestingly, issues around regulations were considered a minor issue.

Next Steps:

This project is intended to inform the industry and any state and federal agricultural support programs about potential weak points in the wholesale marketing channel that need attention. This first survey has helped to create clarity in some areas, especially for growers who are actively engaged in the wholesale market now. However, more information is needed to provide a clear picture moving forward. Specifically, we need to hear from the growers who are not entering the wholesale market channel. We also want to receive more detailed information from growers who are wholesaling. We are sending out a second survey to address these areasand hope that growers will take the time to provide a little more information. Once we have these new data, we will again update the industry and potential support programs.

Many thanks to the growers who participated in this survey, and to Liz Higgins of ENYCHP for helping with survey design. This project is funded by the USDA.



Moving Your Farm from "Good to Great" in Ag Labor Management

ELIZABETH HIGGINS, ENYCHP

For most fruit and vegetable farms, employees are the largest variable expense. Because most farms are small businesses, without dedicated HR staff, managing employees is also largely done by trial and error. Do you know many farmers who put as much thought into selecting, maintaining and developing their human resources (employees) as they do other farm resources; plants, equipment, finances and other inputs? Is there room for improvement on your farm?

Aside from the cost of labor – labor availability is another reason to take a hard look at human resource management on your farm. Although recent immigration restrictions may make the farm labor market even tighter, long term trends in ag employment were already showing a steady decline in agricultural workers from Mexico, as job prospects and the economy there have improved. Higher federal and state minimum wages also increase the number of alternative jobs to farm labor. It is likely that the market for good farm employees will become increasingly competitive. Learning how to effectively attract, hire, train, compensate and retain good workers is likely to be an important strategy for farms that want to win the competition for good employees.

Thanks to a grant from USDA, The Cornell Farmworker Program, Eastern NY Commercial Horticulture Program and CCE Oneida, Ontario and Erie Counties will be offering resource management training programs for farmers and farm managers in 2017 and 2018, including 4 workshops between October and March in 5 locations in NYS on human resource management best management practices. Completion of the series will lead to a certificate in Human Resource Management on the Farm. For farmers who are currently managing, or are planning to manage, a Latino workforce, we will also have a 1-day conference held in 2 locations on increasing competency in supervising a Latino workforce (December 2017 and January 2018). Information about these programs will be available on the ENYCH website or you can contact Elizabeth Higgins (emh56@cornell.edu) if you want to be notified when the program registration is available.

(photo credit USDA)

Springtime Asparagus Weed Control

CHUCK BORNT, ENYCHP

Weed Control in Asparagus: If you havent' already done your pre-emergent herbicide treatments in your asparagus, it's getting that time! Rutgers University in New Jersey recommends 2.5 lb Solicam DF plus 1-2 lbs Karmex DF (do not apply more than 3 pounds per season), 14 days prior to spear emergence (that's the pre-harvest interval) which means applications need to be going out very soon if not immediately (for beds that are at least 1 year old)! This tank mix works on a wide range of pre-emergent broadleaves and grass weeds and is relatively safe to the asparagus. Both of these materials will not work on already growing weeds and also work better if moisture is received soon after application. If weeds are present, the addition of Gramoxone or other paraquat containing material will help control those weeds already established. The addition of Calisto at 3.0 ozs per acre can also improve residual and Common Larmbsquarter and horseweed (marestail or stickweed) control.

However, those are not the only materials labeled for asparagus weed control and below is a list of all the materials labeled in NYS, but targeted towards the more commonly used and effective materials. The materials vary according to application timing (pre vs. post) and targeted weeds. You will need to consult the labels as most of the rates are soil type dependent. Tank mixes will generally provide a broader spectrum of weed control. As always, please consult the labels for rates and additional use precautions or call your local ENYCHP team member.

Callisto (pre spear and post harvest) - annual broadleaf weeds. Callisto controls largely broadleaf weeds and has soil residual as well as postemergence activity on sensitive species. Use 3.0 fl. oz. for postemergence control and 6.0-7.7 fl. oz. for preemergence control. **May be applied twice per season but may not exceed a total of 7.7 fl. oz, so be sure to take into account any pre-emergence applications.** See the label for adjuvant instructions.

