UConn Extension and Department of Plant Science and Landscape Architecture

CROP TALK

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In This Issue:

The use of row cover in a high tunnel system allows for extra protection from the winter conditions--perfect for greens growing as demonstrated here!
Photo: Shuresh Ghimire

UCONN EXTENSION

Call for Pest Monitoring!

Are you interested in collaborating with us for pest monitoring on your farm in the upcoming season? Read below!

UConn Extension Vegetable IPM program is requesting collaboration for pest monitoring for this coming growing season. We are interested in monitoring levels of European corn borer and corn earworm in sweet corn fields, and squash vine borer in squash crops.

From top left clockwise: European corn borer (Photo: University of Missouri IPM); Corn earworm (Photo: J. Obermeyer); Squash vine borer (Photo: UMass Extension Vegetable Program)

We are hoping to collaborate with 10 farms this year. A UConn Extension Vegetable IPM team member will install and maintain the traps, as well as collect trap number data a few times. The agent will instruct collaborators on how to correctly ID moths, get trap numbers, and monitor/maintain traps. Agents will visit participating farms throughout the growing season to collect relevant data.

Interested? Fill out **this form** or follow the link below to be considered for participation. See you in the spring!

https://uconn.co1.qualtrics.com/jfe/form/SV_aeBM8gVexPMypWm

Managing Fungus Gnats and Shore Flies in Vegetable Transplant Production

Leanne Pundt, UConn Extension

Both fungus gnats (*Bradysia* spp.) and shore flies (*Scatella stagnalis*) occur in the moist environments common in greenhouses.

Figure 1: Stockier shore flies and delicate fungus gnats on a yellow sticky card. Photo by L. Pundt

Adult fungus gnats are small (1/8-inch-long), mosquito-like insects, with long legs and antennae. Their two delicate, clear wings have a Y-shaped vein in the wing pattern. Fungus gnat adults are weak flyers and tend to fly in a zig-zag pattern. You may see them moving across the lowermost leaves close to the media surface. Adult females are attracted to fungi so you may also see them near plants with Botrytis sporulation. Females lay their eggs near these areas, so the developing, black headed larvae have access to a fungal food source.

Shore fly adults (are about 1/8 of an inch long), and resemble a small housefly with stockier bodies, shorter legs, and antennae than adult fungus gnats. Shore flies also have five distinct white spots, which adult fungus gnats do not have.Shore fly larvae are white, wedge-shaped and do not have a distinctive head capsule. Shore fly larvae are often found near algae, a primary food source.

Figure 2: Adult shore flies resting on a pepper leaf. Photo by L. Pundt

Shore flies are best managed by preventing algae growth by thoroughly cleaning and sanitizing greenhouse benches, floors, and plug trays before production begins. Avoid overwatering and plant slower growing leeks and onions in smaller plug trays (i.e. 288 celled plug trays) to help the seedlings dry out. Use a well-drained growing media. The beneficial insect-killing nematode, *Steinernema carpocapsae* (Millenium) also helps suppress shore flies.

Fungus Gnat Damage

Fungus gnat larvae are small, (approximately ¼ of an inch long when mature), translucent to white with a distinctive black head capsule. Fungus gnat larvae feed on fungi and decaying organic matter, but also feed upon tender young plant roots. They are most damaging to young seedlings, and plugs. In laboratory studies, adult fungus gnats carried spores of Botrytis, Verticillium, Fusarium and Thielaviopsis as they moved from plant to plant. Spores have also been found in their droppings. But it is unclear how important this disease transmission is in commercial greenhouses.

Biology and Life Cycle

Fungus gnats develop from egg to adult in 21 to 28 days (depending on temperature). Eggs are laid in cracks and crevices in the growing media and hatch in about four to six days. Fungus gnat larvae feed for about two weeks at 72 degrees F and then pupate in the growing media. After four to five days, fungus gnat adults emerge. Overlapping and continuous generations make control difficult.

Scouting

Yellow sticky cards are best placed horizontally at the soil surface, to detect fungus gnat adults. Check and change the cards weekly. Growers develop their own action threshold levels based upon their tolerance levels.

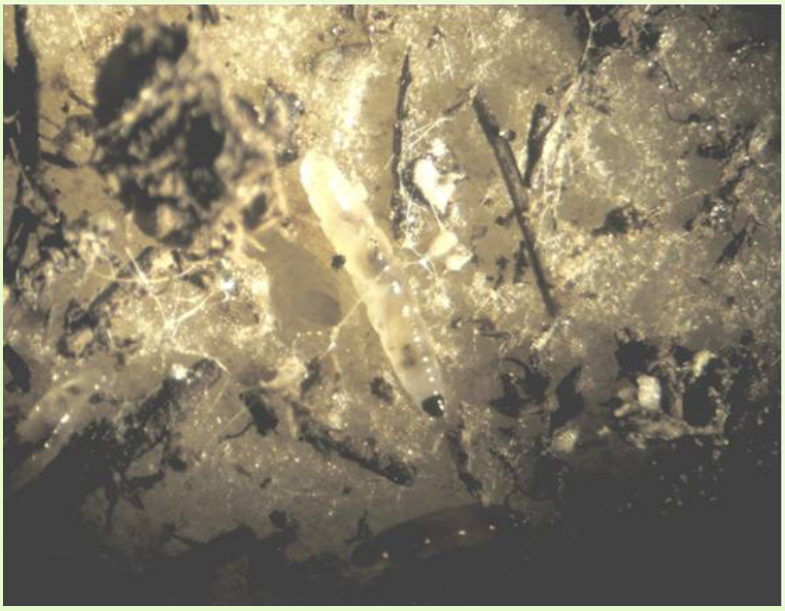

Figure 3: Black headed fungus gnat larvae on a potato disc. Photo by L. Pundt

Cultural Controls for Fungus Gnats

Dry, level, well-drained greenhouse floors help eliminate area where fungus gnats breed.

- Eliminate areas with excess moisture and puddles beneath greenhouse benches.
- Clean up any spilled media on the floor.
- Inspect incoming plugs for fungus gnat larvae or their feeding damage.
- Avoid overwatering and keep plants as dry as possible during production.
- Remove plant debris, and low growing weeds from inside and outside the greenhouse.
- Keep cull piles away from the greenhouse.
- Store the growing media so that it stays dry without tears or openings where native fungus gnats may enter the media bags.
- Avoid using potting mixes with immature composts less than one year old.

Management of Fungus Gnats

Insect growth regulators, and biopesticides can be applied to the growing media to manage fungus gnat larvae. Repeated applications are needed, as most products do not affect the eggs or pupae. Due to resistance issues, there are few products that work effectively against fungus gnat adults.

