

# The Produce Pages

Serving the fruit and vegetable growers of Eastern New York



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## Final Report on Two-Year Garlic Study

By Crystal Stewart, CCE ENYCHP

Post-harvest handling is a yearly challenge for growers in the Northeast. Often the success of the crop continues to be dependent on the weather even after it is out of the ground, with drying going well in dry years and poorly in rainy years. We set the goal of determining the optimal handling to dry garlic through three on-farm post-harvest trials in 2012 and three more in 2013. Through these trials we were able to determine that garlic can tolerate more light, heat, and pruning during the drying process than was previously demonstrated, and that we can create a more effective drying environment regardless of the weather using high tunnels.

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**Cornell University**  
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# The Produce Pages

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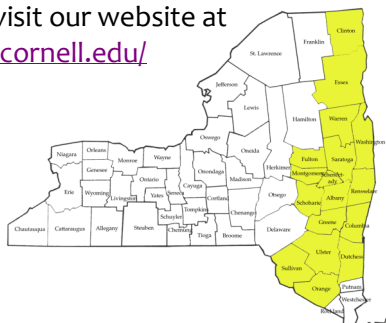
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**On the cover:** Garlic dried in a high tunnel as part of the post-harvest trial. Fans help keep air temperature and humidity uniform in the tunnel even when it is closed.

**Image:** Crystal Stewart. Skymeadow Garlic Farm, Cherry Valley, NY.

*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, Rensselaer, Saratoga, Schoharie, Schenectady, Ulster, Warren and Washington Counties*



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## Choosing post-harvest treatments

Treatments were chosen based on what growers throughout New York indicated worked well for them and through the advice of the Garlic Seed Foundation. The following options were chosen: drying occurred either in a high tunnel with shade cloth or in an open air structure such as a shed or barn; Roots were either left on the bulb until drying was completed or cut off immediately (leaving the basal plate intact); tops were either left on until drying was completed or cut off at various heights during or directly after harvest, and garlic was washed immediately after harvest or was left unwashed. These treatments were combined in every possible way on each of the three farms.

## Effects of treatments on bulb quality, disease incidence, drying time, and final weight

High Tunnel vs. Open Air: Across the trials garlic in high tunnels dried an average of three days faster than garlic in open air structures. Garlic dried in high tunnels had slightly better wrapper quality (tighter, less discoloration) than garlic dried in open-air structures at one site during both years. Garlic dried in tunnels also had slightly lower disease incidence (*Aspergillus*, *Embellisia* and *Botrytis*), though disease was not severe in any site or treatment in either year. No garlic treatments showed damage from being dried in the high tunnel.

The environment in the high tunnel needs to be carefully managed in order to be most effective. Technically temperatures can reach 121° F before waxy breakdown, the physiological disorder resulting from high temperatures, is initiated. However, to account for uneven heating in the high tunnel and possible delays in dropping temperatures through ventilation, the grower cooperators agreed that 110° F was a safer limit. Thermometers to monitor the temperature were located at the same height as the garlic.

Limiting temperature is just one aspect management. Maintaining air movement in the high tunnel through the use of internal fans helps even out the temperature and humidity, particularly if drying racks are stacked (Image 1). The grower cooperators also agreed running dehumidifiers at night and whenever the high tunnel was closed was beneficial, as it removed up to 20 gallons of water from the air during an eight-hour period and kept conditions closer to optimal. Without closing the tunnel and running dehumidifiers the

Table 1: Treatments and average weights aggregated from three trial sites, each with three replications per treatment.

Treatment	Average weight/head	Count
Cut at 6"	0.113lbs	1036
Uncut	0.130lbs	972

Table 2: Treatments, aggregated weights of treatments across replications, counts, and average weights per head from year two. Data was combined from all three sites.

Treatment	Weight/treatment	Count	Average weight/head
1.5 inch	23.7lbs	183	0.129lbs
6 inch	22.7lbs	186	0.122lbs
10 inch	24.4lbs	206	0.118lbs
Uncut	39.4lbs	302	0.130lbs

humidity in the tunnel can reach up 100%, which pauses or reverses the drying process.

Roots trimmed vs. roots untrimmed: No statistically significant differences were observed between these treatments in regards to bulb quality, weight, or disease incidence in either year. Root pruning is considerably more difficult and time consuming on wet roots than dry roots.

Tops trimmed vs. tops untrimmed: Trimming the tops mechanically in the field using a sickle-bar mower greatly increased the speed of harvest and reduced the space needed for drying. Top trimming did not have a significant effect on disease incidence in dried bulbs, but there were differences in bulb weight at two of the farms in year one, with un-cut bulbs being slightly heavier (Table 1). It was unclear if this difference was due to weight loss or to double bulbs, since the number of bulbs is greater in the treatments with lower weights. Because of this question, relatively uniformly sized, non-doubled bulbs were chosen for the samples during year two instead of taking every bulb from a plot, including doubles, as had been done in year one. In addition to this change, additional cutting lengths were also added to determine if leaving some stem would affect weight or disease incidence. During year two, the pruning length did not affect the dried weight of bulbs significantly (Table 2). Furthermore, there were no significant differences in disease incidence across any of the trimming treatments.

Washed vs. unwashed: Washed garlic initially had very clean, tight wrappers, but became more discolored than

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the unwashed garlic during the drying and curing process. Most discoloration could be removed by removing 1-3 wrapper leaves, but this extra step is time consuming. Disease incidence, particularly *Aspergillus* and *Embellisia*, was slightly higher in washed garlic. This treatment was discontinued after year one of the study because the returns from the process were deemed too low.

### Discussion of results and next steps

These trials have demonstrated that it is possible to dry garlic quickly and effectively by creating a warm, dry environment. Garlic can be dried at 110° F without damage to the bulbs. Furthermore, one to two layers of shade cloth provides enough protection for bulbs to prevent damage from the sun.

These trials have also demonstrated that trimming the tops of the garlic while it is in the field rather than drying the whole plant intact does not increase disease issues or reduce bulb weight. This finding is particularly useful to growers who find that they have too much garlic for their drying area, as they can remove the tops without concern that the garlic will become unmarketable or lose value as a result.

Notably, all of these trials were conducted in relatively dry years. We might expect that if the season had been

wetter, differences between high tunnel and open-air drying systems would have increased rather than decreased. The worse the outside conditions for drying, the more important it becomes to be able to control the environment. High tunnels offer more significant opportunities for control than most barn systems.

Not every grower will be able to use a high tunnel system to dry garlic, or will want to cut the tops. These recommendations do not need to be followed exactly for success, but if a grower is struggling with disease and post-harvest breakdown, applying the principles of limiting humidity and increasing temperature while drying should prove beneficial, whether accomplished in a high tunnel, a hay mow, etc.

To follow-up on these studies, we would like to address growers' questions about the effects of these treatments on longer-term storage and on quality factors such as sulfur compound concentration, and would like to determine what the best environment is to store garlic for one, three, or 6 months.

If there are questions about how to apply these treatments to a specific post-harvest system, please contact Crystal at [cls263@cornell.edu](mailto:cls263@cornell.edu) or 518.775.0018.

*This project was made possible through the support of Northeast SARE.*

## Plastic Greenhouse Film Update

Polyethylene plastic has many properties that make it useful as a covering for greenhouses. Its low cost, large sheet size, ease of attachment and good light transmission are properties that have helped to expand its use so that today it is the most common glazing.

Since the early 1960's when polyethylene film was first used to cover wood frame greenhouses, many improvements have been made. Early films lacked durability and had to be replaced annually. They didn't stand up to the abrasion from the structure and the weather. They also had a short life due to deterioration from the ultra violet rays of the sun.

Most polyethylene film is manufactured as a coextrusion of three layers with different polymers and additives. Each of them contributes to the quality of the film and enhances its performance. The following summarizes some of the characteristics that you need for your crops.

**Life** – the life of polyethylene films is limited due to degradation processes induced by sunlight and heat. Co-poly is a low-cost material that is good for one season. It is a good choice for seasonal greenhouses, overwintering structures and high tunnels. Avoid construction grade material that has less strength. Greenhouse grade poly is warranted for 4 years or more and costs about double that of co-poly. It contains an ultra-violet (UV) stabilizer that reduces degradation. If additional strength is needed, such as windy in locations, a woven poly or nylon scrim-reinforced material should be considered.

