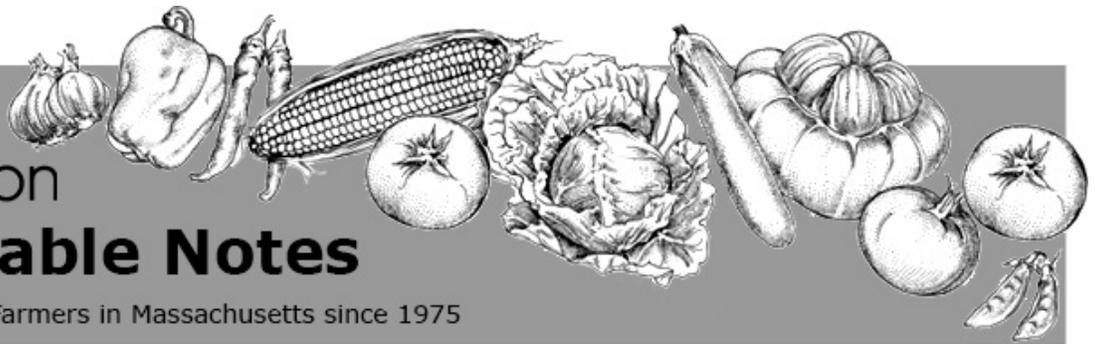




UMass
Extension

Vegetable Notes

For Vegetable Farmers in Massachusetts since 1975



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IN THIS ISSUE:

- Crop Conditions
- Hot Water Seed Treatment
- Researchers Pinpoint Which Bird Species Pose Food Safety Risk to Crops
- Climate Adaptations at Foxtrot Farm
- News
- Events
- Sponsors

CROP CONDITIONS

Happy New Year to all!

2021 brought many challenges, from continuing COVID-19 fluctuations and restrictions, to record-breaking rainfall and labor shortages—we are all hoping for a healthy and productive 2022!

This year the Vegetable Team was able to hire two summer student employees and a new educator, Hannah Whitehead. We were able to connect with more growers than ever through farm visits, email and phone conversations, and in-person and remote educational workshops. Here are some highlights:

- We were awarded 5 new or continuing grants. Projects include collaborations with MDAR, Nuestras Raices, and World Farmers. Funding will support our efforts to expand our audience to a more inclusive and diverse set of farmers. We will continue to provide education on crop and pest management, conduct on-farm scouting and mentoring, provide support for water testing and food safety on farms, conduct applied research on cucurbit pests and organic pesticide efficacy, and much more!
- We made 96 visits to 18 farms in our IPM Mentor Farm and Pest Scouting Network Programs
- We responded to 222 request for assistance with crop and pest management issues by phone, text, and email
- We gave 12 presentations at educational workshops, reaching 675 growers
- We organized 15 workshops, field days, and twilight meetings, both online and in-person, reaching 1,371 growers
- We conducted 10 applied research trials on topics including disease-resistant cucumber varieties, spinach downy mildew, damping off in winter tunnels, and organic pesticide efficacy trials in brassicas, Swiss chard, and sweet potatoes
- And we published 26 issues of Vegetable Notes!

Thanks to those of you who have already donated or sponsored our program – we can't do it without you! Funding from donors and sponsors helps ensure that we can write Veg Notes each week, since the publication has no direct funding source. **There is still time to sign up as a sponsor or to make a donation**, you can find all the info on our fundraising page [here](#). Thank you in advance for your ongoing support!

After the rush of holiday markets, things have slowed down a bit on many farms. Sales of root veggies, leafy greens from winter tunnels and greenhouses, and processed goods continue at winter farmers markets and through CSAs, but much time is being dedicated now to crop planning and poring over seed catalogs. Here are a few resources we think you might find useful when thinking about crop rotations, cover cropping, nutrient management, and variety selection.

- [Scouting resources](#)
- [Pest identification](#)
- [Nutrient Management](#)
- [Crop Planning](#) including fertility tables under each crop
- [Cover Crop Selection](#)

CONTACT US:

Contact the UMass Extension Vegetable Program with your farm-related questions, any time of the year. We always do our best to respond to all inquiries. **Office phone:** (413) 577-3976 *We are currently working remotely but checking these messages daily, so please leave us a message!* **Email:** umassveg@umass.edu

Home Gardeners: Please contact the UMass GreenInfo Help Line with home gardening and homesteading questions, at greeninfo@umext.umass.edu.

- [Resistant Varieties](#) from Meg McGrath at Cornell University

There are also a plethora of education workshops happening now around the state and the wide wide web! Take a look through the events section, and look for the vegetable team at NOFA-MA this Saturday, where Genevieve and Lisa will be presenting on Vegetable Pests of the Year and Water Quality for Food Safety. We'll also be presenting on soil fertility and water testing and changes to the FSMA water rule at the upcoming NEVBGA meetings – however these meetings are in the process of being rescheduled for later this winter when we can hopefully meet in-person again.

HOT WATER SEED TREATMENT

Some plant pathogens, including specific fungal, oomycete, bacterial, and viral pathogens, can be carried on seed; some can only infest the seed surface and others are able to penetrate the seed coat and survive within the seed. In both cases, when the seed is planted, the pathogen can grow along with the seed, resulting in an infected plant. Therefore, starting with disease-free seed is an important step towards growing disease-free crops. Seeds can be treated with chlorine or pesticides to eliminate pathogens that are associated with the surface of seeds. However, these treatments cannot penetrate the seed coat, and therefore leave internal pathogens untouched. Hot water can penetrate the seed coat and kill pathogens, making it a useful tool for managing seed-borne pathogens. With the right tools, growers can hot water treat seeds effectively at home, or, we offer a hot water seed treatment service through the UMass Extension Vegetable Program. This article includes instructions on treating your own seed as well as information on how to submit seeds to be treated.

