The Produce Pages

Serving the fruit and vegetable growers of Eastern New York

December 2017

Featured Farm

CRYSTAL STEWART, ENYCHP

Our grower profile this month takes us north, into central Fulton County to visit Gray's Garden and Greenhouse. Up here the winters are long and the growing season is short, so produce farmers often have to extend the season in a variety of ways. Eric and Stephanie Gray do this during November and December with a flourishing wreath and Christmas tree business, while extending the spring with a robust greenhouse operation. I sat down to talk to Stephanie on a kissing-ball decorating day, in the cozy greenhouse that is used for assembly work and storing the last of the winter squash. Eric was putting siding on the house they have built over the last few years while we chatted—as always, the work on farm/home is never done.

About the farm:

The Grays started the farm business in 2005, after some time already on the land. The first season they sold produce and beef through a self-serve roadside stand along their road frontage on State Highway 29. By that fall the Grays had already decided to build their first 30-by-96 foot greenhouse, followed by another the next year and a third the year after. At the same time they expanded the produce part of the business and became early adopters of high-tunnel growing, building six 12-by-50 foot structures next to the garden.

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Cornell Cooperative Extension
Eastern NY Commercial Horticulture Program

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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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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

Slowly the business expanded from being a garden with a roadside stand to include a thriving greenhouse business, farmers' markets throughout Fulton and Montgomery Counties, garlic festivals throughout eastern New York, and a wholesale and retail wreath and Christmas tree business. The Grays have added perennial crops including blueberries, apples and Christmas trees each year. The protected culture aspect of the business has also grown over time. Two NRCS grants, one in 2015 and one in 2016, allowed for the construction of side-by-side 30-by-96 foot high tunnels in the produce fields.

View of Gray's Greenhouses in Summer

All told, the Grays now have about 10 acres of land devoted to vegetable production, about two tenths of an acre under high tunnels, almost 9,000 square feet of greenhouses, 1000 blueberry bushes, and about 900 Christmas trees. During the evolution of the business, both Eric and Stephanie have transitioned from having off-farm jobs to working on the farm full time.

Highlights of Grays' Garden and Greenhouse:

From my perspective, Eric and Stephanie are known for having some of the highest quality and best diversity of produce in Fulton/Montgomery Counties. Grey's Garden and Greenhouse is a consistent anchor vendor at Fulton/Montgomery Farmers' markets and people are willing to make the 20-minute drive from neighboring towns to visit the greenhouses for healthy and beautifully unique transplants, hanging baskets and perennials every spring.

From a horticultural perspective, I'm always impressed by the level or organization and hygiene at this operation. The greenhouses are used in every season, and during each transition they are cleaned and organized. The fields are beautifully maintained, thoughtfully laid out, and increasingly well managed to handle the weather extremes we see on a yearly basis.

Stephanie feels that the greenhouse operation stands out because of the number of seedlings which are grown from seed rather than plugs. This allows her to select a tremendous variety of plants, and to grow them with strong, healthy root systems. Part of why this is economical in this very cold environment is because the greenhouses are primarily heated with a wood furnace/boiler, and use propane only as backup heat.

Stephanie also shared that part of how the perception of such high quality is created is by having very high grading standards. They Grays keep both pigs and cows, and are able to feed any produce which is not top quality to their animals.

Marketing away from population centers:

The Grays have chosen to focus their marketing efforts on local markets, and do not try to enter even the Albany market aside from the garlic crop. They rely on strong sales at the local farmers' markets and through the roadside stand, and on wholesale accounts for the wreaths. Currently 90% of the 1000 wreaths made per year are wholesaled, largely for fundraisers.

Stephanie Gray creating kissing balls for sale at their roadside stand

Marketing at Gray's is led by Stephanie, who

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earned her MBA before starting the business. She maintains a website filled with pictures and descriptions of the farm, develops beautiful displays for the farmers' markets and stand, and is responsive to customers' needs. Of course all the marketing in the world won't sell sub-par product, so it worth stating that both Eric and Stephanie are hardworking and attentive growers.

The future for Gray's Garden and Greenhouse:

Over the years the Grays have moved from expanding the business to shifting it towards profit centers and enterprises which feel more sustainable for their lives, and this trend will continue. The vegetable operation will probably reduce production of some low-profit crops like sweet corn (though I'm guessing that Eric will probably always plant a little bit in one of the high tunnels so he can try to have sweet corn by the 4th of July….) in favor of higher-value crops under protected culture. They are also looking to expand the Christmas tree and wreath business, which is less weather dependent than the vegetables. They are also asking themselves what their bodies will want to do in the future, and moving in those directions.

Another recent change which will provide benefits into the future was changing the legal structure of the business from a partnership into an S-Corp. This change will limit their personal liability and will provide tax benefits.

Highs and lows of farming:

Stephanie was quick to cite the freedom that farming provides as one of the best parts of doing what they do. She enjoyed having her son and daughter with her in the greenhouse and field when they were younger, and is happy to have the flexibility now to attend school events. Eric and Stephanie love being their own bosses.

The most challenging aspect of farming also came quickly, and was different for each farmer. For Eric, the biggest challenge is the weather. Whether it's late frosts killing flower buds in the fruit, torrential rainstorms, or early frosts, the weather has been really hard on the farm lately. For Stephanie, the biggest challenge is labor. Finding local workers who are dedicated, professional, and who stay is a challenge.

Advice for other farmers:

Stephanie talked quite a bit about how much the farm has been built by many hands. *Making relationships with the farmers around you by working for them before you get started, by getting to know them at the farmers' markets, and by spending time together is important to creating a community*. The Grays co-own a plastic layer with another local produce farmer, they share equipment with Eric's parents, and they exchange blueberries for peaches with yet another farm. They also exchange information.

Working with CCE:

The Grays try to go to as many trainings as possible—they love the on-farm trainings where they can see with their own eyes the challenges that other people are facing. They read the weekly newsletters every week to find out what to look for, and find the farm visits helpful. They feel that enrollment is invaluable for what it costs.

2018 ENYCHP Enrollments are due!

This year, enrollment will be $65 before the January 31st deadline and $80 after this date, so be sure to enroll promptly! ***Enrolled members of ENYCHP receive:***

- Access to cutting edge research and Extension Educators with expertise in their field
- Discounted meeting fees
- Timely reports of pest outbreaks in your area.
- Online access to all ENYCHP newsletters and E-alerts

To Enroll Online Click HERE!

Managing Your Orchard Between Plantings

MICHAEL BASEDOW, ENYCHP

Managing soil health can be challenging in perennial cropping systems like an orchard. Once the trees are planted, it is difficult to make big changes to the soil environment around the trees. One of the best times to improve soil in an orchard is when an old block is scheduled to be removed and replanted. A year or two of cover cropping and soil adjustments can have a large impact on your soil. In particular, this time can be used to adjust your soil pH and fertility, and reduce nematode and weed pressure.

Before replanting your site is an excellent time to adjust your soil's fertility. Once the old trees are out of the ground, you can take soil tests and incorporate as much lime as needed to get your pH back to an appropriate range, as many of our soils in New York tend to run on the acidic side. To adjust the pH throughout the soil profile, lime should be harrowed and then plowed deeply into the soil. Nutrients like potassium, phosphorous, nitrogen, and boron should also be incorporated into the soil during this time if your test shows a need.

Over the course of time, orchards can build up populations of plant parasitic nematodes, other soil borne pathogens, and problematic weed species. While there are chemical control options for soil fumigation, there are a number of cover crops that can be used to achieve these goals, though they will require some extra management to get the full benefits. Sorghum and sudangrass contain cyanoglycosides. These turn into hydrogen cyanide when they are hydrolyzed, which is toxic to nematodes. Some members of the mustard family produce glucosinolates, which are also nematicidic. From 2015 to 2017 Penn State extension educators and commercial growers established a two year orchard cover crop rotation in four orchards across the state. After two years of the cover crops -a rotation of sudex (a sorghum-sudangrass hybrid) and rapeseed- dagger nematode populations were reduced to the zero tolerance level in all orchard replant sites.

In the first year, sudex was planted in mid-June as a summer cover crop, and was either drilled at 35 to 40 pounds per acre or broadcast at 45 to 50 pounds per acre. After the sudex was incorporated, a fall planting of rapeseed was drilled in September at 10 pounds per acre. In the following spring, rapeseed was planted again at 10 pounds per acre. This was incorporated in the fall, and was followed by fall planting an endophyte enhanced fescue mix for the orchard, which would be established the following spring. Seed for the cover crops were purchased from local agriculture supply companies. The average price for the sudex seed cost $94, while each rapeseed crop was $13. A full breakdown of the budget, including labor and fixed costs, was developed and is linked at the end of this article.

The caveat of this is that the cover crops must be finely chopped at the correct maturity, and incorporated and packed into the soil within two hours of being chopped. Otherwise, the fumigant properties from the cover crops volatilize in the air, and are lost to the atmosphere.

Having two years of cover crops, along with cultivating between cover crop plantings, can also help reduce weed pressure prior to planting the next orchard. In the Penn State plots, the row middles were seeded with a grass mix in the fall prior to orchard planting. The sod in the tree rows were then treated with glyphosate prior to planting the new orchard, allowing the trees to be planted into the sod residue with very little spring weed pressure.

So, if you have the ability to leave a piece of land out of production for a year or two between orchard plantings, consider using cover crops to help get the land back in shape for the next orchard cycle.