**Thickness** – one-year co-poly film is available in 3, 4 and 6 mil thickness. Three or four mil film is common for one year use on narrow tunnels and overwintering houses. Greenhouse grade material, only available in 6 mil thickness, is best for multi-year application.

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*Plastic Greenhouse Film Update, continued from previous page*

**Condensate control (AC)** – also referred to as anti-drip is a wetting agent that reduces surface tension allowing condensation to flow rather than form droplets. This can be sprayed on the film or incorporated in the center layer and usually lasts a couple of years. Condensation droplets reduce light transmission and can lead to disease problems when they drip onto plants. An anti-fogging additive may be included to prevent early morning and late afternoon fog formation in the greenhouse.

**Reduced nighttime heat loss (IR)** – this is an additive that traps the inside radiant heat from escaping. In heated greenhouses, the savings have been measured to total from 10 – 20% depending on whether the sky is cloudy or clear. In double layer poly installations, the IR film is always placed as the inner layer to retain nighttime heat. Research has shown that IR film can increase color and/or compactness and accelerated crop development. This is most likely due to increased nighttime plant tissue temperature. Costing only a couple of cents more per square foot, the payback is only a few weeks for a greenhouse heated all winter.

**Reduced daytime heat gain** – in areas with strong sunlight, blocking part of the infrared spectrum can lower inside temperature up to 10°F. Selective pigments can be added to the outside layer in copolymer film to reflect or absorb the near infrared radiation which is useless for plant growth. Research has shown that the higher the outside temperature, the larger the temperature difference achieved by use of these films. The advantages include lower cooling costs, greater worker comfort, lower irrigation needs, reduced plant stress and improved fruit taste.

**Ultra-violet (UV)** – bees need UV to navigate. If you are using bees to pollinate plants in the greenhouse, purchasing a film that allows some of the UV part of the light energy spectrum to pass through may be important. Otherwise, UV blocking film will reduce whiteflies, thrips, aphids and other insects. It can also control some fungal diseases.

**Controlled diffusion** – light diffusion is another property that has recently been added by manufacturers. This increases the amount of diffused light that reaches the plants, reducing scorching and increasing light to lower leaves. It is especially important with tall crops such as tomatoes, cucumbers and peppers. Research has shown that diffused light also reduces fungus spore development and insect propagation.

**Light transmission** – photosynthetically active radiation (PAR) light transmission varies with the type of additive in the film. Typical values are UV stabilized film – 88 - 91%, IR-AC film – 82 - 87%, IR-AC with diffusion – 77 - 88%. Dust, smog and plastic deterioration can also reduce light transmission. A “rule of thumb” is one percent increase in light equals one percent increase in plant growth during the winter or in cloudy weather. Some growers replace the plastic every year just to get a few percent higher light levels when growing plants during the short days of winter. Some manufacturers make a film with anti-static properties that repels dust, dirt and smog.

**Photoselective films** – these absorb or reflect specific wavelengths of light. They can enhance plant growth, suppress insects and diseases and affect flower development. Red films such as Dupont IR and Smartlite Red film reduce PAR light and create a shading effect. They have also been shown to improve rose yield and quality.

Single or double layer poly –if you are growing during the heating season, an inflated double layer is desirable. It reduces heat loss at night by about 40%. It also reduces the stress at the attachments and the rippling of the plastic on a windy day. Air inflation at ¼” water static pressure is best. A slightly higher pressure should be used in windy or snowy weather. Connecting the blower to use outside air will reduce condensation between the two layers. Single layer is common on high tunnels and nursery overwintering houses.

**Plastic failure** – early failure of poly can be attributed to attachment stress, abrasion on rough surfaces and sharp edges or heat build up in the area of rafters, purlins and extrusions. Contact with chemicals from pesticides or pressure treated lumber can also affect the life of the plastic. Poly may also be subject to cuts from blowing ice especially if there are multiple greenhouses adjacent to each other. A scrim reinforce poly may be desirable in these situations.

The high quality and long durability make today’s copolymer plastic a good choice for greenhouse glazing. Make your selection from the many options that are available to enhance plant growth.

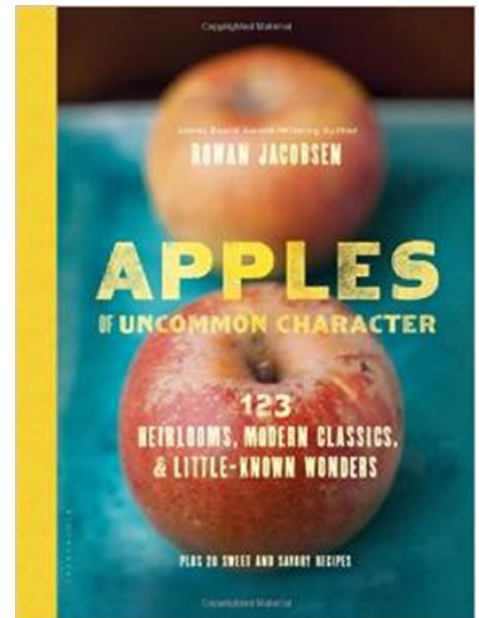
*John W. Bartok, Jr., Extension Professor  
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of Connecticut, Storrs CT - 2013*

## A New Apple Book

By Maire Ullrich, CCE ENYCHP

*Apples of Uncommon Character; 123 Heirlooms, Modern Classics & Little Known Wonders* by Rowan Jacobsen is a new book just released that is clearly marketed to the consumer. Each apple has a lovely photograph and a full-page of information describing its origin, breeding history, visual, sensory, and culinary characteristics. The apples are segmented by these categories: Summer Apples, Dessert Apples, Bakers & Sauces, Keepers, Cider Fruit and Oddballs. There are also recipes and additional resource information on mail-order fruit / cider and festivals. New York has a couple of entries in this area.

I'm bringing attention to this book because it is written by a well-awarded author and is likely to get good circulation in the "foodie" circles. I am certain some of the 123 varieties are grown in Eastern New York. If you grow some of the more rare varieties featured, you may have a sudden upsurge in interest in 2015.



Here is the list of varieties featured in the book:

Ambrosia	Gala	Lady Williams	Sheepnose
Ananas Reinette	Ginger Gold	Lamb Abbey Pearmain	Silken
Api Étoile	Glockenapfel	Macoun	Smokehouse
Arkansas Black	Golden Delicious	Maiden's Blush	Snow
Ashmead's Kernel	Golden Harvey	Malinda	Spokane Beauty
Autumn Crisp	Golden Russet	McIntosh	St. Edmund's Russet
Baldwin	GoldRush	Medaille d'Or	St. Lawrence
Belle de Boskoop	Granite Beauty	Mother	Stark
Ben Davis	Granny Smith	Mutsu	Strayman
Bethel	Gravenstein	Newtown Pippin	Summer Rambo
Black Oxford	Gray Pearmain	Nodhead	Sweet Sixteen
Black Twig	Grimes Golden	Northern Spy	SweetTango
Blenheim Orange	Harrison	Northwest Greening	Tolman Sweet
Blue Pearmain	Harry Masters Jersey	Orleans Reinette	Twenty Ounce Pippin
Braeburn	Hewes Crab	Ozark Gold	Virginia Gold
Bramley's Seedling	Hidden Rose	Pink Lady	Virginia Winesap
Burgundy	Honeycrisp	Pink Pearl	Wagener
Calville Blanc	Hubbardston Nonesuch	Pinova	Wealthy
Chenango Strawberry	Hudson's Golden Gem	Pitmaston Pineapple	Westfield Seek-No-Further
Chestnut Crab	James Grieve	Pixie Crunch	White Winter Pearmain
Claygate Pearmain	Jonagold	Pomme Grise	Wickson
Cortland	Jonathan	Porter	Winesap
Court Pendu Plat	Kandil Sinap	Pound Sweet	Winter Banana
Cox's Orange Pippin	Karmijn de Sonnaville	Red Astrachan	Winter Sweet Paradise
D'Arcy Spice	Kavanagh	Red Delicious	Wolf River
Dabinett	Kazakh Wild Apples	Redfield	Yates
Ellis Bitter	Keepsake	Reine des Reinettes	Yellow Bellflower
Empire	King of the Pippins	Rhode Island Greening	Yellow Transparent
Esopus Spitzenberg	Kingston Black	Ribston Pippin	York Imperial
Flower of Kent	Knobbed Russet	Rome Beauty	Zabergau Reinette
Fuji	Lady	Roxbury Russet	



# The USDA-FSA Tree Assistance Program

## Can it Help with Severe Fire Blight Losses?

By Dan Donahue, CCE ENYCHP

### The Problem

Fire Blight (*Erwinia amylovora*) re-appeared in Eastern New York orchards this past season with a vengeance. Producers who followed the computer prediction models (see NEWA), acted on CCE E-Alerts, or their gut feeling that conditions were going to be just right for infection, and applied 2-3 bloom sprays of streptomycin, were generally spared from severe damage. Some of those who did not apply bloom sprays at the correct timing, and after all, for some, fire blight strikes had not been observed for some 20-odd years, suffered severe damage to both non-bearing and mature orchards. In some cases, these stricken trees killed, or will be unlikely to survive once the cankers become active in the spring.