Karmex DF (Pre spear and post harvest) – annual broadleaves and grasses. For use on established beds only! Two applications may be used. The first application should be made before weeds become established but no earlier than 4 weeks before spear emergence and no later than the early cutting period. A second application may be made immediately following completion of harvest provided rainfall is expected. When two applications are used in one season, do not exceed 3 lbs. per acre in one season. Karmex may or may not provide some control of already emerged weeds, but the best use is as a pre-emergent.

Solicam DF (pre spear emergence) - annual broadleaves and grasses. For use on established beds only! Rates vary depending on soil type. As mentioned above, Solicam at 2.5 lbs per acre tank mixed with 1-2 lbs per acre of Karmex is the preferred treatment in New Jersey. Apply Solicam DF in a minimum of 20 gallons of water per acre as a broadcast pre-emergence treatment. Do not apply within 14 days of harvest. Solicam will not control weeds that are already emerged.

Lorox 50DF (pre and post) Broadleaves and grasses. **Lorox may be applied preemergence (minimum of 15 gallons/acre) and post emergence** (minimum of 25 gallons/acre) on newly planted crowns or established beds. Do not tank mix Lorox with other herbicides or adjuvants. See label for recommended use of activated carbon with applications to new crowns. Three applications of 1-4 lbs can be made annually with a maximum use of 4 lbs/year.

Dual Magnum (pre spear emergence) - annual grasses, yellow nutsedge, hairy galinsoga, suppression of other broadleaf weeds. A single application may be made to dormant, established beds in the spring prior to crop emergence but may fit best as an application right after your last cutting to control Yellow Nutsedge and Eastern Black Nightshade (pre-emergent). Choose rates based upon soil type. Because this label is a New York State's multi-crop 24(c) Special Local Need (SLN) supplemental label, you must acquire an indemnification from Syngenta in order to use this product. Be sure to use the Dual Magnum formulation as that is the product that is labeled for asparagus (do not use Dual II Magnum).

Clarity 2.5 EC (pre and post spear emergence)- sowthistle, mustard spp., redroot pigweed, Russian thistle, common chickweed, field bindweed. **Apply Clarity to emerged and actively growing weeds immediately after cutting the field but 24 hr before the next cutting**. Multiple applications may be made per season but may not exceed a maximum of 16 fl oz per acre per year. If spray contacts emerged spears, twisting may result. Label recommends 40 – 60 gallons of water/acre be used.

Prowl H2O (pre-spear emergence). Application must be made prior to spear emergence or remove emerged spears prior to making the application, however there is a 14 day PHI. Do not apply post emergent or injury will likely occur. Do not apply more than 2.4 pints if grown on sandy soils.

Sandea (pre and post) - Pre-emergence applications: galinsoga, lambsquarters, mustard/radish species, redroot pigweed, ragweed, velvet-leaf. **Post-emergence applications:** yellow nutsedge, galinsoga, redroot pigweed, mustard/radish species, ragweed, velvetleaf. Apply post emergence to established beds. May be applied during harvest season (1 day PHI) May be applied at the end of the harvest season but it is recommended to use a nonionic surfactant or COC with drop nozzles to maximize coverage of weeds while minimizing fern contact and injury to the asparagus. Do not exceed 2 oz/A/season.

Chateau WDG (pre spear and post harvest) — annual broadleaf weeds. **Chateau SW should be applied at least 2 weeks prior to spear emergence or to dormant asparagus after harvest. There is the possibility of injury if Chateau is applied less than two weeks before spear emergence.** Chateau may be used for residual weed control as well as to assist in postemergence burndown of some annual and perennial weeds in dormant asparagus. To control weeds postemergence use 0.25% v/v non-ionic surfactant and a spray grade nitrogen source. This is a very active material and I have seen some crop injury (twisted spears) in the past when used pre-emergent so get it on early.

