



UMass
Extension

Vegetable Notes

For Vegetable Farmers in Massachusetts since 1975



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CROP CONDITIONS

Fieldwork isn't done yet! While many crops have now been frost killed, the bugs and diseases may remain! Sue Scheufele reports: "Just yesterday I saw cabbage aphids alive and kicking (literally) in my field of cabbage which had been harvested weeks ago but the residues not destroyed—I always advise growers to destroy residues ASAP after harvesting to stop pest populations from growing unchecked but I do not always take my own advice!" But there are lots of tasks still on growers' to-do lists...caterpillar and low tunnels are going up to protect overwintering and season extension crops, decisions are being made about better supplies for next season, storage crops are being bartered and shuffled around the state, fields and greenhouses are being tidied, and equipment auctions and tradeshow are being attended along with other educational programs. Registration for the New England Vegetable and Fruit Conference is now open: [Register Now!](#) Hotels are filling up fast.

With our fall experiments now at a close, the vegetable team has been busy lately attending programs to keep us updated on research and growing strategies useful to farmers. Last week at the "Lean Farming" workshop at Outlook Farm in Westhampton hosted by CISA, Lisa learned from the presenter Scott Morrison about ideas for eliminating sources of waste on farms, such as unnecessary movements and wasted time, inappropriate inventory, preventable mistakes, and how to encourage everyone on the farm to look for ways to continuously improve processes. Scott detailed some of the elements of the lean concept, including using colors and labeling for easy visual management, locating tools and supplies near where they'll be used to save time, and standardizing your storage so you know you'll have what you need when you need it. Katie visited the USDA-NRCS Big Flats Plant Materials Center in Elmira, NY during a cover crop conference, and saw tillage radish planted in August loaded with *Alternaria* while radish planted in September was symptom free. She also met a clever farmer who had sharpened the blades on his roller crimper so that when driven in one direction it chopped, and in another direction, it rolled. Sue attended the Brassica School in Saratoga Springs, NY on November 7th where lively discussions were had between growers, industry reps, and university researchers on all things brassica including plant spacing, varieties, weed control and more. A few growers shared their success using white plastic mulch to suppress weeds without overheating cool-loving brassica crops, as can



Aphid hotels...er...Brussels sprouts.

happen with black mulch. Mulches can also disrupt host-finding by aphids and flea beetles and may also reduce *Alternaria* severity. Sue learned from a grower using biodegradable white mulch made by BioTelo that newer formulations are easier to lay, hold up better in season, and break down better in soil than older iterations of these products. She also learned that Brussels sprouts require a lot of N up front so that they grow straight and tall before the summer heat halts their growth. Brussels do get stressed during hot and dry summer weather but do not show it like other crops by wilting—Sue plans to irrigate her sprouts more next summer and try using mulches to suppress insect and disease pests.

IDENTIFYING DISEASES OF CARROTS

Carrot acreage is on the rise in New England, as more growers target expanding, year-round markets. Carrots can be affected by many bacteria, fungi and nematodes in the field and in storage. Foliar diseases may cause lower yields due to loss of photosynthetic area, difficulty in harvest if the tops are weakened, and lower marketability if the carrots cannot be sold in bunches. Root diseases can lower yields of fresh eating carrots and can spread in storage, drastically reducing yields brought to later markets. Root diseases are caused by soil dwelling organisms and therefore their incidence may vary considerably from farm to farm. Proper disease identification will help you to prevent future outbreaks by adjusting crop rotations accordingly, and prevent moving infested soil from field to field. Some of the major carrot disease symptoms are described below. If you are noticing foliar or root symptoms like those described, send a sample to your state diagnostic lab to confirm, and take steps to protect current and future crops. See the [UMass Diagnostic Lab](#) website for their sample submission instructions.

Alternaria Leaf Blight (*Alternaria dauci* and *A. radicina*) symptoms first appear along leaflet margins as greenish-brown, water-soaked lesions which enlarge, turn brown to black, and often develop a yellow halo. Older leaves are more susceptible to infection. When about 40% of the leaf is infected, the leaf yellows, collapses, and dies. Petiole lesions are common, elongate, and can quickly kill entire leaves. *A. radicina* causes similar foliar symptoms but can also produce a dry, mealy, black decay known as black rot on carrot roots held in storage.