### The Program

The USDA's Farm Service Agency (FSA) makes available financial support to afflicted producers through the Tree Assistance Program, commonly referred to TAP. Producers may apply for assistance to replace or remediate orchards which have suffered losses due to a weather-related event. Commonly these events will be floods or windstorms. However, tree losses due to a disease infection that was brought about by a weather event, can qualify for the program. Since successful fire blight infections are related to a certain duration of rainfall and level of heat, at a particular timing (for example, bloom or following a mid-season hailstorm), for the purposes of the TAP these infections are considered to be caused by weather events.

To date, several growers have approached the FSA with the intent to file claims for fire blight damage and/or tree loss, under the TAP program. To qualify for TAP, orchardists and nursery tree growers must:

- Have suffered qualifying tree, bush or vine losses in excess of 15 percent mortality (adjusted for normal mortality) from an eligible natural disaster for the individual stand;
- Have owned the eligible trees, bushes and vines when the natural disaster occurred, but eligible growers are not required to own the land on which eligible trees, bushes and vines are planted;
- Replace eligible trees, bushes and vines within 12 months from the date the application is approved.



Fireblight damage in a local orchard. Image: Dan Donahue

If damage is so severe that the tree is considered a total loss, financial assistance of \$8.00 towards the cost of a replacement tree, as well as an additional \$2.00 towards replanting expense. In addition, \$500.00 per acre is available towards the removal of the diseased trees, and preparation of the land for replanting. If it is considered a reasonable practice to attempt to save the tree, \$4.00 to \$7.00 is available towards the rehabilitation of each tree.

### There are a Few Challenges

*When is a tree actually considered dead?* This is a real dilemma when it comes to a severe infection in a perennial crop, such as apples or pears. While it is possible for this disease to fully consume a tree in one season, often this is not the case. Entire scaffold branches may display symptoms such as the famous "shepherds-crook" and visible cankers back into the trunk, however the tree itself is technically still alive. Experience and common sense tells us that such a tree will eventually be consumed by the disease, or have to be pruned so aggressively in a remedial fashion that it will require years of re-growth in a vegetative state before it will be in a renewed condition to produce an economic crop. Such a tree, while not biologically dead, could be argued to be "economically" dead.

*Can the afflicted trees be observed for mortality over a period of years?* Yes, it is possible to file a claim, enumerate and mark the afflicted trees, and monitor those trees over a period of years in order to conclusively document that they eventually succumbed

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*Tree Assistance Program and Fire Blight Losses, continued from previous page*

to the disease. Financial assistance would then be paid on the tree loss. Is this practical, or even a best management practice? Allowing active infections to remain in the orchard will only serve as a source of inoculum for the following seasons. Our current recommendation is to cut out and remove fire blight strikes from the orchard. Allowing active infections to remain in the orchard cannot be considered a best management practice, and places nearby trees at risk.

*Replant the orchard within 12 months?* In the world of tree fruit, 12 months is a short period of time. These days, purchasing trees in any volume require contracting with a nursery 1-3 years in advance to ensure obtaining the desired variety on the appropriate rootstock. If the producer is replanting a contiguous block, it may be a best management practice to plant a cover crop and take steps to augment soil fertility for 1-3 years before attempting to replant. A young tree replanted into an orchard where mature trees in the vicinity are harboring substantial quantities of fire blight inoculum may also be a risky practice.

### What to Do?

ENYCHP is working with FSA to clarify the above questions, and find a way to implement the TAP program so that afflicted producers can receive meaningful assistance. There is a deadline of January 15, 2015 to apply for TAP assistance, and report your tree mortality counts as well as identifying and reporting the number of trees requiring remediation in order to restore their health. If you are interested in pursuing this program:

- Survey your orchards for damage, documenting those blocks that appear to meet the 15% mortality requirement. This threshold is essential, even if your objective is individual tree remediation.
- Contact your county FSA representative to start the application process (*please see the contact info below*).
- It will be necessary to document that *Erwinia amylovora* is in fact present in the orchard. Contact your CCE ENYCHP Tree Fruit Specialist for assistance in taking the disease sample and having it analyzed.
- Do not cut down and remove your severely infected trees at this time. FSA representative need to see the afflicted trees in the field, tree stumps do not count. Fire blight infections are not currently active, so there is no risk of further infection at this moment.

Depending on how FSA is allowed to interpret the program regulation, you may or may not qualify for assistance. However, if afflicted producers don't apply by 01/15/15, there is a 100% chance of not qualifying.

### USDA – FSA Offices and Contacts in the CCE ENYCHP Region

Please type or paste the following link into your web browser to find the local FSA office serving your county: <http://offices.sc.egov.usda.gov/locator/app?state=ny&agency=fsa> You can also “Google” your county FSA office for contact information.

Dan Donahue of Cornell Cooperative Extension is also available to discuss your situation; he can be reached at 518-322-7812.

## The Tasting Room Experience and Winery Customer Satisfaction

By Miguel I. Gómez and Erin M. Kelley, Dyson School of Applied Economics and Management, Cornell University.  
Forward by Anna Wallis, CCE ENYCHP.

*Cold-hardy grape and wine production is a rapidly growing industry in northern New York. A demographic study published in 2007 reported over 500 acres of cold-hardy grape vines being grown in New York with approximately 70% of vineyards planning to expand. As an emerging industry, one of the challenges has been establishing a market and reaching customers. This customer satisfaction survey conducted in 2014, evaluated in the importance of service, retail execution, and ambiance on customers' experiences in six wineries.*

*The results give valuable information about the most (and least) important attributes for a commercial winery—things local wineries may use to increase and retain their customer base.*

**Background and Rationale:** Customer satisfaction is especially important for the cold climate wineries in New York and Iowa that are the focus of this study. This emerging industry relies on visitors (regional customers and tourists) for an important share of total sales. Ensuring that customers have a satisfactory experience when visiting the winery can create customer loyalty and positive press as clients recommend the establishment to their friends, colleagues and family.



### Treatments:

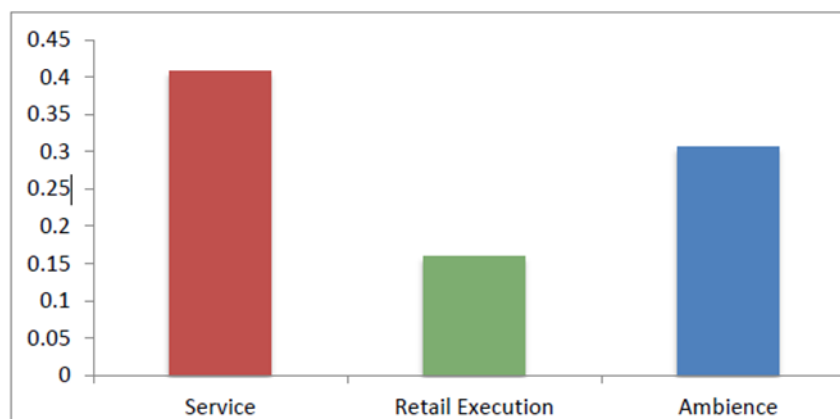
- A total of six wineries participated in the study, two of which were located in New York State and four in Iowa.
- The Wineries were first contacted by Cornell University to ascertain their desire to participate in the study.
- The primary researcher on the project (Professor Miguel Gomez) then travelled to each of the Wineries to speak directly with the tasting room managers.
- During the meetings he specifically reviewed a detailed protocol for conducting the data collection process.

