UCONN EXTENSION AND DEPARTMENT OF PLANT SCIENCE AND LANDSCAPE ARCHITECTURE



CROP TALK

Volume 17, Issue 2 — November 2021



I will be retiring in mid-January 2022 and moving on the next chapter in my life. I have thoroughly enjoyed working with many of you over these past many years and will miss those interactions. However, Pete and I are looking forward to travelling (get COVID and wildfires out west under control), more time with family and our many other interests. Yes, we plan to keep farming so I will see many of you at upcoming meetings. I wish you all the best in the upcoming season. -Mary

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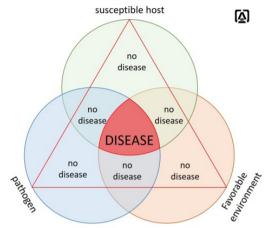
This material is based upon work supported by USDA/NIFA under Award Number 2018-70027-28588

Rotation Between Fruit Crops

Mary Concklin, Extension Educator – Fruit Production & IPM; IPM Program Coordinator

Cover cropping or growing cash crops before replanting a field to fruit that was previously in fruit is nothing new. We've heard it for decades, but do you fully understand the 'why' behind the practice? There are several reasons, and two important ones are pathogens and soil health.

Plant pathogens: when we think of plant diseases, remember the plant disease triangle. In order for a pathogen to cause an infection we need a susceptible host plant, environmental conditions conducive for an infection (i.e., moist conditions, favorable temperatures) and the pathogen. All 3 must be present or no infection will occur.



Let's look at a couple of scenarios.

1st scenario:

Diagram: plantdiseases.com

A strawberry field was plowed under at the end of the season and a cover crop was planted for the summer, field disced, and a fall cover crop was planted. The next spring the grower replanted the field. It was an abnormally wet year (think 2021) and the strawberry plants collapsed. The diagnosis was Red Stele caused by *Phytophthora fragariae*. This had been an occasional problem in that field in the past. But a single year out of strawberries and in cover crops was not enough. *Phytophthora* is a water mold that can easily survive in the soil for 6 years as resting spores without a host plant, although the spore population can decline over time. That field should have been planted to another crop for at least 6 years before going back into strawberries (not always a possibility when you have limited land resources) OR plant *Phytophthora fragariae* resistant strawberry varieties.

2nd scenario:

A field had been in vegetables for years, including sweet corn, pumpkins, potatoes and eggplant. The grower planted the field to brambles and within a couple of years plants in parts of the field were collapsing. The diagnosis was Verticillium wilt caused by two fungi, *Verticillium dahlae* and *Verticillium albo-atrum*, which clog the vascular system in the plants causing them to wilt and collapse. Optimum conditions for infection include moist, warm soils (700F-800F). These are soil borne fungi that can survive in the soil for many years on crop residue and other plant hosts which include solanaceous vegetables (potato -some varieties are resistant, tomato, pepper, eggplant), cabbage, strawberries, ornamentals and several weeds. Rotating with cereals, grasses or broccoli for several years before planting brambles in that field is recommended. Or plant the field to apples or pears which are resistant/tolerant of the pathogens. (McCain, A.H., R.D. Raabe, and S. Wilhelm. 1981. Plants Resistant to or Susceptible to Verticillium Wilt. University of California Leaflet 2703.)

Soil health: Cover crops add organic matter to the soil once incorporated, which also has a positive impact the amount of nitrogen available for plant. For most tree fruit and berry crops, a soil organic matter level of at least 3% is the goal. There are a couple of exceptions: grape crops don't need more than 3%, while blueberries will thrive with much higher organic matter levels. In addition, the addition of cover crops provides food for soil microbes, improve soil structure, reduce erosion, retain nutrients, increase soil water holding capacity, mitigate soil compaction, suppress weeds, and can help to reduce or minimize soil pathogens.

Solid Ground

Solid Ground has started their 2021-2022 schedule and is working with multiple partners throughout the region to provide resources for farmers.