Root knot nematode symptoms.

Bacterial Leaf Blight (*Xanthomonas campestris* pv. *carotae*) symptoms appear primarily on leaf margins as small, yellow, angular leaf spots which expand, turn brown to black with a yellow halo, and become dry and brittle. Leaflets may become distorted and curled. Symptoms can extend into petioles, produce a yellow-brown, gummy exudate, and occur on flower stalks. Infected umbels can be completely blighted and seed infection can occur—use treated seed to prevent introducing this disease.

Root Knot Nematode (*Meloidogyne hapla*) forms galls or root thickenings of various sizes and shapes. Growth of infected carrots is patchy and uneven and severely infected carrots exhibit forking, galls, hairiness, and stubby roots. When soil populations of *M. hapla* are high symptoms include stunted plants, uneven stands, premature leaf death, and branches and swellings on both lateral and tap roots. Marketable yield is reduced by deformities, size reduction, branches, and knobs. *M. hapla* persists in the soil and has a very wide host range so rotation can be difficult, but monocots are non-hosts so small grains and corn as well as resistant varieties of tomato, alliums, and bean can be grown in rotations to reduce population size.



Black root rot on stored carrots. Photo by L. du Toit

Black Root Rot (*Thielaviopsis basicola*) occurs primarily in storage when conditions are not ideal and temperature and humidity are too high. The fungus causes superficial, irregular black lesions which occur in a random pattern. The discoloration, caused by masses of dark brown to black chlamydospores, is limited to the skin. The pathogen rapidly invades wounded tissue and is favored by long post-harvest periods without cooling so careful harvest and immediate cooling and storage can minimize disease impact.



Signs of white mold including white mycelia with black sclerotia. Photo by D. Brown



Cavity spot caused by *Pythium* spp. Photo by S. Livingston



Pythium causing forking of roots, *Pythium* spp. can also cause proliferation of fine roots. Photo by OMAFRA



Crown rot caused by *Rhizoctonia carotae*. Photo by Tamil Nadu Agricultural University

White Mold (*Sclerotinia sclerotiorum*) affects many vegetable crops but carrots are particularly susceptible, especially late in the season and during storage. The fungus may be present in soil, storage areas, or containers. Symptoms include characteristic white mycelial growth and hard, black sclerotia (overwintering structures), which can be seen on the crown of infected carrots. In storage, the disease is characterized by a soft, watery rot with fluffy white mycelia and black sclerotia present. Sclerotia can persist in soil for many years and the fungus has a very wide host range making this disease difficult to manage. Grasses and onions are non-hosts that can be used in long rotations and a commercially available biocontrol organism (trade name Contans) has been shown to be effective in parasitizing overwintering sclerotia. Contans should be incorporated into infested soils in the fall if a susceptible crop must be planted there next year.

Cavity Spot and Root Dieback (*Pythium* spp.). Infections from *Pythium* spp. can occur during early root development and are favored by moist soil conditions. Root dieback symptoms appear as rusty-brown lateral root formation, or forking and stunting; symptoms that can be easily confused with damage from nematodes, soil compaction or soil drainage problems. Cavity spot often shows up later in the season near harvest. Horizontal, sunken lesions varying in size from 1 to 10 mm appear on the surface of the root and can provide an ingress for secondary fungal or bacterial infections.

Crown Rot (*Rhizoctonia carotae*). Early symptoms are horizontal dark brown lesions around the root crown. As the crop matures the tops may die in patches in the field and as the disease progresses lesions join to form large, deep, rotten areas on the top part of the root. *R. carotae* can also cause crater rot and violet root rot but these diseases are less common in MA. Crown rot is favored by moist conditions, so planting on ridges, harvesting early and without wounding, cleaning equipment, and maintaining clean and proper storage conditions may minimize impact.

