



UMass
Extension

Vegetable Notes

For Vegetable Farmers in Massachusetts since 1975



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CROP CONDITIONS

Welcome to the 30th year of Vegetable Notes!

To heat or not to heat high tunnels was the question floating around farmer discussion groups during the extreme cold snap we just had. Most I spoke to chose not to heat. As it turns out, John Bartok, an Agricultural Engineer retired from UConn, has researched this issue quite a bit. When making the decision to heat or not, keep in mind that the heating system should be large enough to maintain 60°F to melt snow and ice. A Salamander just didn't won't cut it in the extreme cold. It takes 250 btu/hr per sq.ft. of roofing to melt wet snow falling at a rate of 1" per hr. If you have a system to meet these needs, then heat! If not, consider that high winds associated with storms can blow ice around and damage plastic. If you need to re-plastic your tunnels this year, read more about it in an article by John Bartok here: [Choose the right plastic film for your needs](#).

Whether the cause was cold weather or downy mildew on lettuce, spinach, and brassicas, there has been a noted shortage of winter greens on retail shelves. However, those who shut their tunnels up tightly are tentatively reporting that the greens survived, if not in the best condition. Other issues farmers reported during our recent cold snap were freezing and bursting pipes as well as failures to keep their storage conditions warm enough. Some sacrificed ventilation for a short period to get a little more insulation through the cold spell. Check out our handy table of "Optimum Conditions for Storage Crops" in this week's issue and check in on your storage crops to see how they're doing

Between attending the many excellent educational programs available this winter, farmers are also getting their regulatory requirements taken care of. Lisa McKeag, UMass Extension Educator is hosting a Produce Safety Alliance Grower Training Series across the state. See details in the Events section. Also, pesticide license applications, exam scheduling, and renewals are now conducted online! In case you got that letter from MDAR back in August informing you of this fact and forgot about it like I did, here is the link to complete your pesticide license application or renewal online: <http://www.mass.gov/eea/agencies/agr/pesticides/pesticide-examination-and-licensing.html>. Originally, the deadline was 12/31/17, but I just renewed my license in the last two days, so it's not too late!

POTATO BLACKLEG UPDATE

Blackleg is a bacterial disease of potato caused by species in the genera *Dickeya* and *Pectobacterium*. It has been a growing cause for concern among potato growers in recent years, and also the subject of a great deal of research.

On November 9, 2017, The *Dickeya* and *Pectobacterium* Summit was hosted by the University of Maine Cooperative Extension in Bangor. More than 170 growers, scientists, extension personnel, and industry representatives gathered to hear researchers from the United States and Europe share current information on the bacteria that cause blackleg in potatoes. An interesting picture emerged as the speakers shared their findings. Blackleg epidemiology appears to differ significantly between Europe and North



Potato *Dickeya*; seedlot on the right is infected.
photo: Meg McGrath

America. This is likely due to differences in climate, potato culture, and pathogen population structure. In North America, disease symptoms and epidemiology differ somewhat from east to west.

Speaker presentations are available online at <https://extension.umaine.edu/agriculture/programs-by-topic/dickeya-and-pectobacterium-summit/>. Some salient points from the meeting are summarized below.