### Methods

We developed and tested the survey instrument based on earlier work by Gómez (2010) and Gómez, McLaughlin and Wittink (2004), along with advice from a few winery operators in cold climate wine regions. The survey was divided into three sections. The first section asked tasting room visitors to rate their perception of twenty-four customer satisfaction attributes related to their tasting room experience. Customers were asked to rate the winery performance of these attributes from 1 (poor) to 5 (excellent). The second section pertained to on-site wine sales and

### Relationship between Customer Satisfaction and Sales Performance

Figure 1: Effect of increasing each factor score by 1-point (from 4 to 5) on the probability that the overall customer satisfaction score equals 5/5



asked customers whether or not they purchased wine, the amount purchased (bottles and dollars), intention to purchase in the future, and willingness to recommend the winery to others in the future. The final section collected demographic information on the survey respondent. We collected over 400 responses. Once the surveys were compiled and organized into a database, we developed statistical methods (factor analysis and multiple regression) to focus on two research questions: what drives customer satisfaction, and does customer satisfaction lead to greater sales? For this part of the analysis, the data from each of the wineries was pooled together to make for a larger sample size and more significant results.

### Results

#### What Drives Customer Satisfaction?

In this study, customers were asked to rate 24 specific attributes of the tasting experience on a scale of 1 to 5. These attributes included: overall tasting room cleanliness, appearance of grounds/view, wine knowledge of pourer, variety of wines available for tasting, availability of food/snack items, and availability of wine for purchasing, among others. These 24 attributes could be grouped under three main categories (which we will call factors): Retail Execution, Service and Ambience.

These three factors each contribute to overall customer satisfaction. Nevertheless, some matter more than others. Of utmost importance is the service provided by the winery, then the ambience created, and finally the retail execution (Figure 1). We found that customers were

Factor 1: SERVICE	<ul style="list-style-type: none"> <li>– Wine knowledge of pourer</li> <li>– Appearance/presentation of pourer</li> <li>– Friendliness of pourer</li> <li>– Flexibility in choice of wines tasted</li> <li>– Helpfulness of tasting room staff</li> <li>– Hospitality and personalized attention of staff (including the owner)</li> <li>– Space (elbow room) for tasting</li> <li>– Waiting time for tasting to start</li> </ul>
Factor 2: RETAIL EXECUTION	<ul style="list-style-type: none"> <li>– Availability of non-wine gift items</li> <li>– Availability of food/snack items</li> <li>– Presentation/display of wines</li> <li>– Discounts for volume purchases</li> <li>– Availability of wine for purchasing</li> <li>– Speed of check-out</li> </ul>
Factor 3: AMBIENCE	<ul style="list-style-type: none"> <li>– Appearance of grounds/view</li> <li>– Overall tasting room cleanliness</li> <li>– Lighting in the tasting room</li> <li>– Sounds in the tasting room</li> </ul>

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*The Tasting Room Experience and Winery Customer Satisfaction, continued from previous page*

40% more likely to rank their overall experience a 5/5 (instead of a 4/5) if they were highly satisfied with the service provided by the winery. Furthermore, customers were 30% more likely to rate their experience a 5/5 instead of a 4/5 if they were highly satisfied with the ambience provided by the winery. Finally, we found that customers were 16% more likely to rate their experience a 5/5 instead of a 4/5 if they were highly satisfied with the retail execution.

Figure 2 shows that higher levels of customer satisfaction are associated with greater sales (as measured by the number of bottles purchased). For example: customers who ranked their overall tasting experience a 4/5 purchased 2.8 bottles on average, while customers who ranked their overall tasting experience a 5/5 purchased 4 bottles on average. This shows that the biggest gains to be made are from moving a customer from “satisfied” (ranking his or her experience 4/5) to “very satisfied” (ranking his or her experience a 5/5”).

We then conducted further statistical analysis, which allowed us conclude with certainty that a one unit increase in customer satisfaction leads to approximately one more bottle being purchased. This says that on average, increasing customers’ overall experience by 1 unit from ‘2’ to a ‘3’, or a ‘3’ to a ‘4’ or a ‘4’ to a ‘5’ increases sales by 1 bottle per customer.

A similar relationship is detected when we plot the total amount spent (in dollars) for each level of customer satisfaction (Figure 3). Customers that rate their experience a 4/5 purchase 40\$ on average while those who rank it a 5/5 spend just over 60\$ on average. Again, we see that a more highly satisfied customer will spend more money after a tasting. More specifically, the greatest gains will be made from moving a customer from “satisfied” to “very satisfied”.

We then conducted further statistical analysis, which demonstrated that a one unit increase in customer satisfaction leads to approximately 10 more dollars being spent (which is just a little less than the cost of a bottle). This says that on average, increasing customers’ overall experience by 1 unit from ‘2’ to a ‘3’, or a ‘3’ to a ‘4’ or a ‘4’ to a ‘5’ increases sales by 10 dollars per customer.

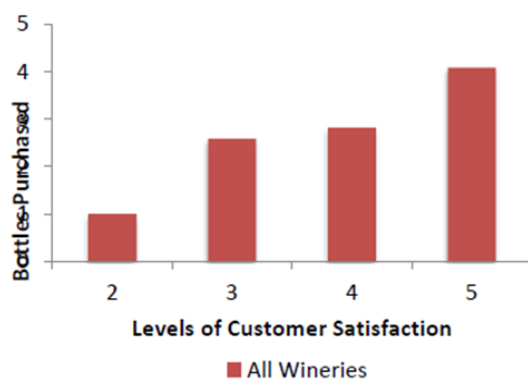
### What the results mean:

This report can shed light on the following issues relevant to wine tasting room managers:

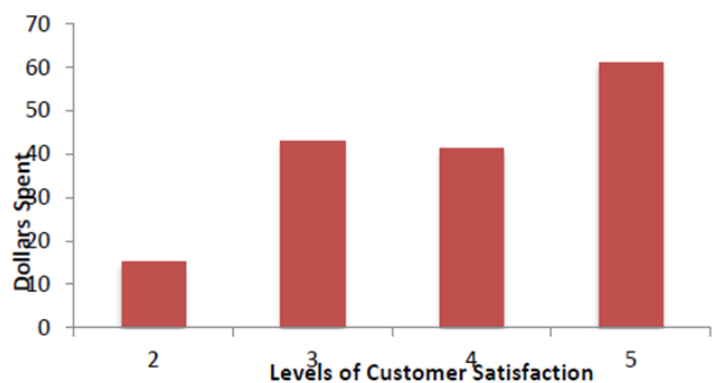
- To gain a better understanding of the type of customer that the wineries are servicing. The data we collected during June-November 12 suggests that the average visitor has some post-secondary education; is approximately 40-49 years old; and drinks wine on a regular basis
- To identify attributes in which the tasting room was performing well *at the time of the survey*, and other attributes in which further improvements could be made.
  - o The three attributes which customers appreciated most were the following: the overall tasting room cleanliness, the friendliness of the pourer, the helpfulness of the tasting room staff, and the hospitality of the tasting room staff.
  - o The three attributes that customers appreciated the least were: winery signage and directions, availability of food/snack items, and discounts for volume purchases.

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**Figure 2: Number of Bottles Purchased for Each Level of Customer Satisfaction**



**Figure 3: Number of Dollars Spent for Each Level of Customer Satisfaction**



*The Tasting Room Experience and Winery Customer Satisfaction, continued from previous page*

- To distinguish the most important drivers of customer satisfaction:
  - o Service (Most Important)
  - o Ambience (Second Most Important)
  - o Retail Execution (Third Most Important)
- To illustrate that higher levels of customer satisfaction leads to greater sales.
  - o The biggest gains to be made come from moving customer satisfaction from a 4 ('satisfied') to a 5 ('highly satisfied'). This means that Wineries must fine-tune every aspect of the tasting to ensure a premium experience.

