



UMASS
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Vegetable Notes

For Vegetable Farmers in Massachusetts

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RESEARCH UPDATE: EVALUATION OF CONVENTIONAL AND OMRI-APPROVED INSECTICIDES TO REDUCE CABBAGE ROOT MAGGOT DAMAGE

Susan Scheufele, Katie Campbell-Nelson, Lisa McKeag, Ruth Hazzard

Rationale: Cabbage root maggot is probably a familiar pest to any of you who grow brassica crops such as cabbage, broccoli, and kale. The

adult fly overwinters in the soil, emerges in late-May to early-June and lays eggs at the base of freshly transplanted brassicas. When the eggs hatch, larvae feed on root and hypocotyl tissue causing stunting, wilting, and eventual collapse of plants. There are multiple generations that can continue to cause problems throughout the season but soil temperatures usually become too hot for larvae to do much damage in summer. Another fall generation can cause damage to root crops such as turnips and rutabagas, where larval feeding causes ugly tunneling on root surfaces, making the crop unmarketable.

Chemical control options for conventional and organic growers are limited. A banded, soil drench at transplant using the organophosphate Lorsban (chlorpyrifos) has been the standard commercial treatment for preventing root maggot infestation. New restrictions, buildup of resistant pest populations, the amount of time it takes to make applications, applicator and worker safety and the need for effective organic options are among the reasons that growers are seeking alternative chemistries. We evaluated two new products in the diamide class, Coragen and Verimark, that are systemic and therefore offer greater flexibility in application method and timing, and have a long residual. Additionally, we evaluated the OMRI-approved insecticide Entrust SC (spinosad) applied either as a transplant drench followed by soil drenches after transplanting, or as soil drenches after transplant with no pre-plant tray drench. Please note that Entrust is not currently labeled for control of cabbage root maggot or for transplant drench applications at this time in MA. If proven to be effective, a label expansion would be pursued in order to make a new tool available for organic farmers and a new rotational chemistry for conventional growers.

In a second trial we evaluated efficacy of different formulations and rates of thiamethoxam seed treatments compared to imidacloprid applied as a transplant drench. Seed treatments offer a simpler and faster way for growers to apply insecticides compared to soil drenches which require much labor and water to apply, and could be especially useful in protecting direct-seeded brassica crops such as radishes, turnips, and rutabagas from root maggot damage.

Materials and Methods

Drench treatments (Table 1 on next page) were evaluated in spring cabbage (Farao seeded 28 Mar and transplanted 02 May into double rows with 12" in-row spacing) and seed treatments were evaluated in spring broccoli (Preakness seeded 18 Apr—delayed due to seed treatment and shipping—and transplanted on 12 May into double rows with 12" in-row spacing). The



experiment was conducted at the University of Massachusetts Research and Education Farm in South Deerfield, MA in a field with soil classified as Hadley silt loam. Soil was amended with 50 lb urea, and 20 tons/A manure-based compost was added to increase soil organic matter which is attractive to CRM flies for egg laying. A randomized complete block design with 4 replications of

Treatment	Active Ingredient	Rate	Application Method
Spring cabbage (Farao) treatments			
Untreated	De-Ionized Water	na	Banded over row after transplant
Lorsban	Chlorpyrifos	2.4 fl oz/A	Banded over row after transplant
Verimark	Cyantraniliprole	13 fl oz/A	Tray drench in GH
Coragen	Chlorantraniliprole	5 fl oz/A	Tray drench in GH
Entrust SC-A	Spinosad	10 fl oz/A	Tray drench pre-plant; Banded at planting; Banded 14 days later
Entrust SC-B	Spinosad	10 fl oz/A	Banded at planting; Banded 14 days later
Broccoli (Preakness) treatments			
Untreated	F300	na	Seed
FI400-C (Cruiser)	thiamethoxam	0.05 mg/ seed	Seed
FI400-C (Cruiser)	thiamethoxam	0.10 mg/ seed	Seed
FI400-EXP	FI400-EXP	0.05 mg/ seed	Seed
FI400-EXP	FI400-EXP	0.10 mg/ seed	Seed
AdmirePRO	Imidacloprid	7.0 fl oz/A	Banded over row at transplant