Treating your seeds with hot water can help prevent the establishment of seed-borne diseases on your farm, or prevent their reintroduction year after year. However, while hot water seed treatment (HWST) will kill pathogens on and within your seeds, it does not *protect* crops from disease and does not guarantee disease-free crops. Many diseases, including some of those that can be seed-borne, are spread throughout the growing season by wind, water, and insects and can arrive on your farm by those paths. Crop rotation and field sanitation are key for preventing diseases that overwinter on crop debris, and you likely need to control for wind-, water-, and insect-borne diseases in your crops, regardless of whether or not you hot water treat your seed.

HWST has the beneficial effect of priming seeds, resulting in faster germination than untreated seed. However, the treatment can decrease germination rates, especially of older seed (more than 1 year old) or seeds that were grown under stressful environmental conditions. Treated seed does not remain viable for as long as untreated seed and should be planted during the growing season immediately following treatment.

Deciding which seeds to treat:

- **Determine the likelihood that seed-borne pathogens are present based on the seed** (see Table 1 for reference). If you are saving your own seed and diagnosed one of the diseases in Table 1 in your crop, you should hot water treat that seed.

If you buy in seed, it can be harder to determine if HWST is necessary. Tomato, pepper, and brassicas are good candidates for hot water seed treatment because there are common bacterial and fungal diseases of these small-seeded crops that can be easily killed through treatment. Having a conversation with your seed supplier is also a good idea: ask them if the seed was produced in a way to minimize exposure to seed-borne pathogens and if the seed was tested for their presence. Find out if the seed has already been treated with hot water or if it has been primed (pre-soaked to promote earlier and more uniform germination), as treating again could adversely affect the seed. Only a few companies routinely hot-water treat seeds—many are reluctant because there is a risk that germination rate will drop if the water is too hot or if the seeds were already exposed to stressful environmental conditions.



We use a strip of insect netting folded in half and stapled along either side to make reusable treatment packets. The open edge of the packet is clamped shut with binder clips.



Treat seed in an ample amount of water so that the water can move throughout each seed packet.

- **Don't treat seed that has a fungicide or insecticide treatment coating, or pelleted seed**, as the treatments or pelleting will wash off during treatment.
- **Treat only the seeds that you will use next season.** HWST reduces the shelf-life of seeds, so don't treat seeds that you plan to seed more than a year in the future.
- **Don't treat old seed.** Treat only seeds that were produced for the current growing season. HWST is more likely to decrease the germination of old seed.
- **Large-seeded crops (beans, cucurbits, peas, corn etc.) are usually not effectively disinfested with hot water treatment** because the temperature required to heat the whole seed would kill the outer seed tissue and the seed will not germinate. In some cases, hot water has been used to disinfect just the surface of larger seeds, for example, treating anthracnose on beans.

Treatment procedure: The general protocol for seed treatment is the same across all crops, with just the water temperature and treatment time varying depending on the crop. The temperature of water for treating seed varies from 115 to 125°F, and the treatment period varies from 10 to 60 minutes. See Table 1 for treatment times and temperatures for different crops. It is important to use the appropriate protocol for each crop to control pathogens without damaging the seed; a difference of just a few degrees can either damage your seed or fail to kill pathogens. While hot water seed treatment can be done effectively on a stovetop in a large pot with an accurate thermometer and careful temperature control, it is easier and safer to use precision water baths which provide an even, stable, and accurate temperature.

Before you treat all of your seed, you may want to conduct a seed germination test, as different varieties and seed lots may react differently to hot water treatment. Treat a 50- or 100-seed sample using the procedure below, then test the germination of both the treated seeds and an equal number of untreated seeds, either in the same growing medium that you plan to use for transplant production, or in a moist paper towel. If the test gives acceptable germination rates, treat as much seed as you expect to use in the coming season.

1. **Preheat water baths.** Heat one bath to 100°F and another to your treatment temperature. The first bath will be used to preheat the seed so that the temperature of the treatment bath doesn't drop significantly when the seeds are added. Heat enough water to allow water to move around seeds freely. We treat about 0.5 liters of seed at a time in our six-liter water bath. Use an accurate laboratory thermometer. It is important that the water be maintained at a uniform temperature throughout the bath, that the recommended temperature not be exceeded, and that the seed be treated no longer than the time interval specified. A stirring hot plate helps to provide continuous agitation and uniform water temperature, though it can be done with continuous, consistent manual agitation or an aquarium bubbler. Keep a separate container of room temperature water close by to add, if necessary, to prevent overheating. An immersion circulator (a hand-held water heater used for the sous vide cooking method) is a great tool for treating your own seed.
2. **Prepare the seed.** Make a packet for the seeds out of cheesecloth, screen, a coffee filter, or insect netting. Fill

each packet no more than halfway with seed, to allow for water movement throughout the packet. Include a metal bolt, coin, or other weight to keep the seed submerged. Label all packets, especially if you're treating more than one variety at once! We label our packets by including a small piece of a plastic transplant tray label tag, labeled with permanent marker inside the packet.

3. **Pre-heat the seed.** Submerge the seed in the pre-heat bath for 10 minutes, constantly checking the temperature to ensure that it does not rise above 100°F.
4. **Treat the seed.** Move the seed to the treatment bath and treat for recommended time. Again, check the temperature constantly to ensure that it does not rise above the recommended temperature. Remove the seeds promptly and run them under room temperature tap water to cool them.
5. **Dry the seed.** Pat dry with towels, then air dry at 70 to 75°F by spreading the seed on dry paper towels. We leave treated seeds in their packets and dry them in a simple food dehydrator on *fan only* (no heat! Not all dehydrators have this option—check before you buy) to dry the seeds quickly.