For more information on this project, please visit:

Penn State Extension Article https://extension.psu.edu/planting-sorghum-sudangrass-following-orchard-removal.

Budget Link: https://extension.psu.edu/downloadable/download/sample/sample_id/2183/.

TREE FRUIT IPM: SUDDEN APPLE DECLINE AT THE EXPO

Growers of high-density apple orchards in various parts of Northeastern North America are reporting an increasing incidence of 'Sudden Apple Decline', whereby young trees in the early years of production begin to decline and die. So far, no obvious or consistent causative agents have been identified, although several contributing factors have been suggested, including winter damage, sub-lethal effects of certain herbicides, and various other biological and environmental stressors. In this session, plant pathologist Dr. Kari Peter of Penn State University will discuss her experiences with Sudden Apple Decline in Pennsylvania (where the problem was first noted several years ago), while Drs. Kerik Cox and Tess Grasswitz will present an overview of the current situation in New York.

The 2018 Empire State Producers Expo is January 16-18 at the SRC Arena in Syracuse, NY. This annual show combines the major fruit, flower and vegetable associations of New York State in order to provide a comprehensive trade show and educational conference for New York producers, as well as neighboring states and Eastern Canada. In years past over 100 presentations were given by Cornell Cooperative Extension personnel and highly regarded speakers from across the country. Panel discussions feature some of the top industry experts and growers in New York. Between educational sessions, attendees can visit the trade show featuring over 150 commercial vendors and non-profit exhibitors.

Educational sessions topics include commodity specific programs in berries, cabbage, snap beans, peas, beets, carrots, fruiting vegetables (tomatoes, peppers), cut flowers, tree fruit, sweet corn, tomato, onion, Cole crops, root crops, vine crops, and emerging markets (hops, malting barley, mushrooms, hemp, hard cider); and multidisciplinary programs in precision irrigation, weed management, soil health, biopesticides, beginning farmer operations, marketing, greenhouse production, climate and forecast models, GMOs, and wildlife management. DEC pesticide recertification credits and Certified Crop Advisor (CCA) credits will be offered during the appropriate educational sessions.

For more information about the Expo and to register, visit the NYS Vegetable Growers Association website at nysvga.org/expo.

TREE FRUIT IPM: SUDDEN APPLE DECLINE SESSION

WEDNESDAY, JANUARY 17| 3:45 PM – 5:00 PM

Session organized by Tessa Grasswitz, CCE

Using Entomopathogenic Nematodes to Control Strawberry Root Weevil Complex

L. MCDERMOTT*, E. SHIELDS**, T. TESTA**, L. PASHOW***, AND A. IVY*

Figure 1 Strawberry field in northern NY. The middle of the rows at left show poor growth due to heavy infestation of black vine weevil. Rows at right are not infested and appear more vigorous with better spring regrowth. Photo courtesy of A. Ivy.

Introduction

Strawberries, blueberries and raspberries are high value crops with the cost of establishment ranging from $3,700-$8,500 per acre. Small fruit industry working groups have identified strawberry root disease complex, plant parasitic nematodes and soil insects as the biggest barriers behind weed control to continued success with strawberry production in the northeast United States. The inconspicuous nature of larval root feeding and its associated yield loss and plant death is often missed, or misdiagnosed as root disease, until large insect populations have developed and widespread crop losses are being suffered by the farmer, see Figure 1. Root weevils have also been found in blueberry and raspberry plantings, but the extent of the problem in these crops is undocumented. The current lack of effective insecticides to control the weevil pests compounds the complex issue of root loss and related plant death. It is often difficult for farmers to separate the effects of insect damage from the very similar symptoms caused by a variety of nutrition/ pathogens/pests issues. Successful management requires an integrated approach utilizing identification, education, recommendations and applications. This article explains a two year study, supported by the New York Farm Viability Institute (NYFVI). The first goal of the study is to catalogue the soil borne barriers in strawberry plantings showing poor vigor using a thorough survey of soil and plant tissue characteristics. Future articles in NY Fruit Quarterly will detail those findings.

Understanding weevil pests

The second goal of this project is to introduce native entomopathogenic nematodes to strawberry fields infested with root weevils. These nematodes parasitize certain soil insects. Significant progress has been made in the control of strawberry root weevil complex in those plantings where populations have been very high and insecticides are not effective. Root weevils are beetles in the snout beetle family in the genus *Otiorhynchus.* They are all serious pests of agricultural crops, and feed on the roots of over 100 different plants. They are difficult to control and manage even with the use of soil insecticides. The three common root weevils affecting berries are Rough strawberry root weevil, *O. rugosostriatus*, Strawberry root weevil, *O. ovatus* and Black vine weevil, *O. sulcatus*. Black vine weevil has been a known pest of ornamental nursery plants for many decades.

Figure 2 Glove tips on left provide perspective on size of root weevil larvae at right of photo. Photo courtesy of A. Ivy

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All root weevils in the *Otiorhynchus* genus look similar in the adult form and as larvae. Adults are brown or black and range from 0.2 inches in length (strawberry root weevil) to 0.4 inches in length (black vine weevil). The larvae are white or cream colored and legless, see Fig. 2. The adults feed on foliage, and leaves a very distinctive half-moon chewing damage on leaves, see Fig. 3, while the larvae of all species feed on roots and actually cause the most damage. The adults reproduce parthenogenetically meaning that virtually all of the adults are females. The elytra (forewings) are fused leaving the adults flightless. This characteristic helps explain some of the tactical approaches to management. It also helps explain how the insects are moving from seemingly disparate strawberry production regions. It technically could take only the introduction of a single insect to start a new infestation on a farm. This introduction can occur through potted nursery stock brought onto the farm, or shared farming implements etc. Farms that have nursery stock as part of their retail offerings, or those that have strawberry fields in close proximity to nursery fields or retail nursery sales yards seem more prone to having infestations. Weevil insects also tend to prefer sandy soils to heavier loam soils.[1] (it is really an issue of drainage rather than soil type. Heavy soils with tile drainage have problems also)

Due to the secretive nature of the adults, feeding only at night and the root feeding of the larvae, new infestations go unnoticed for several years until the population has grown large enough to cause die back in significant portions of the berry planting. Soil insecticides did not eradicate the population, but repeated applications of insecticides were able to keep populations at a tolerable economic level.

Figure 3 Leaf notching done by black vine weevil adults. Photo courtesy of L. Pashow

Figure 4- Extension Specialist Amy Ivy rinsing beneficial nematodes through a screen into a solution prior to field application. Photo courtesy of L. McDermott

Management using biocontrol

The use of native entomopathogenic nematodes that are able to overwinter in cold climates came to northern NY berry growers attention because of a related *Otiorhynchus* species that attacks alfalfa in nine northern NY counties. Research and on-site application has shown that these nematodes can control devastating populations of the alfalfa snout beetle (*Otiorhynchus ligustici*) a close relative of the strawberry pest weevils. Over the past 25+ years, research has been focused on developing an effective biological program for this insect using native persistent entomopathogenic nematodes isolated in NNY. The focus of this program was to develop a biological control program where entomopathogenic nematode were introduced a single time for multiple year suppression of the alfalfa snout beetle. Techniques have been developed for farmers to rear their own nematodes and apply them through commercial spray equipment, requiring only slight modification. To date, approximately 14-16,000 acres have been treated with these native nematodes and has resulted in control of the alfalfa snout beetle in northern NY.

Since the root weevil complex attacking berries is also known to be sensitive to entomopathogenic nematodes, research and extension efforts have broadened to crops attacked by black vine weevil and strawberry root weevil. In two northern NY

farms, native entomopathogenic nematodes were introduced a single time and they are persisting for multiple growing seasons, causing a decline of the root weevils to a sub economic level. There is an important difference between the native entomopathogenic nematodes and the commercially available nematodes. The native nematodes are able to overwinter requiring far fewer applications resulting in a cost savings.

Research has shown that the native nematodes need to be applied only once at a cost of $150/acre (producer-reared, $300/acre if purchased ready to apply) and they continually suppress the soil insect complex for many years. Subsequent research has shown the same strategy is effective against the root weevil complex in upland cranberry production and is being tested against white grubs in both grapes and in turf. These successes encouraged the development of this research project in the berry production system**.**

Application

The beneficial parasitic nematodes used in the berry farm applications were raised in Dr. Elson Shields' Cornell University laboratory, but a lab environment is not a requirement to raising these biocontrol agents. Several dairy farmers in northern NY have successfully raised their own nematodes for the purpose of controlling alfalfa snout beetle. The nematodes are introduced to cups of wax worms that they promptly parasitize and are then able to reproduce. The cups of wax worms need to be kept at temperatures between 65 ^{o} and 75 ^{o} F for approximately 3 weeks. When juvenile infective nematodes emerge from the deceased wax worms, the field application process can begin. Mary DeBeer, a partner with her father Ronald in DeBeer Seeds and Spraying, Moira, started a business raising the nematodes to make them available commercially to farmers that want to apply but not raise their own biocontrol.

Figure 5 Evening application of insect attacking nematodes to control black vine weevil larvae is made using boom sprayer with filters and screens removed from nozzles. Photo courtesy of L. McDermott

The first application step is to screen the wax worms and media out of the nematode mix. This involves rinsing the substrate through doubled window screen, to wash the nematodes into a solution that will be applied to the field, Figure 4. The best results are achieved if application is in the evening as this helps prevent nematode death from UV exposure from the sun and desiccation from warm temperatures. The nematode solution can be made using a normal, thoroughly rinsed, boom sprayer with all filters and screens removed from the nozzles. The grower in our demonstration left a control plot to gauge effectiveness against the nematode application site, Figure 5.

