

Preparing High Tunnels for Overwintered Spinach Elisabeth Hodgdon, CCE Eastern NY Commercial Horticulture

Spinach is often referred to as the "money maker" of all overwintered high tunnel crops. Now is the time to get your greens off to a good start as you terminate summer crops and prepare your tunnel for the winter season.

Planting date

It can be a difficult to decide when it's time to transition the high tunnel from summer crops particularly tomatoes—to winter greens. Many high tunnel tomato crops are still going strong right now. However, as the price of tomatoes drops and plants succumb to nutrient deficiency and disease, it's time to think about seeding or transplanting spinach and other winter greens. Keep in mind that the window for planting winter greens following summer crop removal can be narrow, and shortening day lengths and cooler temperatures greatly slow growth as the fall progresses. Seeding spinach into trays for transplanting later can buy extra time for summer crops to remain in place.

The general rule is that spinach should be seeded at least 35-50 days before daylength is reduced to less than 10 hours per day. This timing will depend on your latitude. Ideally, spinach should have a minimum of 4-5 true leaves once daylength reaches 10 hours. At the Cornell Willsboro Research Farm, we found that spinach yields are maximized when the spinach is transplanted at the end of August or early September.

Soil Preparation and Fertility

Ideally, your spinach crop should be planted into soil that is well worked with a pH of 6.5-6.8. Remove rocks and smooth beds if using a pinpoint seeder requiring a flat soil surface.

It seems to me that recommended fertilizer application rates are fairly well defined for field crops. For high tunnels though, especially overwintered crops, they don't seem to be as well understood. Winter growing in high tunnel structures isn't brand new, but it's new enough that I don't think we fully understand what's going on in the soil and how available nutrients are at different times of the year. In cold soils, the microbes and biochemical processes can be slowed down. Last winter, we conducted an experiment to try to determine the optimum nitrogen fertilizer rate for overwintered organically-

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managed high tunnel spinach.



Overwintered high tunnel spinach yield across planting date and Nitrogen fertility treatments.

For field spinach, Cornell's recommended rate for N fertility is 130 lbs/acre. However, anecdotally, we've been hearing about growers applying 200 to even 600 lbs per acre of nitrogen for their overwintered spinach! We question whether that much nitrogen is really needed. Personally, I wonder about unhealthy nitrate accumulation in winter spinach, which is of concern in some places around the world, such as in Europe. We also wonder if growers could save on fertilizer costs by reducing the amount of nitrogen that they apply.

At the research farm, we tested four different rates of nitrogen (0, 65, 130, and 200 lbs/ac) on overwintered spinach using North Country Organic's Pro Booster (10-0-0) and measured crop yield and foliar nitrogen. Pro Booster contains a combination of several animal-based and plant-based meals (such as blood meal and alfalfa meal) that are both quick and slow release. We transplanted the spinach in mid-September and harvested it in fall 2018, late winter and early spring 2019. At each harvest, we also sent leaf samples off in the mail for foliar nutrient testing to determine whether the nitrogen levels in the leaves were within the recommended range.

Surprisingly, we found that there were no statistically significant differences in spinach yield or foliar N between any of our nitrogen treatments, not even between the control with no nitrogen and our highest nitrogen treatment at a rate of 200 lbs/ac (Fig. 1). In all of our foliar testing results, the nitrogen levels within the leaves were within the recommended levels.

Our best explanation for this result is that perhaps the nitrogen was not available to the plants in the cold soil. Or rather, there was residual nutrition in the soil (from turned under sod) that provided enough nitrogen to support spinach growth without fertilizer, buffering the effect of the fertilizer. Our high tunnel was in sod before we turned it over to plant the spinach. However, we can't help but think that spinach does not need upwards of 200+ lbs nitrogen per acre, at least under the growing conditions we have at the research farm. We can't come to any conclusions yet with only one year of our data. We need more information on the growth of spinach at different nitrogen rates on different soils with different fertilizers.

I've heard that some growers in our region have had good luck with around 100 lbs of nitrogen per acre. Eliot Coleman, the winter production guru from Maine, recommends using well-finished compost at a rate of one 5 gal bucket per 10 ft. of 30 inch wide bed, with supplemental alfalfa meal if following a heavy feeding crop such as tomatoes.

Two weeks ago I seeded spinach for this winter's trial. This year, we'll be looking at spinach yield and foliar nitrogen across the same four nitrogen treatments (0, 65, 130, and 200 lbs of nitrogen per acre), using two different fertilizer sources, Pro Booster again, and feather meal. We will be transplanting the spinach at the Willsboro Farm and including a demonstration site at a participating farm in Washington County. We plan to repeat the experiment again the following winter as well. I hope that three years of spinach data can help us refine our recommendations for nitrogen fertility for overwintered spinach. Stay tuned for more results in the future.