The biopesticide, *Bacillus thuringiensis* var. *israelensis*, (Gnatrol WDG), is most effective against the young first instar fungus gnat larvae. This bacteria must be ingested by the larvae, after which a toxic protein crystal is released into the insect's gut. Larvae stop feeding and die. Gnatrol is only toxic to larvae for two days. Repeat applications, i.e. two or three applications at high rates, may be needed to provide effective control.

Insect growth regulators containing azadirchtin (i.e. Aza-Direct, AzaGuard, Azatin O, Molt X) may be applied to the growing media to manage fungus gnat larvae. Repeat applications may be needed.

Biological Controls for Fungus Gnats

Commercially available biological control agents (BCAs) include generalist predatory mites, *Stratiolaelaps scimitus*, entomopathogenic (insect-killing) nematodes, *Steinernema feltiae*, and rove beetles, *Dalotia coriara*. All these BCA's should be used preventively and applied to moist growing media. They are also compatible with each other.

Steinernema feltiae are applied as a drench treatment against fungus gnat larvae during cloudy, overcast weather. Repeated applications every two weeks are needed. *Stratiolaelaps scimitus*, feeds on fungus gnat larvae, thrips pupae and shore fly larvae. These predatory mites are best used when fungus gnat populations are low. The rove beetle, *Dalotia coriaria*, is a generalist predator that feeds upon fungus gnat and shore fly larvae in the growing media. The slender, dark brown or black adults are nocturnal, so are best released in the evening. Both adults and larvae tend to hide in cracks and crevices of the growing media.

Additional resources:

Lamb, E. B. Eshenaur, N. Mattson and J. P. Sanderson. 2014. Practical Suggestions for Managing Fungus Gnats in the Greenhouse https://ecommons.cornell.edu/server/api/core/bitstreams/a8bf8cf2-ddf9-4549-b345-1daf8bfacd82/content

New England Vegetable Management Guide – Vegetable Transplants. Updated online December 2023.https://nevegetable.org/vegetable-transplant-production

Pundt, L. 2024. Biological Control of Fungus Gnats. UConn Greenhouse IPM Fact Sheet. https://ipm-cahnr.media.uconn.edu/wp-content/uploads/sites/3216/2024/01/2024biologicalcontrol-of-fungus-gnatsfinal.pdf

Pundt, L. 2023. Shore Flies in the Greenhouse. UConn Greenhouse IPM Fact sheet https://ipm-cahnr.media.uconn.edu/wp-content/uploads/sites/3216/2023/11/2023shorefliesinthegreenhousefinal.pdf

Guidelines for Soil Fertility Management on Vegetable Farms

Shuresh Ghimire, Assistant Extension Educator - Vegetable Specialist, UConn Extension

Soil test measures soil nutrients that are expected to become plant-available. Soils on which vegetables will be grown should be sampled and tested at least once every three years. The pH of soils cultivated for vegetables typically declines (becomes more acidic) gradually because of the removal of calcium, magnesium and potassium ions by leaching and crop uptake, and from acid forming fertilizers. In addition, many of Connecticut's soils tend to be more acidic from the rocks ground and deposited by glaciation. Testing every year gives a more complete evaluation and is appropriate when significant changes have been made in the fertilizer program.

In general, vegetable crops will thrive at soil pH 6.0 to 7, with 6.5 being optimal for most vegetables. Some vegetables do well at pH 5.5; potatoes will tolerate even greater acidity. When soil pH is adequate, the availability of both major and minor nutrients is maximized, and the accumulation of toxic metals is minimized. Managing soil pH is one of the most effective low-cost strategies to ensure better nutrient use by plants.

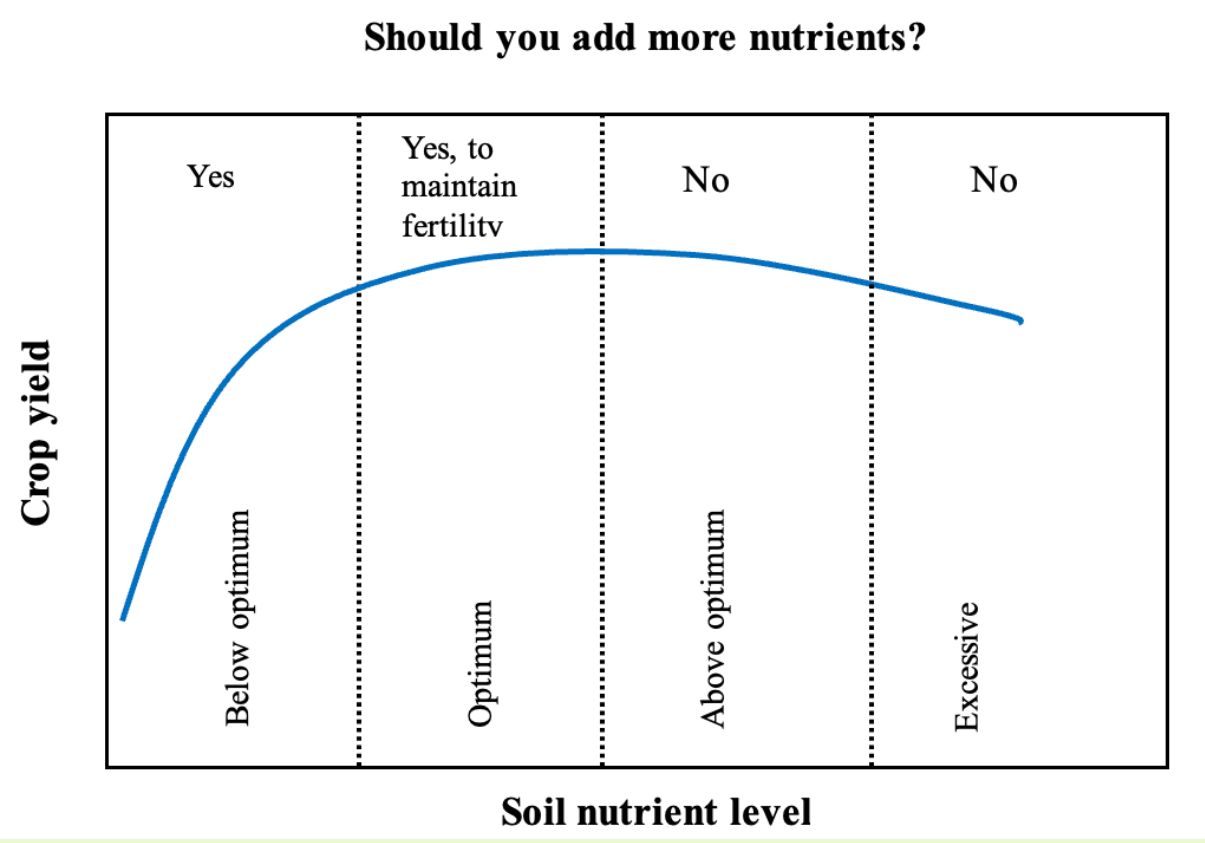

Figure 1. Soil nutrient level vs. probability of crop yield response to nutrient addition. The probability of increased crop yield through nutrient addition is higher when soil nutrient levels are low and lower when soil test values are already high.