Scouting for root weevil infestations

Root weevil larvae are easiest to see in the spring. Adult root weevils can be present after harvest; however traditional chemical control measures of the adults should be taken early before egg laying begins in late spring. Eggs that were laid in the soil prior to or during harvest will hatch into young larvae that begin feeding on roots this fall. Root weevil larvae overwinter two to eight inches deep in the soil. You can scout for root weevil larvae in the fall, but they are even smaller than in the spring and very difficult to see. Black vine weevils (BVW) can be found throughout the state while Strawberry root weevil (SRW) has been found in the primary fruit growing regions and less consistently. Still, these pests seem transient. Ongoing surveys for root problems in strawberries has revealed inconsistent and unpredictable populations in eastern NY.

To scout for these pests, follow the protocol below:

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BERRIES

- In the spring, watch for areas of weak growth. Dig in the root zones, checking for the white grub like root weevil larvae.
- When weevil adults emerge, watch for leaf notching especially on sucker growth near the ground.
- After dark on warm, calm nights, scout fields with a flashlight. Black vine and strawberry root weevils will be found feeding on top of the foliage.
- Look for adults in the dead plant material and weeds at the base of plants.
- In the fall, check areas that show weak growth and redden prematurely. The larvae be found in the fall but are much smaller than in the spring.

[1] Loeb, G. Proceedings 2007 Empire State Fruit and Vegetable Expo, page 39

*** Laura McDermott and Amy Ivy, Specialists with Cornell Cooperative Extension, Eastern NY Commercial Horticulture program. **Dr. Elson Shields, Cornell University Entomologist and Tony Testa, research support specialist, Cornell University, Ithaca, NY. *** Lindsey Pashow, Harvest NY Ag Business Development and Marketing Specialist, Northern NY.**

VEGETABLES

Mechanical Cultivation Equipment Demo Recap

ETHAN GRUNDBERG, ENYCHP

In early October, nearly 60 growers came to Orange County's black dirt region to see some of the newest mechanical cultivation equipment available to vegetable growers. While the advances in cultivation technology are impressive and can lead one to believe that all weed management challenges of the world will be effortlessly conquered in the future with cameras, robots, and parallel linkages, it's important to keep in mind that these tools only work under certain conditions and when employed as part of a broader integrated weed management plan. So, before discussing some of the impressive technology that was on display, it's worth re-emphasizing several of the points made by the New York State IPM Weed Management Specialist, Dr. Bryan Brown, during the demonstrations.

First, not all mechanical cultivation tools work well on all weed species. Tough perennials, like Canada thistle and quackgrass, can thrive under regular tillage and are unlikely to be defeated by mechanical cultivation that only eliminates top growth without tackling the huge energy reserves stored in the underground rhizomes. Tillage and cultivation can actually make these weeds worse by spreading rhizomes through the field from which new weed populations can emerge. So, taking a regular inventory of which weed species are causing problems in each field is a necessary first step for understanding if and how to incorporate mechanical cultivation tools into a broader weed management strategy.

Second, timing is critical. All growers know that killing a 1-inch tall galinsoga plant is easier than managing one that is 6-inches tall. However, the importance of timing goes beyond weed growth stage. When using mechanical cultivation, it's helpful to keep in mind what Sam Hitchcock Tilton of Michigan State University refers to as "the first prime imperative." Essentially, effective mechanical cultivation depends upon creating a size difference between a cash crop and the weed population. In order for the cash crop to withstand the cultivation (especially with some of the new in-row tools like finger weeders), they must be better rooted than the weeds that are being targeted. This can be accomplished any number of different ways: timing planting as soon as possible after field preparation or stale seedbedding, using pre-emergent flame weeding or herbicides, manipulating seeding depth to favor early emergence of the cash crop, and more. The exact timing of these strategies is crucial to create that size difference between weeds and crop that successful mechanical cultivation is based on. If you're interested in hearing more of what Sam has to say about weed management, check out Chris Blanchard's Farmer-to-Farmer podcast episode 136 with Sam available at http://www.farmertofarmerpodcast.com/episodes/tilton.

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Third, keep working on your weed seed bank. The weed seed bank is the entire population of viable weed seeds in the soil profile. Every time a redroot pigweed plant is allowed to mature and produce 250,000 seeds, those seeds and all of the other seeds from the lambsquarters, sheperd's purse, and more become part of the weed seed bank. It may seem obvious, but keeping the weed seed bank as small as possible is critical for successful weed management, whether mechanical or chemical. Let's assume that a weed management tactic, whether an application of GoalTender or a pass with a steerable KULT-Kress precision cultivation tool, can control 90% of the weeds emerging from the weed seed bank. If there are only 100 viable weed seeds in a given bed, that 90% reduction means that there are only 10 weeds left uncontrolled. However, if we've let field edges produces a bunch of weed seeds and weed control got away from us in the ditches for a few years, let's imagine that that same bed now has 1,000,000 viable weed seeds in the soil profile. 90% efficacy now means we are still left with 100,000 weeds to battle compared to the 10 in the example above. Depleting the weed seed bank means managing weeds not only in season, but also before and after the cash crop by adjusting tillage timing, smothering out weeds with cover crops, controlling weeds on field edges and in ditches, and using tactics like stale seedbedding to trick weed seeds into germinating before managing them with light cultivation or herbicides.

Finally, precision cultivation demands a precision production system. Both of the equipment dealers who presented at the field demonstration, Michael Smith and Keith Campbell, repeatedly stressed this point. It's not enough to go buy an expensive state-of-the-art cultivator if you don't also have a way to ensure consistent and precise field preparation and planting. For example, a four-row Garford Robocrop unit can handle plenty of imprecision or skips in a single row, but the space between those four rows of crop MUST be consistent across the entire field for the equipment to work. Dibbling or using a water-wheel transplanter does NOT provide adequate consistency of between row spacing for these tools to work as designed. Without investing the time to create a uniform seed bed and investing the capital in seeding or transplanting equipment that can guarantee consistent between row spacing, precision cultivation tools may lead to more headaches than successes.

For those of you who were unable to attend the demonstration, check out the video highlight reel from the event at https://www.youtube.com/watch?v=hYyToq4qrZ0&feature=youtu.be. I was particularly impressed by the new parallel linkages developed by KULT-Kress that bolt onto an Allis Chalmers G toolbar to allow those cultivating tractors to be outfitted with finger weeders, cutting discs, and more. The main attraction was, without a doubt, the demonstration of the Garford Robocrop distributed by Willsie Equipment. The Robocrop uses cameras and in-cab software to differentiate between weeds and the cash crop and hydraulically insert sweeps between plants in-row (with a minimum of 8-inch spacing between plants in-row). There are some limits as to which crops the Robocrop software can currently recognize, but a second generation of software is apparently due for release within a year or two that should expand the number of crops on which it can be used.

Thank you to Michael Smith (michael.smith@kult-kress.com) from KULT-Kress and Keith Campbell (keith@willsie.com) from Willsie Equipment for making their equipment and expertise available for the demonstration. Thank you, also, to Mark Rogowski of S&SO Produce Farms for providing most of the tractors and the field space for the demonstration plot. Finally, thanks to Dr. Bryan Brown of NYS IPM for providing insight into how to effectively integrate mechanical cultivation into a weed management plan; Bryan can be reached at bryan.brown@cornell.edu if you have questions for him.

Terrateck Cultitrack tractor equipped with KULT-Kress DUO cultivator

Brassica School Update

CRYSTAL STEWART, ENYCHP

As the season wound down, growers came together in Saratoga Springs with a handful of industry and university folks to talk about ways to grow better brassicas. It was a fun and educational day with insight flowing in many directions, focused on better understanding how to grow quality broccoli, cauliflower, and the ever-mysterious Brussels sprouts.

We followed brassicas from seed to harvest, selecting topics for discussion from the audience while following the flow of the season. Early discussion focused on variety selection and seed sanitation. Thomas Björkman, director of the Eastern Broccoli Project, and Jan Van der Heide of Bejo seeds focused on variety selection for heat tolerance. Jan suggested that Bejo's variety Burney shows great promise with heat tolerance, though it does not fare well with cool temperatures, so should be used as a summer planting, not in the spring or fall. Thomas suggested that two varieties available from Sakata, Imperial and Emerald Crown, also show great promise in the peak heat of the season.

Sue Schueffle from UMass rounded out the seed conversation with discussion of hot water treatment. She noted that hot water treatments can be used to eliminate seedborne diseases such as Alternaria and Black Rot, and that hot water treatments are relatively easy to complete with some basic equipment including a good thermometer and temperature control system for the water. Growers asked whether it is useful to plant cleaned seed into soil already infested with Alternaria, and the answer was that this is probably not particularly helpful. Hot water treatments are best reserved for situations where growers can avoid infesting their soil in the first place.

Jan pointed out that many seed companies, including Bejo, already test seed for various diseases and will hot water treat to eliminate disease before shipping the seed. If seed has already been treated and is treated again, there is a high probability that the germination rate will fall, as the hydration and heating of the seed repeatedly will cause damage. If there is a question about seed, asking the company about pre-treatment may be necessary. Some companies, like Johnny's list previous hot water treatment on the package. However, this is not required information.