- The symptoms of *Dickeya* infection differ somewhat between northeastern and western North America. In the Northeast, non-emergence is a common issue, but this is seldom seen in the West. This may be due to differences in the environment and/or the prevalence of different *Dickeya* species in the two regions.
- With *Dickeya*, disease development is related to the amount of bacteria (inoculum level) in the seed. *Dickeya* causes damage at a lower inoculum level than *Pectobacterium* and therefore causes a more aggressive form of the disease.
- Tubers infected with *Dickeya* may appear healthy at harvest. The bacterium is inactive at low temperatures, so **it is unlikely to cause storage rot**. Infected tubers used for seed may still look healthy at planting, but the bacteria will become active again as soil temperature increases.
- *Dickeya* does not appear to be spread during seed cutting or during the planting process; however, it is still advisable to disinfect cutting and planting equipment, and ensure sufficient suberization of pieces before planting.
- **Spread of *Dickeya* is more significant during harvest**, especially if tubers are handled roughly. Management suggestions include handling tubers as gently as possible and avoiding bruising during harvest, postponing harvest until tuber skin has fully matured, and harvesting when soil is dry.
- Researchers have found that copper can induce *Dickeya* to enter a dormant state. This may account, at least in part, for some management failures seen in the field. The effect is dose dependent. Management suggestion: **when applying copper, use the highest labeled rate**.
- Overwintered tubers may harbor *Dickeya* and/or *Pectobacterium* and serve as a source of inoculum in the following year. This is a more significant problem in regions that do not experience hard frosts.
- Both *Dickeya* and *Pectobacterium* **can survive in not degraded plant material in the soil**, but neither survives for extended periods in soil outside of plant material. *Pectobacterium* survives up to three months, and *Dickeya* survives for about one month outside of plant tissue. Both bacteria can survive in perennial weed hosts, so crop rotation is still advisable.
- Both *Dickeya* and *Pectobacterium* **can affect a number of other vegetable crops**, including carrots, parsnips, broccoli, corn, and sunflowers. Neither bacterium appears to affect legumes or small grains; therefore, these crops are good choices for rotation.
- *Dickeya dianthicola* (currently the most common species in the eastern U.S.) remains latent in mother tubers early in the season. Disease expression begins when soil temperatures reach 86°F or greater. Corresponding air temperatures are generally $\geq 77^\circ\text{F}$. At lower temperatures, plants may not collapse but simply appear stunted and lacking in vigor.
- Optimum temperature for *Pectobacterium* is approximately 65-80°F.
- *Pectobacterium parvintieri* (formerly *P. wasabiae*) is the most common species of *Pectobacterium* in the United States at this time.
- Co-infections of *Dickeya* and *P. parvintieri* and/or *P. carotovora* are common in New England. Little is known about how the two species interact.
- Blackleg is associated with water. Both *Dickeya* and *Pectobacterium* are facultative anaerobes, which means that they thrive in the low oxygen environment of wet soils. Both bacteria may also be **spread by water movement through the soil**.
- *Dickeya* and *Pectobacterium* species can both be found in surface waters (rivers, ponds) but not in deep wells. **Management suggestion:** avoid the use of surface waters for irrigation.
- **Both bacteria can live in tuber lenticels without causing disease.** Bacteria become active when environmental conditions are right, and then disease occurs. Bacteria are released into the soil when infected tissues break down.

--Author Angie Madeiras thanks the USDA-NIFA, EIPM grant for sponsoring her attendance at this meeting.

OPTIMUM CONDITIONS FOR STORAGE CROPS

	Storage	Notes	Ethylene Sensitivity*
Potato	Lower temperature gradually to 40-45°F for tablestock or seed. Store at 50°F for chip stock varieties. Maintain RH at 90%. Store 5-8 months.	Curing and storage environments must be dark to prevent greening. At colder temperatures, starches convert to sugar.	LOW
Sweet potato	Store at 55-60°F at 90% RH. Well-cured roots can store for up to a year in optimal conditions.	Starches in roots convert to sugars for the first 30 days post harvest; wait until 3 weeks after harvest for best flavor. Avoid chilling injury by keeping roots above 50°F. Chilling injury promotes root decay and decreases storage potential.	MODERATE (causes discoloration)
Winter Squash	Store at 55-60°F and 50-75% RH. Storage potential varies with variety, from 2-6 months.	Avoid chilling injury in field or storage, which occurs when temperatures are below 50°F. Injury increases as temperature decreases and/or length of chilling time increases. Decay accelerates after chilling. High temperatures decrease flesh quality, and high RH promotes decay.	MODERATE (causes discoloration)
Onion	Store at 32°F and 65-70% RH. Avoid condensation by cooling gradually and maintaining steady temperature. Storage potential depends on variety.	As onions mature, their dry matter content and pungency increase. Onions produced from seeds store longer than those from sets. High temperature increases sprouting, high RH stimulates root growth, and the combination increases likelihood of rotting.	LOW
Garlic	Store at 32°F and 65-70% RH. Seed garlic should be stored at 50°F. Garlic should keep for 6 to 7 months at 32°F.	High temperatures (>65°F) cause dehydration, intermediate temperatures (40-65°F) promote sprouting, and high RH promotes root growth and molding.	LOW
Carrot	Store carrots at 32°F and 98- 100% RH. Can be stored 5-9 months. Potential storage time increases with higher RH.	May be stored washed or unwashed. Washing immediately after harvest may reduce disease incidence in storage. Storing with ethylene- producers (like apples), and wounding and bruising during washing, can cause bitterness.	HIGH (causes bitterness)
Parsnip	Store at 32°F and 90-95% RH with greens removed. Parsnips will keep for 2-6 months at optimum conditions.	Starches in parsnip roots convert to sugars at cold temperatures. Early fall dug parsnips can be induced to sweeten with a short (2-3 weeks) cold storage treatment.	HIGH (causes bitterness)
Beet, Radish, Turnip & Rutabaga	Store at 32°F and 95% RH with greens removed. Radishes can be stored for 2-4 months, turnips and rutabaga for 4-5 months, and beets for 4-6 months.	Low humidity causes shriveling and weight loss, and shortens storage life.	LOW
Cabbage	Store cabbage at 32°F and 98-100% RH. Can last 4-6 months in optimum conditions.	Cabbage and other Brassicas freeze at 30°F, and storability starts to decrease at >34°F. Presence of light in storage can decrease leaf yellowing during storage.	HIGH (promotes leaf yellowing, wilting, and abscission)