Pest management

Aphids can be particularly problematic in overwintered greens. Pests that were problematic in summer high tunnel crops can move



Spinach planted on August 27 (left) versus on September 10 (right) in November 2018. Photo: E. Hodgdon

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to winter crops. To prevent insect pests from becoming a problem in greens, apply an insecticide or release biological control agents into the summer crop before transitioning to greens. Aphidius parasitoid wasp species are not effected by shortening day lengths, and thus can remain active throughout the fall.

The fall is also a good time to think about preparing for increasing rodent pressure in the high tunnel. Succulent plant material in a warm tunnel is tempting for rodents in the winter. For food safety purposes, tin cat-type traps are recommended for use in tunnels (and other areas on the farm) because they don't use bait that can potentially contaminate the crop. Resist the temptation to let cats or dogs into the tunnel for animal control, since they can also present a food safety risk.

With careful timing of planting, soil preparation, and pest management, spinach can extend the harvest season through until holiday markets and live up to its "money maker" reputation.

References and Recommended Reading

Coleman, E. 2009. The Winter Harvest Handbook. Chelsea Green Publishing. White River Junction, Vermont.

Johnny's Selected Seeds. A Guide to Winter Harvest Crops and Overwintering for Spring Harvest. https://www.johnnyseeds.com/ growers-library/vegetables/winter-growing-guide-high-tunnelscheduling.html

New England Vegetable Guide. Spinach. https://nevegetable.org/ crops/spinach

Fall Brood of Allium Leafminer is Out in Full Force!

Teresa Rusinek, CCE Eastern NY Commercial Horticulture

The first ALM flies were spotted last week on Monday, September 9th at our trial location just outside of Kingston in Ulster County. Since then we have found flies and the tell-tale ALM oviposition marks on scallions and leeks at several additional locations in the Hudson Valley. Over the past week, the adult ALM fly population at our trial site has boomed and we are now seeing dozens of oviposition marks per leek plant. The oviposition marks also serve as feeding sites for the adult flies, so all the marks will not necessarily correspond to an egg that hatches into a larva.

Allium leafminer can cause serious economic losses in fall alliums, especially in leeks. If you are planning to use proteknet or row cover to exclude adults, check your alliums for oviposition marks first. If you see ALM flies and oviposition marks on more than just a few plants, it is probably too late to achieve good control with exclusion. However, based on our application timing trial last fall on leeks, there is still time to apply one or two targeted sprays of Entrust or Radiant insecticides over the next 2-3 weeks to get good control of larvae already in the plant. There are other insecticides



labeled for use on alliums for this leafminer. We're also going to have a twilight meeting to review findings from our 2-year trial on organic allium leafminer management at the Hudson Valley Farm



Adult ALM oviposition marks on onion leaf (left). ALM larval mining on scallions; Adult oviposition marks also visible on middle peaf (middle). ALM pupae in Ulster County leek from fall 2016. Note the soft rot in the larval mines (right). Photos: Ethan Grundberg and Teresa Rusinek

Hub on October 3rd. See more details on the page 11 flyer, register online at https://enych.cce.cornell.edu/event.php?id=1262; hope to see some of you there!

The days are getting shorter and the days cooler and I've been getting some calls about harvesting sweet potatoes. I use two factors when determining when to dig sweet potatoes: First, sweet potatoes can be dug at any time roots reach a marketable size which can occur whenever you think they are big enough for your market. They will continue to grow and size until they are either dug or get hit with frost. Which brings me to my second factor in determining when to dig them – they can take a light frost, but need to be dug before soils get into the lower 50° F. Once soils become cold, they will start to produce a white milky substance in the roots that is bitter to the taste. They will also not store as well. Also, keep in mind that sweet potatoes do not reach their full potential flavor until they have been dug and properly cured – so digging them is only half of the work! If you are an Irish potato grower, remember that sweet

potatoes are nothing like your standard Irish potatoes. In fact, they have very little in common. Sweet potatoes are much more delicate and require more attention when harvesting and storing.

Keys to sweet potato harvesting:

1. Do not let the roots get exposed to cold temperatures (less than 50°F), especially soil temperatures. Sweet potato vines can be hit with a light frost, but when roots are exposed to prolonged colder temperatures, they can form an internal white ring of tissue which

The series will be taken a

really decreases the quality of the root. The roots will not store as long or taste as good. That is also why we recommend storing sweet potato roots at or around $55^{\circ}F$.