Table 1. Cabbage Root Maggot treatments in cabbage and broccoli trials

each treatment and untreated controls was used. Each replicate plot consisted of 60 plants to allow for three destructive samples and facilitate rating plant collapse over time. Once a week, plots were rated for overall plant vigor (0-100% based on size, color, stunting or discoloration caused by CRM, and leaf damage caused by flea beetle (FB)). Three times over the period of the trial, 10 plants per plot were randomly and destructively sampled to assess individual plant vigor, number of larvae present, and damage to roots. Root damage caused by CRM was rated on the following categorical scale: 1= strong root development and no damage to main or secondary roots; 2=slight damage but secondary roots still present; 3=moderate root damage, i.e., not many secondary roots and secondary roots discolored; 4=severe damage, i.e., almost no roots present; and 5=plant completely dead. On 07 Jul, 10 cabbage plants per plot were harvested and head diameter and marketable weight was recorded. Broccoli plants grew slowly and did not form heads, likely due to high pest pressure and dry, hot conditions; therefore yield data was not collected for this crop. All data were analyzed using a general linear model for mixed effects and means were separated using Tukey's HSD ($\alpha = 0.05$).

Results & Discussion

Pressure from both CRM and FB was extremely high in this field. We monitored CRM adult flight using yellow sticky cards placed randomly throughout the field and we first observed adult flies on 05 May, two days after cabbage was transplanted and before broccoli was transplanted. This allowed us to really see

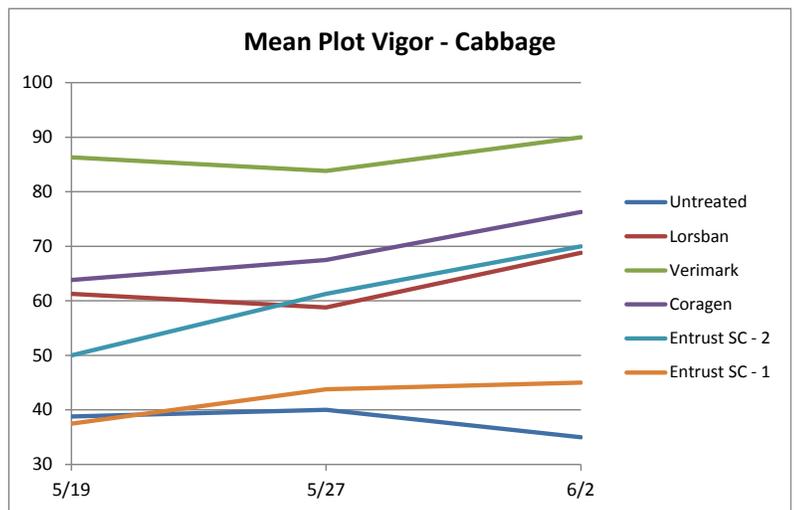


Figure 1. Efficacy of drench treatments on overall plot vigor in cabbage.

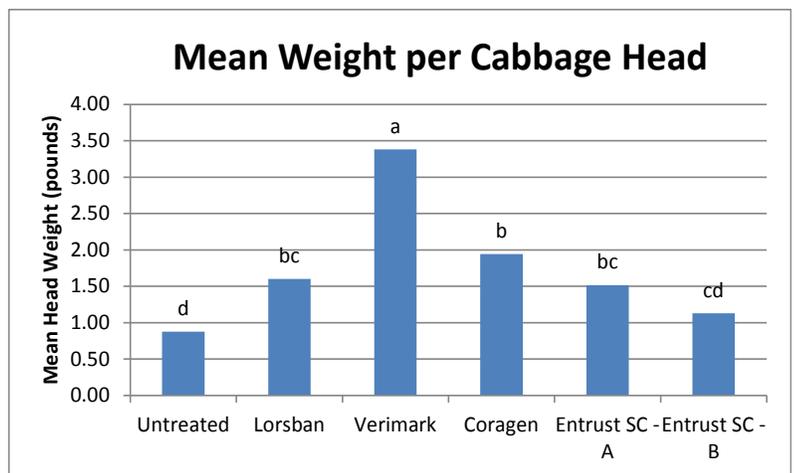


Figure 2. Efficacy of drench treatments on cabbage yield.

differences between treatments in the cabbage study, but the broccoli was so small when it was transplanted and there was already substantial CRM and FB activity by 12 May so those plants really struggled all season and never formed heads.