Primary plant nutrients: Nitrogen, Phosphorus and Potassium

Nitrogen levels fluctuate widely depending on environmental conditions and can change during soil sample shipping. Therefore, nitrogen is not routinely measured. Pre-Sidedress Nitrogen Test (PSNT) will test for nitrogen levels.

Apply nitrogen close to the time the crop is most active in taking it up. Band either at planting or as a sidedressing to apply nitrogen most efficiently. Split applications and sidedressing are an important adaptation strategy after major rainfall events. Use plastic mulch to limit leaching and enhance mineralization from organic matter. Account for nitrogen from organic matter, cover crops, composts, manure, etc., which becomes available as the soils warm. As soil organic matter decomposes, generally 20 pounds of N/acre/year is released for each percent of organic matter.

Phosphorus is usually tightly bound to soil particles with only small amounts in the soil water. Phosphorus may also occur in soil organic matter. Most phosphorus loss is attributable to surface runoff and soil erosion. Techniques that help prevent nutrient loss to the environment include prevention of soil erosion and avoidance of overfertilization. Many of our soils, especially in fields close to dairy and poultry farms, where large amounts of manure were applied, can display very high phosphorus levels.

Potassium deficiency in vegetables is often found in soils testing high in potassium due to issues with potassium uptake, such as root disfunction, soil compaction, and extremely high fruit demand. To manage potassium in vegetable crops, the keys are to maintain high levels in soils, minimize soil compaction, manage irrigation, and add additional potassium though fertigation or side dressing prior to flowering in fruiting vegetables.

Secondary nutrients: Calcium, Magnesium, and Sulfur

Control of calcium disorders starts with proper liming. Lime provides soil calcium and raises the soil pH. The most important factors to control calcium disorders are to supply a steady rate of water (through irrigation), limit root damage (while cultivating row middles), reduce compaction and waterlogging. Planting at a spacing that allows for good air movement will also help by increasing the vapor pressure deficit leading to increase root uptake. In addition, choose varieties that are less susceptible to these calcium disorders. Generally, varieties with very long fruit are more susceptible to calcium deficiencies.

Foliar calcium applications should be considered a supplement and not a correction for calcium deficiencies and good soil and water management as calcium moves primarily through xylem. Sidedressed calcium has been shown to have positive effects on root crops such as potatoes, particularly in sandy soils. Calcium nitrate or chelated calcium applied through the drip irrigation system can help alleviate calcium disorders in some drip irrigated vegetables such as tomatoes.

Magnesium is often applied from dolomitic limestone or high-magnesium limestones, especially if a pH adjustment is required. If no liming agent is required, magnesium should be applied as a fertilizer source, such as Epsom salt. In an emergency, magnesium may be applied as a foliar spray, but should expect low efficacy.

Most of the sulfur in the upper part of the soil is held in organic matter. Crops grown on soils with less than 2% organic matter often require sulfur fertilization. Soils with higher organic matter content can potentially supply adequate sulfur, but environmental conditions can slow microbial activity and therefore limit sulfur availability, especially in cold soils during late fall and early spring. Manures and compost generally supply ample amounts of sulfur. Cole crops such as cabbage, broccoli, mustard, turnip greens, and radishes remove higher amount of sulfur (30 and 45 lbs/a) than most other vegetables (10-25 lbs/a). Growing deep-rooted cover crops can be beneficial for sulfur and other nutrients availability by preventing nutrient leaching from the soil profile.

Micronutrients: Boron, Zinc, Manganese, Copper, Molybdenum, and Iron

Micronutrients are as important to plants as are the primary and secondary nutrients but required in smaller amounts. Response to micronutrients is rare on soils of reasonable organic matter or on manured soils having pH is in the proper range.

Micronutrient deficiencies are most likely to occur in sandy soils with low organic matter. Of all the micronutrients, boron is most likely to be needed to supplement soil levels for cauliflower, broccoli, cabbage, and beets that are most susceptible to hollow heart caused by boron deficiency. On the other hand, bean, cucumber, garlic, Jerusalem artichoke, lima bean and pea are sensitive to high levels of boron and should not be planted on fields following crops that have received boron application.

Additional resources:

- Interpretation of soil test results by UConn Soil Laboratory
- Soil pH and management suggestions by Dawn Pettinelli and Shuresh Ghimire
- New England Vegetable Management Guide

Managing Cover Crops in Spring

Maggie Ng, Vegetable IPM Outreach Assistant, UConn Extension

It's spring! Well, almost. And many of you have been deep in preparations for this coming season, crop planning, purchasing seed, prepping nurseries, repairing machinery… You might step out one sunny day, look over the farm, and wonder, "What am I gonna do with all this over-wintered rye cover crop?!" An important factor in preparing the farm for spring growing is knowing when and how to terminate cover crops that may have survived the winter. Additionally, if spring cover cropping is included in your plans (look at you go!), then this brief guide is just for you.

Photo 1: Winter rye. Photo: University of Wisconsin-Madison Crops and Soils Extension.

Termination Methods and Timing for Winter Rye

Timing and technique are key for terminating overwintered cover crop. If you planted winter rye last year, it may feel like time is of the essence given how rapid its growth is now! You don't want it to impact your cash crop by taking over and outcompeting what is going in next. The optimal time to start depends on the method used to terminate the cover crop. Methods include rolling/crimping, mowing, tilling or incorporation, herbicides, or burning winter rye.

Rolling/crimping is the use of a specialized roller to flatten the cover crop at certain growth stages. This results in a mat of flattened cover crop, which eventually dies and turns into a layer of organic material on the soil surface. The most effective growth stage of winter rye for rolling/crimping is either flowering or early milk to soft dough (Kornecki & Balkcom, 2020). The estimated planting/seeding window is 3 weeks post rolling/crimping. Rolling before this stage can result in the crop raising back up and shading out planted areas (Crdavids, 2022). The roller/crimping method is gaining attention in no-till agricultural systems, as it involves little to no soil disturbance and an abundance of organic matter. It also helps growers avoid the use of herbicides in cover crop termination. Some farmers are exploring planting directly into crimped winter rye as an organic mulch, particularly with tomatoes and pumpkins. This is a great option for weed control, soil cooling, building soil health, and even providing habitat for beneficial insects.