2. Mowing or cutting the vines will help make the harvest go easier, but it will not help "set" the skins or "toughen up" the skins as it does with regular Irish potatoes. You can mow and dig sweet potatoes the same day and the skins would be no different from if you cut the vines two weeks prior to harvesting.

3. Sweet potato skins are very thin and tender so if you are using a mechanical digger such as a potato digger to harvest your roots, make sure you run the chain as slow as possible and carry as much dirt up the chain as possible to reduce the amount of bouncing that occurs. The thin, delicate skin is easily broken and the extra soil with help cushion its ride up the chain. Any cuts, bruises, or skin abrasions will reduce quality and storability significantly. It might even be worth taking the shakers off your digger to reduce the amount of bouncing of the roots on the rods. The longer the chain, the more dirt that can sift down through the rods exposing the roots which can then allow workers to pull the roots off the digger before they are put back on the ground. This would eliminate one more potential bruising opportunity.

4. What should you put the roots in? I get this question a lot and if possible when picking up your sweet potatoes, use some kind of slotted crate or small bin that will allow air to flow through them. Instruct your workers to gently place them in these containers. If picking up with buckets and dumping into bins, reduce the distance the roots have to fall as much as possible. This again will help reduce cuts and bruises.

5. Do not wash your roots until you are ready to go to market with them! Remove as much dirt as possible when digging, keep them dry and place directly into the harvest containers. These containers should then be taken an area to cure.

6. Sweet potatoes can be dug and sold immediately however, curing is when the roots develop their flavors and starches are converted

into sugars that give sweet potatoes their sweetness and flavor. Curing also allows any cuts, abrasions or bruises to heal which allows for better storability of roots.

7. Ideal curing conditions are a temperature of 85°F with 90% humidity for 5-7 days. It's probably not the temperature that is difficult to maintain, but the humidity level. Wetting the floors several times a day or covering bins with burlap that is soaked in water is an option. However, do not soak the burlap while it is covering the bins – pull it off, soak it and then put it back on

the bins. You want to keep the roots as dry as possible. Not many of us have "curing rooms" so I have seen folks using empty greenhouses this time of year which can work just as well. If using a greenhouse, there are a couple of things that need to be done - floors of the greenhouse should be watered several times a day in order to keep the humidity levels at 90% or again you can use burlap soaked in water to cover them. Fans and the heater thermostat should be set for 85°F. Make sure the heater is turned on to keep the greenhouse as close to 85°F night. Heat might also be required during the day if it is rainy or cloudy. If this is not possible, maintaining 70°F at night will just take a little bit longer to cure, usually between 10 and 14 days. Also, sweet potatoes can also suffer from sunscald like other vegetables so either make the bins or containers are covered (use the soaked burlap as mentioned above) as to not expose the roots to the direct sunlight or have shade cloths in place.

Once your sweet potatoes are cured, store as close to 55 - 60°F as possible, but no lower, and maintain a high humidity. If done properly, sweet potatoes should easily store into February and even into April if conditions are right.

Harvest and Post-Harvest Handling for Fall Vegetables—Leafy and Heading Crops Gordon Johnson, Extension Vegetables & Fruit Specialist, University of Delaware Cooperative Extension (Source: Weekly Crop Update, Volume 27, Issue 25, September 13, 2019)

Fall vegetable harvest will begin soon. For best quality and longevity of leafy and heading crops in the fall, it is important to reduce respiration and water loss from crops immediately after harvest. Harvest is best done in the early morning when field heat is lowest. All of these crops are best stored at near freezing and high humidity.

Broccoli should be harvested when heads have reached maximum diameter and flower buds (beads) are still tight. Bunched broccoli heads are tied together in groups of 3-4 with a rubber band. Broccoli should be hydrocooled or packed in ice immediately after harvest and stored at 32°F (0°C) and relative humidity of 95-100% to maintain salable condition. Under these conditions broccoli should keep satisfactorily 10-14 days.

Cabbage is harvested when heads are tight and have reached the desired size for the variety and spacing. The head is harvested by bending it to one side and cutting the base with a knife. Harvesting knives should be sharpened frequently. The stalk should be cut flat and as close to the head as possible, yet long enough to retain 2-4 wrapper leaves. Extra leaves should be removed. Heads with insect damage and other defects should be discarded. Room or forced air cool harvested cabbage and then store at 32°F (0°C) and a relative humidity of 98-100%. Barrel-type Chinese cabbage (Napa cabbage) is handled similarly but is more fragile and requires a large twist-tie to keep leaves tight.