In partnership with New CT Farmer Alliance and CT NOFA, we are hosting Farmer Circles where farmers can join together with their peers over various topics in order to gain and share knowledge. To see all the available topics visit the NCTFA site here: https://www.newctfarmers.com/farmer-circles

The Agro-Mechanics series has also been released for farmers so they can learn tangible skills with tools, tractors, and welding! To see a complete listing of this series, and to register, go to the website here: https://newfarms.uconn.edu/solidground/

And lastly, to grow farmer's marketing skills, the Grown ConNECTed program is partnering with Solid Ground to put on a training series. They'll focus on giving farmers tools to get their businesses in front of consumers in easy ways. To find these trainings and sign up visit the website here: <u>https://www.grownconnected.org/forfarmers</u>

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AG M	ECHA	NICS TRAINING SERIES: 2021-202	2
	NOV 13th	CHAINSAW SKILLS & SAFETY FOR WOMEN ROCKVILLE AGRI-SCIENCE HIGH SCHOOL, VERNON CT - 9AM-3PM Intro to safe chain saw operation. Students will learn about PPE, work area safety, basic saw maintenance, chain sharpening, & how to develop a felling plan. Students will have a chance to fell a tree! Bring your own saw, or use ours. For women only.	
	NOV 20TH	TRACTOR IMPLEMENT OPERATIONS, SAFETY & ADJUSTMENT NONNEWAUG AGRI-SCIENCE HIGH SCHOOL, WOODBURY CT - 9AM -3PM Safe & precise hookup of tractor attachments is critical on farms! Whether it's 3-point- hitch or PTO, if this process is intimidating or difficult for you, join us! Learn the tips for attaching, calibrating, using common tractor attachments smoothly & efficiently.	
	DEC 4TH snow date Dec 18th	SMALL ENGINGE BREAKDOWN & REASSEMBLE NONNEWAUG AGRI-SCIENCE HIGH SCHOOL, WOODBURY CT - 9AM -3PM Ever wonder what a carburetor looks like? Or where it even <i>is</i> on a weed wacker? Get an in-depth understanding of small engine maintenance & repair by pulling apart and reassembling a standard small engine. We provide the engines! Bring your questions and any small engine that's giving you trouble on your farm.	
) ļ	DEC 11TH snow date jan 8th	ADVANCED WELDING USING METAL INERT GAS METHODS ROCKVILLE AGRI-SCIENCE HIGH SCHOOL, VERNON CT - 9AM-3PM Did you attend our welding workshop last year? Are you a novice welder? This workshop is perfect for you as we go deeper into welding using MIG (Metal Inert Gas) and take on bigger welding tasks that you might encounter on your farm.	
<u> </u>	FEB 5TH	POWER TOOLS & CARPENTRY BASICS FOR BIPOC FARMERS NONNEWAUG AGRI-SCIENCE HIGH SCHOOL, WOODBURY CT - 9AM-3PM Get familiar with the power tools & carpentry skills that you'll need on your farm. Learn to use an impact driver, drill, skill saw, table saw, & more. You'll work with your new skills to complete a project to take home! For those identifying as BIPOC only.	
	FEB 12TH	FIELD IRRIGATION ROCKVILLE AGRI-SCIENCE HIGH SCHOOL, VERNON CT - 9AM-3PM Irrigation is a critical part of growing food. Reliable water infrastructure is key! Learn about drip lines, sprinklers, overhead guns, tile drainage, and reliable sources for your irrigation components.	

COST PER WORKSHOP \$25 - Lunch included | SPACES ARE LIMITED! REGISTER TODAY! If the cost is prohibitive, you may request a stipend for lost wages and/or travel, by emailing rebecca.toms@uconn.edu

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Please contact us 2 weeks in advance with special needs (dietary, translation, accessibility, etc.) We'll do our best to accommodate you COVID REQUIREMENTS: MASKS OR CLOTH FACE COVERINGS THAT COVER A PERSON'S NOSE AND MOUTH ARE REQUIRED TO BE WORN AND WE EXPECT MASKS AND SOCIAL DISTANCING MEASURES TO BE USED AT THIS WORKSHOP. PLEASE DO NOT ATTEND IF YOU ARE NOT FEELING WELL- YOU WILL RECEIVE A REFUND.