Photo 2: Terminating cereal rye with a roller-crimper. Photo: M. Barbercheck, Penn State

Other methods that circumvent the use of herbicides are mowing, tilling/incorporation, and burning. Burning is not as widely adopted, as it turns the soil hydrophobic and prevents rainfall from penetrating the soil. Additionally, all stored carbon is released as carbon dioxide, resulting in close to total loss of any sequestered carbon. Mowing can be an effective means of termination, but must be done at the correct time to prevent regrowth and competition with cash crops. The cut must also be below the growing point. For winter rye, which is a grass, the growing point is below the soil surface during the vegetative state and emerges above the soil during flowering (Hill & Sprague, 2023).

Thus, the proper timing for mowing is during flowering before the winter rye goes to seed. Residues from mowing can be left on the surface as a mulch or incorporated into the soil via tilling. The use of silage tarps to cover residue can help expedite decomposition after mowing. Tarps can be kept in place with sandbags and can be left on fields until bed preparation takes place. This can create a less dense mulch on the surface, making it easier to plant directly into the mowed residue. In tillage systems, it is very common to incorporate cover crops using tillage techniques. It is recommended to do so at or before full bloom, and to delay planting for 2 to 4 weeks after incorporation (Barbercheck & Borrelli, 2023).

Lastly, herbicide application, particularly glyphosate, is an inexpensive and effective way to terminate cover crops. The grower can choose to terminate the crop at any time, which allows for maximum biomass to be achieved. This has many benefits, including carbon sequestration. However, this is only an option for conventional growers, and glyphosate has been shown to be neurotoxic to animals and humans (Costas-Ferreira, et al., 2022), and growers may prefer to avoid its use.

Winter rye has been known to have allelopathic effects. This is one reason that it is chosen for weed suppression, as its allelochemicals can prevent germination of weed seeds and hinder growth of weed plants for a few weeks after termination. However, it is plant-specific and does have the potential to affect cash crop growth. Research has shown that allelopathic impacts are based largely on seed size, resulting in smaller seeds being more effected than larger seeds. Terminating winter rye 2 weeks prior to planting can help alleviate allelopathic effects (USDA, 2016).

Spring Cover Crops: The Basics

Planting spring cover crops in March or April can aid in weed control, building soil health and fertility, providing habitat for beneficial insects, and preventing soil erosion in the start of the growing season. They can be grown in areas where crops are not set to be planted until May or June. There are multiple options for spring cover crops, including mustards, spring oats, red clover, field peas, and annual ryegrass. You can also use mixtures of cover crop seed. In that case, you would reduce the seeding rate of the crops you'd like to mix. See the table on the next page for seeding rates for each cover crop type.

Cover Crop Type	Seeding Rate (lbs/acre)
Field peas	30-60
Mustards	10-20
Spring oats	90-120
Annual ryegrass	20-30
Red clover	10-16
Seeding rates sourced from G. Johnson, UDel Cooperative Extension	

Cover crops are typically broadcasted for direct sowing, and are oftentimes rolled into the soil to ensure proper soil-to-seed contact. Adequate soil moisture and exposure to sunlight are necessary for germination, so make sure to water thoroughly and choose a spot out of the shade! Germination times depends on the cover crop type and your goals for usage. For example, if you want a quick cover for weed suppression and aren't as concerned with nitrogen fixation, you will want to choose an oat (e.g. spring oats) over a slower-growing legume (e.g. red clover).

There are some incredibly useful tools available online to aid in cover crop planting and decision making. There is a specialized Cover Crop Species Selector, generated and hosted by Precision Sustainable Agriculture. First, you would choose your state, field location, site conditions (drainage class and flooding frequency), goals for cover cropping in order of importance, and your cash crop planting window (planting and harvest dates). The tool will then generate a table of cover crops that meet your set criteria. The table will also include growing windows for the specific cover crop type.

On the next page is an example of a table of suggested cover crops meeting three goals: 1) Nitrogen fixation, 2) Improving Soil Organic Matter, and 3) Outcompeting Summer Annual Weeds for a local Tolland CT location. Red clover is the #1 recommended option, with yellow sweetclover following as a close 2nd. Try out this tool and see what you get!

The USDA also has a Cover Crop Chart that details crop type, growth cycle, growing season, water usage, and plant architecture for a selection of cover crops. For example, crimson clover is indicated as an option if you want a legume for nitrogen fixation to smother weeds during the cooler part of the season. It is an upright-spreading annual legume with medium relative water usage. Click the link to find the chart!

Termination of spring-planted cover crops can be achieved by any of the methods mentioned earlier in this article. Terminate spring-planted cover crops 2 to 3 weeks prior to planting. Prepare summer planting areas as you normally would. Happy cover cropping!

Resources:

- USDA Cover Crop Chart Webpage: https://www.ars.usda.gov/plains-area/mandan-nd/ngprl/docs/cover-crop-chart/
- Cover Crop Species Selector: https://cals.cornell.edu/field-crops/about/resources/web-based-tools

Additional Resources:

- Barbercheck, M., & Borrelli, K. (2023, April 12). Terminating Winter Cover Crops in Organic Crops. PennState Extension. Retrieved February 27, 2024, from https://extension.psu.edu/terminating-winter-cover-crops-in-organic-crops

- Crdavids (2022, May 19). Winter Rye Cover Crop: When to terminate? A UVM BLOG OUT CROPPINGS: IMPORTANT CROP NEWS FROM THE FIELD! Retrieved February 26, 2024, from https://blog.uvm.edu/outcropn/2022/05/19/winter-rye-cover-crop-when-to-terminate/

- Costas-Ferreira C, Durán R, Faro LRF. (2022, Apr 21) Toxic Effects of Glyphosate on the Nervous System: A Systematic Review. Int J Mol Sci. ;23(9):4605. doi: 10.3390/ijms23094605. PMID: 35562999; PMCID: PMC9101768. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC9101768/

- Hill, E., & Sprague, C. (2023, March 31). Cover Crop Termination. MSU Extension. Retrieved February 27, 2024, from https://www.canr.msu.edu/resources/cover-crop-termination

- Johnson, G. (2023, March 3). SPRING PLANTED COVER CROPS. UDel Cooperative Extension. Retrieved February 27, 2024, from https://sites.udel.edu/weeklycropupdate/?p=21643

- Kornecki, T. S., & Balkcom, K. S. (2020). Planting in Cover Crop Residue (pp. 119-121). Sustainable Agriculture Research and Education (SARE). https://www.sare.org/publications/conservation-tillage-systems-in-the-southeast/chapter-9-planting-in-cover-crop-residue/cover-crop-termination-methods/