Cauliflower is harvested while the heads are pure white and before the curds become loose. Most varieties are self-blanching. For those that are not, blanching is achieved by tying outer leaves over the heads when heads are 3 to 4 inches in diameter. Blanching takes about 1 week in hot weather and 2 weeks in cooler weather. The head is harvested by bending it to one side and cutting the base with a knife. Harvesting knives should be sharpened frequently. The stalk should be cut flat and as close to the head as possible with a minimum of wrapper leaves. Cauliflower may cut, wrapped, and packed in the field. Reduce temperatures using room cooling or forced air. Store harvested cauliflower at 32°F (0°C) and a relative humidity of at least 95%. Avoid bruising heads in harvest, handling and packing.

Brussels sprouts are the compact vegetative buds that develop along the stem of the Brussels sprouts plant. They should be harvested when the buds are firm, but not overmature which is indicated by splitting of the outer leaves. Harvest by snapping and trim with a sharp knife. Good quality Brussels sprouts should be bright green, without yellowing or discoloration, and have a firm texture. Brussels sprouts are moderately perishable and can be stored 3-5 weeks at temperatures near the optimum of 32°F and 95% relative humidity. Brussels sprouts are often hydrocooled, but can be force air cooled as well.

Kale and Collards may be harvested by cutting off entire plants near

ground level. Whole plants are then bunched. As an alternative, lower leaves may be stripped from plants and packed individually. Kale and collards may also be machine cut 4-6 inches from the ground when full tonnage has been achieved but before petioles have elongated. Multiple harvests are possible. Because of their perishability, kale and collards should be held as close to 32°F (0°C) as possible. At this temperature, they can be held for 10-14 days. Relative humidity of at least 95% is desirable to prevent wilting. Air circulation should be adequate to remove heat of respiration, but excessive air circulation will speed transpiration and wilting. Satisfactory precooling is accomplished by vacuum cooling or hydrocooling. These leafy greens are commonly shipped with package and top ice to maintain freshness. Kale packed in polyethylene lined crates and protected by crushed ice keeps in excellent condition for 3 weeks at 32°F (0°C).

Lettuce is extremely perishable and needs to be handled delicately and marketed rapidly. Head lettuce is harvested when the heads are of good size (about 2 lb) and solid. Head lettuce is hand cut and trimmed (leave 3 undamaged wrapper leaves on each head) and placed in containers in the field. It is then vacuum cooled or hydrocooled. Specialty leaf lettuces and other greens for bag mixes are harvested by hand or mechanically. Leaf, butterhead and cos/ romaine types are cut and trimmed in the field. Lettuce should be precooled to 34°F (1°C) by hydrocooling soon after harvest and stored at 32°F (0°C) and 98-100% relative humidity for retention of quality and shelf life. At 32°F, head lettuce can be held in good condition for 2-3 weeks. Leaf, cos/romaine, and butterhead lettuce have a shorter shelf life. Lettuce is easily damaged by freezing, so all parts of the storage room must be kept above the freezing point (31.7°F, -0.2°C).

Turnip and Mustard Greens for baby salad mixes are cut at ground level for a single harvest, or 1-2 inches from the ground for multiple cuts. Larger turnip, mustard, and Asian greens may be harvested by cutting off entire plants near ground level for a single harvest, or by cutting 2-6 inches above the ground to allow for regrowth. For processing, greens are machine cut 4-6 inches from the ground when full tonnage has been achieved but before petioles and midribs have become too large. Multiple harvests may be possible. Greens should be transported as quickly as possible to the packing area. Hydrocooling or vacuum cooling are recommended for pre-cooling. Greens should be held as close to 32°F as possible, because of their perishability. At this temperature, greens can be held 10-14 days. Relative humidity of at least 95% is desirable to prevent wilting. Air circulation should be adequate to remove heat of respiration, but not too rapid to speed transpiration and wilting. Greens are commonly shipped with plastic package and top ice. Greens packed in polyethylene-lined crates and protected by crushed ice keep in excellent condition if kept near 32°F but deteriorate rapidly at higher temperatures.

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For fresh market Spinach, Chard, and Beet Tops, plants should be dry prior to harvest to prevent petiole breakage. When harvesting by hand, cut leaves above the crown or soil line and bunch. Exclude yellow leaves and leaves that are dirty with soil. Bunched spinach, chard, and beet tops must be handled very carefully to avoid breakage of plants or bunches during bunching, washing and packaging. Spinach for bag mixes are usually hand harvested, but mechanical harvesters for this purpose are now available. Walkbehind harvesters are also available for smaller acreage growers. Spinach, chard, and beet tops are very perishable and can be stored for only 10-14 days. Crushed ice should be used for rapid cooling and for removing the heat of respiration. Top ice, hydro-cooling and vacuum cooling are other satisfactory cooling methods. Store spinach at 32°F (0°C) and 95-100% relative humidity. Most spinach for fresh market is prepackaged in perforated plastic bags to reduce moisture loss and physical injury. Controlled atmospheres with 10-

40% carbon dioxide and 10% oxygen retard yellowing and extend shelf life.