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Using Beneficial Nematodes Against Fungus Gnat Larvae and Thrips Pupae for Your Spring Greenhouse Crops

By Leanne Pundt, UConn Extension

If you are interested in using biological controls in your spring greenhouse crops, start by using beneficial nematodes. They are easy to use with these advantages: no re-entry interval (REI), no postharvest interval (PHI), and no personal protective equipment is needed during their application. There is almost no risk that the target pest will develop resistance to their use. However, beneficial nematodes are living organisms, so here are some tips to help you them successfully.

What are beneficial nematodes? Nematodes are small, non-segmented, colorless, cylindrical roundworms that occur naturally in soils throughout the world. Some species kill insects and are known as entomopathogenic (insect-killing) nematodes. They are primarily used against soil dwelling pests. This is because they are sensitive to ultraviolet light and desiccation. The most common species used in greenhouses is Steinernema feltiae for fungus gnat larvae and western flower thrips and onion thrips pupae in the growing media. Nematodes can be relied upon to manage fungus gnats, but thrips are generally also managed with preventive releases of beneficial predatory mites ("cucumeris").

Their Life Cycle The life cycle of nematodes includes an egg stage, four larval stages and adults. The third larval stage is the infective form of the nematode (IJ). The juvenile nematodes enter the insect host through body openings such as the mouth, anus or breathing holes. They multiply within the host and release a symbiotic bacterium whose toxin kills the target insect pest. The larvae are killed in one to two days by blood poisoning. Nematodes feed and reproduce, emerging as infective juveniles to search for new insect hosts to infect.

How to best use beneficial nematodes? The beneficial nematode S. feltiae, sold under the trade names of (NemaShield, Nemasys, ScanMask and Entonem) is used as a soil drench or sprench against fungus gnat larvae and thrips pupae in the growing media. Preventative applications to moist soils work best. Repeat applications every two weeks. Consult the label for specific rates. They are available in various formulations. Smaller quantities may be sold on sponges and larger quantities come in trays. (see Figure 1)

- Apply nematodes with a sprayer or injector (remove screens and filters)
- If using an injector, set the dilution to 1:100. Remove all filters or screens (50 mesh or finer) in any spray lines so that the nematodes can pass through undamaged.
- If using a sprayer, the spray pressure should be kept below 300 psi.
- Remove nematodes from refrigerator and let them warm up for 30 minutes.
- Although nematodes are applied in water, they are not aquatic creatures, so adequate aeration of the nematode suspension during application is needed.
- Use a small battery powered submersible pump to keep the solution agitated. The small pump will also keep them from settling on the bottom. Dramm manufactures an aeration bucket specific for using the nematodes with a fertilizer injector.

- Keep the suspension in the spray tank cool and apply as soon as possible after mixing.
- Use clean, cool water that does not contain fertilizers.
- Nematodes can be applied thru an irrigation system, however, there is better distribution with boom sprayers than with drip or sprinkler systems.
- •Media temperatures should be above 50° F but avoid applying when soil temperatures are above 80°F. Optimum media temperatures are between 60-70°F.
- Water the growing media the day before application. (Nematodes need moisture to move thru the growing media). Check the BASF website for information on chemical compatibility.

Be sure to Check their viability before and after application

- Let nematodes come to room temperature for 30 minutes.
- Place a small amount of the product in a small, clear container or petri dish. Add 1 or 2 drops of room temperature water; wait a few minutes and look live nematodes that are actively moving or swimming or curled or have a slight J curve. Dead nematodes are straight and still.
- Use a dark black background and a hand lens or microscope to see the small (0.6 mm or 0.02 inches in length) nematodes. Dead nematodes will be straight and still.
- Collect spray water with an empty nematode tray and check them when they come out of the hose, too.