*Crops that produce significant amounts of ethylene during storage include: apple, pear, peach, plum, cantelope, tomato, plus several tropical fruits



Sweet potato chilling injury. photo: Leonard Morris, UC Davis



Ethylene-induced yellowing on cabbage.
photo: Don Edwards, UC Davis

-- October 2011, updated January 2018 by G. Higgins, UMass Extension Vegetable Program

Authors: A. Brown, A Cavanagh, R. Hazzard, University of Massachusetts, and B. Sideman, University of New Hampshire
Funded by Northeast SARE Winter Vegetable Project UMass - UNH - CISA - SEL

TOOLS IN THE BATTLE AGAINST PHYTOPHTHORA BLIGHT

Phytophthora capsici, which causes Phytophthora blight, is the worst disease a vegetable grower may encounter. *Phytophthora* has the ability to rein a crop quickly and totally. Over the past decade it has dramatically spread to “clean” farms. *Phytophthora* has the ability to last in the soil for seven or more years. It infects a wide range of vegetable crops but the crops most severely impacted have been pumpkins, winter squash, watermelon, and peppers.

How can this dreaded disease get onto your farm? It can happen in several ways. One grower got it after his fields were flooded. Another grower got it when he agreed to sell a couple of boxes of winter squash at the farmers’ market for a friend. When the squash started to rot, he through the decaying fruit into one of his fields. The next summer he lost 5 acres of butternut squash in that field. He did not harvest a single fruit. Another grower borrowed a transplanter from a neighbor that has *Phytophthora*. One grower got it from a custom applicator’s equipment. Several growers have gotten it from packing or repacking other peoples’ produce on their farm. The stories go on and on.

As a new grower, how can you keep your farm clean? First, be aware of how *Phytophthora* spreads. It moves with soil, equipment, feet, and water (both runoff and irrigation). Be sure that the water you use for irrigation is not contaminated. If a friend or neighbor has *Phytophthora*, be very careful about sharing anything [equipment, tools, etc], walking in each other’s fields, and avoid moving produce from their farm to yours. If you are buying produce, do not discard any unsold pieces on the farm. Divert any run-off from a neighboring farm that has *Phytophthora*.

Second, do not create an environment which favors *Phytophthora*. It thrives in low, wet areas and in compacted soil areas. Manage your irrigation so that your soils are moist but not saturated. This one is a tough one but – be careful how you use plastic mulch. Plastic allows heavy rainfall to gather between the rows. That is the same area that is compacted by field equipment. If you are using plastic or have low wet areas, consider subsoiling between the rows. It makes a big difference.

What can you do if you have *Phytophthora* on you farm? Manage your crop rotations to avoid putting susceptible crops into Phytophthora-prone fields. Grasses are resistant to *Phytophthora capsici*. Select *Phytophthora*-resistant varieties of susceptible crops when available. They help but are not a silver bullet. Create an environment in which your plants will thrive: high organic matter, adauit moisture consistantly, good fertility, good pest control, and good soil drainage.