Maturity of **Green Onions** is determined primarily by size which is largely determined by seeding density. Green or "bunching" onions are selected varieties of white onion (Allium cepa) planted at high density or from the non-bulbing onion group (Allium fistulosum) generally called Japanese-bunching. Harvest when the onions are at ¼ to ½ inch in diameter at the base plate of the immature bulb or shank. Quality green onions have a thin, white shank or neck at least 5 to 7.5 cm (2-3 inches) in length. Green onions are highly perishable and normally marketed over a short period. Lowering and removing the heat of respiration as well as preventing water loss is critical. Package-icing and perforated polyethylene film liners are used cool quickly and maintain quality. Green onions may also be hydrocooled. Green onions are best held at 32°F and 98% humidity. Under these conditions, they will store for up to 4 weeks.

Harvesting Irish Potatoes for Storage Chuck Bornt, CCE Eastern NY Commercial Horticulture

Even though potato harvest has been happening since late July/early August, the bulk of the storage crop is or will be happening soon so here are a few reminders when harvesting potatoes:

- One of the key components to ensuring the highest quality potatoes is proper vine killing. Minimally vine killing should occur 2-3 weeks before harvest to ensure the tubers set their skin, making the tubers more resistant to skinning and bruising. Vine killing can be done many different ways including flail mowing, flaming and chemical desiccants. See Table 1 for a list of chemical desiccants.
- ✓ Keep an eye on soil temperatures! Irish potatoes should not be harvested if the pulp (internal tissue) temperature of the tubers is less than 40 O F. Pulp temperatures below that can increase bruising and internal issues like black spot. I find using a soil thermometer or even a meat thermometer that goes low enough works well to determine pulp temperatures.
- Maintain fungicide applications as long as there is green tissue left exposed including those stumps of vines from flail mowing. These tissues are still susceptible to diseases such as Late Blight.
- Make sure that tubers are not falling from heights greater than 6 inches (this includes digging and handling). This will also help reduce the potential for bruising and black spot (a result of bruising).
- ✓ Do not put harvested potatoes directly into a cold storage. Potatoes should go in a dark area and allowed to cool down gradually and heal or cure up a bit. The best temperatures for this to happen is 60 -65 degrees F for about 5 – 20 days at a high humidity with good air circulation. Cooling them down rapidly

could result in condensation developing and that is not what we want as that can increase rot organisms that might already be there. I know this might be contrary to what most of us think, but carrying a little bit of moist soil into the bins or whatever you are harvesting into is not a terrible thing – and I don't mean tons of soil, but enough that it provides some of the humidity needed to help properly cure your potatoes.

- ✓ After this healing period they can be moved into storage and cooled slowly to 40 F maintaining a high relative humidity of about 90 95%. This should help reduce the shrinking that happens in storage.
- ✓ Do not wash potatoes before putting them into storage, but rather wash what you need as you need them. Do not put warm potatoes into wash water that is 10 degrees colder as this will increase bacterial breakdown. For that matter, you should follow this rule for all produce that is washed!
- Don't dig and plan on storing tubers from wet areas of a field. If possible keep them separate and plan to market those immediately to reduce the chance of brining disease into the storage.
- ✓ Cull hard! Do not put any potatoes that do not look healthy into your storage, and when it doubt, don't put it in!

Please refer to the table on the next page containing labeled desiccants for potatoes in NYS.