Crop	Treatment Temperature and Time		Diseases Controlled
	Temperature	Time	
Broccoli	122°F	20 minutes	Alternaria leaf spot, bacterial leaf spot, black leg, black rot
Brussels sprouts	122°F	25 minutes	
Cabbage	122°F	25 minutes	
Collards	122°F	20 minutes	
Kale	122°F	20 minutes	
Carrot	122°F	20 minutes	Alternaria leaf blight, bacterial leaf blight, Cercospora leaf spot, Crater rot/foliar blight
Celery/Celeriac	118°F	30 minutes	Bacterial leaf spot, Cercospora leaf spot, Septoria leaf spot, Phoma crown and root rot
Eggplant	122°F	25 minutes	anthracnose, Early blight, Phomopsis, Verticillium wilt
Lettuce	118°F	30 minutes	Anthrachnose, bacterial leaf spot, lettuce mosaic virus, Septoria leaf spot, Verticillium wilt
Onion	122°F	20 minutes	purple blotch, Stemphylium leaf blight, basal rot, Botrytis blight, smudge, black mold, downy mildew
Pepper	125°F	30 minutes	Anthrachnose, bacterial leaf spot, cucumber mosaic virus, pepper mild mosaic virus, tobacco mosaic virus, tomato mosaic virus
Parsley	122°F	30 minutes	bacterial leaf blight, Alternaria leaf blight, black rot, Cercosporoid leaf blight, Septoria blight
Spinach	122°F	25 minutes	anthracnose, Cladosporium leaf spot, cucumber mosaic virus, downy mildew, Fusarium wilt, Stemphylium leaf spot, Verticillium wilt
Tomato	122°F	25 minutes	alfalfa mosaic virus, anthracnose, bacterial canker, bacterial speck, bacterial spot, cucumber mosaic virus, early blight, Fusarium wilt, leaf mold, Septoria leaf spot, tomato mosaic virus, Verticillium wilt, double virus streak
Source: " Managing Pathogens Inside Seed with Hot Water " – Meg McGrath, Cornell University Long Island Horticultural Research & Extension Center			

Equipment: There are many options for water bath equipment; cheaper options likely require you to watch and adjust the temperature constantly where more expensive options may be more precise and hands-off. [Stirring hot plates](#) start at about \$400. Both [analog](#) and [digital precision water baths](#) run at about \$700 minimum. [Laboratory thermometers](#) are about \$15. There are many brands of sous vide immersion circulators that sell for \$50-100.

UMass Hot Water Seed Treatment Service: If the procedure above sounds daunting or you're not sure you want to invest in hot water treatment equipment, we can treat your seed for you! We are only able to treat seed that will be used by the submitter—we cannot treat seed that will be resold or distributed. Submissions are treated and returned to the submitter within 10 days of receipt.

We are currently working from home, so if you are sending in seeds for treatment, please email us at umassveg@umass.edu ahead of time so we know to expect them.

Click here to submit a hot water seed treatment sample

RESEARCHERS PINPOINT WHICH BIRD SPECIES POSE FOOD SAFETY RISK TO CROPS: E. coli and Salmonella Are Rare in Wild Birds, Campylobacter More Common

-- by Emily Dooley, January 5, 2022. The original article can be found [here](#).

Editors' note: In the [December 2021 issue of Veg Notes](#) we shared new research on birds in agricultural areas, and their impact on crops and pests. This article from UC Davis about birds and food safety is an interesting follow-up.

Concerns over foodborne risk from birds may not be as severe as once thought by produce farmers, according to research from the University of California, Davis, that found low instances of *E. coli* and *Salmonella* prevalence.

While the research found that the risk is often low, it varies depending on species. Birds like starlings that flock in large numbers and forage on the ground near cattle are more likely to spread pathogenic bacteria to crops like lettuce, spinach and broccoli, according to the study of food safety risk and bird pathogens. In contrast, insect-eating species were less likely to carry pathogens.

[The findings](#), published in the journal *Ecological Applications*, suggest that current practice of removing bird habitats around produce growers' farms over concerns the animals could bring foodborne pathogens into their fields may not solve the problem.

"Farmers are increasingly concerned that birds may be spreading foodborne diseases to their crops," said Daniel Karp, the senior author on the study and an assistant professor in the UC Davis Department of Wildlife, Fish and Conservation Biology. "Yet not all bird species are equally risky."

Only one foodborne disease outbreak in produce has been conclusively traced to birds: a *Campylobacter* outbreak in peas from Alaska. While the bacteria can cause diarrhea and other foodborne illness in humans, it's less of a concern to growers than *E. coli* and *Salmonella*, which have been responsible for multiple outbreaks across the nation.

In this study, researchers compiled more than 11,000 bacteria tests of wild bird feces and found that *Campylobacter* was detected in 8 percent of samples. But pathogenic *E. coli* and *Salmonella* were only found in very rare cases (less than 0.5%).

In addition to the bacteria tests, researchers conducted roughly 1,500 bird surveys across 350 fresh produce fields in Western states and collected more than 1,200 fecal samples from fields. They then modeled the prevalence of pathogens in feces, interactions with crops, and the likelihood of different bird species to defecate on crops to determine risk.

Insect-eating birds pose lower risk

Based on the data, insect-eating birds, such as swallows, present a lower risk, while birds that flock near livestock, such as blackbirds and starlings, are more likely to transmit pathogens.

The data can help the agricultural industry determine risk and take



Species that form big flocks and are associated with livestock, like this invasive European starling, carry greater risks of foodborne pathogens. Photo: Getty

action, such as separating produce crops from cattle lands. They also don't need to treat all birds the same.