Educational efforts have focused on keeping *Phytophthora* off the farm and on cultural practices that minimize the impact of an infection. In 2016 a new fungicide was used with success in pepper fields on a Luzerne County farm. This farm has a long history of battling *Phytophthora*. The fungicide, Orondis Gold, appeared to stop the spread of a *Phytophthora* infection despite weather conditions that favored the disease. Research was conducted in 2017 to determine if the apparent benefits of Orondis could be repeated, if there are other control options that offer equal or better control, and if control can be obtained at a lower cost per acre. One of the treatments was an application of manure based compost. The hope was that the biological activity stimulated by the compost would out-compete *Phytophthora* in the soil. This control option could possibly provide a viable *Phytophthora* management option for organic vegetable growers.

The Pennsylvania Vegetable Growers Association and the Pennsylvania Vegetable Marketing and Research Program provided a grant that made the research possible.

The plot was planted on June 14, 2017 in Columbia County. A field in Benton, Pennsylvania was selected based on its history of *Phytophthora* blight. Irrigation was available but due to adequate rainfall was not used until August 25, 2017. A soil sample was taken and 1.5 tons of high calcium lime was applied as recommended on May 26, 2017. The plot was fertilized with 80-80-80 on June 1, 2017. Black plastic mulch on 6' centers was laid on June 12, 2017. Three randomized replications of each of the four treatments were established. The manure compost was worked into the soil in the compost treatment replications on May 22, 2017. The plot was planted on June 14, 2017. The peppers were planted in a double row 25' long. One of the double rows was planted to the cultivar Zsa Zsa and the other row was planted to the cultivar Playmaker. Zsa Zsa was selected because of its susceptibility to *Phytophthora* and Playmaker was selected because of its resistance to *Phytophthora*. The four replicated treatments were 1) Orondis Gold 2) Revus & Nu-Cop HB rotated with Tanos & Nu-Cop HB, 3) manure compost, and 4) untreated check.

Treatment 1: Orondis Gold was applied one time only as a drench at the rate of 2.4 oz/acre on June 28, 2017. The label on the Orondis Gold used in the research recommended is 2.4 to 9.6 oz per acre. The current Orondis Gold label recommends 4.8 to 9.6 oz per acre.

Treatment 2: Revus and Nu-Cop rotated with Tanos and Nu-Cop treatments were applied to the treatment 2 areas on a weekly rotating basis starting July 27 through September 12, 2017. Tanos was applied at 8 oz/acre, Revus was applied at 8 oz/acre (label recommendation), and Nu-Cop was applied at 1 lb/acre.

Treatment 3: The manure (dairy) compost was applied broadcast at the rate of 3 tons/acre on May 22, 2017. The compost was shallowly worked into the soil immediately after application.

Treatment 4: The check did not receive any fungicide or soil treatments.



September 15, 2017 first infection on untreated Zsa Zsa.
Photo: John Esslinger, Penn State

Phytophthora blight was not observed in the plot from the time of planting through the middle of August, so the plot was irrigated on August 25th and inoculated with *Phytophthora* on August 28th. *Phytophthora* blight was first observed on Zsa Zsa fruit in the untreated check on September 15, 2017. On September 21, 2017 each plant was evaluated for the presence of *Phytophthora*.

Results: The table below indicates the number of plants that had at least one fruit with *Phytophthora* symptoms out of the 75 plants that made up each treatment.

Treatments:	Zsa Zsa	Playmaker
Orondis Gold	13 b	22 b
Tanos & Copper, Revus & Copper	2 a	1 a
Manure compost	35 c	25 b
Untreated check	24 c	38 c

The Tanos & Copper, Revus & Copper treatment out-performed the other treatments. The Orondis Gold treatment was second best. The manure compost had less disease than the untreated check with the Playmaker variety but not with the Zsa Zsa treatment.

Below is the cost comparison of the treatments:

Treatment 1 consisted of Orondis Gold applied at 2.4 oz./acre which cost \$65.00/acre.

Treatment 2 consisted of Tanos & Nu-Cop (July 27, Aug. 8, Aug. 25 and Sept. 12) rotated with Revus & Nu-Cop (Aug. 4, Aug. 17, Sept. 1) applied as tank mixes and sprayed over the top. Tanos was applied at the rate of 8.0 oz/acre, Revus was applied at 8.0 oz/acre, and Nu-Cop was applied at 1 lb/acre.