Scab (*Streptomyces* spp.) can cause both raised and sunken, dry, corky lesions on the carrot root, however, symptoms are rarely severe enough to cause major losses in yield or crop marketability. Avoid planting carrots in alkaline soils, which are known to favor the incidence of scab, or in potato fields with high incidence of scab, as the disease may be caused by the same organism in carrots.

-Written by Susan B. Scheufele, UMass Extension

CONTROL PESTS BETTER BY PLANNING AHEAD

On June 22nd of this year, we published an article by Extension Educator Lisa McKeag about "[Pest Scouting and Using the UMass Scouting Sheets](#)". Perhaps you used some of these scouting tools and are now ready to evaluate whether they worked or not. Over decades of working with growers directly to implement Integrated Pest Management (IPM) on their farms, we have developed an IPM planning template to help you focus and be successful with your pest management

strategies. Now is the time of year we are sitting with growers all around the state to evaluate the efficacy of their 2017 IPM Plans, which we implemented with them on a biweekly basis this season, and to plan for next year. We hope that this planning template may be useful to you as well.

IPM is a stepwise approach to managing pests that combines accurate knowledge of the pest and level of potential harm with multiple tactics to prevent, reduce or eliminate the effect of pests (disease, insects, weeds or even abiotic issues) on your crops. In this planning template, we will select a few key pests to tackle using the IPM principles of monitoring, scouting, and implementing effective cultural, biological, and chemical controls at the right time.

Following are instructions to completing your [2018 IPM Plan](#) (click on the link for a blank template):

Crop & Pest columns: *Choose no more than 5 pest and crop combinations you would most like to work on next season.* We have found that focusing on no more than 5 pest issues each season on your most valuable or newest crops leads to more successful pest management because it allows the grower to learn the pest life cycle, and become more confident at using control strategies that work. Each season, new issues may come up and over time, you will become an IPM expert!

Past Control Strategies column: *Write down what strategies you have tried before.*

What didn't work? Take a moment to think about your crop quality or yields this season related to the pest in question. Did you reduce pesticide use or other inputs such as labor on this crop this season? Did you make more money on this crop? Perhaps some of your strategies worked, but not others. *Write down what didn't work for you to manage this pest in the past.* "I don't know" may be what you write down, especially if you are working with a crop or new invasive pest you don't have much experience with.

Future IPM Strategies column: Think broadly at first about the IPM tools and strategies you will use in your 2018 plan. Be picky, only *write down the strategies you will use in this column.*

- 1. Accurate identification:** determine the true underlying cause of the pest problem through soil or plant tissue testing, disease diagnostics, insect and weed identification, or other methods. Often we find that in the first year of working with a grower on their IPM plan, pest identification is the most important task.
- 2. Pest scouting:** Determine pest levels, damage, life stage, and keep records over time. We recommend weekly scouting for most crops (more frequently sometimes as the crop nears thresholds for some pests). Check out our [scouting resources](#) page to find pest scouting sheets we developed for different crops.
- 3. Monitoring & Forecasting:** Use data loggers, pheromone traps, online networks, pest models and pest or weather forecasts to monitor or predict pest arrival/emergence and potential for damage.
- 4. Cultural practices:** e.g. crop rotation, mulches, irrigation, resistant varieties, row covers.
- 5. Biological control:** Attract and/or release beneficials, predators and/or parasitoids to control pests.
- 6. Chemical control:** Choose the right materials, time to spray, improve coverage, and manage for resistance.

This Year's Plan column: (write year here for example '2018') Get more specific with the strategies you just wrote down in the previous column. Use our [Scouting Toolkit Inventory](#) to find out what you will need for the season and where to get it. *Write down the tools and supplies needed, people involved, resources to use, etc. Write down the steps necessary to implement your plan and who will do them.*

Calendar Alert column: *When does each task need to be done or planned?* Jot down dates or set calendar reminders to make sure you get traps set up on time, know when to begin scouting for a pest, etc. Review past 'Pest Alerts' in Vegetable Notes to get an idea when pests first appeared in your area or rely on past experience to plan.