"Maybe farmers don't need to be quite as concerned about all types of birds," Karp said. "Our data suggest that some of the pest-eating birds that can really benefit crop production may not be so risky from a food-safety perspective."

Removing habitat can backfire

This study and the authors' [prior work](#) indicate that removing habitat around farms may actually benefit the species that pose more risk and harm the beneficial, pest-eating ones that are less risky to food safety. This is because many prolific insect-eaters may visit crop fields to eat pests but need nearby natural habitats to survive. In contrast, many of the bird species that most commonly carry foodborne pathogens readily thrive on both cattle farms and produce farms without natural habitat nearby.

Other findings

Insect-eating birds that forage in the tree canopy pose minimal threat because they are less likely to carry foodborne pathogens and come into direct contact with produce. They can also be valuable parts of the ecosystem, particularly if they eat pests that can harm crops. Installing bird boxes could attract the pest-eaters, as well as help with conservation efforts.

"We basically didn't know which birds were problematic," said lead author Olivia Smith, a postdoctoral researcher at Michigan State University who was at University of Georgia when the paper was written. "I think this is a good step forward for the field."

Additional co-authoring institutions include James Cook University, UC Berkeley, UC Riverside, University of Kentucky, University of Texas, Virginia Polytechnic Institute and State University, Washington State University, BioEpAr, The Nature Conservancy and Van Andel Institute.

The research was funded by the U.S. Department of Agriculture and the National Science Foundation.

CLIMATE ADAPTATIONS AT FOXTROT FARM: MULCHING STRATEGIES FOR MOISTURE MANAGEMENT

In our [November issue of Veg Notes](#), we told you about the [Northeast Climate Adaptation Fellowship](#). This peer-to-peer learning program led by teams from UMaine, UVM, and the USDA Climate Hub was created to help farmers and farm service providers in the Northeast work together to increase understanding of the science of climate change and adoption of climate adaptation strategies.

I participated in the Fellowship, working with Abby Ferla at [Foxtrot Farm](#) in Ashfield, MA to assess the farm's current strategy for mulching the pathways of a no-till bed system. Water management is a key area of concern for the farm, particularly in the face of increasingly variable and unpredictable weather in the Northeast, including increased heavy precipitation events as well as periods of prolonged drought. Foxtrot Farm currently does not have irrigation in their fields, and the fields are often too wet to work in in the spring but too dry in the summer and fall. The fields also sit on an 8% slope and are at risk of soil erosion during heavy storms.

Climate resilience is a guiding objective of Foxtrot Farm. To manage moisture, the farm's existing adaptations include a permanent bed system where the beds in adjacent fields are arranged in alternating directions to prevent water runoff; permanent grass strips; and drainage ditches to collect and direct the flow of water. Abby mulches the pathways of the permanent beds with a paper mulch that covers the pathway and part of the bed, and straw or wood chips laid over the paper, along with compost. The system has been effective at suppressing weeds and preventing soil loss, but involves a good amount of up-front labor. It also involves purchasing materials from off the farm. Abby wondered if there was a way



Farmers may be able to promote insect-eating species like this tree swallow by installing nest boxes without increasing food safety risks.

Photo: O. Smith

to achieve the same benefits with less work and potentially with mulch materials produced on or closer to the farm. We set up a demonstration trial to compare the standard mulching treatment to two others – straw mulch alone and a living mulch of rye and clover. Our main objective was to determine if either of the two new mulch treatments would be better than or as effective as Abby’s standard treatment at maintaining soil moisture in the pathways and adjacent calendula beds throughout the season. We also wanted to see if any of the treatments did a better job of handling excess moisture in the walking paths. See Figure 1, below, for a detailed description of the three treatments.

Figure 1. Pathway mulch treatments, materials per pathway and material sources.		
Standard: Paper + Straw or woodchips + Com- post	Cover crop	Straw alone
WeedGuard Plus paper mulch	Italian ryegrass 0.5# per 50 sq. ft. (Lakeview Organics)	Straw mulch, 0.5 bale
Straw mulch, 0.5 bale (local farm)	Crimson clover 0.2# per 50 sq. ft. (Lakeview Organics)	Compost, 0.3 cu. yd.
Wood chips, 25 gal. (oak, hemlock; produced on-farm)	Compost, 0.2 cu. yd.	
Compost, 0.3 cu. yd. (Bearpath Compost)		

The trial area was a 50’x50’ plot with beds that were slightly raised, about 8” higher than the walking paths between them. Each treatment plot consisted of two beds plus adjacent walkways. Calendula was chosen to be the crop planted in the trial beds—calendula is one of the main crops for the farm and is sold dried in bulk and through the farm’s CSA. Beds were prepared for planting on 26 April and calendula was planted on 27 April. The standard mulch was laid on 27 April; the living mulch was seeded on 15 May and straw mulch applied on 15 May.

Soil moisture sensors were installed at 12” depth—one each in a bed and pathway of each plot—on 12 May. We used [Irrometer Watermark sensors](#), which measure electrical resistance, a measure of soil water tension. Measurements, in centibars, are read using a handheld meter. Centibars are a unit of measure for how tightly soil particles hold moisture. The higher the number, the drier the soil (or the harder a plant has to work to pull out water).

See Figure 2 for photos of the plots taken on 9 June showing each of the treatments.

Soil moisture data

Data collected over the course of the trial included soil moisture sensor readings and observational data about crop vigor and pest and weed pressure. Sensor readings were taken at approximately monthly intervals on 28 June, 26 July, 23 August, and 6 September.