Figure 1: Checking viability of nematodes. See tray of nematodes by arrow. Dead nematodes are straight as an arrow and still whereas live nematodes are curled or have a slight J curve. Photos by L. Pundt

Can I store beneficial nematodes? Several formulations are available and storage time depends upon the species and formulation. If you must store the nematodes, store them in a refrigerator at a constant 40° F.Avoid storing them in a refrigerator that is opened frequently. It

is best to purchase a dedicated refrigerator just for storing your nematodes, so you can provide temperatures that are more constant.

Avoid placing them in a small refrigerator where they may freeze and die! Check the expiration date on the package for the length of time they can be stored. Let the nematodes sit at room temperature for about 30 minutes before mixing them in the tank solution to avoid drastic changes in temperature.

Beneficial nematodes are most effectively used preventively in conjunction with good cultural practices.

Put Local on Your Tray NEW Funding for CT Grown for CT Kids!

Farmers are no stranger to market opportunities. **Farm to School** --as it represents *shortening the distance* between local agriculture, school food and food education-- is becoming an increasingly appealing opportunity for CT farmers looking to diversify and/or expand their market. Advocates of farm to school programs and policy worked for months to craft a new piece of legislation that funds a grant program for schools to increase their farm to school activities.

The grant is here! Passed in the 2021 legislative session, the CT Grown for CT Kids Grant Program is a statewide grant program administered by the CT Dept. of Agriculture to help establish and further farm to school initiatives.

While the grant program can be used for everything from school garden activities to farm and food curriculum implementation, applicants can also use funds to **increase local procurement** and increase their capacity to handle products that are delivered directly from the farm. This means that local farm businesses are poised to be the benefactors of up to \$500k in spending on these activities. Funding is headed to public school districts, Early Childhood Education centers, local and regional boards of education, or any organization or entity administering or assisting in the development of a farm-to-school program and partnering with a CT public school. Cyrena Thibodaeu, the grant administrator at the CT Department of Agriculture adds, **"Farms are eligible to apply! They just need to have a signed letter from the school that they are in partnership and the school wants the program to happen!"**

With supply chain issues affecting all sectors, especially schools, there is an urgency to widen opportunities to increase local purchasing either direct from local farms or through the wholesale supply chain. The demand and interest is there and now there is funding to grease the wheels and work through the obstacles. Applicants for this funding will be looking to implement their ideas Spring 2022-Fall 2023 and that means your NEXT growing season could see increased demand for local fruits and vegetables.

UConn Extension's <u>Put Local on Your Tray Program</u> is poised as ever to facilitate relationships between farms and school districts . **We offer expertise and support to schools in menu planning and matching with local farm businesses. We can also help guide farmers in navigating contracts with schools.** Our seasonal marketing campaigns to highlight local products includes the distribution of materials (posters, stickers, student activity books) to thousands of students crunching a CT grown apple or savoring carrots from a farm in their town.

More children than ever depend on meals provided by schools, including breakfast, lunch, snacks and sometimes evening meals, as well as summer food programs. Due to COVID-19, special federal emergency waivers have made school meals free to all students and have made it easier for school food directors to procure ingredients wherever they can find it. Recognition of the important role that schools play in ensuring family food security has also heightened the awareness that schools can and should be serving meals with the freshest, healthiest ingredients available, and we all know, that means local!

If you would like to be connected to a district or early childhood education center that is strategizing how to buy more local fresh fruits and vegetables reach out to Shannon Raider-Ginsburg, program coordinator at Put Local on Your Tray at Shannon.Raider@uconn.edu and let's get your CT grown to CT kids.

> Learn all about the new grant program here at https://portal.ct.gov/DOAG/ADaRC/ADaRC/CT-Grown-for-CT-Kids-Grant-Program



Cover Crops between Plastic-mulched Beds

Shuresh Ghimire, Extension Vegetable Specialist, UConn Extension

Plastic mulching has been integral to vegetable production systems for many decades as mulches control weeds, moderate soil temperature, conserve soil moisture, minimize nutrient loss, reduce disease incidence, and ultimately increase crop yield and quality. Despite these advantages, soil erosion in between plastic-mulched beds and at the end of the rows can be severe as the impervious surface of plastic-covered beds can induce aggressive runoff, particularly when the row middles are left bare. With erosion, pesticides and nutrients run off from plasticulture systems contaminating the water resources.