Notes column: Consider outside influences which may not be directly related to your plan, but which may impact your success, for example: equipment or labor shortages, unpredictable weather, underlying field conditions (ie. rocky, low fertility, prior crops and surrounding environment), etc. *Write down any of these outside influences which may have a specific effect on your plan.*

Below is a sample IPM plans from a grower we have worked with in the past to guide you:

Crop	Pest	Past Control Strategies	Future IPM Strategies	This Year's Plan: 2018	Calendar Alert	Notes
Summer Squash, Zucchini, and various winter squash: Delicata, Butternut Acorn Spaghetti	Squash Vine Borer (SVB)	<p>We identify the larvae in stalks, but it's too late to treat once they are infesting the crop. We lost about 30% of yield to fruit infestation in the fall. We didn't know there could be 2 generations of SVB per year!</p> <p>What didn't work? Treatment was too late since Entrust must be consumed by the larvae before they enter the stalk and row cover is not practical on a large scale. We need to know when adults arrive, how to identify eggs and when to treat so that we can target eggs before larvae enter the plant.</p>	<p>Accurate Identification: Adult and eggs.</p> <p>Monitoring: Use pheromone trap to determine arrival of adults. Trap is to be placed in the top of the crop canopy about 3ft. above the ground.</p> <p>Chemical Control: Use Entrust targeting based of plant at a threshold of 5 adults/trap in non-vining crops and 12/trap in vining crops.</p>	<p>Get Pest ID guide from UMass Extension.</p> <p>Manager order trap and pheromones from <i>Great Lakes IPM</i>.</p> <p>Manager will set up the trap with field crew and assign a scout.</p> <p>First place the trap in the field where the winter squash was last year, then when the first adults are captured, move the trap to the summer squash field.</p> <p>Scout will check traps weekly and scout for eggs then report to Manager.</p> <p>Farmer will treat at threshold.</p>	<p>December 3: Order trapping supplies and ID Guide.</p> <p>May 15: Set up trap.</p> <p>Early June (likely): Scout for eggs near the base of the plant.</p> <p>Weekly, May 15 – harvest: Check trap and scout field.</p> <p>Spray if threshold is reached.</p>	<p>Summer Squash is being grown in the field adjacent to last year's winter squash which had a high infestation, so heavy pressure is expected. The winter squash was not tilled under to destroy pupae because this is a No-till field, so higher populations are also expected.</p>

Find everything you need to complete this plan and carry it out next year on the “[Scouting Resources](#)” section of our website. You are now well prepared! Have an idea that's not quite fleshed out? Need some help talking through your plan? Have some ideas about how to improve this planning template? Give us a call: Sue Scheufeles, and Lisa McKeag (413-577-3976); Katie Campbell-Nelson (413-545-1051); or write to us at umassveg@umass.edu.

-Written by K. Campbell-Nelson and S. Scheufeles

SARE FARMER GRANTS – APPLICATION DEADLINE DECEMBER 5TH

The USDA's Northeast Sustainable Agriculture Research & Education Program (NESARE), Farmer Grants offers up to \$15,000 in support of innovative ideas that can advance production practices for growers and producers in the Northeast. The Farmer Grants are for commercial producers who have an innovative idea they want to test using a field trial, on-farm demonstration, marketing initiative, or other technique. Applicants must work with a technical advisor who serves in a consulting capacity. Applications can be downloaded from the NE-SARE website at <http://www.nesare.org/Grants/Get-a-Grant/FarmerGrant>

The application deadline is December 5, 2017 at 11:59 p.m. ET. Northeast SARE provides an excellent guidance video at: <http://www.nesare.org/Dig-Deeper/Grant-Workshop-PowerPoints-and-Webinars/Farmer-Grant-narrated-PowerPoint>

CROP DISASTER PROGRAM DEADLINE NOVEMBER 20, 2017

Are you concerned with the weather extremes we have seen in the last few years? There have been more incidents of hail, drought and excess moisture. Any one of these perils can destroy a vegetable crop in a matter of hours. Maybe you can absorb a loss here and there and still survive, or maybe you'd like some level of disaster coverage!