Tanos cost per/acre = \$19.33 X 4 applications = \$77.32/acre

Revus cost per/acre = \$21.64 X 3 applications = \$64.92/acre

Copper cost per/acre = \$6.00 X 7 applications = \$42.00/acre

Total cost of treatment 2 per acre was \$184.24. (does not include the cost of 7 applications)

Treatment 3 consisted of 3 tons of manure compost/acre which cost approximately \$180.00/acre.

Treatment 4 had no additional costs.

Conclusions: Treatment 2 (Tanos & Nu-Cop, Revus & Nu-Cop) performed very well. While the treatment did not totally prevent disease development, it did keep disease to a manageable level. The cost was relatively high. Treatment 1 (Orondis Gold) did a good job but there was enough diseased fruit to cause concern. Since Orondis Gold was only applied once and at the lowest labeled rate the cost per acre was significantly lower than the other treatments. Syngenta has increased the lowest labeled rate from 2.4 oz/acre to 4.8 oz/acre. The 4.8 ounce rate gives better season-long control and would still be the lowest cost treatment. The treatment 3 (manure compost) had little or no benefit in managing the disease. The treatment cost was high compared to the fungicidal benefit. There was not a significant difference in susceptibility of the Zsa Zsa and the Playmaker. This may be explained by the fact that since the playmaker is a large fruited bell pepper. Due to the weight of the fruit (no harvesting was done) the plants tended to lean over allowing the fruit to come in contact with the soil. The Zsa Zsa is a smaller fruited pepper that tended to hold the fruit up off the soil.

-- by John Esslinger, PennState Extension Educator

NEWS

Get SMART: New Solar Incentive Program Coming to Massachusetts

The Massachusetts Department of Energy Resources (DOER) is in the process of finalizing a new solar PV incentive program, the [Solar Massachusetts Renewable Target \(SMART\)](#) Program. The regulations for SMART include an option for dual-use solar arrays on continually farmed agricultural land, namely an Agricultural Solar Tariff Generation Unit. UMass Extension is named in the regulation as a resource to farmers and developers in the development of dual-use agricultural plans. Specifically, these plans will be developed “in conjunction with UMass Amherst agricultural extension services, including compatibility with the design of the agricultural solar system for such factors as crop selection, sun-light percentage, etc.” Guidelines for the SMART program have not yet been finalized.

[UMass Clean Energy Extension](#) (CEE) is actively working with UMass Agricultural Extension, DOER, and Massachusetts Department of Agricultural Resource (MDAR) to develop tools and guidance for those considering dual-use PV systems. If you are being contacted by solar development companies about building arrays on your land, or just have interest or questions about this new regulation, please feel free to **contact River Strong at CEE: gcstrong@umass.edu, (413) 545-8510 ext. 2.**

For further reading, here is a link to the regulation:

<https://www.mass.gov/files/documents/2017/10/16/225cmr20.pdf>

UVM/UMass Water Use Survey

Thanks to all of you who have already filled out the UVM Extension/UMass Amherst Extension survey on Whole Farm Water Use! For those of you who have not, we are making one final request that you take 10 minutes to share your thoughts. Thank you in advance for sharing your experience and helping us improve our programing. Survey link: <https://survey.uvm.edu/index.php/972258?newtest=Y&lang=en>

EVENTS

[31st Annual NOFA/Mass Winter Conference](#)

When: Saturday, January 13th, 2018

Where: Worcester State University, Sheehan Hall, 486 Chandler Street Worcester, MA

Join us this January and take food production beyond sustainability to regenerative practices. Growers of all levels and land sizes gather at this year's NOFA/Mass Winter Conference to embark on regenerative practices that produce robust nutritious food, rebuild soils, keep healthier animals and create healthier humans!

Lisa McKeag, UMass Extension Vegetable Program and Michael Botelho: Coordinator for the Massachusetts Department of Agricultural Resources' (MDAR) Commonwealth Quality Program (CQP) will be presenting:

Preparing Your Farm for the Food Safety Modernization Act (FSMA)

Massachusetts' new Produce Inspection Program to implement FSMA's Produce Rule integrates with existing food safety audit programs, supporting farms of all sizes with technical assistance, education and grant funds to prevent foodborne illness and expand market access. Learn what to expect from an audit or inspection and get tools to help with recordkeeping and training.