From seed-based topics, we moved on to more of the challenges faced during the growing season, including pest pressure, nutrient management, and management of heat stress. The heat stress conversation drew significant interest, with many growers (and this extension educator!) unaware of exactly what conditions lead to many of the issues we see with mid-season brassicas, including loose heads, uneven flower formation (sterile buds), and bolting. It turns out that night temperatures are at the heart of the issue, specifically during the head initiation and formation period. During that time if there are just 3-4 nights when temperatures are at or above 65 degrees Fahrenheit, head formation becomes extremely erratic. As Jan rather unforgettably put it, "If you are laying in bed and don't want anyone or anything to touch you, chances are your brassicas are having problems." My sweaty summer nights are forever transformed.

Our pest discussions focused on emerging issues, including Swede Midge. The grower speakers we invited to the meeting were both experiencing trouble with Swede Midge already, and had stopped growing mid-season broccoli because of it. We (CCE) feel strongly that this pest's migration into the region is imminent if it hasn't happened already, and stressed vigilance by growers. If brassicas are making blind heads, kale and brassica greens are distorted, and buds are aborting, give us a call, and we will help determine the cause. We will also be setting traps throughout the region to monitor the range and spread of this insect.

Overall, the Brassica School was a great day filled with meaningful conversation and information exchange. We are looking forward to offering more events with farmer-to-farmer exchange being a dominant part of the schedule, and hope you will join in the fun!

Growers had the opportunity to interact with industry representatives during table discussions.

Produce Sales to Food Hubs and Auctions May Lead Small Farmers to Lose Qualified Exemption Under FSMA

ROBERT HADAD, CORNELL VEGETABLE PROGRAM

Under the FDA's Food Safety Modernization Act (FSMA) the regulations allowed for certain well-defined exemptions for some small farm operations. Here is a section of the regulations: The "Standards for the Growing, Harvesting, Packing, and Holding of Produce for Human Consumption" rule (21 CFR Part 112) (the "Produce Safety Rule") (80 FR 74353 (Nov. 27, 2015)) provides a qualified exemption and modified requirements for farms that meet two requirements: (1) The farm must have food sales averaging less than $500,000 per year during the previous 3 years; and (2) the farm's sales to qualified end-users must exceed sales to others (See 21 CFR § 112.5). A qualified end-user is either: (1) The consumer of the food or (2) a restaurant or retail food establishment that is located in the same State or the same Indian reservation as the farm or not more than 275 miles away (See 21 CFR § 112.3).

Well-defined might not be too accurate. During the first pilot training of trainers back in December 2015 the language they used in the definition of "qualified exemption" caused questions to be asked concerning sales. They used the term "retail" very loosely in the context of selling produce to the end user. As mentioned above, the regulation allows for any farmer who grows more than $25,000 and less than $500,000 in total food sales with over 50% of the produce sold to a qualified end user within 275 miles from the farm then the farm can have a qualified exemption from most of the rules. There are still some parts of the rule that need to be followed such as documentation of sales, certain signage and labeling requirements and an annual review of their status under the qualified exemption.

The issue of qualified end user is the sticking point. At the training, the question was asked if an otherwise qualified exempt farm sells produce to a food hub who in turn sells to other enterprises, how does this relate back to the point where the word "retail" sales comes in from the language of the regulation? In other words if the produce isn't sold as strictly retail and the buyer is the not the end user, then how does this affect qualified exemption status? The FDA representative at the training couldn't answer the question but advised that we send the question to their Technical Assistance Network (TAN). This we did.

Two weeks ago (22 months later) an answer came back via email from the TAN clarifying the language of the regulation. They quoted the language as such, "A qualified end-user is either: (1) The consumer of the food or (2) a restaurant or retail food establishment that is located in the same State or the same Indian reservation as the farm or not more than 275 miles away (See 21 CFR § 112.3)". They go on to say that selling to a food hub is wholesaling and the hub sells the produce to non-consumers. If more than 50% of the farm's sales are not retail then the farm would not be eligible for the qualified exemption. So the clarification then is both on who the end user is and what percentage of total food sales goes to retail or wholesale.

Food hubs are and will be an important source of sales for our growers. These buyers can offer produce farms, particularly those who are in more rural locations, better access to markets than they could probably afford individually. Collaborative marketing options are the future for the success of small family farms. Through farm food safety education from Cooperative Extension and other groups, having to deal with FSMA shouldn't be a huge hurdle.

After digesting the response from FDA, a new question emerged. If smaller produce farms are to lose the qualified exemption because sales to food hub is not retail nor an eligible end user, how will this affect produce auction growers?

When the final version of the rule came out a lot of attention was given to how the produce auction itself would be impacted by the regulations. Would it be considered a handling facility? The word eventually came that a produce auction would not fall under the Protective Preventative Controls section of the FSMA.

Based on the FDA's response to the question we posed about food hubs and qualified exemptions for smaller farmers, what is the impact for produce auction growers? The answer seems to be that they too lose their qualified exemption. Full compliance with the federal regulation will be required.

There doesn't need to be any panic over these turns of events. The federal rule requires a full day training on farm food safety using the Produce Safety Alliance (PSA) curriculum created with a lot of input from farmers. The PSA is housed within Cornell so the group is very tied to NY growers.

Implementing farm food safety practices on the farm shouldn't seem like a daunting task. There are great training programs out there along with readily available support. Produce farmers shouldn't feel they are alone in trying to accomplish all that is being asked of them. The produce sales markets are increasingly asking their growers to follow food safety practices. Some just want the growers to be trained; others want growers to have and follow a farm food safety plan. Still others want farmers to be certified through an audit scheme. In NY there are educational and financial resources available to help.

The time table for farms to meet the FSMA regulations is based on their sales. Implementation for farms with ***food*** sales over $500,000 have until the end of January 2018. Growers between $250,000 up to $500,000 have until the end of January 2019. Smaller growers with ***food*** sales above $25,000 to $250,000 have until January 2020. Growers with under $25,000 in ***produce*** sales are exempt, except for labeling and documenting sales with receipts to prove exemption.

Notice the words ***food*** and ***produce*** in the categories. FDA has set this language on purpose. For the under $25,000 exemption, the sales calculation is based only on produce sales. For the other categories, the sales calculations includes all produce plus any livestock, livestock products, crops for livestock feed, and hay.

For more information, questions, or assistance, please contact Robert Hadad, rgh26@cornell.edu 585-739-4065 or a Cornell Cooperative Extension specialist or educator in your county. Look for dates and locations for farm food safety trainings on the Cornell National GAPs site https://gaps.cornell.edu/ or the Cornell Vegetable Team webpage https://cvp.cce.cornell.edu or the Eastern NY Commercial Horticulture Team site https://enych.cce.cornell.edu/

Delegation: Key to Effective Management, The Happy Acres Orchard Story

ELIZABETH HIGGINS, ENYCHP

Bob Smith, owner of Happy Acres Orchard, was increasingly frustrated with his staff. "No-one seems to be able to make a decision without asking me. If I'm not there, work just stops." He also expressed concern that his equipment mechanic, Pete, was threatening to quit because he felt he was overworked, but his orchard manager, Juan, was also upset that work that he expected Pete to do wasn't getting done. "I feel like I have enough people", he said, "but the work isn't getting done. If I could clone myself, I could get the work done." Bob said.

Unfortunately for Bob, managing others differs a great deal from performing work ourselves. It requires new skills, attitudes, and an organizational framework that clearly defines roles and relationships. The first thing that we did was to look at how Bob's farm was organized.

The key to good management is delegation, which means passing responsibilities to others. Delegation needs to take place at various levels in the farm operation, depending on the nature and complexity of tasks to be performed. Tasks must be assigned to appropriate levels to keep labor costs down and make the best use of available skills.

Delegation takes place along lines of authority. Usually these lines are described in an organizational chart and through job descriptions. There are two fundamental principles that apply to an organizational chart.

> No employee can have more than one boss.
>
> Authority must be equal to responsibility.

The first principle relates primarily to issues of communication and accountability. If a farm employee is expected to take orders from more than one person, what happens when orders conflict? On the other side, which boss checks to see that work was performed as directed? A one-to-one relationship between supervisor and subordinate is essential to avoid confusion.

The second principle of authority equal to responsibility is a practical consideration that is often overlooked by management. When an employee is assigned to a particular function he/she must have prior approval to make the critical decisions necessary to handle the job. Without this authority the employee is hamstrung, and the efficiency of delegation is lost in frequent delays of "checking with the boss."

In a fruit operation, like Bob's, a general manager might separate harvesting functions from orchard-care functions for delegation purposes. One employee might be in charge of supervising harvesting crews, arranging for trucking, and maintaining related equipment while another would be responsible for pest management decisions and spray applications and could even supervise the roadside stand.

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So first we looked at Bob's current organizational chart.