In the cabbage study (see Figures 1 & 2), all treatments except the Entrust SC-B treatment significantly reduced root damage compared to the control, with Lorsban and Entrust SC-A performing the best. As for plot vigor, Verimark outperformed all other cabbage drench treatments, with Coragen, Lorsban, and Entrust SC-A tying for second. Entrust SC-B did not perform better than the untreated control. The Verimark treatment produced the biggest yield of cabbage in terms of both weight and size of heads (see Figure 2). Lorsban, Coragen, and Entrust SC-A produced equally large heads and significantly improved yield relative to the untreated control, whereas the Entrust SC-B treatment did not.

In the second trial, all seed treatments significantly improved plant vigor up to 10 days after planting relative to the untreated control. By 17 days after transplant only the 0.1 mg/seed rates of thiamethoxam and the imidacloprid drench significantly improved vigor relative to the untreated control. By the end of the experiment only the imidacloprid treatment still had any effect on improving plant vigor (see Figure 3).

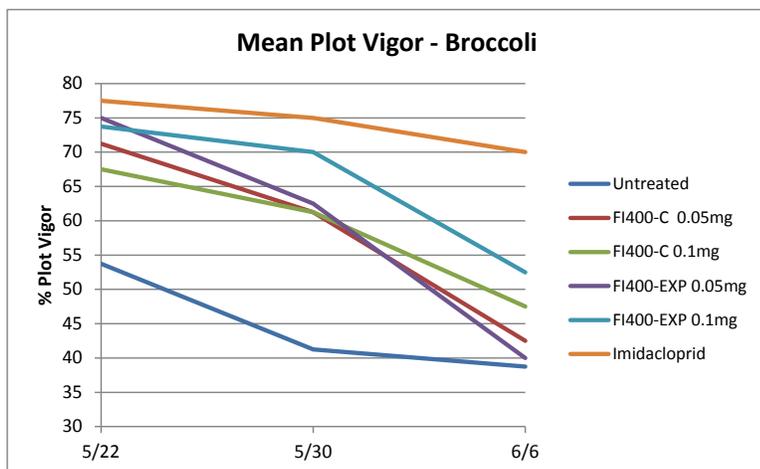


Figure 3. Efficacy of seed treatments on overall plot vigor in broccoli.

Overall, Verimark performed very well and represents a new option for controlling CRM with improved efficacy, ease-of-use, and reduced risks for humans and the environment than the industry standard, Lorsban. Coragen performed as well as Lorsban in many indices, and is similarly easier to apply and safer for humans and the environment. More work is needed to determine the best application methods and timing for Entrust SC but these results suggest that pre-plant and post-plant drenches are needed under CRM pressure. We feel that this product shows promise and we hope to continue to study it and work towards a label expansion for CRM drench treatments in the future.

Funding for this project was provided by DuPont Crop Protection, Syngenta, the New England Vegetable & Berry Growers' Association, and a grant from USDA NIFA.

VALUE-ADDED FOOD PROCESSING FOR A FOOD BUSINESS: SOME CONSIDERATIONS BEFORE YOU START

Adding a value-added product, such as a baked good, jam, pickle, sauce, or canned vegetable to your market stand or wholesale offerings can be a great way to preserve your harvests, and expand your business. However, before you launch into a new food business venture there are a few considerations that should be accounted for prior to production.

Before producing a new food product it is critical that you understand the food safety risks associated with this food type and the processing conditions you must use in order to minimize any food safety risks. You should know where you intend to process the food, and be aware of the regulations specific to the product.

Food Safety

Understanding the processing conditions used for preservation is essential for food safety. Generally speaking, government regulation uses the term *potentially hazardous food* to refer to a food product that “requires temperature control because it is in a form capable of supporting the rapid growth of infectious or toxigenic microorganisms”. While there are many factors that influence the safety of food products, three important measurements can help determine if a food product is potentially hazardous: water activity (A_w), pH, and time/temperature

- **Water Activity (A_w)** is a measure of the amount of water available to support microbial growth. The value range is from 0 to 1.0. Water activity can be measured using a water activity meter. The higher the A_w value, the more water there is available to harbor microbial growth. Most microorganisms grow well at 0.91 to 0.99. For example, most cheeses have $A_w > 0.9$, while cookies and crackers have a A_w of 0.3. Foods with $A_w < 0.85$ do not support the growth of

pathogens such as *C. botulinum*.