While the sensors were installed with the idea that they would help discern differences among the treatments in their ability to buffer both heavy spring rains and a hot, dry summer, 2021 provided exactly the opposite. After a warm, dry spring, the first soil moisture sensor reading on 28 June showed that the soil in both the beds and walkways of each treatment was dry. Soil moisture sensors are most often used to inform irrigation decision-making; if these data were applied for that purpose, each of the beds would have been at or approaching the need for irrigation on the date of the first reading. Starting in early July, though, the rains started. There were several heavy rains preceding each of the other sensor readings and in each case, the soil was at or near saturation. There were no appreciable differences in soil moisture between the treatments—the soil was just wet.

Plant vigor data

The other data collected was more interesting. The calendula blossoms were harvested 7 times over the course of the trial

with the earliest harvest date in early July and the latest in late August. The calendula plants in each treatment were rated for vigor on 3 dates during this time, based on Abby's experience with this crop.



Figure 2. Mulch treatments trialed. Photos: L. McKeag

Abby's standard mulching strategy of paper mulch, straw or wood chips, and compost, consistently had the highest calendula vigor ratings. The plants were robust and green and flowered until the last harvest on 25 August. The straw mulch alone performed well also. There was some insignificant weed pressure in these beds and the blossoms were somewhat less plentiful. The living mulch of Italian ryegrass and crimson clover performed poorly. There was significant weed pressure and the plants largely stopped blooming before the last harvest. No insect or other non-weed pests were observed in any of the plots. See Figure 3, below, for an image of the three plots taken in August.



Figure 3. Trial plots in August showing differences in vigor across treatments. Note that the green strips in the Italian rye + clover plot are the living mulch; there are few living calendula plants remaining in this treatment, while the standard and straw mulch plots still have harvestable flowers. Photos: A. Ferla

Cost-benefit analysis

In addition to the trial data, a cost-benefit analysis was conducted comparing the standard mulch treatment to each of the trial treatments. Abby's standard treatment had higher materials costs, primarily due to the cost of the paper mulch, and more labor costs at the beginning of the season to set the mulch up. But even given this, the standard treatment again performed better than the straw or living mulches. The living mulch required weed whacking and in-season weeding, and both the straw and living mulch required more end-of-season clean-up than the standard. This, along with the decreased yields for both of the trial mulch treatments, meant that the standard beds were \$21/bed more profitable than the straw mulch alone and \$121/bed more profitable than the living mulch.

Discussion

The trial was designed to compare the soil moisture-buffering capacity of two alternative mulching strategies to the somewhat cumbersome strategy currently used at the farm, given the conditions Abby has become accustomed to over the course of her tenure there – wet springs and dry summers. One of the key takeaways from the information presented to participants of the Climate Adaptation Fellowship is that the global climate is not just warming overall, but that the effects of this warming are variable across regions and lead to greater weather extremes and increased unpredictability in weather patterns. As if to illustrate this point, the weather at Foxtrot Farm in 2021 was exactly the opposite from what we had planned for. The growing season began with a worryingly long dry spell and was followed by the wettest July in Massachusetts history.

The trial was designed to test the buffering of extremes, though, and under the conditions, Abby's existing strategy for mulching her no-till beds held up well. This treatment produced strong yields and good weed control, with little to no need for end-of-season clean-up in these beds, despite the heavy rains. Abby reported that the latest harvest date for the calendula, 25 August, was earlier than in previous years indicating that all of the plots suffered from the extreme summer rain. The standard plot beds did outperform those in the other treatment plots, though, and were ultimately more profitable even given the relatively high labor input at the start of the season to install the 3-part mulch.

The poor performance of the calendula beds in the living mulch plot was particularly disappointing, as the strategy of growing mulch on the farm was attractive to Abby. We concluded that it would be beneficial to replicate this experiment in a drier year, perhaps choosing a different living mulch and cash crop combination. There is strong interest in living mulches among farmers and a lot of ongoing research, as [we reported in Veg Notes this past July](#). While living mulches may have soil health, weed suppression, and other benefits, they also present challenges. Living mulches may compete with cash crops for nutrients, water, and space, or have [allelopathic effects](#) on adjacent crops. More research is needed to better understand the best way to productively use living mulches.

While every year on a farm is another phase in a long, uncontrolled experiment with untold variables, conducting this somewhat more rigorous trial provided observable evidence that one of Foxtrot Farm's routine practices is working, at least under the given conditions. The project gave Abby the opportunity to practice data collection and to gain experience using a tool – soil moisture sensors – that may be useful in making water-related decisions on her farm in the future.

In the long-term, Abby is considering implementing other adaptation strategies on her farm to deal with variable and unpredictable rainfall, such as digging either a shallow or deep well, constructing a water catchment system, or installing additional drainage ditches or subsurface drainage. She still wonders if she can mulch her beds with fewer off-farm inputs and less work.

The trend in the Northeast is toward more intense precipitation and warmer temperatures with longer periods of sustained drought. No one strategy will be enough to manage all the challenges that will come with these changes. Each year will be a trial of sorts and it will take a combination of many tools and techniques for farmers in the Northeast to be resilient under new conditions.

Thanks to Abby for sharing her farm and her many innovative ideas and practices with me this summer and thanks to the organizers and other fellows of the Climate Adaptation Fellowship for sharing their time and knowledge.

--by Lisa McKeag, UMass Vegetable Program

NEWS

UMASS POLLINATOR SURVEY

UMass Extension is designing outreach on pollinator topics! We want to hear your interests, so that we can tailor our work to your needs. This survey should take about 5 minutes to complete. We are excited to hear from you: your response will directly shape our future research and educational programs.