## Improving Crop Land with Tile Drainage

By Laura McDermott, CCE ENYCHP

*This article is a summary of highlighted points made at a November 12 workshop sponsored by Cornell Cooperative Extension's Capital Area Agriculture and Horticulture Program, CCE Rensselaer County and CCE's Central NY Dairy and Field Crops Program.*

### Why should farmers install tile drainage?

Yield improvement is one of the primary reason to tile land. This has been confirmed by many studies, just recently in a study from The Ohio State University, where drainage improvements on poorly drained soils were shown to result in substantially higher corn yields. These long-term experiments on Toledo silty clay, a very poorly drained soil, compared surface drainage only, tile drainage only, and a combination of surface and tile drainage on replicated plots. Average yields over 13 years were 92, 116 and 121 bushels per acre for the surface only, tile only and surface plus tile drainage systems, respectively, versus 60 bushels per acre on the un-drained plots. This increase in yield makes it easy to see that it would only take a few years to pay off a 30' on center pattern drainage system which averages about \$1000/acre(1).

Tiling not only removes yield limiting water from the soil, but it can also reduce compaction – a huge problem on many marginal soils and sometimes even on excellent soils. The water holding capacity of soil improves once it is drained and improved drainage allows more flexibility for alternative crop rotations and increased cover cropping. Better timeliness of planting, harvesting, and cultivating, is another great benefit realized by tile drainage.

### Why don't more farmers install tile drainage?

One of the primary reasons farms don't install tile drainage is initial cost. The cost of an average drainage tile installation usually ranges between \$1000-1500/acre. A brief review of the information about

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Corrugated tile drainage options from left to right: standard tiling used in many situations; sand slot used in sand or loam soils; and wrapped tiles used in many soil situations to minimize clogging.



Poorly drained soil that would benefit from tile drainage. Photo source: Soil and Water Lab, Cornell BEE Dept. [index.htm](http://index.htm)



*Improving Crop Land with Tile Drainage, continued from previous page*

improved yield should help convince growers that tiling can be very worthwhile.

A second obstacle to installation is a fear of regulatory issues. Wetland determination is often seen as a complicated and highly regulated process. This unfortunately does not have to be true – but the best way to avoid problems is be pro-active. It is VERY important to visit with the USDA-NRCS staff PRIOR to digging. The staff there will help you determine the historical use of the ground as well as review the soil types of the land involved. Soil survey information can be found in printed soil surveys or on the web at: <http://websoilsurvey.nrcs.usda.gov/app/>. Farmers must file Form AD 1026 prior to digging. <http://forms.sc.egov.usda.gov/efcommon/eFileServices/eForms/AD1026.PDF>. It is important to remember that the land determination is good forever and the determination stays with the land – NOT the farmer. Turn-around time for the AD-1026 is supposed to be 30 days but can often take longer. You need to ask this question at the beginning of the process.

A third significant obstacle is finding a drainage specialist that can design an efficient system and then finding installation specialists that can accomplish the job in a timely manner. Many farmers will install tiling themselves, which is an excellent idea if the job is uncomplicated. Good reasons to install your own drainage include:

- Timeliness
- Quality control
- Straightforward job on small acreage

Good reasons to NOT install tile drainage:

- No spare time
- Steep learning curve required – especially for larger jobs.
- Availability of manpower. It is very likely that a large job will require 3-4 men devoted to the job.
- Construction equipment is necessary. Farms may have some of this equipment but likely not all. Equipment required includes a drain plow and stringer plus tractor; a bulldozer with a winch; a dumptruck; a jackhammer on an excavator and a rock rake on a payloador. All of these may be necessary for correct and efficient installation.

### **Considerations when Installing Tile Drainage**

Design specialist Steve Mahoney, owner of River Bend Farm Agricultural and Environmental Services discussed

design requirements for successful drainage systems. Tiling is obviously not “tile” anymore but in fact is corrugated plastic tubing and pipe. There are 2 sources of agricultural drainage tile in the northeast: Soleno Textiles in Quebec, <http://www.solenotextiles.com/en> and Advanced Drainage Systems in Ludlow, Mass. <http://www.ads-pipe.com/en/>. Because these materials are so bulky it doesn't make a lot of sense to order from outside of the region – if you do be sure to check shipping prices.

There are four types of drainage pipe:

1. Standard – can be used on every soil type with the exception of “quick sand”
2. Sand slot – excellent choice for almost every soil type. Slots are difficult to see but these pipes have been shown to drain well.
3. Wrapped pipe – wrapped with a 20% fine type of fabric – some farms have had problems using this pipe on fine clay – but wrapped pipe works extremely well with sand and loam soils.
4. Non-perforated tiling – This smooth walled pipe eliminates the threat of root penetration. It is often used near hedgerows and outlets.

Main line tiling is usually larger, 10”, 8” or 6” in diameter, and lateral pipes are all usually 4” in diameter.

Drainage pipe (tile) needs to be buried 4’ down in order to spread the lateral tile pattern apart. If the tile is shallow – 3-3.5’ depth - the pattern will close to 20-25’ apart. That increases the cost of the job. However, depending upon the soil type, the tile used and the value of the crop being grown, the farmer may decide to close up that lateral pattern and still have the tile buried deeply. It is common for high value vegetable crop land to have a lateral tile pattern of 20’.

Tile should be installed using laser or GPS guidance. Laser guidance needs to be moved more frequently, especially when contours are involved, but it's often the guidance of choice for main lines. GPS guidance does a great job and is often considered to be the ‘cadillac’ guidance system.

Tile fittings are important and farmers should consult the supply company when placing the order, especially if they are doing the job themselves. One important tip given was that an animal guard should DEFINITELY be installed at the outlets. These are very low cost and can prevent a lot of damage by encroaching critters. Fixing the damage is very difficult and expensive.

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*Improving Crop Land with Tile Drainage, continued from previous page*

Still, outlets need to be checked annually. It would also be helpful if outlets were permanently located on a map or spreadsheet using GPS coordinates so that future generations can find them. You might also consider locating and tabulating existing drainage that may be known by the older generation but not necessarily the younger crew. Another consideration in design is the question of allowing tiles to drain into the irrigation pond. Vegetable farmers that have fields infested with *Phytophthora capsici* should not allow drainage tiles to flow into the irrigation pond as that would result in all of the irrigated farm being infested by this extremely damaging vegetable crop disease. Dr. Larry Geohring of the Biological and Environmental Engineering Dept at Cornell University shared some of the remediation research that is being conducted by the Soil and Water Lab in that Department, <http://soilandwater.bee.cornell.edu/index.htm>.

Farmers are encouraged to contact their local extension office if they have questions that go beyond normal installation problems.

Tile drainage water can be a source of dissolved phosphorus and nitrates that pollute our waters. Properly managing fertilizers and manure will prevent pollution. Applying manure to fields that are not saturated with water (frozen or not) and incorporating it are the key to stopping nutrient contamination from reaching tile lines.

For more help with tile drainage questions, visit your local Soil and Water Conservation District office and ask for the SWCD Drainage Guide or download one at this link: [http://www.waynecountynysoilandwater.org/wp-content/uploads/drainage\\_guide\\_ny.pdf](http://www.waynecountynysoilandwater.org/wp-content/uploads/drainage_guide_ny.pdf).

1) *Economic Factors of Drainage Related to Corn Production, Fact Sheet NCH-23*, B. H. Nolte and R. D. Duvick, The Ohio State University. <https://www.extension.purdue.edu/extmedia/nch/nch-23.html>.

## Policy Protection: Exploring Farm Employment Policies and Position Descriptions

*By Maire Ullrich, CCE ENYCHP*

This article focuses on retail farm stand and market employees. Because their contact with customers is crucial to the success of the business it is important to reduce the opportunities for miscommunications. Many of these policies could be applied to any farm worker.

In all cases both you and the new employee might feel better (and get better results) if you supplied them with a position description and/or a simplified policy manual. An added advantage is a legal one. If all of the policies are written, and all of the problems documented, the business has less liability if/when an employee is terminated or takes issue with something you feel is inappropriate but was never "spelled-out". An example would be an employee who shows up for work in a t-shirt with a vulgar sign, word or illustration. You have not been specific about a dress code but it is clearly not something customers would be comfortable with. What do you do? Avoid hard feelings and potentially an argument and termination by establishing good rules up front.