- **pH** is the value on a scale of 1 to 14 that measures acidity, where 7 is neutral, values below 7 are acidic, and values above 7 are basic. In food systems, foods with a pH < 4.6 are considered “high acid” and do not support the growth of pathogens, while foods with a pH > 4.6 are considered “low acid”. Knowing whether the pH of your food is above or below 4.6 will guide you in deciding on what processing conditions are necessary to manage food safety risks.
- **Time/Temperature** is used to manage the risk of microbial growth and/or to use as a thermal processing step to kill any pathogens of concern. If you are using temperature to control your process, it is critical that the targeted temperature is met and it is maintained for the appropriate time to ensure proper food safety.

There are a variety of other food science analyses that can assess the properties of foods, but pH, A_w and time/temperature are the most widely used for managing food safety risks.

If you have a pH meter and are able to monitor your equilibrated pH be sure that your probe is clean, the unit is calibrated and you are using the appropriate method for measuring pH for canned products. A great reference to illustrate how to measure the pH can be found at: [pH Measurement for Shelf Stable Canned Foods](#). If you do not have access to a pH meter, you can have your product analyzed at a food lab. Regional labs available in the Northeast can be found at the UMass Food Science Extension site (<http://ag.umass.edu/food-science/resources>).

Regulations

All food products must adhere to the regulations relevant to the food type. Due to the risks associated with different food processing techniques (e.g. canning), there are different food safety requirements associated with different food product types. For example, jellies/jams by regulatory definition contain a significant amount of sugar that ensures that the water activity (A_w) is below 0.85 and the pH is below 4.6. However, products such as shelf-stable pickled cucumbers have A_w > 0.85 and the product uses vinegar to ensure that the pH < 4.6. Therefore, it is considered an acidified food, and needs to abide by additional regulations (21CFR114). Below is a general list of some of the more common regulations related to value-added processing specific to non-meat, FDA regulated food products.

CFR Code	General Description	Notes	Examples
21CFR110	Good Manufacturing Practices	All food products must comply with Good Manufacturing Practices	All FDA regulated foods must comply.
21CFR114	Shelf Stable Acidified Foods	Foods that have a A_w > 0.85 and are formulated with a pH < 4.6	Pickles Marinara sauce Salsas
21CFR113	Shelf Stable Low-Acid Foods	Food products that have a A_w > 0.85 and have a pH < 4.6	Lentil soup Canned corn
21CFR123	HACCP	Hazard Analysis of Critical Control points (HACCP)	Juice, Seafood, Meat & Poultry products.

If your product is considered a low-acid canned food or an acidified canned food, you MUST:

- Have the product formula and process reviewed and approved by a process authority
- File the product processing (each product) with the federal government
- Have all operators that are producing the product attend and receive certification from a governmentally approved processing training (the most recognized is [Better Process Control School](#)).

If you are processing a juice product, you are required by law to have a Hazard Analysis of Critical Control Points (HACCP) plan. HACCP is a food safety management plan that identifies the potential biological, chemical and physical hazards associated with your processing facility and establishes appropriate controls to manage the identified risks. While the FDA currently only requires HACCP for juice and seafood, there are many consumers, such as large grocery chains, that require this type of plan for all of their vendors.

Process Authority

A process authority is a governmentally recognized thermal processing expert capable of providing technical recommendations relevant to food processing. Your product must be reviewed by a process authority if the food is a shelf-stable low acid canned food or shelf stable acidified canned food. There is at least a 3 week lead time to receive a scheduled process from a process authority and the service fee generally ranges between \$200-300. Below are two process authority resources in the northeast:

- Cornell – <https://necfe.foodscience.cals.cornell.edu/about/contact-us>
- University of ME – <http://foodsciencehumannutrition.umaine.edu/food-technology/process-and-product-reviews/>

Processing Facilities

If the food product is intended for sale you must comply with state and/or federal regulations. A few foods are allowed to be processed in an at-home kitchen if it is licensed while many food products require a licensed commercial kitchen for production.

Residential kitchens: If you intend to use a residential kitchen it can only be for non-potentially hazardous foods AND the facility must be licensed and inspected by local boards of health. Foods that are considered non-potentially hazardous may include: baked goods (excluding dairy and/or custard fillings), confectioneries, jams, and jellies.