Click Here to Register: <https://www.regonline.com/builder/site/default.aspx?EventID=2054087>

[NEVBGA & Cooperative Extension 596th Growers' Meeting](#)

When: Saturday, February 3, 2018 - 8:30am to 4:00pm

Where: Hudson-Concord Elks Lodge, 99 Park Street, Hudson, MA 01749

There is a \$20 registration fee, which is waived for members of NEV&BGA. Lunch buffet is an additional \$20.

Program topics include:

- New England Vegetable and Fruit Management Guide Updates
- Biopesticides
- Weed Control between Plastic
- 2017 Melon, Butternut Squash, Sweet Corn and Strawberry Evaluations
- Incorporating Hydroponics into your Vegetable Operation
- Soil & Tissue Sampling: What to do with Results

To register, please RSVP to 978-423-6694 or secretary@nevbga.org by January 27, or visit our Eventbrite page: <https://goo.gl/9o2RbZ>

[Produce Safety Alliance Grower Training Series](#)

Wondering where to begin with food safety? Start here! The PSA Grower Training is currently the only FDA-recognized produce safety training to help growers implement Good Agricultural Practices (GAPs) and understand their responsibilities under new Federal regulations. Whether you have a farm that is fully covered by the law or a small, exempt farm and you're just looking for information, this training is for you.

The PSA Grower Training Course satisfies the FSMA Produce Safety Rule requirement outlined in § 112.22(c) that requires 'At least one supervisor or responsible party for your farm must have successfully completed food safety train-

ing at least equivalent to that received under standardized curriculum recognized as adequate by the Food and Drug Administration.' The training is also required for participation in Massachusetts' Commonwealth Quality Program. Cost is \$40 for each program and includes the required PSA Grower Manual (\$50 value), a Certificate of Course attendance from AFDO (\$35 value), and lunch and refreshments

The training will be held in 4 locations:

When: Tuesday, February 6, 2018 - 9:00am to 5:00pm

Where: Holyoke Community College, 303 Homestead Avenue, Kittredge Center, room 303, Holyoke, MA 01040

REGISTER HERE: <https://www.regonline.com/builder/site/?eventid=2147907>

When: Tuesday, February 13, 2018 - 9:00am to 5:00pm

Where: Topsfield Fairgrounds, 207 Boston Street, Beekeeping Building, Topsfield, MA 01983

REGISTER HERE: <https://www.regonline.com/builder/site/?eventid=2148006>

When: Tuesday, March 13, 2018 - 9:00am to 5:00pm

Where: Lenox Town Hall auditorium, 6 Walker Street, Lenox, MA 01240

REGISTER HERE: <https://www.regonline.com/builder/site/?eventid=2152815>

When: Tuesday, March 20, 2018 - 9:00am to 5:00pm

Where: UMass Cranberry Station Library, 1 State Bog Road, (For GPS, enter: Intersection of Spectacle Pond Road and Glen Charlie Road), Wareham, MA 02538

REGISTER HERE: <https://www.regonline.com/builder/site/?eventid=2148029>

NOTE, if none of these locations in MA is convenient for you, please contact Lisa McKeag, lmckeag@umass.edu, 413-577-3976. We may be able to schedule an additional training if there is sufficient demand in an another area of the state.

[CISA Winter Workshop: Developing Farm SOPs and Training Staff](#)

When: Friday, February 9, 2018 from 1 pm to 4 pm

Where: Harvest Farm of Whately, 125 Long Plain Rd., South Deerfield, MA 01373

In collaboration with MDAR and UMass we will go over how to create and implement Standard Operating Procedures (SOPs) and how to train your staff as it relates to Food Safety and the Produce Safety Rule under the Food Safety Modernization Act (FSMA). Gary Gemme of Harvest Farm of Whately will talk about some of his methods for staff training and management.

Presenters: Lisa McKeag – UMass Extension, Michael Botelho and Alexandra Hachem – MDAR, Gary Gemme – Harvest Farm of Whately

TO REGISTER: <https://www.buylocalfood.org/event/cisa-winter-workshop-developing-farm-sops-and-training-staff/>

[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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