This article is skeleton designed to ease the process. Of course you have policies now, but they are likely verbal directives with no written policy handbook. Not all policies (especially new ones) can be enacted immediately but try writing down a few. The winter will

be a great time to solidify them. First, sit down and write out all of the rules/regulations and expectations, especially those that created problems this year or every year. Then, in the spring, all (new and old) workers can start fresh. These items are hard to approach with many employees since many may be friends or family. The sooner you start the better. Employees will appreciate it. In any relationship, clear expectations help it thrive.

Items you might want to create policies around:

### 1. Compensation

#### a. *Work hours | Days | Season | Pay | Bonuses*

- i. Unit of pay - by the piece (if legal), hour, day, or by the job.
- ii. Where and how to they record this. Show them how' to fill out a time card I you use one.
- iii. Have a standard pay scale. Workers like to see what is involved in earning more. This helps with goal setting and improvement..
- iv. Payroll period, pay day, form of pay, deductions.
- v. If a cash bonus is possible for working until the end of the season, be sure to include if it performance based or not.

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*Farm Employment Policies/Position Descriptions, continued from previous page*

- b. **Benefits** - Fill in whatever is offered; holidays, vacation, sick leave, produce/milk/meat, housing, insurance, retirement.
  - i. On the produce, milk & meat etc. be clear on quantity per week or month. It may sound silly but it's difficult to control later if an employee starts to take advantage. If it's not free, what's the "family discount" for workers?
  - ii. For paid sick leave and vacation formulate an accrual rate. Specify how much can be accrued or "carried-over" .
  - iii. When do benefits terminate? *e.g. Health insurance ends one week after your last day. Housing provided must be evacuated within 2 weeks of last day.*

## 2. **Chain of Command & Advancement**

- a. If possible, supply the crew with a visual flow chart of the chain of command with phone numbers or other contact information with each level. New employees might appreciate one with photos so that co-workers and co-supervisors could be identified more quickly.
  - i. Be clear who this employee reports to, who can assign tasks and who can reprimand. Teens are particularly sensitive to who the "Boss" is, who can tell them what to do and who cannot.
  - ii. Let them know who to go to with specific issues, if you are not available. This will eliminate you being burdened with hundreds of tiny questions someone else could handle.
  - iii. Be clear about position possibilities and limitations.
- b. Will they move 4P with seniority, merit, or will they need to obtain licenses (pesticide applicator, class drivers', etc.) or other formal training documents?
- c. Ask them if they are comfortable with the possibilities or limitations. To avoid frustration, make sure both sides are clear about your future together.

## 3. **Scheduling**

- a. Who does the work scheduling?
- b. What is the process if they need to change their regular schedule permanently or need 1 day off?

- c. How much prior notice do they need to give if it is not an emergency?

## 4. **Appearance**

- a. Dress - if you supply farm shirts, etc., what is the expectation of the employee wearing them?
  - i. You can't give them 1 shirt and expect them to wear it every day. Or, do you just require a particular color/style of shirts and pants.
  - ii. Remember to discuss shoes. Farm work is dangerous for toes and sandals are very popular.
- b. Hair (color, length/restraint)- is the requirement different for males and females? Is it a safety issue? Personally, I really dislike when long hair is not kept back, particularly when food workers (which for all intense and purposes your workers are) are handling it to push it out of their face. Additionally, hands that are busy flipping hair out of faces not doing the work assigned.
- c. Personal decoration (earrings, tattoos, etc.) - What will be allowed, what will not? If one of your workers practices a religion that requires a particular dress or adornment, it is best you make an accommodation for these if you do not want a lawsuit.
- d. Hygiene - unfortunately, this sometimes has to be addressed. It may be safer to start with as part of dress/appearance. Expectations of clothes/body cleanliness may need to be addressed given they are working with food.
- e. Other food-contact issues- spitting, smoking, hand washing, and eating all need to be addressed. Refer to the Department of Health where you have your business for assistance with legal requirements. Then you may decide to have stricter recommendations when you consider what a customer would like to see and what they REALLY wouldn't.

## 5. **Job Tasks**

- a. List specific tasks that will occur and at what frequency. *e.g. Check supplies every 2 hours. Water plants at the beginning and end of your shift.*
- b. Is it their job to be courteous and knowledgeable? If you expect a specific attitude, quality customer service and general knowledge of produce and the

*continued on next page*



farm you need to make them a priority in written policies.

- c. History/experience related to the specific tasks. Are there physical or legal limitations to prospective employees that will prohibit them from fulfilling the position within reason? An example of this would be a potential driver who will be getting their CDL while employed at the farm. Then, to find out, due to his/her driving history, cannot drive for the farm or your insurance carrier will dramatically increase your premiums. Many of these things should probably be handled at the interview or on the applications. Be cautious here. It is easy to enter illegal territory. Keep it task-centered. Right question: Can you lift 75lbs? Wrong question: Do you have any back problems?
- d. Tools and Equipment - Are there specific policies about the use and handling of farm tools/equipment? This may include policies on vehicles, phone, or internet use.

## 6. Training & Trial Period

- a. How much training, when will it begin/end or is it continuous?
- b. How long is the probationary period?
- c. Most policies should include a "employment-at-will" statement which outlines that employees can be terminated or leave at any time.
- d. Include in the policy a process for giving notice.

## 7. Reprimands & Termination

- a. Not only do you need to tell employees what they should do, you need to tell them what will happen when policies are not followed. Many farmers are in perpetual need of workers and are reluctant to reprimand or fire. Get over that feeling. Poor employees cost the business dearly
- b. Outline the process for reprimand and how many reprimands it takes to be fired. Of course some of the infractions require immediate termination such as stealing, property destruction, or bold insubordination.
- c. Will drug testing be used for drivers of forklifts or trucks, or only after an accident? What safety rules MUST be adhered to? Be specific what it takes for an employee to be fired on the spot.
- d. For all employees, be sure to follow through on reprimands and terminations. If employees witness

the keeping on of an employee who was insubordinate, they will lose respect and may also become a problem.

- e. Remember to include anything that might have to do with proprietary information, non-competition clauses.

## 8. Availability of Policies

- a. Have policies available in a public space for questions and reinforcement.
- b. Make sure all farm management members work on the policies and agree with the "rules".
- c. Have them translated into Spanish.

## 9. Other Items to Consider

- a. Farm History and/or Mission Statement
- b. Safety, Health, First Aid and Emergency Procedures
- c. Work Ethics – what parts of your business are not up for discussion with public?
- d. Advances and Loans
- e. Housing
- f. Facilities for employee use (everything from bathrooms to lunch tables to barns for a family party)
- g. Parking
- h. Solicitation of farm property
- i. Visitor Policy
- j. Phone Policy (yours and their cell phone too)

## Other Resources:

- An excellent guide I used in the preparation of this article was a website from the University of California on "Policies and Handbooks"; <http://nature.berkeley.edu/ucce50/ag-labor/7labor/16.htm>. Call Maire at 845-344-1234 if you would like a copy.
- Also available is "Writing an Employee Handbook: A Guide for Farm Managers" from Cornell for \$7.75. Contact Maire at 845-344-1234 for a hard copy.
- NYS Department of Labor. Please check and make sure your policies are legal and nondiscriminatory. Call Geovanny Trivino at 518-421-5247 if you have questions.
- And think about passing your policies by your insurance agent. If you are covered for employee lawsuits they would be very interested in ensuring policies are sound.

## State & Federal Program Opportunities to Improve Soil Health for Vegetable Producers

By Greg Albrecht, Ag Environmental Management (AEM), NYS Dept. of Ag & Markets, and Dale Gates, USDA Natural Resources Conservation Service (NRCS)

*(New funding opportunities are available to assist growers in adoption of reduced tillage and cover cropping practices. Contact NRCS at your local USDA Service Center, &/or county Soil & Water Conservation District staff. ed. C. MacNeil, CVP)*

Improving soil health is the right thing to do for both production and conservation. Moving to a higher level of soil health under intensive vegetable production can be a challenge from both a financial and logistical standpoint, but growers may already be implementing practices toward the goal. An effective soil health strategy is based on the following concepts:

- feeding and diversifying soil organisms through a wider range of crops in rotation and organic matter inputs,
- managing more by disturbing the soil less,
- growing a living root year-round, and
- keeping the soil covered as much as possible.