Commercial Kitchens: If the food product is considered potentially hazardous it must be processed in a licensed commercial kitchen and adhere to the appropriate food regulations pertaining to your food product. Some examples include ready-to-eat meals, canned foods, and dairy products. To learn more about acquiring a license for a commercial kitchen you can go to: MA Health and Human Services. If you are not yet ready to invest in your own commercial facility, you may rent from available commercial kitchen facilities. To learn more about available commercial kitchens in the area go to: <http://ag.umass.edu/food-science/resources>.

Please note: shelf-stable, low acid food products (i.e. foods with an equilibrated pH > 4.6 and Aw > 0.85) require either aseptic processing or retorting processing (a commercial scaled pressure cooker) for commercial distribution. Home-use pressure cookers are prohibited for retail distribution.

In summary, developing a new food product can be a novel way to expand your business. Before you start processing, do remember to consider that:

- Most value-added processing must be done in an approved kitchen.
- Shelf stable acidified and low-acid foods (i.e. canned) need to have their process reviewed by a process authority, their product filed with the FDA and have all their operators trained prior to commercial production.
- It is critical to process your food the same way, every time and know what controls (i.e. time, temp, Aw, pH) you will use to monitor your product to ensure food safety.

Upcoming Food Production Events

If you are interested in pursuing a new food product and would like to learn more about food processing please consider attending some of the upcoming UMass Food Science Extension Short Courses:

- [Introduction to HACCP](#), December 2-4, UMass Campus Center, Amherst MA
- Product Development Considerations - Beyond the Concept
Hosted at [Franklin County Development Center](#), Greenfield, MA. November 13 & 20th from 6-9PM
Hosted at [Crop Circle Kitchen](#), Dorchester, MA. December 9 & 10th from 6-9PM
- [Better Process Control School](#), January 6-9, UMass Campus Center, Amherst, MA

Additional Information

[FDA definition of potentially hazardous foods.](#)

Clemson's Regulation Decision Tree: [Clemson Extension Low Acid and Acidified Foods.pdf](#)

Virginia Tech Extension's [Understanding Water Activity in Your Food.](#)

Wisconsin Extension's [fact sheet on pH and using a pH meter.](#)

-Amanda Kinchla, UMass Extension Food Science Specialist

NEWS & DEADLINES

Last Call for Feedback from Winter Growers!!

If you grow vegetables for sale anytime between December and April, we want to hear from you! UMass Extension, along with our project partners, are wrapping up a multi-year SARE-funded project on the state of winter vegetable production in New England. Whether you've shifted all your production over to the winter months, or you've just dabbled in using low tunnels for some early spring sales, we'd love to know how it's going. Your feedback will help guide the direction of future research projects and educational programs. Thanks for your help!

We created this short survey in survey monkey. It takes about 5 minutes to complete: <https://www.surveymonkey.com/s/winterVN>

-The UMass Vegetable Team (for the Northeast SARE Winter Harvest & Sales Project Partners: UNH Extension, UMass Extension, Communities Involved in Sustaining Agriculture, and Seacoast Eat Local)

New England Vegetable and Berry Growers Association Seeks New Secretary Treasurer.

The New England Vegetable & Berry Growers Association ([NEV&BGA](#)) is a strong and progressive organization that offers wide-ranging initiatives supporting the well-being of the vegetable and berry industry throughout New England. It is the oldest vegetable growers association in America and has been run by and for vegetable growers since 1886. With over 300 members from all five New England states, it is an active advocate for farmers, and works closely with Cooperative Extension to organize and co-sponsor educational programs including daylong meetings and the biennial [New England Vegetable and Fruit Conference and Trade](#) show in Manchester, NH. The Association supports Extension research projects with funding from members. It offers regular, commercial and associate memberships for growers and agricultural businesses. It is a non-profit membership organization with an Executive Committee that includes representatives from all New England States.

The Secretary-Treasurer position has been held for the past eleven years by John Howell, retired vegetable specialist from UMass Extension. He will be stepping down from this position in winter 2015 and the Association invites applications. This is a paid, part-time position. It offers an opportunity to engage with growers around the region and to support the Association's work and growth over the coming years.

The duties of the position include:

- Pay all bills, receive all monies and maintain financial records and bank accounts.
- Send dues notices, meeting notices and other pertinent information to members.
- Meet with the Executive Committee to conduct the business of the organization, and maintain minutes of these meetings.
- Meet with the Program Committee to select topics for 2-3 annual daylong meetings, and then plan and organize these programs.
- Represent the association at various meetings and functions and act as a primary contact person.
- On behalf of the association, act as treasurer for the New England Vegetable and Fruit Conference and participate in the steering committee of the NEVFC conference.
- The position could also include organizing and managing the Trade Show for the New England Vegetable and Fruit Conference. (Note: this responsibility could become a separate job, depending on the interests and skills of the applicant.)