[Click here to take the survey.](#)

REMINDER: CHLORPYRIFOS AGRICULTURAL TOLERANCES EXPIRE FEBRUARY 28, 2022

On August 18, 2021, the EPA announced that it will revoke all tolerances for chlorpyrifos, which establish the amount of a pesticide that is allowed on food. This revocation will go into effect on February 28, 2022. This means that after that date, chlorpyrifos cannot be used on agricultural products; any product treated with chlorpyrifos will be considered adulterated and cannot be sold. Existing stocks of chlorpyrifos products cannot be used. This decision was made after the EPA determined that the current aggregate exposures from use of chlorpyrifos do not meet the legally required safety standard that there is a reasonable certainty that no harm will result from such exposures. Chlorpyrifos products that were previously labeled for use in vegetable crops include Bolton, Cobalt, Hatchet, Lorsban, Match-Up, Nufos, Stallion, Vulcan, Warhawk, Whirlwind, and Yuma.

UNH EXTENSION IS HIRING!

Vegetable and fruit production field specialist: The University of New Hampshire Extension seeks a field specialist in vegetable and fruit production in Hillsborough County. The field specialist will provide formal and informal education for farms, businesses, and individuals. Expertise in vegetable production is a priority for this position.

[Click here to see the complete job listing.](#)

Field specialist in agricultural business management: The University of New Hampshire Extension seeks a field specialist in agricultural business management in Rockingham County. The field specialist will provide formal and informal education for businesses, communities, and individuals by organizing and implementing educational programs, including workshops, webinars, grower meetings, and in-person farm visits; disseminating current research-based information through development of fact sheets, articles, and other print and web-based resources; and providing one-on-one technical assistance in business management to improve business profitability. A master's degree and two years' experience in agricultural economics, agricultural business management, farm business management, or a closely related field is preferred.

[Click here to see the complete job listing.](#)

For more information about both positions, contact Program Team Leader, Amy Papineau, amy.papineau@unh.edu 603-862-1601.

2022 CENSUS OF AGRICULTURE IS COMING SOON!

The Ag Census is conducted by the National Agricultural Statistics Service (NASS) every 5 years. It is the only source of comprehensive agricultural data for every state and county in the nation. The data are widely used to inform decisions that benefit the agricultural community and the nation – from decisions guiding essential food delivery systems, succession planning, and new and beginning farmer programs, to decisions affecting agricultural practices, land stewardship, sustainability, and more. **The 2022 Census of Agriculture will be mailed out to all known U.S. producers next fall.** In accordance with federal law, NASS keeps all responses confidential and uses them for statistical purposes only.

If you are a producer who does not currently receive NASS surveys or censuses, visit www.nass.usda.gov/AgCensus and click on the green “Sign Up to Be Counted in the 2022 Census” button at the top of the page.

The USDA is also conducting 2 efforts to improve the census process:

- The USDA will test the **2022 Census of Agriculture online questionnaire in new Respondent Portal**. Starting in January, approximately 15,000 agricultural producers across the nation and the various segments of U.S. agriculture will receive an invitation to assist in the online 2022 Census of Agriculture Content Test, which will run through spring, [Click here to see the full news release from the USDA.](#)
- USDA NASS is conducting the **2021 Farm Producer Study** to improve knowledge and understanding of agricultural producers and help USDA improve services to them. This survey is different from the 2022 Census of Agriculture. This brief questionnaire was mailed in December to approximately 75,000 U.S. agricultural producers across the country. Taking no more than 10 minutes to complete, the questionnaire asks participants for demographic and basic farm information. NASS conducts studies like this to determine what questions to incorporate in future censuses and surveys. Producers can respond securely online at www.agcounts.usda.gov or by mail. The deadline for response is **Jan. 18, 2022.**

SURVEY: REDUCED TILLAGE EQUIPMENT

As part of the [Massachusetts Coordinated Soil Health Program](#), the American Farmland Trust has put together a very short survey to collect information on what reduced tillage equipment is in the fleets of MA producers, what equipment is working better or worse than expected, and what kinds of equipment you would like to learn more about and even try out on your farms.

[Click here to take this survey.](#)

For more information about the MA Coordinated Soil Health Program, visit <https://farmland.org/ma-soil-health-program/>, where you can also fill out a [more detailed survey on soil health practices and implementation needs](#).

NEW, FREE RESOURCE: THE MA FOOD PROCESSORS RESOURCE GUIDE

The MA Department of Agricultural Resources and UMass Extension Food Safety Program is pleased to present the MA Food Processors Resource Guide, a new resource for supporting new and growing value-added agricultural and entrepreneurial food businesses. The Guide includes regulatory information specific to MA but much of the information will also be relevant in other states. Chapters include Getting Started; Performing Market Research; Scaling Up; Calculating Costs & Setting a Price; Food Safety Basics; Labeling, Regulations & Design; Business Planning, Registering a Business & Insurance; Marketing, Promotions & Social Media; Sales, Brokers, Distributors & Trade Shows; Resources; and Resources for Women, BIPOC & LGBTQ+ Entrepreneurs.

[Click here to access the free, online MA Food Processors Resource Guide.](#)

This resource was supported by the Specialty Crop Block Grant Program at the U.S. Department of Agriculture through grant AM170100XXXXG054. Its contents are solely the responsibility of the authors and do not represent the official views of the USDA.

EVENTS

NOFA/MASS WINTER CONFERENCE

When: Saturday-Sunday, January 15-16, 2022, 9am-6pm

Registration: \$45-250 sliding scale. Scholarships available. [Click here to register.](#)

Join your peers in the organic, regenerative, sustainable living movement at the NOFA/Mass Winter Conference this January. Gain access to presenters and information that keeps you on the pulse of the latest developments, insights and innovations happening on the farms and gardens of your local region as well as from further afield.

The Conference will be held as a hybrid event, with both in-person and virtual attendance options. You'll be welcome to join us on the campus of Worcester State University or from your very own home.