Figure 1

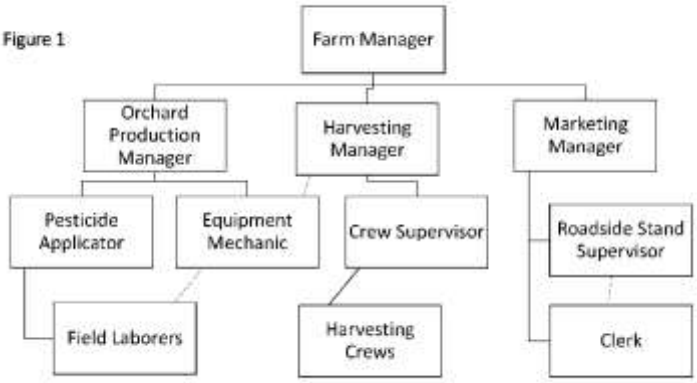

Figure 2

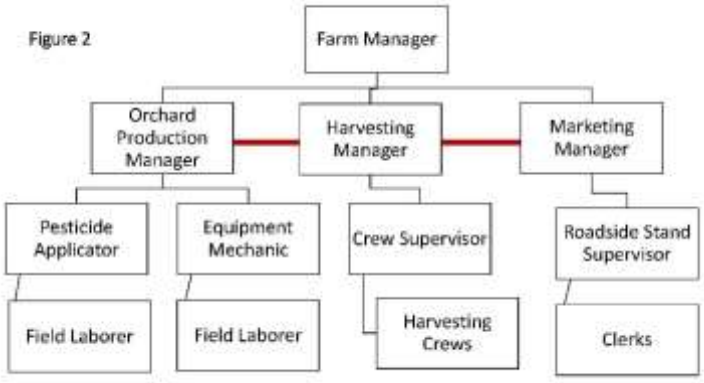

Figure 1: Bob's current farm chart, violates the "one boss" principle all over the place. When asked why Pete reported to both Juan, the orchard production manager and Ed, the harvesting manager, Bob's rationale was, *"Both the orchard production and harvesting managers are dependent on equipment, so they should have authority over the mechanic."* The statement is true, but the structure invites disaster. Pete felt pulled between Juan and Ed and consequently, overworked. When asked, Juan said that he was not fully aware of Ed's expectations of Pete's time.

We revised Bob's chart into one that was likely to be more effective (Figure 2). Functions are segregated and communication between managers is relied upon to channel needs from one division to another. Vertically in the organization, with each position reporting to a single position above. Communication lines (in red) are drawn between the middle managers to convey that interaction between divisions follows that course. For example, the harvesting manager, Ed, will go through the orchard production manager, Juan, on equipment issues and the marketing manager will consult with the harvesting manager about which varieties to pick next instead of going directly to the crew supervisor. This system also applies within divisions. Note that the marketing manager will go through a subordinate supervisor for help from the clerks.

Regardless of how authority is to be divided and delegation is to follow, the most important response is to stick with it and give managers authority over the decisions that fall under their area of supervision. The most difficult thing for an owner/ operator/ worker to do is to let go!

Why is it so hard? On the surface, we would think that one would welcome the opportunity to "offload" some responsibility. Bob, for example, was frustrated by how much his staff relied on hime, but in reality, he was inhibiting their ability to make decisions. Some of the key barriers were:

- **Loss of control**. In talking to Bob, it was clear that he doubted the ability of his staff to do their jobs. He feared that he would lose control of the operation and everything would "go to the dogs." He was unintentionally conveying this belief to his managers, so they responded by double-checking all decisions with him.

- **Feeling of laziness**. Individuals who have done heavy physical labor most of their lives often think that they will appear lazy if they let someone else do the work they once did. Paperwork also may not seem like "real work." Bob also really liked being out in the orchard. Because he was often there, his employees deferred to him

- **Inadequate communication skills**. This was the hardest skill for Bob to master. Describing and delegating work to others is substantially different from doing it. Bob realized that he became frustrated with trying to explain what needed to be done and often decided that "it's easier just to do it myself."

We discussed a technique to handle the last issue. It is vitally important that orders include the following:

1. who is directly responsible,
2. what specifically is to be done, and
3. when it should be completed.

These three simple instructions usually eliminate confusion with delegated tasks In general, the most difficult skill to develop in handling the delegation function of management is gaining the confidence to do it. The manager needs to feel comfortable that problems that arise because of the performance of subordinates can be solved and that overall the operation will function more efficiently when the workload and responsibility are

shared.

A year later, after establishing clearer lines of authority, working with his staff to increase their confidence in making decisions (and his confidence in them) and working to more clearly communicate with employees and helping them to more clearly communicate with their staff, Bob reported that things were going much more smoothly on the farm.

If you are having similar problems on your farm, the ENYCH Program and CCE collaborators around New York State are offering workshops this winter on improving HR skills "Good to Great: Improving Ag Labor Management". Workshops will be offered in Essex, Saratoga and Ulster Counties. The first 4 sessions, in Essex, are on November 29 and December 13. Links to this program are available on the Events page at https://enych.cce.cornell.edu/events.php.

This material is based upon work supported by USDA/NIFA under Award Number 2015-49200-24225.

NORTHEAST EXTENSION RISK MANAGEMENT EDUCATION

USDA United States Department of Agriculture National Institute of Food and Agriculture

CSAs in Eastern NY 2017—Price and Market Data

ELIZABETH HIGGINS, ENYCHP

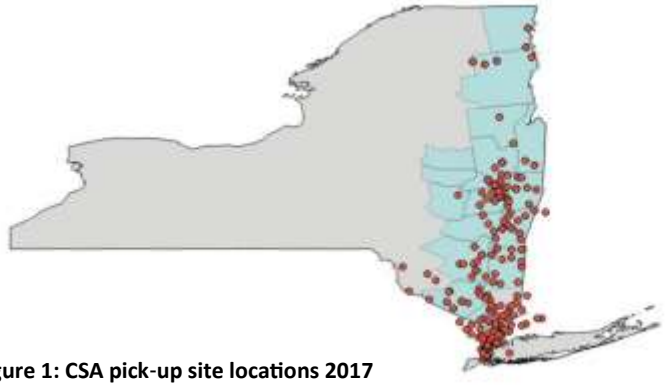

Figure 1: CSA pick-up site locations 2017

In 2017 105 active CSA farms were identified in the 17 Eastern NY Counties, and Westchester, Sullivan and Rockland. Of these, 95 were primarily vegetable CSAs and 10 were primarily another crop/commodity (fruit, meat, cut flowers).

The 95 vegetable CSAs served approximately 319 drop-off sites, which were concentrated in the lower Hudson Valley and NYC (Figure 1). The number of drop-off sites, per CSA farm ranged from 1 to 24, but most farms did not have many sites. Only 8 of the 95 vegetable-oriented CSAs had 10 or more drop-off locations. The median # of sites per farm was 2, generally the farm and another site. 65 farms had on-farm CSA sites (65 pick-up sites). 61 of the pick-up sites were at a farmer's market. The remaining 193 pick-up sites were organized at an off-farm location specifically for the CSA farm.

We found share data for 34 of the 95 CSAs. Most CSAs that reported this information had 80-200 shares, followed by 30-80 shares. Few reported under 30 or over 1000 shares (Figure 2). Looking only at large size, traditional vegetable summer CSAs, assuming the 2017 median price of $594 or $28/week for 22 weeks, the income from most CSAs in our region would range from about $49,000 to $123,000. A large CSA with over 1000 shares would be expected to bring in a gross income of $600,000 or more and a smaller CSA (30-80 members) be likely to gross $18,500-$49,000. It is

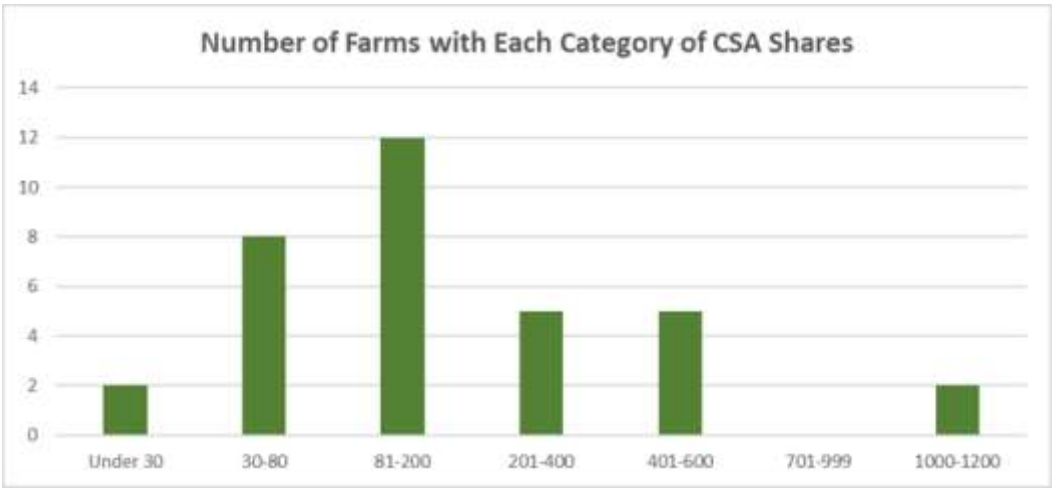

Figure 2: Number of farms with each category of CSA share members in 2017, (n=34 farms)

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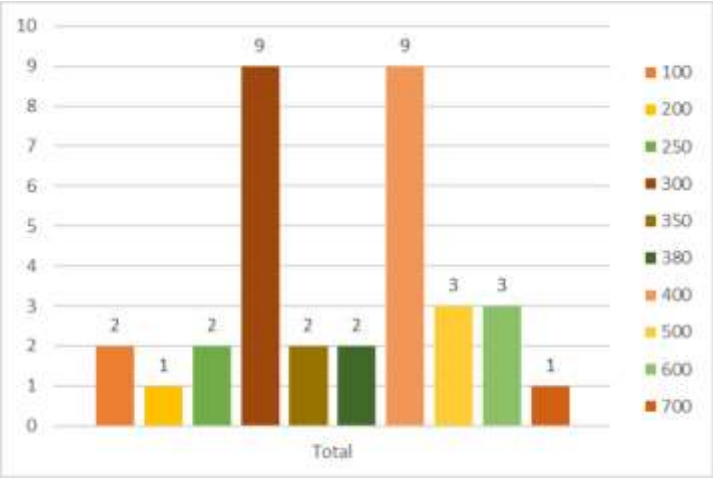

Figure 3: Minimum starting price (and # of farms) of farms with CSA cards in 2017 (n=34)

therefore likely that most CSA farms fewer than 80 members do not rely on CSAs as their primary source of income, but we did not collect data on other sources of revenue. The median price was used, rather than the mean because there were a few outlier farms that had significantly higher CSA prices that tended to skew the data.