For more information or to apply contact:

David Tuttle, President - Phone: 207-676-2648; 207-651-0080 (cell); Email: tuttledavid52@hotmail.com, OR

John Howell, Secretary-treasurer - Phone: 413 665-3501; 413 835-5380 (cell); Email: howell@umext.umass.edu

Vendors Needed for Year-Round Market

The Boston Public Market - a year-round indoor market featuring local farmers, fishermen, and specialty food producers - is seeking local growers with the capacity to provide produce year-round as permanent full-time vendors. With

a focus on entirely New England-sourced products, the market will be the first of its kind in the United States when it opens next summer. To learn more about the Boston Public Market and vendor opportunities, visit www.bostonpublic-market.org or call Tiffani Emig at 617-973-4909.

Northeast SARE Farmer Grant proposals Due December 2!

If you are a farmer and have an interesting idea that you'd like to try, now is the time to visit the [Northeast SARE website](#). Get application materials using the "for applicants" box on the right side of the webpage.

You can [read descriptions of last year's grants](#) here. For more information, contact Carol Delaney at carol.delaney@uvm.edu.



****NEW Risk Management Option****

Whole Farm Revenue Protection (WFRP) is a new option growers can use to protect the income of their farm. The WFRP was included in the 2014 Farm Bill and replaces the Adjusted Gross Revenue (AGR) policies. WFRP may provide growers with protection from low yield, low market prices or other threats to their revenue. Growers are encouraged to check with their crop insurance agent.

WFRP fact sheet: <http://www.rma.usda.gov/policies/2015/wfrpfactsheet.pdf>

Comparison of WFRP and AGR policies: <http://www.rma.usda.gov/policies/2015/comparison.pdf>

Important Signup date (11-20-2014) for Non-Insured Crops

The final signup deadline for insurance protection on perennial crops is **November 20th, 2014**.

The 2014 farm bill made significant changes to the Non-Insured Crop Disaster Assistance Program (NAP). Growers may purchase up to 65% yield protection and 100% price coverage. Catastrophic coverage for beginning farmers, limited resource and social disadvantaged farmers is available at no cost with buy up coverage at reduced rate. Growers are encouraged to check with their local Farm Service Agency (FSA) office.

UPCOMING EVENTS

Pollinator Health and Safety Conference

When: Thursday, November 20, 2014 from 8:00 am to 5:30 pm

Where: Portland Marriott at Sable Oaks, 200 Sable Oaks Drive, South Portland, ME 04106

The University of Maine Cooperative Extension and the Maine Department of Agriculture, Conservation and Forestry are co-sponsoring the Pollinator Health and Safety Conference to bring together farmers, bee-keepers, entomologists, policy-makers and others interested in protecting pollinators. State and national experts on pollinators, bee-keeping, and pesticides will share the latest scientific research on factors affecting pollinator health and best practices for their protection.

Registration: \$75.00/person. DEADLINE TO REGISTER: November 14, 2014. Contact Meghan Dill, meghan.dill@maine.edu or 207.581.3878 for more information.

****Approved for 7 pesticide applicator recertification credits****

Agricultural Justice Project's (AJP) Food Justice Certification Workshop

When: Thursday, November 20, 2014 from 6:00-8:00pm

Where: Florence Civic Center, 90 Park Street, Florence, MA 01062

Co-sponsored by the UMass Labor Center, this will be an evening to learn more about the AJP's Food Justice Certification and the movement to ensure fair treatment of workers, fair pricing for farmers, and fair business practices in all agricultural production. Will include: a viewing of Hungry for Justice, a short film about a Florida farm and their commitment to social justice; the Agricultural Justice Project standards for farms and food businesses; and a discussion of how to create a workplace that takes a comprehensive approach to justice and equity, including conflict resolution, democratic and cooperative structures, fair labor policies, health and safety. **Speakers:** **Elizabeth Henderson**, organic farmer, author of Sharing the Harvest, and founding member of the AJP, and **Jessica Culley**, an organizer at the New-Jersey based Comité de Apoyo a los Trabajadores Agrícolas (CATA).

Please RSVP to Jon Magee at mageejp@gmail.com or (413) 774-0116.