April is National Safe Digging Month

CHRIS THOME, PROGRAM DIRECTOR, PIPELINE AG SAFETY ALLIANCE

National Safe Digging Month (NSDM) begins this Saturday. NSDM is recognized by the U.S. House of Representatives and Senate. The goal of National Safe Digging Month is to spread awareness for 811, the national number you call before doing any digging, big or small. Whether building a fence or pulling a deep ripper, a call to 811 should be made to protect the workers, the public, the environment and our buried infrastructure.

There are many promotional materials available at the Common Ground Alliance website including infographics, print and social materials, web buttons, case studies and a governor proclamation toolkit. Many infographics are also located at the PASA website in the Ag Agent login portal. If you have any questions, please let us know and help us spread the safe digging message!

Never Assume: As spring is upon us and farmers are preparing the fields, the following is a story about a spring plant, featured in the 2016 AG Excavation Safety Guide, that sheds light on an incident that can become all too real if the proper safety procedures aren't followed.

It was an early morning just like any other when a farmer was getting ready to head out to the field. He had never attempted deep tilling at 16" on the field before, but he was using a borrowed piece of equipment and was told it would make a big difference in the crop yields. As he approached the field with the equipment ready to go, he began down a straight path, using a tree in the distance as a point of reference. In this particular field, there was a 26" steel pipe carrying natural gas that he was headed straight toward.

As his tractor crossed the underground pipeline that ran perpendicular to his route, a slight bounce caused him to stop the equipment and identify what he hit. As he stepped foot off the tractor he noticed a yellow pipeline marker along the fence with the words "Warning" on it. Immediately he was fearful he struck the pipeline.

"Most transmission pipelines made of steel are covered with a continuous protective coating to help prevent corrosion. Even a small disruption in this coating can cause major corrosion damage that can lead to catastrophic failure if not repaired. That is why it is very important to report pipeline strikes or possible pipelines strikes to the pipeline company so qualified individuals can assess the damage and make the appropriate repairs. Pipelines are designed to safety transport the commodity inside, but even a small bump or nudge can sacrifice the reliability until it is reported and properly repaired."

According to the article, if you experience a pipeline emergency like a pipeline strike and you think you have come into contact with the pipe, immediately turn off all ignition sources without risking injury or your safety, and abandon any equipment while quickly leaving the

area on foot. When you are at a safe location, call the 24-hour emergency number posted on the pipeline marker to notify the company and contact your local emergency response personnel. While on the phone with the pipeline company's gas control center, the controller will ask several questions regarding the incident. Pipeline operations personnel will be sent to the incident location to investigate the pipeline area and determine what valves need to be closed. If it's determined a release has occurred, the controller will also contact emergency response personnel.

This story provides a very important lesson; "[a]lways pay attention to pipeline markers". If you are going to do any type of digging, call 811. "A pipeline strike that goes unnoticed could remain unnoticed for several years without problems, but at some point, even a nick to the coating could eventually lead to catastrophic damage."

If you'd like copies of the 2016 AG Excavation Safety Guide, please let us know.

To identify if there is a transmission pipeline in a particular area, go to npms.phmsa.dot.gov and search by county. For the full article, click here and go to page 15, "I just HIT a pipeline, Now What?".

Seedless Watermelon Management—Thoughts Ahead of the Season

GORDON JOHNSON, EXTENSION VEGETABLE & FRUIT SPECIALIST, UNIVERSITY OF DELAWARE

Editor's note: This article is from the April 7, 2017 issue of the University of Delaware Weekly Crop Update, Volume 25, Issue 2.

Plastic is being laid across the region in anticipation of the first watermelon plantings about a month away. The following are some thoughts on watermelon management addressing questions received over the past year and in light of recent applied watermelon research.

Managing Fruit Size, Spacing, and Marketable Yield: Some growers have had a problem with producing too many oversized watermelons (which have limited markets) in the last 2 years. Fruit size is best managed by choosing varieties that have been evaluated and selected for filling different size classes. A variety that commonly produces a high percentage of 36 count watermelons may, under certain growing conditions, produce high numbers of oversized melons. Conversely, under heat stress conditions, a predominately 60 count watermelon variety may produce high numbers of undersized melons.