Increasingly CSA farms in the region are adopting "declining balance" cards or vouchers that can be used at the farm-stand or farmers market in lieu of the traditional CSA share. Most CSAs that use this provide a price premium of around 10% for paying a set amount at the start of the growing season. For example, you pay $500, but get a card worth $550 that can be used at the farmers market or farm stand. Most farms had a minimum up-front payment and most were between $300 and $400. A few, but not all, allowed CSA members to add funds during the season and most farms did not carry the balance over to the next year. Unused funds at the end of the season, by contract, go to the farm. Of the 95 vegetable CSAs, 34 farms used the balance cards in 2017.

In 2017, 37 of the 95 vegetable CSAs offered discounted CSA shares, based on income or ability to pay and only 19 CSA farms, of the 95 total, required volunteer effort from members. After subtracting the 34 farms that used the declining balance cards, none of which had income-based payments or volunteer requirements, 60% of "traditional CSAs" had income-based shares available and 31% had a volunteer requirement for members.

In the next issue of Produce Pages I will provide analysis of the impact of farm and pick-up site location on price, volunteer requirements and other CSA attributes – stay tuned!

*Assume $28 x 22 weeks x 80 - 200 shares

FARM BUSINESS MANAGEMENT

Partnering with University of Buffalo to Adapt Precision Agricultural Tools for Improved Irrigation Management in Vegetable Crops

DARCY TALENKO, CCE CORNELL VEGETABLE PROGRAM

VEGETABLES

Water and nutrient management are key to sustainable and profitable vegetable production. The water- and nutrient- holding capacities of soils are directly related to the soil properties. Current irrigation and nutrient management programs in vegetables in western NY employ field-wide water and nutrient application schedules without accounting for site-specific variations in the soil characteristics. CVP specialist, Darcy Telenko has partnered with Environmental Geophysicist, Erasmus Oware from the University of Buffalo in a NYFVI sponsored project to identify and account for sub-field soil variability for efficient water and nutrient management practices. The project employed electromagnetic soil mapping to create sub-field management zones (MZ) to guide the application of precise amount of water and nutrient to reduce water, energy, and fertilizer expenditures (Figure 1). Once management zones were identified infiltration tests were then used to determine optimal operating range of soil water content for each management zone in a field (Figure 1).

During 2017, three farms participated in the soil mapping and data collection. An example of the ECa contour map that was generated is pictured in Figure 2 where two distinct zones were identified – dark green and light green regions. Within these management zones irrigation tests are then performed at selected locations (red dotes) to calibrate the water-holding characteristics representative of each zone. Results of the irrigation tests suggest that the two soil zones have different water-holding characteristics and, hence, should be irrigated differently. For instance, the water depletion profiles of the sensors found in the same soil zone behaved similarly compared to those found in different zone (Fig. 4). The drainage

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profiles from both the 10 cm and 30 cm sensors reveal poor drainage of soil zone 1 dark green (MZ1S1 & MZ1S2) in contrast to those of soil zone 2 light green (MZ2S1 & MZ2S20), suggesting short but frequent irrigation in the dark green zone and long but infrequent irrigation in the light green zone.

The knowledge of spatial variations in soil characteristics can instruct site-specific water and nutrient management decisions to reduce input costs (when water is not need), but also while increasing productively by irrigating at the right time and amount for the crop in a sustainable and environmentally friendly approach. We aim to continue to refine the use of these tools to help our growers become more judicious in their irrigation practices, which is critical in light of recent erratic weather conditions that have impacted water availability in recent years.

We are looking for additional cooperators for 2018, please contact Darcy Telenko for more information.

Figure 1: The electromagnetic instrument mounted in a sled that is drawn across the field for soil variability mapping and irrigation experiment with soil moisture monitoring at the 10 cm and 30 cm depth of the soil profile.

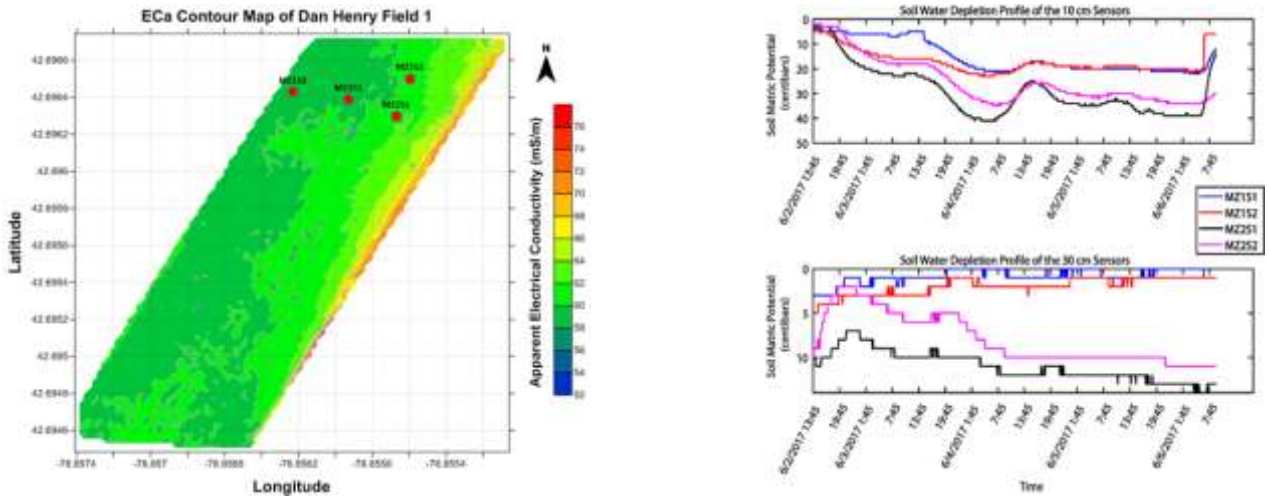

Figure 2: The red circles mark selected locations in the two soil zone for irrigation experiments to determine their respective water-holding capacities. The plots of the soil water depletion profiles of the 10 cm (top) and 30 cm (bottom) sensors for the irritation experiments at Field 1.

A Note from Annie:

I will be leaving the ENYCHP team in December 2017 to pursue a Master's of Science in Entomology at the University of Florida. During this time, I will live and work at the UF Everglades Research and Education Center in Belle Glade, FL. My research project will focus on developing a streamlined fly population monitoring tool and refining insecticidal control methods for silk flies, a severe ear-feeding insect pest in Florida sweet corn. Field experiments for the project will test efficacy of baits, lures and traps to help determine how field populations of silk flies relate to the most effective traps and how trap catches can inform insecticide application timing.

I look forward to further developing my research skills in pest management and applying all that I have learned during my time with ENYCHP. It has been a pleasure to work with Cooperative Extension and the fruit and vegetable growers of eastern New York. A special thanks to the growers who participate in the NYS IPM sweet corn pheromone trapping network and unknowingly helped me prepare for this new chapter in life!

Sincerely,

Anna Mills

Tomato School

At the New York State Fruit and Vegetable EXPO, Syracuse, Jan 16th (note the new location!)

Join us for a full day of grower-led discussion about tomato production, from transplant production through marketing. Bring your questions and be ready to join in the discussion about growing healthy, profitable tomatoes today and tomorrow.

Session One: Transplants, Trellising, and Variety Selection: 9:00-10:15 am

Hear from Nelson Hoover of Maple Lane Produce in Pen Yann, NY about how he grows quality transplants, and how you can, too.

Breakout sessions:

Small groups will rotate through discussions led by grower, university, and industry experts about transplant production, variety selection, and trellising. Share what you know, and learn from others!

Session Two: Mulches, Water Management, and Weed Control: 10:45 am-12 noon

Hear from Nate Savage of Sunscape Farms in Rochester, NY about his experiences with bio-degradable mulch on 45 acres.

Breakout sessions:

Small groups will rotate through discussions led by grower, university, and industry experts about mulch options, water management, and weed control. Share what you know, and learn from others!

Session Three: Diseases, Pests, and Prevention: 2:00-3:15 pm

Dr. Christine Smart from Cornell will share the latest developments in bacterial disease management.

Breakout sessions:

Small groups will rotate through discussions led by grower, university, and industry experts about diseases, pests, and cultural considerations for plant health. Share what you know, and learn from others!