New England Vegetable & Berry Growers Association December Meeting

When: Saturday, December 6, 2014 from 10:00 am to 3:00 pm

Where: Portsmouth Country Club, 80 Country Club Lane, Greenland, NH 03840

Co-sponsored by the New England Vegetable & Berry Growers Association and the New England Extension Vegetable Consortium. Topics will include:

- Bird Control by Alan Eaton, University of New Hampshire
- Managing Sap Beetles in Sweet Corn by Jude Boucher, University of Connecticut
- Summary of Brassica IPM Research by Susan Scheufele, University of Massachusetts
- Hydroponic Vegetable Production on Our Farm by David Tuttle, North Berwick, ME

Greenhouse Vegetable Production in Containers

When: Wednesday, December 10, 2014 from 9:30 am to 3:45 pm

Where: Sturbridge Publick House, 277 Main Street, Route 131, Sturbridge, MA 01566

Join us for this educational program on container grown greenhouse vegetable production (tomatoes, greens and cucumbers).

- Growing Greenhouse Tomatoes and Greenhouse Cucumbers in Containers
Rich McAvoy, University of Connecticut
- Perfecting Biocontrol in Greenhouse Vegetables
Carol Glenister, IPM Laboratories, Locke NY
- Growing Bench-top Greens
Brian Krug, University of New Hampshire
Brian will talk about current UNH research including cultivars and growing methods.
- Diseases and Disorders of Greenhouse Tomatoes, Cukes and Greens
M.Bess Dicklow, University of Massachusetts Extension Plant Disease Diagnostic Laboratory
- Grower to Grower Panel
Brad Clegg, Four Town Farm, Seekonk, MA
Dave Volante, Volante Farms, Needham, MA

Registration: \$40 per person or \$35 per person for 3 or more from same business. Includes morning refreshments, breaks and handouts. Two contact hours for pesticide recertification have been requested. [Register](#) on-line, or contact Tina Smith, 413-545-5306, tsmith@umext.umass.edu for more information.

UConn Extension: Growing Container-Grown Greenhouse Vegetables

When: Tuesday, December 16, 2014 from 9:00 am to 4:00 pm

Where: Litchfield County Extension Office, 843 University Drive, Torrington CT 06790

Topics will include growing greenhouse tomatoes, cucumbers and greens, **Connecticut grown labeling**, food safety

and grower to grower panel.

Contact Leanne Pundt, University of Connecticut at 860.626.6855 or leanne.pundt@uconn.edu for more information.

NOFA/Mass Winter Conference

When: Saturday, January 10, 2015

Where: Worcester State University, 486 Chandler St, Worcester, MA 01602

The Northeast Organic Farming Association, Massachusetts Chapter (NOFA/Mass) invites you to its 28th Annual Conference, featuring over 60 workshops, exhibits, an all-day seminar and keynote by Greg Judy, rotational grazer and carbon sequestration advocate.

Including presentations by UMass Extension personnel:

Vegetable Diseases: 2014 Year in Review – Susan Scheufele, Vegetable Program

Organic Pesticide Safety & Use – Lisa McKeag, Vegetable Program; Natalia Clifton, Pesticide Education

Assessing and Managing Agricultural Risks on Your Farm – Paul Russell & Tom Smiarowski, Risk Management

Plant Nutrition and Organic Certification for Greenhouse Crops

When: Thursday, February 26, 2015 from 10:00 am to 1:30 pm

Where: D&D Farms Inc., 32 Hudson Rd., Stow, MA 01775

Cost: \$30 (Includes Lunch); **Mail-in Registration:** [Printable Program and Registration Form](#)

For more information contact:

Tina Smith, Univ. of Mass, Amherst 413-545-5306, tsmithatumext.umass.edu

Geoffrey Njue, Univ. of Mass, Cranberry Exp. Station 508-295-2212 ext. 47, gnjueatumext.umass.edu

Bob Luczai, Massachusetts Flower Growers Association, bluczai@massflowergrowers.com

Vegetable Notes. Ruth Hazzard, Katie Campbell-Nelson, Lisa McKeag, Susan Scheufele, co-editors. Vegetable Notes is published weekly from May to September and monthly during the off-season, and includes contributions from the faculty and staff of the UMass Extension Vegetable Program, other universities and USDA agencies, growers, and private IPM consultants. Authors of articles are noted.

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