Further improvement of soil health over time can lead to higher yields, improved product quality, soils more resilient to droughty and wet conditions (weather extremes), reduced pest pressure, improved nutrient recycling, and reduced outside inputs. Producers who have a plan in mind for improving their soil health, and are committed to moving to a higher level, may be at a point where putting a soil health conservation system on the ground aligns well with state and federal program opportunities.

The objective of an effective soil health strategy is to first determine where the weak links are in the current cropping system. Determination of a soil health resource concern may be in the form of visual soil indicators, less than optimum yields, high input cost, soil test results, and/or soil health modeling. Identifying the correct practices, and the extent and technical specifications of each practice needed for success is the next step. Determining a point where each practice can be inserted into a current system in order to be effective and still maintain a producer's objective for crop timing and yield can be challenging especially for vegetable producers. An effective soil health strategy requires increased management and may involve short term increases in labor and equipment cost while fine-tuning the best system. Federal and state/local cost-share programs can significantly help offset some of these upfront costs.

Technical Assistance for soil health planning and implementation is always available from local conservation professionals including local Natural Resources Conservation Service (NRCS), Soil and Water Conservation District (SWCD), Cornell Cooperative Extension (CCE), and private Technical Service Providers (TSPs). It is critical that conservation professionals work with you to get the technical and timing aspects right for the practices needed for a comprehensive, working, soil health management system. Once the technical components of a soil health system are planned, determining if implementation may fit into a cost-share program can be explored.

Whether working with NRCS, a SWCD, CCE, and/or a private-sector TSP, there are a host of practices that can be used on their own, or more often and better yet, together to improve soil health. The table on the next page outlines several of the common practices, often used together to achieve an effective, long-term strategy for soil health.

### Federal Program Opportunities:

The Environmental Quality Incentive Program (EQIP) offered through the NRCS provides significant funding opportunities for soil health practices listed in the table above. EQIP offers payment for implementation of new practices on eligible cropland to address an existing, documented resource concern such as degraded soil health and high erosion rates. Applications are ranked according to the magnitude of the resource concern addressed in a conservation plan. Multiple practices implemented as a system tend to be more effective and rank higher. Payment rates vary depending on the practices to be implemented. For example, implementation of a Cover Crop practice could result in a payment applied to cost anywhere from around \$60/acre to \$100/acre under the 2014 EQIP program. Higher payments are for more complex, higher cost cover crop mixes and where organic seed is required. Payments for implementation of reduced tillage practices range from about \$13/acre to \$16/acre in payments that are applied towards implementation costs. Payments for the cost of implementing a new Conservation Crop Rotation may be in the range of \$14/acre to \$54/acre, again with higher payments for implementation of higher cost systems. Final payment rates for all practices are determined by the resource concerns identified and addressed through the conservation plan. Growers can sign up for EQIP on a continuous basis through NRCS at their local USDA Service Center. In order **to qualify for the 2015 crop year,**

*State & Federal Program Opportunities to Improve Soil Health for Vegetable Producers, continued from previous page*

**EQIP applications will need to be submitted as soon as possible** to meet a funding sign-up deadline sometime in early November.

The Conservation Stewardship Program (CSP) is another Federal funding opportunity administered by NRCS. Land that is cropped annually is eligible, as well as land set aside for natural resource management. CSP offers payments where existing high levels of soil health and other natural resource stewardship can be demonstrated. For CSP, many soil health practices have largely been implemented through a conservation plan in the past and are maintained on the cropland landscape. CSP applications are processed through a conservation measurement tool (CMT). If a grower is meeting a

certain stewardship threshold and is willing to enhance certain practices on their farm with increased management intensity, they could be eligible for a lump sum yearly payment under CSP. The CSP payment is designed to assist with up-front operation and maintenance cost associated with maintaining conservation management systems on farms. Farms that have addressed resource concerns in the past through EQIP, state programs, or on their own with conservation management systems and are maintaining those systems may fit well into the CSP program. CSP applications are also taken on a continuous basis by NRCS at USDA Service Centers. **Sign up as soon as possible** in order to be considered for the next funding cycle.

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Common Conservation Practices Available to Build Soil Health Systems		
Practice	General Technical Requirements	Soil Health Strategy Achieved
Conservation Crop Rotation (328)	Introduction of a new resource conserving crop into the crop rotation. Close grown crops such as small grains qualify.	Increase diversity in the soil biosphere, increase soil cover, allows for increased flexibility to insert diverse cover crops into the over-all system.
Cover Crop (340)	Planting living cover during non-cropped periods of the crop year. Cover crops can be planted for fall, winter, spring, and summer periods. Follow specified seeding rates and planting dates depending on season and type of cover crop planned.	Provide living cover, living roots 24/7. Increase level of soil organic matter, bio-diversity, energy transfer to soil microbes, and nutrient recycling.
Residue and Tillage Management, No-Till/Strip Till/Direct Seed (329)	Change tillage methods from a full width system to one or two pass systems that leave at least 40% of the surface un-tilled.	Decrease soil disturbance, increase residue cover and soil organic matter.
Residue and Tillage Management, Mulch Till (345)	Change tillage methods from full width high disturbance inversion types to lower disturbance full width tillage such as vertical tillage and low disturbance chisels and disks. Generally requires a higher residue crop to gain benefits.	Decrease soil disturbance, increase residue cover and soil organic matter.
Nutrient Management (590)	Apply all plant nutrients and soil amendments according to the 4R concept (right place, right time, right rate, and right form). Requires qualified professional to develop the management plan. Producers needs to document nutrient applications with record keeping.	Increases nutrient cycling efficiency and increases plant condition. Recycles carbon and nutrients from manures and composts. Healthy crops lead to healthy soils.
Integrated Pest Management (595)	Use of prevention, avoidance, and mitigation techniques before making pest suppression decisions. Pest scouting and detailed record keeping required.	Increases plant condition. Healthy crops lead to healthy soils. Minimizes impact to soil microbes from pesticides.
Irrigation Water Management (449)	Scheduling of irrigation water in association with micro-irrigation systems. Water is applied based on plant needs and soil moisture status. Requires development of a plan and detailed record keeping	Reduces irrigation-induced soil erosion and negative impacts on soil structure by over application of irrigation water.



*State & Federal Program Opportunities to Improve Soil Health for Vegetable Producers, continued from previous page*

For more info on federal program opportunities to address soil health and other conservation objectives, visit: <http://www.nrcs.usda.gov/wps/portal/nrcs/site/ny/home/>. Click on *Get Started with NRCS* to review the process of getting financial assistance for good soil management. For the location of the nearest NRCS office go to: <http://offices.sc.egov.usda.gov/locator/app?state=NY>

### State and Local Program Opportunities:

Through their local Agricultural Environmental Management (AEM) programming and with support from the NYS Department of Agriculture and Markets and the NYS Soil and Water Conservation Committee, county-based Soil and Water Conservation Districts (SWCD) offer technical assistance and cost-share opportunities for a wide-range of conservation practice systems, including those beneficial for soil health. The approach is centered on conserving natural resources in concert with the goals of farm businesses. Taking a stepwise approach,

conservation professionals from your local District can help with:

- assessing existing stewardship and opportunities for improvement (Tiers 1 and 2),
- planning conservation systems to improve soil health, conserve soil, and benefit water quality (Tier 3),
- implementing those practice systems (Tier 4), and
- evaluating their performance over time (Tier 5).

Connecting with your local SWCD is the best way to discuss specifics about AEM, technical assistance, cost-share opportunities (such as through the NYS Agricultural Nonpoint Source Abatement and Control Grants Program), and next steps. **Contact your local SWCD as soon as possible to be eligible for 2015 cost-share opportunities.** Contact info for District offices can be found at: [www.agriculture.ny.gov/SoilWater/contacts/county\\_offices.html](http://www.agriculture.ny.gov/SoilWater/contacts/county_offices.html)

## Farmers Market Benchmark Project

One of the tools available to farmers to help determine the success of their business relative to other similar businesses is industry benchmarking. These are measures and standards which a business can use to compare its performance with other similar businesses. For example, greenhouse operations may find that an average labor costs are 21% of their gross sales. By comparing their own labor costs against this measure, the greenhouse operator can determine whether his labor costs are in line with the industry and take steps to reduce these costs.