Session Four: Moving from Field to Market with a Profit: 3:45-5:00 pm

Hear from Kara Cusolito about fresh ideas for marketing tomatoes at Plowbreak Farm in Burdett, NY. Check them out on Instagram @plowbreakfarm to see their mixed cherry tomatoes in clamshells for wholesaling!

Breakout sessions:

Small groups will rotate through discussions led by grower, university, and industry experts about harvesting tips, enterprise budgeting, and increasing sales volumes. Share what you know, and learn from others!

Upcoming Events

December 12-14, 2017 – *New England Vegetable & Fruit Conference*. See the website for program and registration information as it becomes available. Go to https://newenglandvfc.org.

January 4th, 2018 - Good to Great: Improving Ag. Labor Management. Saratoga County CCE. This is a four part series being offered by Liz Higgins of ENYCHP. Please find details and registration here: https://enych.cce.cornell.edu/events.php

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 20-21, 2018- *Eastern New York Fruit and Vegetable conference*. Desmond Hotel, Albany, NY. Register here:

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

EXPO

EMPIRE STATE PRODUCERS EXPO | JANUARY 16-18, 2018

New Location in 2018...SRC Arena & Event Center, 4585 West Seneca Turnpike, Syracuse NY

2018 BECKER FORUM – FARM EMPLOYMENT PRACTICES: PLANNING FOR THE FUTURE
Monday, January 15, 2018 | 8:30 AM registration
Holiday Inn Convention Center, 441 Electronics Parkway, Liverpool, NY 13088
$95 before January 5, 2018; $120 after January 5 or at the door

The 2018 Becker Forum will take place on Monday, January 15, one day prior to the opening of the Empire State Producers Expo. The forum will focus on agricultural workforce issues with three general themes; securing a legal agricultural workforce, labor law compliance and H-2A program topics.

Featured speaker Kristi Boswell from USDA will provide an overview regarding her agency's activities aimed at improving opportunities for agricultural employers to attract and hire a qualified and legal workforce.

Other speakers will provide a review of changes in both state and federal laws as well as key employment practices to ensure labor law compliance. Belen Ledezma, New York State Monitor Advocate (NYDOL) will review key labor regulations and provide necessary posters for the farm workplace. In addition, Ann Margaret Pointer, attorney with Fisher Phillips, will review key components of federal labor laws that apply to farm employers with a focus on federal DOL inspections and housing.

The afternoon program will focus on information related to the H-2A Program. Current changes in the H-2A program will be highlighted. Since each year H-2A participation in New York increases, a panel of growers with experience using H-2A will guide forum participants through procedures that they used to effectively hire foreign-born H-2A workers.

A roundtable discussion with the speakers at the end of the afternoon will provide an opportunity for questions and discussion regarding critical workforce issues.

PRODUCE SAFETY ALLIANCE GROWER TRAINING COURSE
Tuesday, January 16, 2018 | 9:00 AM - 5:30 PM
Session organized by Craig Kahlke, CCE Lake Ontario Fruit Team, and Robert Hadad, CCE Cornell Vegetable Program, and Elizabeth Bihn, Food Science, Cornell University
Pre-registration is required and space is limited to 60. For cost and more details, visit http://nysvga.org/expo

Seven training modules will provide an in-depth understanding of farm food safety practices including worker health and hygiene, using soil amendments, wildlife and domestic animals and land use, production and postharvest water guidelines, postharvest handling and sanitation, and how to develop a farm food safety plan for your farm.

BERRY SESSIONS
Tuesday, January 16, 2018 | 9:00 - 5:00 PM
Session organized by Laura McDermott, CCE ENY Commercial Horticulture Program, and Jim O'Connell, CCE Ulster Co.

Growing berries in NYS continues to be a dynamic and promising sector of agriculture. Dr. Courtney Weber kicks the day off with his take on the Industry Trends and the opportunities that are available for NYS growers. Following on his heels will be some new information from the University of New Hampshire about extending the strawberry season. Several well timed breaks will allow attendees plenty of opportunity to visit the trade show.

The final three sessions will focus on pest management. Weed management topics will highlight innovative approaches, including using a crimped cover crop in a berry system and the use of abrasive particles to control weeds organically. After a lunch break the berry session will reconvene and focus on diagnosing and managing soil-borne diseases in perennial strawberry systems. This is a major limiter for berry growers statewide. A hands-on diagnostic lab will help growers understand the complexities to field diagnostics.

The final session will be a Farmer to Farmer Session focused on managing Spotted Wing Drosophila. Growers can talk with other growers and share successes and challenges in this informal, guided conversation format.

All growers – organic, small, large, conventional, direct market, UPick etc – are encouraged to attend.

SNAP BEANS/PEAS
Tuesday, January 16, 2018 | 9:00 AM - 10:15 AM
Session organized by Julie Kikkert, CCE Cornell Vegetable Program

With a focus on large scale/processing crops, the session will begin with updates on herbicides available for use in green peas and snap beans by Dr. Mark VanGessel from the University of Delaware. Dr. VanGessel will also address management of perennial weeds in crop fields. Cucumber mosaic virus was a major cause of yield loss in snap beans in New York and Wisconsin when the virus-vector, the soybean aphid was at high populations a number of years ago. Dr. Brian Nault, Cornell and Dr. Russell Groves, University of Wisconsin-Madison will update us on the status of the soybean aphid and virus situation in snap beans. Lastly, a team of scientists from Cornell and the Rochester Institute of Technology are working to bring new technologies to the age-old problem of white mold disease in beans. Come hear what they are up to.

Watch for the full program to posted on the NYS Vegetable Growers Association website at https://nysvga.org/expo

CABBAGE: KEY COMPONENTS OF WPS FOR CABBAGE CREW, THE DIFFERENCE VARIETY MAKES FOR BLACK ROT, HERBIDIDE TRIAL RESULTS
Tuesday, January 16, 2018 | 10:45 AM - 12:00 PM
Session organized by Christy Hoepting, CCE Cornell Vegetable Program

Cabbage is a labor-intensive crop with crews needed for planting, hand weeding and harvesting. Therefore, this year's cabbage session will include subject matter to address this important component of cabbage production. New regulations for Worker Protection Standards (WPS) went into effect in 2017 with still more on the horizon. Don Nelson, from NYSDEC will address some of these new regulations particularly as they pertain to cabbage production. Where can I get EPA-approved training materials? How do I navigate the Ag exclusion zone regulations? What is the future of special permit training?

Since 2017 was, unfortunately, a good year for black rot, NYSAES Plant Pathologist, Chris Smart will provide her insight into the difference variety makes with respect to development, spread and severity of black rot among several locally grown cabbage varieties. Does black rot stay in the leaves, not move into the head and not reduce yield in a tolerant variety? Is copper bactericide a waste of time on a susceptible variety?

Finally, CCE Cornell Vegetable Program specialists, Christy Hoepting and Darcy Telenko will share their research results on pre-emergent weed control in cabbage featuring control of ragweed.

BEETS/CARROTS
Tuesday, January 16, 2018 | 2:00 PM - 3:15 PM
Session organized by Julie Kikkert, CCE Cornell Vegetable Program

With a limited number of herbicides available for beets and carrots, it may be time to reconsider cultivation techniques for these crops. Newly hired NYS IPM specialist Bryan Brown brings his background in cultivation techniques to Cornell and will provide a review of the principles of cultivation with a focus on small-seeded crops. Rounding out the session, Dr. Russell Groves will review management of insects in carrots and whether incorporating newer reduced risk insecticides may be right for your farm.

EMERGING MARKETS – PROFITABLE LOG-GROWN SHIITAKE MUSHROOMS
Tuesday, January 16, 2018 | 2:00 PM - 3:15 PM
Session organized by Steve Gabriel, Cornell Small Farm Program

Join us to learn about the potential for profitable mushroom cultivation, with a focus on outdoor wood-grown methods. Cornell has been doing research and extension work in this crop for over 10 years. Participants will hear from extension educators and two active growers who have been participating in a business development network to get their enterprises off the ground. Learn the basic methods and requirements for growing, along with information on pricing, markets, and regulations around selling mushrooms.

WEED MANAGEMENT
Tuesday, January 16, 2018 | 3:45 PM - 5:00 PM
Session organized by Darcy Telenko and Julie Kikkert, CCE Cornell Vegetable Program

Newly-hired Cornell Specialty Crops Weed Management Scientist, Dr. John Wallace will discuss how to identify and control emerging weeds in New York Cropping Systems. Dr. Wallace has responsibilities for all horticultural crops and this session should be of interest to all growers. A question and answer period will follow and will allow for feedback on the needs of New York growers as Dr. Wallace begins to focus his research and extension program.

BIOPESTICIDES: HOW THEY WORK, WHY THEY DON'T, AND IMPORTANCE OF FORMULATION ON ACTIVITY AND USE
Wednesday, January 17, 2018 | 10:45 AM - 12:00 PM
Session organized by Darcy Telenko, CCE Cornell Vegetable Program

The biopesticide market has rapidly been expanding and many have become prominent tools in crop management. There are over 300 active ingredients registered with the EPA, with many approved for organic production. Interest in this new class of products is also occurring in conventionally grown crops.

Many growers who have already incorporated biofungicides into their disease management programs feel they are improving disease control and/or crop health due to resistance-inducing activity. Dr. Alyssa Collins from Penn State University will discuss how biocontrol can be used for soilborne diseases – how they work and when they don't. Mila Pearce from BASF will then talk about the different formulations of biologicals and how formulation can impact activity and success. Don't miss out on this session about this rapidly expanding group of products and the best ways to incorporate on your farm.