Table 1: Labeled Desiccants for Potatoes in NYS								
Product	Rate Per Acre	PHI (Days)	REI (Hours)	Notes				
<u>Aim EC</u>	3.2—5.8 ounces if used alone 2 –5.8 if combined with another desiccant	7	12	Used for pre-harvest desiccation of potatoes. Apply in later stages of senescence. Will also desiccate late season susceptible broadleaf weeds. Adequate desiccation is achieved within 14 days after initial treatment. Two applications may be required if crop is in active vegetative growth when desiccation is initiated. Apply in a minimum of 20 gallons per acre and use a non-ionic surfactant (NIS), methylated seed oil (MSO) or crop oil concentrate (COC). Don not use more than 11.6 fluid ounces per acre per crop season				
<u>Reglone 2L</u>	1 −2 pints per acre	7	24	Used for pre-harvest desiccation of potatoes. May make a second application, 5 days after the first if vine growth is particularly dense. Do not exceed a total of 4 pt/A. Drought at the time of application will decrease desiccation effectiveness. Apply in a minimum of 20 gallons of water per acre and use a non-ionic surfactant at 0.06-0.5% v/v (1/2-4 pt per 100 gal) of the finished spray volume.				
<u>Rely</u> 280	21 ounces per acre	9	12	Not for use in Nassau and Suffolk Counties. Do not split application nor apply more than one application. Do not apply to potatoes grown for seed. Canola, corn, cotton, rice, soybean, and sugar beets may be planted at any time after the application. Do not plant treated areas to wheat, barley, buckwheat, millet, oats, rye, sorghum, and triticale until 30 or more days after an application as a potato vine desiccant. Do not plant treated areas to crops other than those listed in this use precautions section until 120 or more days after application.				
VidaEC	5.5 fl oz if used alone 2.75-5.5 fl. oz. if combined with another desiccant	7	12	Make 1 to 2 applications with a minimum interval of 7 days. Do not exceed 2 applications or 11 fl. oz/A per crop season. Apply with either a non-ionic surfactant or crop oil concentrate in 20-50 gallons of water/acre. Use an approved buffering agent to obtain a pH of 5.0 or less if the water source has a pH greater than 7.5. See label for additional information.				
Paraquat	0.7-1.3 pts	3	24	For Fresh Market Potatoes Only (this includes potatoes that are sent directly from the field to a consumer, grocery store, or processor for use.) DO NOT make more than 2 applications per year. DO NOT use on potatoes that will be stored as tuber decomposition may result. DO NOT apply to drought stressed potato vines. DO NOT exceed 2.6 pts./A per season. Begin application when leaves begin to turn yellow. Immature potato foliage is tolerant to PARAQUAT CONCENTRATE. However, desiccation will not be complete under this condition. A non-ionic or crop oil concentrate is recommended. See label for rates. Use 1.3 pts./A rate where quick vine kill is desired. For dense vine growth, use 2 applications of 0.6 pt/ A. Split applications must be applied a minimum of five days apart.				

Field Highlight: Trialing Wireless Soil Moisture and Temperature Sensors Ethan Grundberg, CCE Eastern NY Commercial Horticulture

With funding from a Specialty Crop Block Grant and an ENYCHP Challenge Grant, Ethan Grundberg and Chuck Bornt were able to purchase a Irrometer IrroMesh wireless soil moisture and temperature sensor system. Each node, mounted atop a 10-foot length of conduit, can support up to 3 soil moisture sensors, a soil temperature sensor, and a rain gauge. The nodes then communicate via radio signal to a central base station. When equipped with a cellular modem, the base station can transmit data from up to 12 nodes to the cloud every hour. That means we can check on moisture and temperature levels in our reduced tillage kabocha squash trials in Orange County from anywhere in the world through the web portal shown below! Grundberg and Bornt are excited to trial other soil moisture sensing systems in 2020 to help better inform growers in the region of newer technologies to improve irrigation management on the farm. If you have any questions about the IrroMesh system, please reach out to Ethan at eg572@cornell.edu or check out the spec sheet online at https://www.irrometer.com/pdf/975/425%20IRROmesh%20System-WEB.pdf

	Description	Moisture				Temperature			2
ID/Chart		MO1	MO2	MO3	MO Range	SOIL (°F)	NODE (°F)		
	Averages	21	14	252	NA	66	51		
B419AD9C	Bare Ground 2	10	0	252	Select Ranges	67.1	51.8		
B4A5FDF0	Barley 2	24	13	252	Select Ranges	66.2	50		
B45FD5C6	Barley 1	48	54	252	Select Ranges	66.2	53.6		
B4EC261A	Bare Ground 1	11	0	252	Select Ranges	67.1	49.1	State of the second	3.55
B4491205	Barley 3	31	34	252	Select Ranges	67.1	51.8	A AND B AND A	
B4324E44	Oats 2	16	4	252	Select Ranges	66.2	49.1		and the second s
B4D38572	Bare Ground 3	11	0	252	Select Ranges	68.9	49.1		
B48F3A2F	Oats 1	14	7	252	Select Ranges	66.2	48.2		5
B402E9DB	Oats 3	20	15	252	Select Ranges	67.1	48.2		

Pre-Planting Garlic Considerations

Crystal Stewart-Courtens, CCE Eastern NY Commercial Horticulture

Getting ready to plant garlic is exciting, but a little anxiety-inducing. The last few years one of the big questions on people's minds is whether or not the weather is going to take a turn and the fields will get too moist to plant, particularly when it needs to happen after all the fall crop harvesting. I'm getting a lot of questions about how early is too early. We really are not sure about the answer with this changing climate. Some of our colleagues in Missouri just completed a two year study on planting dates and had very different results in the two years, with one year supporting early (mid-September) planting and the other year yielding very inconclusive results. I'm going to be planting weekly starting this weekend to try to get a sense of what's working now, and will share the results next year. For now, we are advocating to plant when you can get in with good soil conditions, and if you are planting on the early side, hold off on mulching until the ground cools down or even freezes to minimize top growth.