- Majewski, C. (2022, May 1). Cover Cropping for the Home Garden. University of New Hampshire Extension. Retrieved February 27, 2024, from https://extension.unh.edu/resource/cover-cropping-home-garden-fact-sheet

Spotlight: Unique Fruit Crops for Farm Diversification

Evan Lentz, Assistant Extension Educator - Fruit Production and IPM

If there is one thing that was made clear in the 2023 growing season, it's that there is a well-established and increasing need for our attention towards developing and maintaining whole farm resiliency. Highly diversified farms enjoy a great deal of innate resiliency simply due to their mix of commodities. This process of hedging your bets allows for a greater degree of freedom when it comes to marketing and ensures flexibility when enduring pest, climate, or other production related challenges. Diversification can take many forms: utilizing new varieties, expanding into a new commodity group, or employing a new production system. Each requires its own unique level of investment. One unique opportunity for diversification is to explore alternative, novel, or niche fruit crops. In the last edition of Crop Talk, some of these fruits were highlighted. Now, we'll take a deeper look at two of the most appealing contenders for diversification.

Haskap - *Lonicera Caerulea*

Image: Penn State Extension

Haskaps, also known as Honeyberries, are a small bush-type honeysuckle native to regions of North America, with small blue elongated fruit and a flavor described as a combination between a raspberry and blueberry. This crop is slowly gaining traction in the region. They are hardy to Zone 1, are tolerant of most soils, and can be grown in partial sun with the understanding that there will be less fruit production. They are even well suited to urban environments.

Plugs/whips should be planted at least 3 feet apart. Soils should be kept moist, and competition should be kept to a minimum in the first few years. Even grass within 3 feet of plants can impact establishment. Mulching around young plants can help with weed and moisture management. Supplemental irrigation, about 1" per week, can help to establish plants. Once mature, they will not require as much water. Compost is recommended, especially for young plants, as haskaps have a relatively low nutrient requirement and are quick to take up nutrients from the soil. The recommended pH range of this crop is from 5.0-8.0.

Flowering occurs in May with harvest following in June/July. Haskaps are self-incompatible so you will need more than one variety. Below are the results from a haskap variety evaluation done at the University of Montana. This table highlights some of the available varieties, where they were sourced, their relative yields across 5 years, fruit size, and sugar content.

Cultivar	Harvest Time*	Source	Yields (lbs/plant)						Berry Weight (g)	Sugar (ºBx)
			2016	2017	2018	2019	2020	Total		
Blue Goose	Early	Berries Unlimited	0	0.1	0.2	1.9	1.3	3.5	0.6	14.4
Sugar Mountain Blue	Early	Russia	0	0.5	0.3	3.2	1.8	5.8	1	16.7
Blue Corn	Early	Berries Unlimited	0	0.9	NA	NA	NA	0.9	0.8	14.6
Wild Treasure	Early	Berries Unlimited	0	0.4	0.5	3	1.6	5.5	0.8	16.3
Aurora	Mid	U. of Saskatchewan	<0.1	1.2	3.7	7.4	7.1	19.4	1.7	16
Indigo Gem	Early	U. of Saskatchewan	0	1.2	4.9	4.7	3.7	14.5	1.1	17.7
Borealis	Mid	U. of Saskatchewan	<0.1	1.8	4.9	8.8	7.6	23.1	1.5	16.2
Kaido/Honeybunch	Late	M. Thompson	0.1	3.2	3.7	4.6	6.3	17.9	1.5	17
Solo	Late	M. Thompson	0.2	2	5.1	8	6.8	22.1	1.3	16.3
Chito	Late	M. Thompson	0.4	3.3	3.6	3.4	6.2	16.9	1.3	13
Keiko	Late	M. Thompson	0.3	2.9	4.6	7.7	8.1	23.6	1.3	15.5
Taka	Late	M. Thompson	0.1	3.3	4.5	3.9	3.7	15.5	1.5	13.9
Kawai	Late	M. Thompson	0.2	3.9	4	6.4	4.9	19.4	1.5	13.6
Tana	Late	M. Thompson	0.2	3.9	7	12.8	13	36.9	1.4	14.7
85-19	Late	M. Thompson	0.2	4.4	8.7	12.1	14.9	40.3	1.3	16.8

Note: OSU plants were larger at planting in 2015 (2 years older) and are still larger than other varieties. This is, in part, why they had higher yields. Numbered varieties are not yet commercially available. We are also evaluating 'Boreal Blizzard', and 'Boreal Beauty', and they produced 2.6 lbs. of fruit per bush in 2020. 'Honeybee', 'Strawberry Sensation', and 'Blue Moose' are planted outside of the trials.

**early harvest=third week of June, mid harvest=last week of June-early July, late harvest=first two weeks in July.*

Table - University of Minnesota

I'll make sure to keep everyone posted on the progress of our local growers who are exploring this new crop. For more information, please check out these following resources:

- University of Saskatchewan, University of Montana Extension, or Penn State Extension

Kiwiberry – *Actinidia arguta*

Image: UNH Extension

Kiwiberry, also known as Hardy Kiwi, is a woody climbing vine that produces small hairless fruits with a taste like a mild, less acidic kiwi. This crop is also slowly gaining traction, with some Connecticut farmers having already participated in variety trials. As its name suggests, Hardy Kiwi is cold hardy down to about -25°F, unlike their larger, hairy counterparts. This makes them an ideal candidate for production in our region. However, this crop is still sensitive to low spring temperatures. Kiwiberry is a diecious crop, meaning that growers will need a mix of male and female plants to set fruit (a ratio of 1 male to 6-8 females is recommended) and should expect fruit production on female plants only.

Image: UNH Extension

This crop requires well-drained soils, full sun exposure, a soil pH range of 5.5-6.5, and irrigation for the first 4 years at least. Due to its vining habit, a support system will be required. The recommendation is to utilize a T-bar trellis, shown here. Although initial costs may be high, newly planted vineyards can expect to be productive for 20-30 years.

For more information on this crop, check out the online production guide or these Extension websites: NC State, OSU, and UNH Breeding Program.

If anyone is seriously considering either of these fruit crops, please let me know how I can assist in getting you started.

Bacterial Plant Pathogens and Their Overwintering 'Bug' Refuges

Dr. Ana Legrand, Extension Assistant Professor, Department of Plant Science and Landscape Architecture, UConn

Several plant pathogens get around easily with the help of insect vectors. These insects carry and transmit the pathogen to healthy plants either by feeding and directly delivering the pathogen into the plant or by simply depositing contaminated frass (excrement) near feeding wounds which facilitate pathogen entry to plant tissues. Adding insult to this injury is the fact that some pathogens also gain an overwintering refuge in their insect vectors. Here are three examples of bacterial pathogens that make it through the winter within their insect vectors.