The Farmers Market Federation of NY and Cornell Cooperative Extension of Broome County are conducting a study of farmers markets with funding provided by the NY Farm Viability Institute,. Our goal is to acquire enough data on both farmers and markets to develop a set of industry standards or benchmarks. These benchmarks, once defined and published, can be used by farmers to analyze their own businesses. By comparing yourself to industry standards, you can evaluate your successes against other farmers with similar products, markets, etc as well as define the areas where you are struggling. Comparisons with industry benchmarks will allow farmers to see their areas of relative weakness and strength and enable them to make critical decisions about how they market their products.

To determine these benchmarks, it is important to survey farmers market vendors to gather data so we can the define industry standards. In fact, 500 farmers and producers are needed to provide enough data to ensure accurate results.

Help to support the farmers market industry by completing the Farmers Market Benchmark Project survey with your farm information. The survey is located at <https://www.surveymonkey.com/s/FMFNYBenchmarks>. This survey is open through December 31, 2014.

The survey will ask for baseline information on your farm, then move on to questions about your market participation. There are questions for each individual market you participate in, up to 5 markets.

While this survey is lengthy, each question is designed to provide data to allow for multiple comparisons against a wide variety of far types, product lines, and markets. It should take you only 10-15 minutes for the baseline information and first market, with an extra 7-8 minutes for each additional market. Thank you in advance for your participation. Watch for results to be published on our website at [www.nyfarmersmarket.com](http://www.nyfarmersmarket.com).

For more information or if you have any questions, please contact Diane Eggert at [degger@nyfarmersmarket.com](mailto:degger@nyfarmersmarket.com) or Laura Biasillo, [lw257@cornell.edu](mailto:lw257@cornell.edu).

## Eastern NY Winter Fruit Schools- Save the date for these upcoming events!

**Monday February 9<sup>th</sup> – Lake George**

**Tuesday-Thursday, February 10-12<sup>th</sup> – Hudson Valley**

The ENY fruit team will be offering four days of winter meetings covering the most recent information on research, horticultural practices, business, new products, and industry topics. Speakers will include Cornell faculty, industry representatives, and other specialists.

More information, including event registration, will be available on our website soon.



## Commercial Vineyard Site Selection Workshops

Having the proper site is a key component of grape production. Whether you're a new grower looking to start a commercial vineyard or an experienced commercial grower looking to expand your vineyard, this workshop is for you. Jim O'Connell will host two free workshops to discuss and provide examples of valuable online resources that can help with site selection.

**Monday, December 15 from 1 - 3pm**

CCE Rensselaer County, 61 State St., Troy, NY 12180

**Wednesday, December 17 from 1 - 3 pm**

Hudson Valley Lab, 3357 US 9W, Highland, NY 12528

There is no fee for these workshops, but space is limited. Please pre-register by Wednesday December 10, 2014 to Jim O'Connell at 845-943-9814 or email [jm098@cornell.edu](mailto:jm098@cornell.edu).

## Save the Date! Workshops on Managing Spotted Wing Drosophila

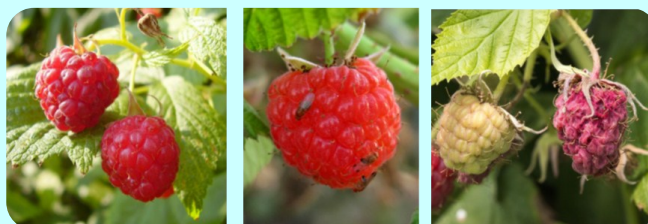
The New York State Berry Growers Association is sponsoring 3 **In-Depth Full Day Workshops about Managing Spotted Wing Drosophila**. For all details, agenda, and registration information go to <http://www.hort.cornell.edu/grower/nybga/swdworkshops/index.html>. Questions? Contact Penny Heritage at NYSBGA at (518) 424-8028 or email [pennyh@nycap.rr.com](mailto:pennyh@nycap.rr.com).

- Wednesday, December 17<sup>th</sup> – Syracuse, NY
- **Wednesday, January 14<sup>th</sup> – CCE Albany Co., 24 Martin Road, Voorheesville, NY 12186**
- Wednesday, March 4<sup>th</sup> – Batavia, NY



Registration for all classes will begin at 8:30 am. There will be 5.5 DEC credits available in several categories.

The agenda will be presented by Cornell researchers and will include SWD biology; SWD management including cultural, biological and chemical management and spray technology; preparing for 2015 – understanding signs and symptoms of SWD infestation, utilizing existing SWD decision making resources and educating your customer base about SWD.



## 2015 Garlic Schools: Two locations to choose from



**Wednesday, February 13th from 10am-3pm**

CCE Saratoga, 50 W. High St, Ballston Spa NY

**Thursday, February 14th from 10 am-3 pm**

Hudson Valley Lab, 3357 US 9W, Highland, NY 12528

This year's garlic schools will have a broad focus on disease, insect and weed pests that growers are already dealing with or that may show up in New York from other parts of the country. Cornell pathologists and growers will discuss the latest research on Aster Yellows, a disease which has devastated the garlic industry in the Midwest, and the soil-borne diseases such as Fusarium. The latest fertility and weed control research will also be presented.

The Cooperative Extension Association  
of Rensselaer County  
Agriculture and Life Sciences Building  
61 State Street, Troy, NY 12180

Non-Profit  
U.S. Postage Paid  
Albany, NY  
Permit #937

## UPCOMING EVENTS

December 15 in Troy, and December 17 in Highland **Commercial Vineyard Site Selection Workshops**  
Free workshops to discuss and provide examples of valuable online resources that can help with site selection.  
*See page 19 for details.*

December-March - 3 Dates and Locations **Spotted Wing Drosophila Management Workshops** December 17 in  
Syracuse, January 14 in Albany, and March 4 in Batavia. Cornell researchers will present information on SWD  
biology and SWD management, spray technology, and preparing for 2015. *See page 19 for details.*

February 9 in Lake George, and February 10-12 in the Hudson Valley **Eastern NY Winter Fruit Schools**  
Research, horticultural practices, business, new products, and industry topics. *See page 19 for details.*

February 13 and 14 **Garlic School** Feb. 13 at CCE Saratoga, and Feb. 14 at the Hudson Valley Lab in Highland.  
Broad focus on disease, insect and weed pests *See page 19 for details.*

January 20-22 **Empire State Producers Expo** Oncenter Convention Center in Syracuse, NY. This show combines  
the major fruit, flower, vegetable, and direct marketing associations of New York State in order to provide a  
comprehensive trade show and educational conference for the fruit and vegetable growers of this state, as well  
as the surrounding states and Eastern Canada. For full details go to <http://nysvga.org/expo/information/>.

February 26 - February 28 **B.E.V. NY 2015: Business, Viticulture, Enology** RIT Inn & Conference Center  
5257 West Henrietta Road, Henrietta, NY 14467. Last year the New York Wine Industry Workshop and the Finger  
Lake Grape Grower Conference joined forces to become B.E.V. NY. This event is focused on providing the New  
York grape and wine industry with the most current and relevant evidence-based information. Presentations will  
be given by Cornell scientists and other regional experts. Registration will be available online in the upcoming  
weeks: <http://flgp.cce.cornell.edu/event.php?id=158>

Cornell Cooperative Extension and the staff assume no liability for the effectiveness of results of any chemicals for pesticide use. No endorsement of any product is made or implied. Every effort has been made to provide correct, complete, and current pesticide recommendations. Nevertheless, changes in pesticide regulations occur constantly and human errors are still possible. These recommendations are not substitutes for pesticide labeling. Please read the label before applying any pesticide. Where trade names are used, no discrimination is intended and no endorsement is implied by Cornell Cooperative Extension.

*Diversity and Inclusion are a part of Cornell University's heritage. We are a recognized employer and educator valuing AA/EEO, Protected Veterans, and Individuals with Disabilities.*