UPCOMING NEVBGA GROWER MEETINGS

The New England Vegetable & Berry Growers' Association (NEVBGA) is the oldest vegetable growers' association in the United States. Through educational programs, industry promotion and advocacy, and networking opportunities, and the funding of Extension research, the NEVBGA supports and promotes the vegetable and berry industry in New England. The NEVBGA and New England state Cooperative Extensions have a long history of presenting educational programs together, including the New England Fruit & Vegetable Conference.

Non-members are welcome to attend NEVBGA grower meetings and are invited to [join the Association](#) as members.

NEVBGA Market Gardener's Meeting - 603rd Growers' Meeting: This meeting, scheduled for Wednesday, January 19, has been postponed until later this winter. We will send out updated information when a new date is set.

Save-the-Date: NEVBGA & Cooperative Extension 604th Growers' Meeting

When: Saturday, February 12, 2022, 9am-4pm

Where: Wilson Farm, 10 Pleasant St., Lexington, MA 02421

Agenda and registration information coming soon!

UNH & UVM FARM LABOR WORKSHOP SERIES

When: Various dates and times, January – March 2022

Where: online

Registration: \$35/workshop. Scholarships and multi-session discounts available, *see below*.

This series of six online workshops is designed to help farmers build practical labor management knowledge and skills. The workshops are geared to produce and diversified livestock producers who are new to managing employees, and to farmers who are considering changes to how they arrange for and manage labor on their farms.

Workshop topics include:

- Planning Your Payroll & Estimating Trade-Offs with Mechanization
- Practical Communication Tools for Employee Management
- Growing Successful Work Teams
- Hiring & Retaining Employees on Your Farm
- The Art of Negotiation: Getting What You Need
- Cultivating a Safe, Healthy, and Productive Crew

Scholarships and multi-session discounts are available, reducing the workshop fee to \$20. However, these options are only available for people who request – and receive approval for – reduced fees in advance of registration and payment. To request a discount or scholarship, please fill out this [online request form](#). Please wait to register until you hear back from us via email. Decisions are generally made within 3 business days. If you are approved, you will receive a voucher code that you will use during the registration/payment process to activate a reduced registration fee for the workshops you indicated you wish to enroll in.

VIRTUAL GET READY FOR SPRING GREENHOUSE PROGRAM – PART 1

When: Wednesday, January 18, 2022, 8:30am-12pm

Where: Online

Registration: \$20. [Click here to register for this workshop.](#)

Join us via GoToWebinar for a virtual education program that will feature tips for growing young plants and managing pests in spring greenhouse crops. Topics on the agenda include tips for handling and propagating young plants, managing piercing-sucking insect pests of greenhouse-grown crops, and identification and management strategies for oomycete diseases in greenhouse crops. This workshop will be geared towards the floriculture industry but will be relevant to some vegetable growers who produce transplants or greenhouse crops.

Part 2 of this series coming March 1, 2022 – details coming soon!

2 pesticide credits in categories 26, 29, 31, and 000 have been approved for this program. Credits are valid for equivalent categories in all New England States.

Questions? Contact Geoffrey Njue at gnjue@umass.edu or 617-243-1932.

2022 LONG ISLAND AGRICULTURAL FORUM

When: Tuesday-Thursday, January 18-20, 2022

Where: online

Registration: \$45 per participant. [Click here to register for the Long Island Ag Forum.](#)

The past year has been different in many ways, but as you know the Long Island agricultural and horticultural industries have not slowed down! Like so many other conferences and events this year, the 2022 Ag Forum will be presented through Zoom webinars and online meetings. While the Forum will be coming to you in a different format, you will still hear the latest in research on environmentally safe and viable production, marketing tips, issues related to crop culture, and legislative, agency, and association updates. Pesticide credits are available – see the [event page](#) for more information.

For more information check out the [sessions brochure](#).

UConn Vegetable Production Certificate Course

When: January 20 – March 3, 2022

Where: online

Registration: \$149. Registration deadline January 14, 2022.

UConn Extension is offering a Vegetable Production Certificate Course, beginning on January 20, 2022. It is a fully online course for new and beginning farmers who have 0-3 years of vegetable growing experience or no formal training in agriculture. The participants will learn answers to the basic questions about farm business planning, planning and preparing for vegetable farm, warm and cool-season vegetable production techniques, season extension, identification of biotic and abiotic issues, and marketing.

Questions? Contact Shuresh Ghimire, Shuresh.Ghimire@uconn.edu, (860) 870-6933

TRI-STATE GREENHOUSE INTEGRATED PEST MANAGEMENT WORKSHOPS: DEALING WITH THE ROOT OF THE PROBLEM

When: Thursdays, January 20 and January 27, 2022, 1-3:30pm

Where: Zoom

Registration: \$50 for both sessions. [Click here for more information, including registration.](#)

The Tri-State Greenhouse IPM Program is a collaboration among growers and specialists from ME, NH, and VT. This year's virtual workshop program will be a two-part online (Zoom) session with a primary focus on IPM below the soil surface.

Pesticide recertification credits have been requested for this series.

Questions? Contact Cheryl Frank Sullivan, cfrank@uvm.edu.

USDA CROP INSURANCE WEBINAR SERIES FROM UCONN EXTENSION

When: Four dates, January 26-February 3, 2022

Where: Online

Registration: Free. [Click here to register for these webinars.](#)

This series of four webinars will provide an update on USDA Risk Management Agency and Farm Service Agency crop insurance programs.