Expo online registration will be available from the NYS Vegetable Growers Association at https://nysvga.org/expo

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ONION SESSIONS
Wednesday, January 17, 2018
Sessions organized by Christy Hoepting, CCE Cornell Vegetable Program

Onion SLB Fungicide Resistance Workshop – Improved Plan for Sustainable SLB Management | 10:45 AM - 12:00 PM
Resistance of Quadris-type fungicides to Stemphylium leaf blight (SLB) now occurs in onion statewide. Although effective fungicides for managing this disease have been identified, fungicide resistance is always looming. First, Christy Hoepting, Cornell Cooperative Extension Onion Specialist will set the stage with the relative performance of several fungicides and what the optimal application timing may be featuring her 2017 on-farm trial results. Then, NYSAES Plant Pathologist, Frank Hay will share his laboratory findings regarding the relative sensitivity of SLB isolates to different fungicide active ingredients. Will his field and her lab findings concur? Next, Kerik Cox, another NYSAES Plant Pathologist with tremendous experience in managing fungicide resistance in tree fruit, will review fungicide resistance theory and draw from his experience to answer some tricky questions: If SLB is resistant to an active ingredient in FRAC 7, will it also be resistant to other active ingredients in this FRAC group? Is it better to rotate after 1 or 2 applications? Will resistant SLB spores from my neighbor's field spread to my field? Are some FRAC groups/active ingredients at higher risk to develop fungicide resistance than others? The session will conclude with a roll out of a new and improved sustainable SLB fungicide program.

Onion Pest Management – Weeds, Thrips, and Pest Interactions with Nitrogen and Variety | 2:00 PM - 3:15 PM
Featured in this session will be the interactions among variety, fertility, yield, onion thrips, rot and other diseases. Brian Nault's graduate student, Ashley Leach will share interactions that she identified during four years of her graduate research, which focused on onion thrips. Is there a relationship between thrips and rot in NY? Do high rates of applied nitrogen result in more rot? What is the optimal rate of nitrogen for today's onion crop? Is spraying by threshold sufficient to control IYSV? What difference does variety make? What are the implications for improved management? Hoepting will also highlight results from her 2017 on-farm onion herbicide trials including Prowl EC vs. H2O, improving pre-emergent control of yellow nutsedge, marsh yellowcress and ragweed, and integration of Goaltender, and pipeline herbicides, Stinger, Reflex and a.i. bicyclopyrone into onion herbicide program for improved weed control and crop safety. Also, check out whether Surchlor reduced bacterial bulb decay in multiple on-farm demos in Steve Beer's update on his bacterial rot research in session III.

Onion Feature Presentation – Onion Breeding in the 21st Century with Dr. Michael J. Havey | 3:45 PM - 5:00 PM
What makes onion breeding unique? What is the state of the onion breeding industry? What is on the horizon for new varieties bred for resistance to onion thrips and diseases, improved stress tolerance, health benefits, storability and heat tolerance? Do genetics dispose onions to bacterial bulb decay? One of the best minds in onion breeding in the country, Dr. Havey will address these questions and speak of the complexities of onion breeding in a language for all to understand. Dr. Havey is a USDA Research Geneticist and Professor at the University of Wisconsin – Madison in Alliums (onions and garlic) and cucurbits, a position he has held since 1988. He has led and been a team member on numerous multi-institutional federal grants addressing key stakeholder-prioritized constraints or attributes (including onion thrips with Cornell's Dr. Brian Nault). His lab has released key inbred onion lines and made significant contributions towards advancing onion breeding.

TREE FRUIT IPM: SUDDEN APPLE DECLINE
Wednesday, January 17, 2018 | 3:45 PM - 5:00 PM
Session organized by Tessa Grasswitz, CCE Lake Ontario Fruit Program

Growers of high-density apple orchards in various parts of Northeastern North America are reporting an increasing incidence of 'Sudden Apple Decline', whereby young trees in the early years of production begin to decline and die. So far, no obvious or consistent causative agents have been identified, although several contributing factors have been suggested, including winter damage, sub-lethal effects of certain herbicides, and various other biological and environmental stressors. In this session, plant pathologist Dr. Kari Peter of Penn State University will discuss her experiences with Sudden Apple Decline in Pennsylvania (where the problem was first noted several years ago), while Drs. Kerik Cox and Tess Grasswitz will present an overview of the current situation in New York.

PRECISION IRRIGATION
Wednesday, January 17, 2018 | 3:45 PM - 5:00 PM
Session organized by Darcy Telenko, CCE Cornell Vegetable Program

Water and nutrient management are key to sustainable and profitable crop production. Join Dr. Jaume Lordan Sanahuja from Cornell as he talks about precision irrigation opportunities for growers – how and why we should irrigate. He will use an example of a NY apple orchard and how precision irrigation can help deliver large sized apples. Darcy Telenko, CCE Cornell Vegetable Program, will then give an update on partnership with Environmental Geophysicist, Erasmus Oware from the University at Buffalo in a NYFVI sponsored project in using soil electrical conductivity measurements for precision water management in vegetable crops in western NY. This project aims to identify and account for sub-field soil variability for efficient water and nutrient management practices and is looking for additional cooperators for 2018.

SOIL HEALTH – NOVEL COVER CROPPING AND STRIP TILLAGE PRACTICES FOR VEGETABLES
Thursday, January 18, 2018 | 9:00 AM - 10:15 AM
Session organized by Ryan Maher, Cornell Small Farms Program

Attend the Soil Health session at the 2018 Empire State Producers Expo to learn how you can integrate cover cropping and reduced tillage practices while overcoming the residue and weed management challenges. Hear Janaki Fisher-Merritt from the Food Farm (Wrenshall, MN) discuss how they have worked to incorporate cover crops in a diverse rotation with cover crop fallows, interseeding, and cut-and-carry mulching. Ryan Maher, from the Cornell Small Farms Program, will share research results from the latest trials on strip tillage in winter hardy cover crops and adaptations for organic cropping systems. Come to think through the approaches and tools that will work to reduce inputs and improve productivity on your farm.

TREE FRUIT: TECHNOLOGIES TO REDUCE PRODUCTION RISKS ASSOCIATED WITH WEATHER
Thursday, January 18, 2018 | 9:00 AM - 10:15 PM
Session organized by Mario Miranda Sazo, CCE Lake Ontario Fruit Program

Tree fruit growers can purchase multi-peril hail insurance but when a premium apple variety is lost due to hail, the indemnification from the crop insurance does not fully compensate for the high value of the crop. In addition, marketing programs for new varieties depend on having a pre-planned supply volume which is lost if the orchard receives significant hail damage. This past season, frequent, more intense hailstorms were experienced which had devastating economic effects for some growers. Therefore, increasing resiliency to extreme and unpredictable hailstorms will help to sustain current and future levels of fruit production and profit.

If you are a grower who is considering netting as a hail control option or would like to know more about it, you should attend the **2018 NY Expo** and tree fruit session on netting titled **"*Technologies to Reduce Production Risks Associated with Weather*"** on **Thursday January 18, 2018, from 9am to 10:15am**. A panel of horticulturists and netting suppliers will discuss the advantages and drawbacks of protective covers. Tom Auvil, invited speaker from North American Plants, Oregon, will participate during the netting discussion as well.

BEGINNING FARMER: DEMYSTIFYING EQUIPMENT PURCHASES
Thursday, January 18, 2018
Buying Equipment for Your Current and Future Scale of Operation (Part A) | 9:00 AM - 10:15 AM
Buying and Scaling a Tractor and Appropriate Equipment (Part B) | 10:45 AM - 12:00 PM
Session organized by Anu Rangarajan, Cornell Small Farms Program

A two-part session at the Expo will review factors for making equipment purchases and will be paired with a tailored tour of the trade show to address participant's questions.

Buying Equipment for Your Current and Future Scale of Operations Part A and B at the 2018 Empire State Producers Expo on Thursday, January 18 will provide an overview to help participants evaluate the many factors to consider when buying equipment, including the trade-offs of purchasing new or used, maintenance needs, and potential challenges.

During the second section of the track, presenter Shane LaBrake for a tour of the trade show floor to review key considerations for picking a tractor and scaling-up equipment, tailored to the interests of session participants. Shane will help participants think through working with the machinery, and begin to evaluate the costs and potential returns of having new and different pieces of equipment. While this session will build on the concepts discussed in Part A, participation in both sessions is not required. Participants will leave this session feeling empowered with information to make better decisions for purchases for their operation.

BEGINNING FARMER: GETTING THE MOST FROM YOUR LABOR
Thursday, January 18, 2018 | 2:00 PM - 4:00 PM
Session organized by Anu Rangarajan, Cornell Small Farms Program

This extended session will provide a framework for farmers and managers to consider when recruiting, hiring, and training employees.

During this session, Elizab 'eth Higgins, of the CCE Eastern NY Commercial Horticulture Program will share techniques for develop clear job descriptions, including information about hiring staff, and offering just in time feedback and performance appraisal to both correct problems and motivate employees. Presenter Kat McCarthy, Cornell Small Farms Program, will next explain how to develop components of an employee handbook, and how these materials can help with employee recruitment and retention. The session will conclude with information about how to establish and run effective training programs. Participants will leave with an outline of text/concepts they could include in the development of their own employee handbook, as well as a checklist for developing job descriptions and training programs on their own farm.

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