Bacterial wilt of cucurbits and cucumber beetles

Bacterial wilt is a significant problem for cucumber and muskmelon production. It is also detrimental to squash and pumpkin crops. The disease is caused by the bacterium, *Erwinia tracheiphila* which is transmitted by both the striped cucumber beetles (*Acalymma vittatum*) and spotted cucumber beetles (*Diabrotica undecimpunctata*). The beetles carry the bacteria in their guts and pass it on through their frass. Bacteria then gain access at beetle feeding wound sites and then spread to xylem vessels involved in water transport. There they multiply and plug the vessels resulting in plant wilting. Cucumber beetles pick up the bacteria when they feed on infected plants. To make matters worse, infected plants are more attractive to the beetles ensuring continuation of this cycle. Striped cucumber beetles overwinter in our area and the pathogen overwinters inside the beetle gut. Beetles overwinter under soil and plant debris near cucurbit fields and they become active in early spring.

Striped cucumber beetle. Photo: Clemson University - USDA Cooperative Extension Slide Series, Bugwood.org

Bacterial wilt. Photo: Jim Jasinski, Ohio State University Extension, Bugwood.org

Plant hosts for *E. tracheiphila* bacteria include pumpkin, gourd, squash with cucumbers and muskmelons as the most susceptible hosts. It is important to protect young plants because seedlings at the cotyledon and 1- to 3-leaf stage are more susceptible to infection than older plants. For more information on bacterial wilt and management visit this UConn IPM fact sheet https://ipm.cahnr.uconn.edu/bacterial-wilt/.

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Stewart's wilt and the corn flea beetle

Stewart's wilt is caused by the bacterium *Pantoea stewartii* which is primarily spread by the corn flea beetle *Chaetocnema pulicaria*. The flea beetles acquire the pathogen while feeding on infected corn plants. The pathogen gets to the insect's gut and from there it is passed on to healthy plants through contaminated frass deposited near beetle feeding wounds. The bacteria colonize the xylem vessels causing wilting and this can be followed by a general browning and water soaking of the stalk tissue. The disease has two different phases on corn. The seedling wilt phase occurs when young plants are infected systemically. The leaf blight phase occurs after tasseling. Discolored and necrotic tissue streaks are observed along the leaf.

Corn flea beetle. Photo: Frank Peairs, Colorado State University, Bugwood.org

This disease causes significant yield loss in susceptible sweet and field corn cultivars. In fact, the severity of this disease depends on the combination of cultivar susceptibility with degree of disease incidence during the previous season and the winter temperatures. The beetles overwinter under leaf litter and other protected areas near fields and the bacterial pathogen overwinters within the corn flea beetle. Colder winter temperatures reduce the survival of these beetles. A disease forecasting model refined by Iowa University uses the average winter temperature during December through February to predict risk of Stewart's wilt in the leaf blight phase.

Stewart's wilt.Photo: Gary Munkvold, Bugwood.org

The number of months with average temperatures above 24°F predict the risk as follows: 0 months then risk is negligible, 1 month leads to low-moderate risk, 2 months give moderate to high risk and 3 months predict high risk. The Northeast Regional Climate Center presents risk maps based on this model at this link: https://www.nrcc.cornell.edu/industry/grass/stewart_maps.html.

The use of disease resistant cultivars is highly recommended and the New England Vegetable Management Guide sweet corn section (https://nevegetable.org/crops/corn-sweet) presents more information on sweet corn cultivars and degree of disease resistance.

Cucurbit yellow vine disease and the squash bug

Cucurbit yellow vine disease (CYVD) of pumpkin and squash is caused by *Serratia marcescens* bacteria. This disease is characterized by leaf yellowing, wilting and eventual plant death resulting from a blockage of water and nutrient transport. The bacteria get transported around by the squash bug, *Anasa tristis* (DeGreer), a key pest in our area. The squash bug feeds on plants using piercing–sucking mouthparts that penetrate plant tissues toward the vascular bundles. These true bugs damage cucurbits through withdrawal of plant sap, resulting in wilting, delayed maturity, reduced yield or plant death. *S. marcescens* bacteria overwinters in the dormant insect vector thus enabling transmission to plants the following season. CYVD has been found in few isolated locations in Connecticut and Massachusetts and it is thought not to be widespread. Symptoms like wilting and yellowing appear similar to squash vine borer attack except that the borer will leave orangish, granular frass waste by holes in the stem.

Squash bug adult. Insert: squash bug eggs. Photos: Ana Legrand, UConn

Reduction of overwintering sites for the squash bug is an important preventive action to reduce their numbers. Crop residue left in the field and other protected areas near previous plantings provide shelter for overwintering adults.

Yellow vine decline symptoms on pumpkin. Photo: Jim Jasinski, Ohio State University Extension, Bugwood.org

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Announcements & Events

2024 Climate Smart Field Days

As the climate continues to keep us on our toes, and growing seasons oscillate between droughts and heavy rain, several farmers are taking the lead implementing innovative strategies to mitigate potential damage from these new weather patterns. Some climate smart strategies involve only slight changes in how farms are managed, while others require new infrastructure, tools and inputs. Fortunately, there are several financial and technical resources available to help you implement climate smart strategies on your farm. UConn Extension's Solid Ground Program is teaming up with CT NOFA and the New CT Farmers Alliance to host 5 Climate Smart Field Days this spring. These free events will offer training on soil health and management, acquiring high tunnels and using them, energy efficiency, and water management.

Climate Smart Field Day will be held at different farms throughout the state, featuring a tour led by the farm operator that gives growers a first-hand look at how they implement climate smart practices. Participants will be able to ask questions specific to their own operations and brainstorm alongside other farmers that might be experiencing similar problems. In addition, USDA-NRCS staff, Extension Educators, and conservation experts will be available at a selection of these trainings to answer further questions regarding best practices and to address specific challenges farmers might be facing in implementing new methods. Each event will include updates on climate smart grants as well as new resources to help farmers interested in transitioning to organic certification.