Now, back to the step by step process to planting garlic this fall.

Step one: Gaze lovingly at your garlic

I think this is pretty self-explanatory.

Step two: mercilessly cull any cloves which are soft

Taking the time to go through seed garlic carefully and culling any cloves which are soft or unusually light will go a long way towards making a healthy, uniform stand possible. But don't stop there--rather than simply tossing soft garlic into the garbage, take the time to open up a bulb now and then and examine the symptoms. Botrytis enters the bulb through the neck, and rots the bulbs from the center outward. Fusarium may attack the basal plate or may cause lesions on the bulb itself. Fusarium is present on almost all garlic at low levels, but can be increased by poor growing conditions (excessive water, poor fertility or poor soil biology), poor post-harvest handling (bruising), and poor

storage conditions (too warm and moist can increase disease dramatically). Surface molds like black mold (aspergillus) can be intimidating, but if the garlic underneath is firm, they are likely not to be an issue for the seed. Know what diseases you have, and how to minimize their growth in the coming year.

What about a seed treatment? We conducted some replicated trials of organic seed and furrow treatments for garlic over the past two years, and did not find that any of them yielded significantly better results for garlic which had Fusarium infections. However, an Oxidate dip for two minutes immediately prior to planting did lead to better yields in our trials, for reasons we don't yet understand.

Step three: Create an ideal growing environment now for better garlic next year

Real talk: creating the right environment for garlic actually starts years in advance, with optimization of rotation to include a three year break from alliums, cover crops to either enhance soil nitrogen or reduce weed pressure, and addition of major soil amendments like lime in previous seasons. The following recommendations are the short-term steps you can take to care for your garlic.

How is the **drainage** in this field? Are you going to need to make raised beds? If planting on plastic, you might want to consider making raised beds well ahead of time in order to ensure that you can finish this task when soil moisture is optimal. Every year I watch growers struggle with bed formation as the fall gets wetter and wetter. This is a slightly riskier proposition for bare raised beds that will remain so or will be straw mulched, but it might end up being worth considering.

Consider the **weed complex** in the area you are planting into. Did you control perennial weeds (I'm looking at you, quackgrass)? Do you know what annual weeds are going to pose the biggest problem, and do you have a plan for control? Winter annuals plague some growers; for others crabgrass or lambsquarter are the main issue. Know when you will need to have strategies in place, and do anything you can at planting.

The goal when creating a fertility plan is to make sure adequate nutrients are available to the garlic when it needs them. Nitrogen is tricky in garlic because soil temperatures dramatically affect availability. Many growers are tempted to put much more than 100 lbs./A down to overcome the issue of cold spring soils. It's an understandable strategy, but chances are very good that much of this N is wasted. So far, we are maintaining the recommendation of 100 lbs. of N, with slow release forms such as compost applied in the fall at planting, and quick release forms like Ammonium Nitrate or Chilean Nitrate (no more than 30% of total N is recommended in this form) applied as garlic emerges in the spring. Our trials have not shown a yield boost with soluble forms above 50 lbs./A of spring applied soluble N. If you apply only soluble forms, consider trying this lower rate and only applying in the spring. Phosphorus and potassium are still recommended applied at the rates recommended by the soil test.



Getting ready to cultivate and re-form garlic beds for early planting. Photo: C. Stewart-Courtens



Harvested garlic. Photo: C. Stewart-Courtens

"Farm Focused" Sexual Harassment Prevention Training Richard Stup, Cornell University

A team of Cornell Cooperative Extension educators recently adapted New York State's model sexual harassment prevention training materials to be more relevant to the farm workplace. NY State DOL reviewed these materials to be sure they meet the content requirements and now they are ready for release. You will find both a presentation that teaches about sexual harassment and set of case studies that illustrate it in more detail. The presentation and case studies are available in English and Spanish and in PowerPoint or video format. You can use the PowerPoints as visual aids if you choose to do the presentation and review the case studies yourself. Or, you can show the video recordings of the presentation and case studies to train your farm employees.

We developed a comprehensive farm sexual harassment prevention resource page (<u>https://agworkforce.cals.cornell.edu/regulations/sexual</u> <u>-harassment-prevention/</u>) on the Cornell Agricultural Workforce Development website. The site contains a step-by-step guide to help a farm business meet New York's requirements for employer sexual harassment prevention policies and training. Find the new resources under Step 5.