Watermelon yield and size is also affected by planting density. In reviewing the past research on plant density with seedless watermelons, marketable yield of standard sized seedless watermelons was optimized at densities of 8-10 sq ft per plant (1 ft. between plants). For mini-seedless watermelons and small ice-box types optimal yields were at 4-5 sq ft per plant (0.5 ft. between plants). These are much higher densities than commonly used in our industry. Growers must strike a balance between cost of plants and potential yield. Industry standards in our area are between 20-28 sq ft per plant for standard seedless types (3-4 ft between plants) and 12-20 sq ft per plant for small fruited types (2-2.5 ft between plants). These common spacings maximum size potential. Wider spacings do not produce heavier watermelons. Fruit size can be reduced to a certain degree by reducing in-row spacing (increasing plant density). Reductions of average fruit size of 0.5-1.0 lbs per fruit can be expected for every foot of in-row spacing reduced.

Vine Management in Drive Rows and Row Middle Management: There has been interest in alternative vine management techniques to reduce labor costs and manage diseases. Vine turning in drive rows is time-consuming and requires hand labor. An alternative would be using discs to cut the vines which can be done mechanically. In research over the past 2 years we observed that vine cutting had no adverse yield effects as an alternative to vine turning. Of concern is the potential for disease transmission because a wound is made by the disc. This can potentially be mitigated by spraying these wounds with anti-microbial or bactericidal/fungicidal compounds. This will be focus of research this year.

Another interest has been in reducing the potential of Phytophthora capsici fruit rots in watermelons with row middle management. This disease proliferates when row middles remain saturated or have standing water for extended periods of time. High volume rains (more than 2 inches received in a short period of time)

and saturated soils are the risk factors. Therefore, the issue with Phytophthora in watermelons is two-fold: getting water off the field a quickly as possible, and how to manage row middles where water accumulates as it runs off the plastic. On flat fields with little or no slope these are major issues. Compaction from traffic between rows and in drive rows makes the problem worse.

Field planning to drain water off of watermelon row middles is a key. Orient beds to improve water movement and then install cross drains at regular intervals to move excess rain water off rapidly. Shaping between bed areas to expedite water removal and eliminate ponding is also important. Subsoiling between plastic beds is another potential practice to improve drainage. Increasing spacing between plastic beds may also reduce ponding by having more soil surface to allow for water infiltration.

Calendar of Events

April 17, 2017 . ***Grape Growers Potluck,*** Palia Winery, 10 Sweet Cover Rd. , Highland Mills, NY Call Jim for more info or to let them know what you're bringing 845-691-7117 .

My 3&4 2017. ***Respirator Fit Test/Training.*** Hudson River Health & Alamo Farmworkers Community Center, 890 Pulaski Highway, Goshen, NY 10924. Call Jill for more info or to register 845-344-1234. Pre-registration required for appointment for test & medical evaluation.

See the Website to register for many of these programs and others that have been added
http://enych.cce.cornell.edu/events.php

PERC Pesticide Educational Resources Collaborative

WPS Training Videos

Are you going to be doing your own WPS training his spring? Videos for training and other resources are available at:
http://pesticideresources.org/wps/inventory.html

Grape Grower Pot Luck Dinners

Please join us for the last in our series of educational pot luck dinners. Jim O'Connell and Anna Wallis are reaching out to growers, trying to get to know them in a less formal setting. Jim and Anna are regional fruit educators with Cornell Cooperative Extension's (CCE) Eastern NY Commercial Horticulture Program (ENYCHP).

Let us know what dish you will be bringing, after all it is a potluck! 845-691-7117

Looking forward to seeing you!
Hudson Valley Potluck
April 17, 2017

Respirator Fit Test/ Training

Tuesday May 3 & Wednesday May 4
Hudson River Healthcare Alamo Farmworker Center
890 Pulaski Highway, Goshen, NY 10924

Call Ethan or Jill at 845-344-1234 for more information or to register.