Funding for the 2024 series of Climate Smart Field Days comes from USDA-NIFA-BFRDP Award No. 2023-49400-40870 and USDA's Transition to Organic Partnership Program.
Learn more and register at: https://solidground.extension.uconn.edu/trainings/

HIGH TUNNELS: HOW TO GET AND USE THEM
At Starlight Garden Farm, Durham
Date: Sat. April 6
Time: 10am-2pm

SAFE & EFFICIENT WATER MANAGEMENT
At Russo's Roots, Canterbury
Date: Sun. April 28
Time: 1 pm-4 pm

ENERGY EFFICIENCY ON THE FARM
At Four Root Farm, East Haddam
Date: Sun. May 5
Time: 1 pm-4 pm

SOIL HEALTH ASSESSMENT 3 WAYS-BIOLOGICAL, CHEMICAL, & PHYSICAL
At Sunset Farm, Naugatuck
Date: Sat. May 11
Time: 10am-2pm

SOIL HEALTH BENEFITS OF NO-TILL PRODUCTION
At Sweet Acre Farm, Lebanon
Date: Sun. June 9
Time: 1 pm-4 pm

2024 Climate Smart Field Days

The 2024 Urban Farmer Training Program will be held online this year. If you are interested in joining the Urban Farming this program may be for you. Topics that will be covering include site selection, soils, vegetable and flower production, season extension, the business of farming, etc. For more information please see the flyer and if you have any questions contact Jacqueline at jacqueline.kowalski@uconn.edu

UCONN | COLLEGE OF AGRICULTURE, HEALTH AND NATURAL RESOURCES
EXTENSION

2024 Urban Farmer Training Program

The 2024 Urban Farmer Training Program will be offered online. The next course runs March 5-May 7, 2024 on Tuesday evenings from 6:30-8:30 pm.

Topics include:

- Working with the city and zoning
- Site selection and modification
- Food justice in our communities
- Intensive vegetable and flower production
- Integrated pest management (IPM)
- Season extension
- Business of farming
- Selling your product
- Resources available to urban farmers

To sign up on the interest list:

https://uconn.co1.qualtrics.com/jfe/form/SV_2blWs4ZhQD10Uw6t

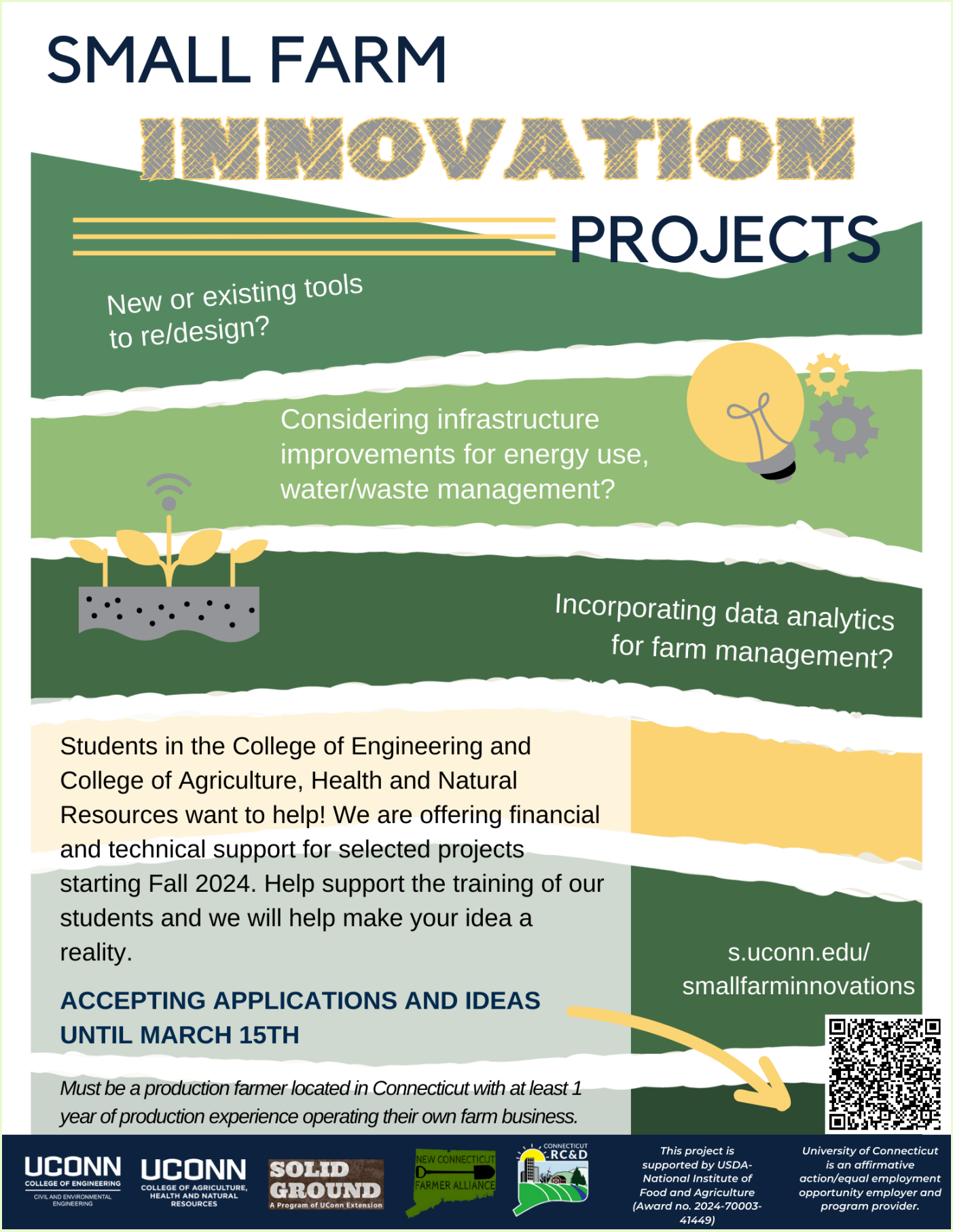
or

Cost: $150, includes course materials and one soil test
Optional growing season field experience

UConn Extension - 1376 Storrs Road, Storrs, CT 06269-4134
s.uconn.edu/extension | extension@uconn.edu | 860-486-9228

UConn complies with all applicable federal and state laws regarding non-discrimination, equal opportunity, affirmative action, and providing reasonable accommodations for persons with disabilities.

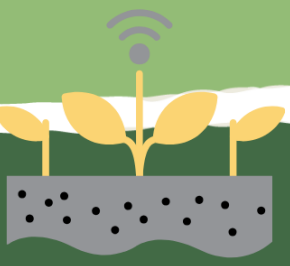
Small Farms Innovations Project



PROYECTOS DE INNOVACIÓN EN PEQUEÑAS GRANJAS

Herramientas nuevas o existentes re/diseñar?

Considerando la infraestructura mejoras para el uso de energía, ¿Gestión del agua/residuos?



Incorporación de análisis de datos para la gestión agrícola?

Los estudiantes de la Facultad de Ingeniería y Facultad de Agricultura, Salud y Naturaleza ¡Los recursos quieren ayudar! Estamos ofreciendo financiera y soporte técnico para proyectos seleccionados a partir del otoño de 2024. Ayude a respaldar la capacitación de nuestros estudiantes, y le ayudaremos a hacer de su idea una realidad.