A few reminders as you prepare for the training:

- 1. Treat it seriously. You could have someone in your workforce experiencing harassment right now.
- 2. Customize your policy for your farm and put it in place before you do the training.
- 3. Customize the "Sexual Harassment Prevention Poster/Notice" and distribute copies to your employees at the training.
- 4. Be sure that you include an interactive portion such as a question and answer session, or brief feedback survey with your employees. You can pause the videos to create opportunities for interactive questions and discussion.
- 5. Document your training activities.
- 6. All New York employers are required to complete the training each year with all employees. The due date for this first time is October 9, 2019!

By Richard Stup, Cornell University. Permission granted to repost, quote, and reprint with author attribution. The post "Farm Focused" Sexual Harassment Prevention Training appeared first on Cornell Agricultural Workforce Development at <u>http://aqworkforce.cals.cornell.edu/</u>



Allium Leafminer IPM Twilight Meeting

Thursday, October 3rd, 2019

3:00pm—5:00pm

Free to attend. Registration is appreciated.

Hudson Valley Farm Hub

1875 Hurley Mountain Rd Hurley, NY 12443



*Please arrive on time. We will assemble and sign in at the tent at the Farm Hub visitor parking lot. The Farm Hub will provide transportation from the visitor parking lot to the field research site. Visitor vehicles are not permitted in the field.

Learn to identify and manage Allium Leafminer (ALM) in your allium crops.

Eastern New York Commercial Horticulture Specialists Ethan Grundberg and Teresa Rusinek will recap allium leafminer biology and distribution, discuss host preference and provide a tour of the research plots at the Hudson Valley Farm Hub. The research focuses on the use of reflective mulch to suppress ALM ovipostion on allium plants and insecticide application timing trial on leeks. The research aims to provide growers with targeted strategies to efficiently and effectively manage ALM. We welcome growers to bring securely bagged samples in clear plastic bags. Ample time will be provided for discussion.

This meeting will be held rain or shine. 1 DEC pesticide applicator credit is available. For more information, contact Teresa Rusinek at <u>tr28@cornell.edu</u> or 845-389-3562

Register here: https://enych.cce.cornell.edu/event.php?id=1262

Cornell Cooperative Extension | Eastern NY Commercial Horticulture Program

Cornell Cooperative Extension is an employer and educator recognized for valuing AA/EEO, Protected Veterans, and Individuals with Disabilities and provides equal program and employment opportunities.

Upcoming Events

Save the date for our FSMA food safety course this fall!

In search of a food safety course to help your farm meet FSMA requirements in preparation for upcoming inspections? The Eastern New York Commercial Horticulture program will be holding a one-day Produce Safety Alliance Grower Training Course in the Mohawk Valley this October. Join us to learn about federal food safety regulations pertaining to worker training, irrigation water testing, manure application, ins and outs of exemptions, and much more.



What: Produce Safety Alliance Grower Training Course

Who: Growers selling over \$25,000 of fresh produce are required to attend an approved food safety course for compliance with FSMA (Food Safety Modernization Act) federal regulations

When: Wednesday, Oct. 30, 2019 from 8 am - 5 pm

Where: Canajoharie Volunteer Fire Department (75 Erie Blvd, Canajoharie, NY)

How to register: https://enych.cce.cornell.edu/event.php?id=1248

Farm Management Decision Aids

Maire Ullrich, CCE Eastern NY Commercial Horticulture

Below is a link to a variety of spreadsheet-based financial decision tools. The anaerobic digestion tools were created by Dr. Brent Gloy and the others were created by Eddy LaDue, Emeritus W.I. Myers Professor of Agricultural Finance. These tools are available for download. Documentation and instructions for using the tools is contained in the files.

They are available at: <u>https://dyson.cornell.edu/outreach/farm-management-decision-aids/</u>

Tools available include:

- o LEAP—Lease Analysis Program;
- FISA—a complete set of financial statements for agriculture;
- CashPro—annual cash flow projection;
- MoCash—monthly cash flow projection;
- Analyzing Replacement Equipment Purchases;
- BTLEASE—before tax lease program.

Corn Trap Counts								
County	CEW	ECB-Z	ECB-E	FAW	WBC			
Albany	50	0	0	4	0			
Orange	3	0	0	17	1			
Ulster 3	4	0	0	1	0			
Dutchess	4	0	0	1	0			
Clinton 1	17	0	0	6	5			
Clinton 2	0	0	0	2	0			
Washington	17	0	0	2	0			

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