Growing a cover crop as a living mulch between plastic-mulched beds of vegetables has the potential to mitigate soil erosion, and pesticides and nutrients runoff as well as can provide weed control, habitat for beneficials agents, and improve soil organic matter in between the beds. Because of limited land availability, particularly in small-scale agriculture, where planting cover crop instead of cash crops can be difficult to justify in short run, growing a cover crop between beds can be more convincing. A living mulch between beds allows for a soil-building cover crop to be grown simultaneously with an income-generating cash crop. However, cover crops in the row middles can compete with cash crop for soil resources and light leading to potential reduction in the crop yield. Therefore, cover crop species selection is important to minimize such competition. Ideally, cover crop species (or combination of species) should have rapid germination and establishment, suppress weeds but should not interference with the cash/vegetable crop, provide good soil coverage but be easily manageable, and can thrive in low-nutrient environments. High biomass cover crop for soil resources and light as well as obstruct the air flow.



Clovers are commonly used legume living mulch species because they have a relatively low growth habit, produce a ground-covering canopy, and fix atmospheric nitrogen, making them more suitable in low-nitrogen soil and less likely to compete with a cash crop for nitrogen than grasses. Other commonly used cover crop species include rye, oats, barley, or combination of clover and small grain.

A clover cover crop planted between the rows of plastic mulched beds of tomatoes in Cecarelli Farms, Northford, Connecticut. This cover crop helps manage the weeds as well as control soil erosion. It is managed by mowing or weed whacking. (Photo courtesy: William Dellacamera). Studies in plasticulture vegetable production systems have reported variable impacts of living mulches on cash crop yields that may be attributed to weather conditions or cash crop and living mulch species selection. Warren et al. (2015) examined the effects of an Italian ryegrass–white clover cv. New Zealand living mulch on broccoli yield in Durham, NH. Drip-irrigated broccoli was grown under a range of organic fertilizer application rates in plastic-mulched beds, with and without a living mulch growing in the row middles. Broccoli yields were similar in the living mulch and bare soil controls under the highest rates of fertilizer application. However, living mulch reduced broccoli yields from 28% to 63%, where the fertilizer rates were lower. The authors attributed reduced broccoli yields to reduced availability of nitrogen, soil moisture and light due to competition with the living mulch.

Reid et al. (2015) established four living mulch treatments between rows of peppers in Yates County, NY and between onions in Seneca County, NY. The living mulches were rye, barley, rye+clover and clover+barley. To measure the effect of the living mulch they collected data on yield and weed growth. Adding clover to the grasses vastly improved ground cover late in the season. Barley+clover was not as effective at controlling weeds as rye+clover. The vigor and persistence of the rye allowed for complete ground cover until the clover was established mid-to-late season. Neither grain in the absence of clover provided adequate weed control. There were no significant differences among the yield between living mulch treatments at either site. However, at both sites yield was greater in control plots without living mulch (cultivation and compost).

Miles (2012) investigated the living mulch of annual ryegrass, Dutch white clover, and teff grown between the plastic-mulched beds of 'Revolution' bell peppers in a Phytophthora blight-inoculated field in NY for their impact on pepper yield and disease incidence. Pepper yield and disease-incidence were not affected by the presence of living mulch compared to a bare soil control. Annual ryegrass, annual ryegrass-Dutch white clover mix (both sowed at 50% recommended seeding rate) and teff were effective in suppressing weeds. Mowing reduced living mulch height and with a suitable specie it increases living mulch groundcover and biomass; thus helping suppress weeds. Combining two living mulch species at reduced seeding rates provided effective weed control.

Thanks to farmer William Dellacamera at Cecarelli Harrison Hill Farm in Northford, CT for sharing his experience of cover cropping practices in between the plastic-mulched beds in order to cope with the extreme weather events that have been more pronounced in the last few years. The link to the video of William sharing his experience is provided at the end of this article.