ACEPTACIÓN DE SOLICITUDES E IDEAS HASTA EL 15 DE MARZO

Debe ser un agricultor de producción ubicado en Connecticut con al menos 1 año de experiencia en producción operando su propio negocio agrícola.

s.uconn.edu/smallfarminnovations

UCONN COLLEGE OF ENGINEERING CIVIL AND ENVIRONMENTAL ENGINEERING

UCONN COLLEGE OF AGRICULTURE, HEALTH AND NATURAL RESOURCES

SOLID GROUND A Program of UConn Extension

NEW CONNECTICUT FARMER ALLIANCE

CONNECTICUT RC&D

Este proyecto es apoyado por USDA Nacional Instituto de Comida y Agricultura(Premio n° 2024-70003- 41449)

Small Farms Innovations Project Cont.

Farmers are always finding ways to make their lives a little easier- to harvest their crop faster, to weed in a more efficient way, to move things around that won't destroy their backs. Well, now you could come up with that useful tool you've been dreaming about and get some of that technical help that has been holding you back! The UConn School of Civil Engineering and CAHNR is partnering up with UConn Extension's Solid Ground Program, New CT Farmers Alliance and CTRC&D to offer make these farm inventions a reality through the Small Farm Innovations Project. Ideas could include a way to scale down larger farm equipment for the small farmer, making an existing innovation more durable, a new farm management tracking system, or upgrading infrastructure on your farm (such as a composting, anerobic digesters, runoff management, water treatment systems, renewable energy, etc.)

Farm projects will be chosen via an application process that helps us understand your ideas and if they fit within the program. A participant that is selected can expect weekly or twice monthly meetings between you and a student team (3-5 engineering and agriculture students) virtually or in person as needed, participation in surveys and an interview related to your experience and participation in Farm Hack event if relevant for your project (hosted by New CT Farmer in late January each year).

To help you make this project feasible, participant stipends are available to support your time investment over the course of the nine-month academic year. The time frame where most of your effort is expected is approximately October 2024 through March 2025. Technical support and financial resources are available to support supplies or other needs for the project (up to $2000).

So if you have a genius idea that has been knocking around in your head for months, apply now! We'd love to help you make your famer more successful by bringing your ideas to reality.

Find out more and apply here: https://vadas.engr.uconn.edu/small-farm-innovations/

Scan me!

New England Vegetable Guide Updates

Pepper transplants with N. cucumeris *sachets for use against thrips*

If you are starting vegetable transplants, the online section of the **New England Vegetable Guide** has been updated. (However, if you have the print version it has not yet been updated).

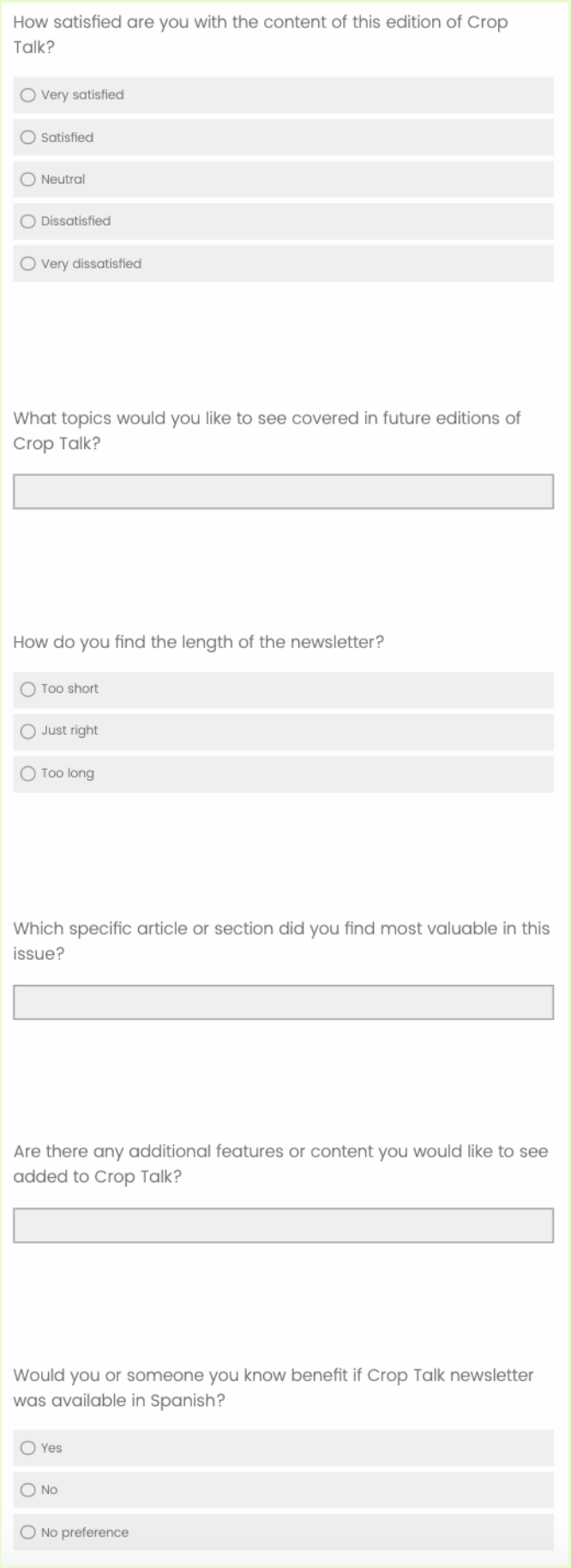
Go to this link: https://nevegetable.org/

And see the section on **Vegetable Transplants** for information on:

- Growing media
- Plant nutrition (conventional and organic)
- Plant culture, use of biological control agents
- Insect and disease management
- Plus insecticides and fungicides labeled for vegetable transplants grown in the greenhouse.

Section Editor: Leanne Pundt

Crop Talk Survey



How satisfied are you with the content of this edition of Crop Talk?

- Very satisfied
- Satisfied
- Neutral
- Dissatisfied
- Very dissatisfied

What topics would you like to see covered in future editions of Crop Talk?

How do you find the length of the newsletter?

- Too short
- Just right
- Too long

Which specific article or section did you find most valuable in this issue?

Are there any additional features or content you would like to see added to Crop Talk?

Would you or someone you know benefit if Crop Talk newsletter was available in Spanish?

- Yes
- No
- No preference

We would appreciate if you could take a few minutes to complete a short survey. This survey focuses on our Crop Talk newsletter, and any feedback you provide will be used to help improve future newsletters!

Click the image to the left to find the survey.

Or scan this code!

s.uconn.edu/croptalksurvey

Thanks for reading and for your participation. :)

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