- **Thursday, January 26, 10-11am:** Livestock and Dairy Insurance Programs
- **Friday, January 27, 11am-12pm:** FSA Non-Insured Crop Insurance (NAP)
- **Tuesday, February 1, 12-1pm:** Multi-Peril Crop Insurance and the NEW Direct Market Tomato Insurance Program Note: The Direct Market Tomato Insurance Program is only directly available in Hartford and New Haven Cos., CT, but MA growers can obtain this policy under a written agreement.
- **Thursday, February 3, 12-1pm:** NEW Whole Farm Revenue Protection, including the new Micro Provisions. *Farmers with gross sales of under \$100,000 will qualify for this program*

FARM SUCCESSION SCHOOL

When: Tuesdays, January 25, February 15, & March 15, 2022, 9am-4pm

Where: John W. Olver Franklin Transit Center, Greenfield, MA

Registration: \$100 per farm. [Click here to register for this series.](#)

MDAR is hosting Land for Good's Farm Succession School for Massachusetts farmers this winter! This is an opportunity for senior generation farmers to talk with peers, learn from advisors, and get support on the challenging process of farm succession and transfer planning.

Succession planning is a process of exploring how to transfer the farm business and assets to a future owner. Succession School provides farmers and farming partners with the structured and sustained support to make decisions,

engage their families, and organize the legal and financial mechanics.

Questions? Contact Shemariah Blum-Evitts, shemariah@landforgood.org or 603-357-1600

Funding provided by the MA Department of Agricultural Resources' Agricultural Business Training Program.

UMASS EXTENSION JUMPING WORM CONFERENCE

When: Wednesday & Thursday, January 26 & 27, 2022, 9-11:45am

Where: online

Registration: \$25 per person for 1 day, \$40 per person for both days. [Click here to register.](#)

Do you have questions about jumping/snake worms? If you immediately answered yes, this conference is for you! Join UMass Extension as we welcome scientists who specialize in jumping/snake worm research to discuss the latest understanding of these earthworms. How to identify these worms, what their potential impacts are, and the latest research into how we might manage them to be discussed. These LIVE virtual presentations will also give you the chance to get your questions answered following each speaker's presentation. So bring your questions!

½ pesticide credit contact hour per day for categories 29, 25, 26, 27, and Applicator's (core) License. Association credits: 1 MCA, 1 MCLP, 1 MCH, 1 CFE, 2 ISA, and 2 SAF (cat 1) credits per day.

VIRTUAL BUSINESS PLANNING WORKSHOP SERIES: FINANCIAL, MARKETING & RISK MANAGEMENT PLANNING

When: Thursdays, January 27, February 3, 17, and 24, and March 10 and 17, 7-9pm

Where: Online

Registration: Free. To register, email either Tom Smiarowski, tsmiarowski@umass.edu, or Paul Russell, pmrussell@umass.edu, and include your name, email address and city/town and state.

Geared to new, beginning, and expanding vegetable and small fruit producers.

Are you thinking of starting your own farm? Are you a beginning farmer and wondering what's out there for assistance to fund capital improvements and upgrade your equipment? Where can I go to get production advice/information? Do you want to upgrade your marketing outlets but don't know how to go about doing this? Do you want to learn how to better manage risks on your farm, especially in light of recent adverse weather? Are you a small farmer looking to grow and expand your business?

If you answered yes to any of the above then this business planning workshop can help you answer those questions. National Crop Insurance Services in conjunction with the UMass Extension Risk Management Education Program is offering this workshop series at **no cost** to participants. Each session will include a formal presentation on the subject topic as well as guest speakers who are farmers or agricultural service providers with experience in the topics and provide adequate time for questions.

[Click here for a full list of session topics and descriptions.](#)

A request has been submitted to the USDA - Farm Service Agency (FSA) to have this course certified to meet the FSA borrower training requirement.

2022 MASS AGGIE WORKSHOP SERIES

When: Saturdays, February 5 – March 26, 10:30am-12pm

Where: Zoom

Registration: \$35/workshop. [Click here for more information and to register.](#)

Each year, UMass Extension offers workshops for homeowners and small-scale farmers to help participants gain new skills to can use in the garden or landscape. Topics of this year's webinars will be Insects: Pests & Beneficials, Orchard Diseases, Home Orchard Establishment, Home Orchard Pruning, Growing Brambles, and Growing Blueberries.

Questions? Contact Doreen York at dyork@umext.umass.edu or 413-545-2254.

VIRTUAL FDA PUBLIC MEETINGS ON THE PROPOSED CHANGES TO AGRICULTURAL WATER REQUIREMENTS IN THE PRODUCE SAFETY RULE

On December 2, the FDA announced the publication of new proposed requirements related to agricultural water in the FSMA Produce Safety Rule (Subpart E).

- Docket FDA-2021-N-0471
- <https://www.regulations.gov/document/FDA-2021-N-0471-0001>

The proposed revisions would significantly change the requirements related to pre-harvest water while retaining the existing standards for post-harvest water and for sprouts. The proposal would replace the microbial criteria and testing requirements for pre-harvest agricultural water with an “agricultural water assessment” of pre-harvest water systems that considers several factors in determining whether the water is likely to introduce contamination to fresh produce.

- There is a 120-day public comment period for the draft rule
- Deadline for comments to the docket is April 5, 2022
- Comments that are thoughtful and substantive, containing real-life examples and solutions will assist the FDA in creating a document that better suits the needs of fresh produce farmers across the country
- Comments can be submitted to the [docket](#), or at one of the public meetings below.

First meeting: Monday, February 14, 2022, 11:45am-7:45pm EST. [Click here to register for the February 14 meeting.](#)

Second meeting: Friday, February 25, 2022, 8:45am-4:45pm EST. [Click here to register for the February 25 meeting.](#)

*Note the long meeting times are intended to provide persons in different regions of the country an opportunity to comment

Questions about the meetings? Contact Juanita Yates, juanita.yates@fda.hhs.gov.

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Vegetable Notes. Genevieve Higgins, Lisa McKeag, Susan Scheufele, Hannah Whitehead co-editors. All photos in this publication are credited to the UMass Extension Vegetable Program unless otherwise noted.

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