Farmer William Dellacamera at Cecarelli Harrison Hill Farm in Northford, CT customized his 10-foot-wide no-till drill to plant cover crops in the 6-foot-wide row middles.

In the first year of experimenting with a new method of cover cropping, William conventionally plowed the field and laid plastic mulch on raised beds leaving 6-foot path in between the beds. He customized his 10foot-wide no-till drill (removed the drilling parts on the edges) to fit in the 6-ft row middles and planted oats and clover in the row middles. Oats was winter killed and clover was managed by mowing next spring through summer. In the fall after the crop harvest, plastic and drip tape were removed and beds were leveled using a 6-foot 3-point hitch aggressive disc harrow. Then cover crops (such as rye, oats, or tillage radish) were seeded using no-till drill in the bed area that was just leveled. When winter-hardy cover crop like rye was used, it needed to be terminated with herbicide next spring before planting the cash crop. In the spring, William ran a subsoiler to break up any hard pan formed by tire tracks, then chisel plowed and 3 passes of disc harrow to prepare the bed for plastic laying. Once raised beds were formed and plastic was laid, soils on the tire tracks were still left uncovered. There are two methods William uses to control weeds in those uncovered area. 1) He has customized a sprayer with shield to spray herbicide (not his preferred approach) to the uncovered area on both sides of the plastic bed. 2) He has customized a plastic mulch layer (2600 Rain-Flo) to include seed hoppers to seed cover crop (oats) on the bare soil left by tire tracks on both sides of the bed. At this time, the entire row middle from the edge of one bed to the edge of the other bed would be covered with cover crops. In the coming seasons, William is fine-tuning the rates of cover crops to maximize the cover crop benefits, particularly the weed control and soil erosion control.



Addition of seed hoppers to the 2600 Rain-Flo Plastic Mulch Layer to seed cover crops on both sides of the plastic bed where soil would remain bare otherwise.



Oats can serve as a good cover crop adjacent to the plastic mulch as it doesn't compete with the cash crop for the soil resources because of its small root system.

Video: Farmer William Dellacamera at Cecarelli Harrison Hill Farms in Northford, CT shares his experience of cover cropping practices in between the plastic-mulched beds. **Click here to watch!**



References/further reading:

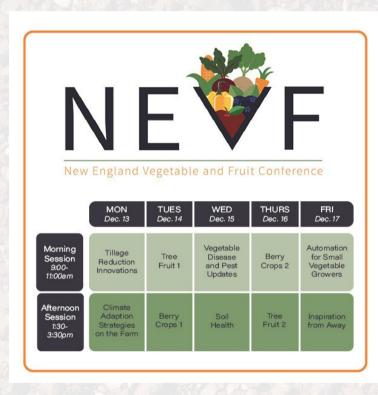
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New England Vegetable and Fruit Conference 2021-Online Light!

December 13-17, 2021

Enjoy the New England Fruit and Vegetable Conference from the comfort of your own living room! The conference will be online this year, due to the ongoing COVID-19 epidemic.

The program will be a streamlined version of our usual in-person content, with one morning and one afternoon session per day for one week, December 13th-17th. Tree fruit, small fruit, and vegetables will all be covered, and pesticide and certified crop advisor credits will be available. Check out the schedule, speaker line up and registration here. We hope to see you online this December, and in person in December 2022!

\$50 registration fee gains you full access to the program and 3-months access to the recordings.

Session Topics will include: Tillage Reduction Innovations, Climate Adaption Strategies on the Farm, Soil Health, Automation for Small Vegetable Growers, Inspirations from Away, 2 Berry Crop Sessions and 2 Tree Fruit Sessions as well as a session on Vegetable Disease and Pest Updates.

Register: https://nevbga.com/nevfc/



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This work is supported by the Crop Protection and Pest Management Program [grant no. 2017-70006-27201/project accession no. 1013777] from the USDA National Institute of Food and Agriculture. Any opinions, findings, conclusions, or recommendations expressed in this publication are those of the author(s) and do not necessarily reflect the view of the U.S. Department of Agriculture.



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