Crop insurance is available for only a few vegetable crops in Massachusetts (potatoes and sweet corn) but all other crops

are covered by the USDA Farm Service Agency (FSA), Non-Insured Crop Disaster Assistance Program (NAP). Under NAP, a producer can purchase basic coverage, commonly called catastrophic coverage, which provides 50% yield protection @ 55% of the established price. Producers can also purchase “Buy-Up” coverage in various levels (50%, 55%, 60%, 65% of established yields) which provides protection at 100% of the established price.

Beginning farmers, historically underserved farmers, and limited resource farmers pay no administrative fee and calculated premiums are reduced by 50%.

The NAP **sales closing date** for all perennial vegetable crops is **November 20, 2017**. The same date applies to any perennial fruit crops that you produce on your operation. If by chance you raise apples (all counties) or peaches (Hampden, Hampshire, Middlesex & Worcester), Federal Crop Insurance is available for those two tree fruits. Closing date for **annual crops** under NAP (and those limited crops covered by Federal Crop Insurance) is **March 15, 2018**.

It's not too late to do obtain coverage for your 2018 crops! So take a close look at NAP and Federal Crop Insurance to determine if NAP and/or Federal Crop Insurance can provide you with some peace of mind in the event that a weather related event affects your crop(s) in 2018!

Contact your UMass Extension Risk Management and Crop Insurance Educators Paul Russell (pmrussell@umass.edu) or Tom Smiarowski (tsmiarowski@umass.edu) to get information about available assistance.

EVENTS

[Greenhouse Vegetable Production in Hydroponics and Soilless Systems](#)

When: Saturday, December 9, 2017

Where: UConn Floriculture Greenhouse, 1395 Storrs Rd., Storrs, CT 06269

This workshop is for farmers who are already growing greenhouse vegetables and would like to improve their production techniques. Speakers will present on topics including manipulation of environmental parameters to promote crop growth, nutrient management, biofungicide use in edible greens, diseases of hydroponic crops, and beneficial microbes in hydroponic systems. A tour of the UConn research greenhouses will also be conducted.

Credits for pesticide recertification will be provided (approval pending).

For more information, click here: <http://greenhouse.uconn.edu/workshopdec9/>

Cost: Early registration (Before Dec 1) \$55/person, Late registration (after Dec 1) \$70/person

To register, send in this form by mail: http://greenhouse.uconn.edu/wp-content/uploads/sites/717/2017/10/2017_UConnHydroponicsDec9.pdf

Questions? Contact Rosa Raudales (860-486-6043, rosa.raudales@uconn.edu) or Leanne Pundt (860-626-6855, leanne.pundt@uconn.edu)

[New England Vegetable and Fruit Conference](#)

When: Tuesday, December 12 to Thursday, December 14, 2017

Where: Radisson Hotel, 700 Elm St, Manchester, NH 03101

The New England Vegetable & Fruit Conference and Trade Show will include more than 25 educational sessions over 3 days, covering major vegetable, berry and tree fruit crops as well as various special topics. A Farmer to Farmer meeting after each morning and afternoon session will bring speakers and farmers together for informal, in-depth discussion on certain issues.

There is also an extensive Trade Show with over 120 exhibitors. We hope that you will enjoy your time here, and meet with fellow growers, advisors, researchers, and industry representatives. We want you to leave with new ideas and new information that will have a positive impact on your farm.

Pre-registration must be received by November 30, 2017: [Click here to register.](#)

[Our Farms, Our Future Conference](#)

When: Tuesday, April 5 to Thursday, April 5, 2017

Where: Hyatt Regency, 315 Chestnut Street, St. Louis, MI 63102

This national event will bring together our diverse agricultural community including farmers and ranchers, agribusiness stakeholders, students, researchers, scientists, agency representatives and nonprofit leaders. Every decade SARE hosts a conference to look at the progress of sustainability in agriculture and to understand our trajectory for the future.

Please join us for a stimulating set of sessions on the future of sustainable agriculture in the United States.

Special Rates for Farmers if you register by the Earlybird Deadline of February 22nd, 2018! [Click here to Register.](#)

THANK YOU TO OUR SPONSORS



FARM CREDIT EAST



Vegetable Notes. Katie Campbell-Nelson, Lisa McKeag, Susan Scheufele, co-editors.

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